Several studies have reported high levels of inflammatory biomarkers in hypertension, but data coming from the general population are sparse. In addition, sex differences have been little explored.

The CoLaus study is a cross-sectional examination survey in a random sample of 6184 Caucasians aged 35 to 75 years in Lausanne, Switzerland. Blood pressure (BP) was assessed using a validated oscillometric device. Morphometric parameters were also measured including body-composition using electrical bio-impedance. Serum ultrasensitive C-reactive protein (hsCRP), tumor necrosis factor α (TNF-α), interleukin-6 (IL-6), and interleukin-1β (IL-1β) were measured in 6067 participants (98.9%).

Crude serum levels of IL-6 (r = 0.08), TNF-α (r = 0.11) and hsCRP (r = 0.21) were positively, and IL-1β negatively (r = -0.07, p < 0.01 for all values), associated with systolic BP. For IL-6, IL-1β and TNF-α, the association disappeared in multivariable analysis, largely explained by differences in age and BMI, in particular fat mass. On the contrary, hsCRP remained independently and positively associated with systolic (β ± SE: 0.74 ± 0.20, p < 0.001) and diastolic (0.46 ± 0.13; p < 0.001) BP. Relationships of hsCRP, IL-6 and TNF-α with BP tended to be stronger in women than in men, partly related to the difference in fat mass, yet the interaction between sex and IL-6 persisted after correction for all tested confounders.

In the general population, the associations between inflammatory biomarkers and rising levels of BP are mainly driven by age and fat mass. The stronger associations in women suggest that sex differences might exist in the complex interplay between BP and inflammation.

**Objective:** Prehypertension is often accompanied with other metabolic disturbances that additionally increase cardiovascular (CV) risk. Our aim was to estimate total CV risk in prehypertension using European Heart Score.

**Design and Method:** CV risk factors and Heart Score were analyzed in 1375 subjects enrolled in epidemiologic survey conducted in rural part of Croatia. Treated hypertensives and individuals with acute illness, chronic terminal diseases that additionally increase cardiovascular (CV) risk. Our aim was to estimate total CV risk in prehypertension using European Heart Score.

**Results:** Four hundred ninety five subjects (216 men, 279 women), mean age 47.75 (range 19-90) were divided into three groups: OBP (N = 131), PH (N = 174), HT (N = 190). The percentages of smokers were 47.3%, 29.9% and 24.61% in OBP, PH and HT, respectively (p < 0.001). Significantly higher values of age, Fbg, T-C, LDL, TG, BMI, WC and ACR (p < 0.001), and nonsignificantly higher values of HDL were found in HT vs PH. Significant differences in age, BMI, WC, T-C and LDL (p < 0.001) were found between PH and OBP while nonsignificantly higher values of Fbg, TG and ACR were observed. As expected, Heart Score was highest in HT group (HT vs PH and OBP, p < 0.001). However, significant difference was also found in Heart Score between PH and OBP group (p < 0.001).

**Conclusion:** Using Heart Score we found global CV risk to be significantly higher in PH than in OBP, indicating that PH should not be ignored, and beside lifestyle changes in some subjects even drug therapy might be considered.
ASSOCIATION OF INSULIN RESISTANCE WITH BEAT-TO-BEAT CARDIOVASCULAR DYNAMICS IN NON-OBSESE, NON-DIABETIC INDIVIDUALS FROM LATIN-AMERICAN ORIGIN

J.E. Ochoa1, M.M. Corpeta2, J.A. Gallo1, J.G. McEwen4, G. Bilò5, D. McEwen4

1University of Milano-Bicocca & Istituto Auxologico Italiano, Milan-Italy; 2Centro Clínico y de Investigacion, Sicor, Medellín-Colombia; 3School of Medicine, University of Antioquia, Medellín-Colombia; 4Corporacion para Investigaciones Biologicas, Medellín-Colombia; 5Dept. Cardiology, Ospedale San Luca, Istituto Auxologico Italiano, Milan-Italy; 6Dept. Cardiology, Univ. Milano-Bicocca, Milan-Italy

Objective: Several studies have shown insulin resistance (IR) to be associated with increased sympathetic drive, a reduced cardiac performance and a decreased local vasodilatory response. However, most of them focused on obesity or type 2 diabetes (DM). Aim of our study was to test whether IR influences cardiovascular (CV) dynamics in a random sample of non-obese, non-diabetic Latin-American subjects.

Methods: Out of a total of 800 participants of Medellín’s Heart Study (M:46%, aged 30-65y) 372 non-obese (BMI < 30 Kg/m²) and non-diabetic individuals were considered in the present analysis. They were classified into quartiles of IR (HOMA-IR index: (glycemia (mg/dL)/18) x insulinemia (µIU/mL)/22.5). Beat-to-beat stroke volume (SV) and R-R interval (RRI) were recorded by impedance cardiography and ECG (Biopac Systems, Inc.) and supine resting blood pressure (BP) measurements were repeated over 5 minutes. Beat-to-beat cardiac and hemodynamic indices were computed and averaged: RRI, heart rate (HR), SV, stroke index (SI), cardiac output (CO), cardiac index (CI), systolic and diastolic BP, systemic vascular resistance (SVR), SVR index (SVRI), pre-ejection period (PEP), left ventricular ejection time (LVET), PEP/LVET ratio, left heart cardiac work (LCW) and LCW index (LCWI).

Results: Analysis of variance adjusted for age, sex, smoking, and BMI, showed significant variation for hemodynamic parameters between IR quartiles. IR was associated with higher HR, SVR, and SVRI levels; and lower SV, SI, CO, CI, RRI, LVET, PEP, and LCW with no significant differences in BP, nor PEP/LVET ratio. See table.

Conclusion: Our findings support the hypothesis that IR has independent effects on hemodynamic indices of CV function, reinforcin g the importance of IR as a CVD risk factor beyond its association with DM and obesity.

Hemodynamic variables by quartiles of HOMA-IR index in non-obese, non-diabetic subjects:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Q1 (&lt;0.84) (n=97)</th>
<th>Q2 (≥0.84-&lt;1.25) (n=91)</th>
<th>Q3 (≥1.25-&lt;1.89) (n=93)</th>
<th>Q4 (≥1.89) (n=93)</th>
<th>p value (ANCOVA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV (mL/beat)</td>
<td>79.7 ± 2.2</td>
<td>87.2 ± 2.2</td>
<td>85 ± 2.1</td>
<td>77.6 ± 2.1</td>
<td>0.02</td>
</tr>
<tr>
<td>SI (L/min/m²)</td>
<td>56.3 ± 1.3</td>
<td>52.39 ± 1.3</td>
<td>49.9 ± 1.3</td>
<td>49.8 ± 1.3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CO (L/min)</td>
<td>5.5 ± 0.16</td>
<td>5.7 ± 0.15</td>
<td>5.4 ± 0.15</td>
<td>5.2 ± 0.15</td>
<td>0.1</td>
</tr>
<tr>
<td>CI (L/min/m²)</td>
<td>3.50 ± 0.94</td>
<td>3.48 ± 0.94</td>
<td>3.15 ± 0.92</td>
<td>3.00 ± 0.95</td>
<td>0.01</td>
</tr>
<tr>
<td>SVR (mmHg/s/cm5/m²)</td>
<td>1383 ± 56</td>
<td>1310 ± 55</td>
<td>1482 ± 53</td>
<td>1542 ± 56</td>
<td>0.01</td>
</tr>
<tr>
<td>SVRI (mmHg/beat/J/m²)</td>
<td>2174 ± 94</td>
<td>2158 ± 92</td>
<td>2536 ± 88</td>
<td>2719 ± 92</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>HR (bpm)</td>
<td>62 ± 1.19</td>
<td>67 ± 1.17</td>
<td>63 ± 1.12</td>
<td>69 ± 1.17</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>RR (mmHg)</td>
<td>887 ± 16</td>
<td>912 ± 16</td>
<td>978 ± 158</td>
<td>897 ± 164</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PEP (ms)</td>
<td>116 ± 3</td>
<td>112 ± 3</td>
<td>109 ± 2</td>
<td>107 ± 2</td>
<td>0.08</td>
</tr>
<tr>
<td>LVET (ms)</td>
<td>207 ± 5</td>
<td>257 ± 5</td>
<td>287 ± 5</td>
<td>288 ± 5</td>
<td>0.002</td>
</tr>
<tr>
<td>LKGM</td>
<td>6.7 ± 0.2</td>
<td>6.8 ± 0.2</td>
<td>6.6 ± 0.2</td>
<td>6.4 ± 0.2</td>
<td>0.58</td>
</tr>
<tr>
<td>LCWI (Kg/m/m²)</td>
<td>3.48 ± 0.96</td>
<td>3.15 ± 0.92</td>
<td>3.00 ± 0.96</td>
<td>3.15 ± 0.96</td>
<td>0.01</td>
</tr>
</tbody>
</table>

*p values are expressed as marginal mean±standard error; **p values after adjustment for age, sex and BMI

THE INFLUENCE OF STRESS AT WORK ON THE RISK OF DEVELOPING ARTERIAL HYPERTENSION IN GENERAL POPULATION 25-64 YEARS OLD IN RUSSIA DURING 14-YEARS (PROGRAM WHO MONICA-PHYCHOSOCIAL)


Aim of study: The aim of our research was studying of influence of stress at work on the relative risk (RR) of development of arterial hypertension (AH) during 14-years.

Materials and methods: Within the framework of WHO program “MONICA - psychosocial” in 1994 random representative sample of men at the age 25-64 years, residents one of the city Novosibirsk (Russia) districts were investigated. A total sample was 657 persons. Stress at work was measured at baseline with the use of the mental MONICA: psychosocial. During the period 1995-2008 all first cases of AH were investigated in the cohort. Statistical analysis were used software package of SPPS 11.5. Cox- proportional regression model was used for an estimation of relative risk (RR).

Results: The men had higher figures AH with testing stress on the workplace. On average the SAP from 134.6 mmHg at the men who are not testing stress at work, rose up to 136.5 mmHg at men with the expressed stress at the workplace. On average DAP also it was increased about 86 mmHg (stress at the workplace is absent) up to 87.3 mmHg at the expressed stress at work (p < 0.05). Within 5 years the tendency of increase in 2 times (95% CI 0.027-4.51; p > 0.05) RR of development AH among the men testing stress at work was observed, in comparison with men of not testing stressful situations at the workplace. Within 10-years period RR AH in 6.8 times was higher (95% CI 2.58-9.46, p < 0.01) among the men testing stressful situations at work, in comparison with whom stress at the workplace was not observed. Within the 14-year period, the relative risk of AH was 5 times higher (p > 0.05) in men with stressful situations at work. Frequency AH was higher in groups of workers heavy and average physical work, and primary level of education, divorced men with stress at work.

Conclusion: The received results show that in population of men 25-64 years old risk AH was connected to stress at work.

PREVALENCE OF MASKED HYPERTENSION IN RELATIVES OF HYPERTENSIVE PATIENTS


Objective: To determine the prevalence of nocturnal hypertension (NH) in normotensive subjects and analyze which factors are predictors of this situation.

Methods: We have selected normotensive subjects, with at least two office blood pressure measurement <140/90 mmHg, that were relatives of first-degree from hypertensive outpatients, proceeding from hypertension units throughout Spain. All the subjects underwent an ambulatory blood pressure monitoring and anthropometric data, as blood and urine analysis, and an electrocardiogram were collected. Nocturnal hypertension was defined when nocturnal blood pressure on ABPM was >120/70 mmHg.

Results: Data from 438 subjects were collected (50.9% men) with a mean age of 45.3 ± 10.9 years, NH prevalence was 41.3%. Subjects with NH were older (47.01 ± 41.1 y) with a greater proportion of men (M 59/4W 41% vs M 45/5W 55%), and with a greater body mass index (26.9 ± 25.5 Kg/m²), with higher office blood pressure measurements (128.3/79.8 vs 122.9/75.9 mmHg), with a lower eGFR (86.25 vs 90.48 ml/min/1.73m²), higher Albumin to Creatinine ratio (9.06 vs 5.98 mg/crea/g), worser lipid profile (LDL Cholesterol 130.4 ± 122.3 mg/dl, HDL Cholesterol 51.5 vs 55.04 mg/dl, Triglycerides 138.02 vs. 107.2 mg/dl) and a higher proportion of office BP >130/80 (77.8 vs 50.4%) all these differences were statistically significant (p < 0.05). After logistic regression analysis only Office BP >130/80 mmHg remained statistically significant (HR 2.33; CI 95% 1.35-4.01; p = 0.002).

Conclusions: nocturnal hypertension in first degree relatives of hypertensive patients has a high prevalence, and is more frequent in older man with overweight and worser cardiovascular risk profile. The better predictor is having an office BP in the high normal range.
A positive family history of hypertension has been pointed out as risk factor for developing masked hypertension in some studies.

**Objective:** To determine the prevalence of masked hypertension in normotensive relatives of hypertensive patients and analyze which factors could be predictors of this situation.

**Methods:** We have selected normotensive subjects, with at least two office blood pressure measurements < 140/90 mm Hg, that were relatives of first-degree from hypertensive outpatients, proceeding from hypertension units throughout Spain. All the subjects underwent an ambulatory blood pressure monitoring and anthropometric data, as blood and urine analysis, and an electrocardiogram were collected. Masked hypertension was defined with mean activity blood pressure on ABPM > 135/85 mmHg.

**Results:** Data from 438 subjects were collected (50.9% men) with a mean age of 45.3 ± 10.9 years. Subjects with masked hypertension had a greater body mass index (27.32 vs. 25.68 kg/m²), were older (47.01 vs 44.1 y) with a greater proportion of alcohol consumption > 30 g/day (44.4 vs 27.7%), a greater proportion of men (66.7% vs 44.3%), with higher office blood pressure measurements (130.5±8.0 vs. 122.9±7.1 mmHg), with a lower eGFR (84.77 vs. 90.4 mil/ml/min/1.73m²), a worser lipid profile (LDL Cholesterol 133.5 vs. 122.3 mg/dl, HDL Cholesterol 50.5 vs. 54.9 mg/dl, Triglycerides 140.6 vs. 111.2 mg/dl) and a higher proportion of of 25-OH-D levels (77.8 vs 50.4%), and all these differences were statistically significant (p < 0.05), higher Albumin to Creatinine ratio (9.06 vs 5.98 mg/g creat), LDL Cholesterol 130.4 vs. 122.3 mg/dl, HDL Cholesterol 51.5 vs. 55.04 mg/dl, Triglycerides 138.02 vs. 127.8 mg/dl) (77.8 vs 50.4%), After logistic regression analysis only Office BP > 130/80 mmHg remained statistically significant (HR 4.21; CI 95% 2.32–7.63; p < 0.001) and being man (HR 3.72; IC 95% 1.17–11.85; p = 0.02) remained statistically significant.

**Conclusions:** In our studied masked hypertension is present in almost one of three normotensive relatives of hypertensive patients, and is more frequent in men with overweight and a worser cardiovascular risk profile. The better predictor of masked hypertension is having an office BP in the high normal range.

**PP.1.08 VITAMIN D DEFICIENCY AND INSULIN RESISTANCE IN PATIENTS WHIT ESSENTIAL HYPERTENSION**


**Background:** Vitamin D deficiency has been associated with insulin resistance (IR) and the development of diabetes mellitus (DM). Our aim was to analyze the presence of this association in a group of hypertensive patients.

**Methods:** Cross-sectional, observational study including 63 patients (51.9% females), aged 63 ± 12 years, diagnosed of essential hypertension and attended in our Hypertension Unit. We performed in all of them a clinical history, a physical examination and routine analysis, including serum 25-OH-D levels, (ECLIA, Roche Diagnostics) and basal insulinemia (ECLIA, Roche Diagnostics). We defined IR as a HOMA-IR index > 7.5 percentile and vitamin D deficiency as serum levels of 25-OH-D < 20 ng/ml.

**Results:** Body mass index (BMI) was 32.4±9, systolic pressure (SP) 136±17 mm Hg and diastolic pressure 74 ± 10 mm Hg. 13 (20.6%) patients had DM and 14 (22%) had an MDRD < 60 ml/min/1.73 cm² (chronic renal insufficiency [CI]). Serum 25-OH-D levels were 21 ± 12 ng/ml, without differences by gender. 33 patients (52, 4%) had vitamin D deficiency again without differences by gender. There were no differences on 25-OH-D levels depending on the presence of DM or CRF. 22 patients (35%) had IR, with no gender differences. The presence of IR was associated with lower levels of 25-OH-D (13 ± 7 ng/ml vs. 23 ± 10 ng/ml, p = 0.009). 25-OH-D levels were negatively correlated (Pearson) with BMI (r = -0.305, p = 0.020), triglycerides (r = -0.323, p = 0.006), basal insulinemia (r = -0.476, p = 0.0014) and HOMA-IR index (r = -0.524, p = 0.0016). Other significant correlations were found with the others analysed parameters (waist perimeter, basal glucose, serum creatinine, MDRD, cystatin C, CRP, fibrinogen, HDL-cholesterol, glycosylated haemoglobin, uric acid, SP and DP). In contrast, HOMA-IR index was positively correlated (Pearson) with BMI (r = 0.567, p = 0.006) and with triglycerides levels (r = 0.426, p = 0.033). On multivariate analysis adjusted by age, the only independent determinant of 25-OH-D levels was HOMA-IR index (B = -2.5, 95% CI: -4.5 to -0.6, p = 0.012) (R² = 0.42). Reciprocally, the only independent determinants of HOMA-IR index were triglycerides levels (B = 0.013, 95% CI: 0.004-0.21, p = 0.007) and 25-OH-D levels (B = -0.72, 95% CI: -0.138 to -0.006, p = 0.033) (R² = 0.44).

**Conclusions:** Half of our hypertensive patients exhibit vitamin D deficiency and a third had insulin resistance. HOMA-IR index was independently associated with 25-OH-D levels. Vitamin D can be a promising new element in the prevention and management of metabolic disease in essential hypertension.

**PP.1.09 ARTERIAL HYPERTENSION AS THE DEFINING FACTOR OF THE HIGH LEVEL OF MEN MORTALITY IN UKRAINE**

O. Kvasha. Research Institute of Cardiology, Kyiv-Ukraine

**Mortality from the cardiovascular diseases (CVD) in Ukraine is one of the highest in Europe. Every year the country loses about 500 thousand people from these diseases.**

**Aim:** To estimate a prognostic significance of risk factors (RF) for mortality from all chronic noninfectious and cardiovascular diseases of men.

**Object and Methods:** Prospective observation (20 years) by the representative selection of men aged 40-59 years old (n = 2511 men), inspected in 1977-1980.

**Results:** The structure of the accumulated mortality looks as follows: CVD - 57.1%, oncologic diseases - 20.8%; other chronic noninfectious diseases 16.9%, other reasons - 5.2%. The comparative analysis of associated tables shows that the high blood pressure (BP) is the leading factor by the significance of RFs for the mortality among observed population. The cross-correlation connection of increased systolic BP (SBP) (r = 26.04, 9.86, 0.8, ð = 0.0005) with mortality from CVD is statistically significant on all stages of prospective observation. The connection of increased diastolic BP (DBP) with mortality becomes trustworthy on the basis of data of the second five-year term observation (r = 46.33, ð = 0.0005) and remains invariably significant in future. Among people with AH the most unfavorable prognosis is marked for patients with the mixed form. The combination of high SAH and DAH increases the probability of men mortality from vascular brain affection not only by 5 times and from CVD by 2.5 times as compared to the isolated forms, but also substantially influences the average life span, reducing it at the average by nine years. The minimum level of the accumulated mortality for the 20-years period is registered at SBP values from 109 to 121 mmHg and DBP 78 mm Hg. The multiple regressional model allowed to estimate the shared contribution of the studied parameters to the mortality from all diseases and CVD. Apart from the age, the most powerful mortality forecaster from CVD for men is AH (32.8%). Among the other RFs are smoking (28.0%) and cholesterol of low-density lipoprotein (7.0%).
Differences Between Hypertensive and Normotensive Women Attended in Primary Care: Baseline Data of the Eva Study


Hospital Universitario Central De Asturias, So Nephrology-Hu Unit, Oviedo-Spain, 11Primare Health Center Carrion De Los Condes, Carrion De Los Condes-Spain, 13Hospital Clinico. So Nephrology-Hu Unit. Valladolid-Spain, 13Primare Health Center Ventanielles, Oviedo-Spain, 1Primare Health Center Bembibre, Rembrbre-Spain, 13Primare Health Center Pola De Siero, Pola De Siero-Spain, 13Primare Health Center Grado, Grado-Spain, 13Primare Health Center Rioja, Rioja-Spain, 13Primare Health Center Valladolid - La Florida, Oviedo-Spain

Objective: The aim is to know the differences in cardiovascular risk factors, target organ damage, associated cardiovascular disease and cardiovascular risk factors among patients with AH and normotensives. Women attended in primary care in Asturias, Leon, Palencia and Valladolid, Spain.

Methods: A descriptive, cross-sectional and multicenter study between October 2009 and January 2010. Baseline data of a 5 years prospective study. Population: Random selection of women with age between 45 and 75 years attended in primary care. The following variables were analyzed: associated cardiovascular risk factors (CVRF): new hypertension patients, new diagnosed diabetic, dyslipidemia, smoking and obesity; target organ damage (TOD): left ventricular hypertrophy (LVH) by electrocardiography, decrease of glomerular filtration rate (GFR) by the MDRD formula, microalbuminuria and slight increase in plasma creatinine; and cardiovascular or renal disease (CVD): stroke, coronary heart disease, heart failure, peripheral vascular disease and renal disease. Cardiovascular risk (CVR) was stratified according to ESC-ESH 2007 guidelines.

Results: 903 women were selected, mean age 59.6 ± 8 years; 412 (45.6%) were hypertensive. In HT women systolic blood pressure was 138 ± 14 mmHg vs. 124.8 ± 14 mmHg in NT, diastolic blood pressure was 81.6 ± 5.9 mmHg vs. 75.8 ± 5.8 mmHg; Prevalence of CVRF in HT respect NT were: obesity 44.7% vs. 18.9% (P = 0.000); dyslipidemia 48.8% vs. 35.8% (P = 1.70; IC 95%: 1.30-2.22, p = 0.000); diabetes 21.8% vs. 6.1% (P = 0.42; IC 95%: 2.77-6.64, p = 0.000) and smoke 10.2% vs. 17.7% (P = 0.52; IC 95%: 0.35-0.78, p = 0.000). TOD was more prevalent in HT than NT: Diabetes 2.9% vs. 1.9% (P = 0.05); obesity 37.7% vs. 33.2% (P = 0.05); dyslipidemia 44.9% vs. 43.3% (P = 0.05); LVH 5.8% vs 30.3% (P = 0.000); microalbuminuria 3% vs. 2% (P = 0.05); glucose intolerance 14.3% vs. 7.9% (P = 0.05); metabolic syndrome 37.7% vs. 30.3% (P = 0.05); The TOD in HT respect to pre-HT was: 8.7% vs. 5.6% (P = 0.05); LVH 5.8% vs 4% (P = 0.05); microalbuminuria 3% vs. 2% (P = 0.05); decrease of glomerular filtration rate 1.4% vs. 3.1% (P = 0.05). The CVD in HT respect to pre-HT was 2.9% vs. 2.5% (P = 0.05).

Conclusions: After one year of follow-up, 12% of prehypertension subjects had developed hypertension. Perhaps on this small proportion we had not yet recognized predictive factors, except a higher prevalence of left ventricular hypertrophy in subjects had developed hypertension.

Epidemiology of Arterial Hypertension in Ukraine: Results of the 30-Year Observation

I. Gorbas. Ukrainian Research Institute of Cardiology, Kyiv-Ukraine

Objective of the investigation is to study the 30-year epidemiological situation dynamics relative to arterial hypertension (AH) in Ukraine. Two separate standard examinations of urban residents aged 18-64 years (respectively 2456 and 2091 persons) were conducted at an interval of 30 years, using conventional epidemiological methods and evaluation criteria. Within the observational period the AH prevalence changed from 27.3 to 29.6% (p < 0.05) at the expense of an increase in the average systolic arterial pressure levels. The results of study have revealed the high prevalence of risk factors among patients with AH. Only 1.2% persons have none of risk factors. In 11.9% inspected AH is reported with one, in 26.4% - with two and in 60.5% - with three or more by risk factors. Only 1.2% persons have none of risk factors. The prevalence of overweight decreased from 48.7 to 38.4 (P < 0.01), hypertyrecludemia - from 28.4 to 15.9 (P < 0.01), smoking frequency was practically unchanged, whereas the hypercolesterolemia prevalence increased from 60.1 to 66.8% (P < 0.05), obesity - from 36.7 to 46.2% (p < 0.05), and low physical activity – from 27.3 to 47.7% (p < 0.001). During 30 years knowledge of patients about the presence of AH grew from 39.7 to 63.4%, amount of persons which use antihypertensive medications increased from 28.7 to 37.5%. Efficiency of treatment did not almost change, hesitating from 9.1 to 14.2%. An epidemiology situation in relation to AH remains unfavorable. At presence of certain of risk profile it is heavy to hope in the near time on the noticeable decline of death rate of population.

Blood Pressure Control in Hypertensive Patients Attended in Referral Units

V. Barrios1, A. de la Sierra2, D. Gonzalez-Segura3, G. Traverza1, Hospital Ramon y Cajal, Madrid-Spain, 1Hospital Matua Terrassa, Terrassa-Spain, 1Admiona Health Research, Barcelona-Spain

Objective: To determine the blood pressure (BP) control in hypertensive patients attended in Hypertension (HT) Referral Units in Spain.
Results: A total of 1,548 patients were recruited by 377 physicians. 58.5% were men; mean age: 64.4 (SD = 12.4) years; mean body mass index: 28.8 (SD = 4.3) kg/m² and mean waist circumference: 99.9 (SD = 13.2) cm. Most common associated risk factors were diabetes mellitus (32.6%) and smoking (29.7%). About one third (34.1%) had left ventricular hypertrophy and 30.9% had established cardiovascular disease. Mean BP (measured at least twice) was 142.5 (SD = 17.3)/83.4 (SD = 11.2) mmHg. BP control was 20.1% according to 2007 ESH-ESC guidelines and 43.1% according to 2009 reappraisal recommendation (<140/90 mmHg for every hypertensive subject). Statistical analysis was performed using the SAS 9.1.3 software package.

Conclusions: BP control in hypertensive patients attended in HT Referral Units remains far from optimal, despite being a high-risk hypertensive population treated by specialized trained physicians. Even considering the recommendations stated by ESH in 2009, more than half of the patients are still uncontrolled.

PP.1.15 BLOOD PRESSURE CONTROL IN PATIENTS WITH HIGH CARDIOVASCULAR RISK ATTENDED IN HYPERTENSION REFERRAL UNITS

A. De La Sierra1, V. Barrios2, D. Asensio3, G. Traveria4

Hospital Mutua Terrassa, Terrassa-Spain, Hospital Ramón y Cajal, Madrid-Spain, Almirall S.A, Barcelona-Spain, Adiunosa Health Research, Barcelona-Spain

Objective: To determine the blood pressure (BP) control in two high cardiovascular risk populations (diabetes and cardiovascular disease (CVD)) attended in Hypertension (HT) Referral Units.

Design and Methods: Epidemiological and multicenter cross-sectional study carried out in Spanish HT Referral Units between January and July 2010. Inclusion criteria: patients of both sexes, ≥18-years old, with previous diagnosis of essential HT, with at least 6 months of follow-up in the Units and treated with antihypertensive drugs at least 3 months prior to inclusion. BP control was considered according two criteria: 2007 ESH-ESC guidelines (<140/90 mmHg for general population and <130/80 mmHg for patients with diabetes or with high or very high added cardiovascular risk) and 2009 ESH reappraisal recommendation (<140/90 for every hypertensive subject). Statistical analysis was performed using the SAS 9.1.3 software package.

Results: A total of 1,548 patients were recruited by 377 physicians. About one third (34.1%) had left ventricular hypertrophy and 30.9% had established cardiovascular disease. Mean BP (measured at least twice) was 142.5 (SD = 17.3)/83.4 (SD = 11.2) mmHg. BP control was 20.1% according to 2007 ESH-ESC guidelines and 43.1% according to 2009 reappraisal recommendation (<140/90 mmHg for every hypertensive subject). Statistical analysis was performed using the SAS 9.1.3 software package.

Conclusions: BP control below 130/80 mmHg in high cardiovascular risk patients is achieved in a low proportion, despite being attended in special care units. Furthermore, even assuming BP control at levels below 140/90 mmHg, it is achieved in only 40% of this high-risk patients.

PP.1.16 HYPERTENSION IS RISING IN NEPALESE COMMUNITY: EVIDENCE FROM A REPEAT CROSS-SECTIONAL STUDY IN RURAL KATHMANDU AFTER TWENTY-FIVE YEARS


Objective: The first hypertension survey in Nepal was done in 1981 in Bhadrasah in rural Kathmandu. After two and half decades, a repeat cross-sectional study was planned in the same location. The objective of the study was to find out the prevalence of hypertension in the urbanizing area of a developing country and to compare the findings with the 1981 study.

Design and Method: A population-based cross-sectional study was done in Bhadrasah in 2006 to estimate the prevalence of hypertension. A total of 1218 adults (527 of them males) aged 21 years or more were enrolled. Cut-off for diagnosing hypertension was set at 140/90 mm Hg (JNC-VII). However, for appropriate comparison with the 1981 study, the higher cut-off of 160/95 mm Hg (WHO Expert Committee 1978) was used.

Results and conclusions: The prevalence of hypertension in Bhadrasah in 2006, according to the JNC VII classification was found to be 33.8% (males: 38.3%, females: 30.8%). Multivariate logistic regression analysis of the common risk factors showed that physical inactivity, high salt intake and obesity were particularly associated with high blood pressure. For comparison with the 1981 finding, when the 2006 data was re-analysed with the then used criteria (160/95 mm Hg), the prevalence of hypertension in 2006 was still 18%, which is a three-fold increment compared to the 6% prevalence in 1981. Important contributors for this rise seem to be increased salt intake (56% vs 60%) and raising level of obesity (12% vs. 43%). This is a first repeat cross-sectional study on blood pressure in a Nepalese population. There is a very high prevalence as well as a sharp rise in hypertension prevalence in this society largely because of changing life-style which is most likely to be because of socio-economic transition.

PP.1.17 SALT INTAKE ADJUSTED FOR BODY WEIGHT AS WELL AS TOTAL SALT INTAKE IS ASSOCIATED WITH CARDIOVASCULAR DAMAGE IN THE GENERAL POPULATION

H. Takase1, Y. Dohi2, T. Toriyama1, T. Okado1, H. Sonoda2, A. Hagikura1, T. Hashimoto1, G. Kimura2, 1Enshu Hospital, Hamamatsu-Japan, 2Nagoya City University Graduate School of Medical Sciences, Nagoya-Jordan

Objective: Excessive salt intake causes hypertension in population at large. On the other hand, salt also causes cardiovascular damages independently of its effects on blood pressure. Although the relationship between total salt intake and cardiovascular organ damage has been discussed, an influence of salt intake adjusted for body weight is not intensively investigated. We studied a possible relationship between body weight-adjusted salt intake and subclinical organ damages in the general population.

Methods: Consecutive 7,126 subjects (male = 4,486, mean age = 56.4 years), who visited our hospital for a yearly physical checkup, were enrolled. Individual salt intake was assessed by estimating 24-hour urinary salt excretion, which was calculated using a method previously reported by Kawano Y, et al.

Results: Although total (g/day) and body weight-adjusted (g/day/kg) salt intakes were greater in subjects with hypertension (n = 2,171) than in those without hypertension (11.9 ± 3.5 vs 10.5 ± 3.2 g/day, p < 0.001 and 1.93 ± 0.53 vs 1.79 ± 0.50, p < 0.0001, respectively), they were not different in subjects with and without antihypertensive medications. B-Type natriuretic peptide (BNP), electrolycardiogram voltage (SV1 + RV5) and urine excretion of albumin were positively correlated with body weight-adjusted as well as total salt intake in univariate analysis. Multiple regression analysis revealed that both body weight-adjusted and total salt intakes independently correlated with BNP (p = 0.0001) and urine excretion of albumin (p < 0.0001) after adjustment for known cardiovascular risk factors. Similar results were obtained in sub-analysis performed in subjects without hypertension (n = 4,955).

Conclusion: Excessive salt intake either assessed by total amount or after adjustment for body weight may cause or accelerate hypertensive organ damages independently of their effects on blood pressure in the general population. An adjustment for body weight may provide more useful information in the assessment of salt intakes for the prevention or management of hypertensive organ damages.

PP.1.18 STRATEGY OF HYPOTENSIVE THERAPY OF AN OUT-PATIENTS DEPARTMENT

Y. Popovina1, M. Komarova2, T. Popovina2. 1Research Institute of Cardiology of Tomsk, Tomsk-Russia, 2Siberian State Medical University of Higher Professional Medical Education, Tomsk-Russia

Aim: To analyze the strategy of hypotensive treatment of patients with the documentary diagnosis of an arterial hypertension (AH).

Design and Methods: Within the limits of the second stage of monitoring of an epidemiological situation concerning AH on the territory of Tomsk region in 2006 year the analysis of 798 out-patient cards of patients with this disease has been carried out. On materials of out-patient cards features of pharmacotherapy of AH at level of a polyclinic link of public health services were studied. Target level of the blood pressure (BP) less than 140/90 mm Hg was considered.

Results: Regularly hypotensive therapy was accepted by 88% of patients, among them - 89.5% of women and 82.8% of men. Target values of BP have
reached 22.8% of men and 24% of women, who received treatment concerning AH. Angiotensin-Converting Enzyme Inhibitor (ACE inhibitors) have been administrated in 34.4% of patients, diuretics - 25.8%, beta-adrenoblockers (BAB) - 16.1%, antagonists of calcium channels (ACC) - 14.7%, "other" - 8.7%, Angiotensin II Receptor Blockers (ARB) - 0.2%. Group "other" basically has been presented by the fixed combination of ACE inhibitors and diuretics. As hypotensive therapy continue to be applied combined no-rezenip - and rezenip containing drugs (17% and 20.8% accordingly). The combined therapy was received by 58.3% of patients. A combination of two drugs received 38.6% of the patients, 17.1% - three drugs, 2.2% - four, 0.4% - five drugs. According to the analysis of out-patient card four kinds of combinations from two preparations have been administrated. Most often there was a combination of ACE inhibitors with diuretic (40%), then BAB with diuretic - 22.7%, ACE inhibitors with ACC - 19.5%, ACC with diuretic - 17.8%. Among combinations of three drugs a basis of prescription have made: ACE inhibitors + BAB + diuretic (7.4%), ACE inhibitors + ACC + diuretic (4.4%), ACC + BAB + diuretic (1.6%).

Conclusion: The overwhelming majority of out-patient patients with AH regularly received hypotensive therapy. However target vallue of the BP have been reached less than at a quarter of patients. In spite of the fact that the administrated combinations are rational, doctors prescribed them insufficiently often. The percent of the fixed combinations administration (which is low) raise patients' compliance as it was proved.

**PP.1.19 EVOLUTION OF THE CAROTID ARTERIAL RISK IN IMMIGRANTS LATINAMERICAN RESIDENTS IN SPAIN. INMIRISK STUDY. PRELIMINARY RESULTS**


**Objectives:** a) analyze the cardiovascular risk in Latinamerican immigrants at the beginning of their stay in Spain. b) to investigate the evolution of their cardiovascular risk according to their time of stay in Spain.

**Design and Methods:** Descriptive and transverse study carried out in Primary Care Center of San Andrés (Murcia) in which a population of approximately 30,000 inhabitants is assisted, 1,500 of which are Latinamerican immigrants. The number of immigrants included was 150 Latinamerican immigrants. A control group of spaniards was also included. A random sample among all the immigrants that went to consultation during the months of April until June of 2010 for any reason, after having requested them a writing informed consent. The following determinations were registered: blood pressure (mm Hg), BMI, waist perimeter, lipid profile (HDL, LDL and total cholesterol), lipoprotein A, homocysteine, ultrasensitive C-reactive protein and cardiovascular risk according to ESH charts.

**Results:** A change in cardiovascular risk factors was detected after 8 years of stay in Spain. In the immigrants with less than 8 years of stay in Spain, BP mean value was 116,47/71,7 mm Hg, being 131,47/99,9 mm Hg in those that have been 8 or more years in Spain. The BP mean value in the group of the Spaniards was 124,8/78,9 mm Hg (P < 0.001). Total cholesterol mean value in the immigrants with less than 8 years of stay in Spain was 185,46 mg/dl, being 209,35 (mg/dl) in those with 8 or more years in Spain. In Spaniards it was 203,34 mg/dl (p < 0.0001). The LDL cholesterole mean value in immigrants with less than 8 years of stay in Spain was 115,74 mg/dl, being 128,44 (mg/dl) in those with 8 or more years in Spain. In Spaniards it was 137,18 mg/dl (p < 0.0001). Other determinations as lipoprotein A presented a mean value in immigrants with less than 8 years of stay in Spain of 8,71 mg/dl, being 18,26 (mg/dl) in those with 8 or more years in Spain. In Spaniards it was high or very high in 4,7% of the immigrants with less than 8 years in Spain and 48,2% of those with 8 or more years in Spain. In Spaniards it was high or very high in 26,4% (p < 0.001).

**Conclusions:** The Latinamerican immigrants presented a higher cardiovascular risk as it increased their time of stay in Spain. This increase of cardiovascular risk was more significant in the group with 8 or more years of stay in Spain.

**PP.1.20 BLOOD PRESSURE CONTROL IN SPANISH HYPERTENSIVE PATIENTS ATTENDED IN PRIMARY HEALTH CARE (THE PRESCAP 2010 STUDY)**


**Objective:** To analyse the degree of blood pressure (BP) control in a broad sample of Spanish hypertensive patients attended in primary care (PC) settings.

**Design and methods:** Epidemiological, observational, cross-sectional and multicentric study. Patients aged ≥ 2 years, with an established clinical diagnosis of hypertension and with antihypertensive treatment, were included. BP was measured following European Guidelines (ESH/ESC 2007), and BP control was regarded as optimal when SBP/DBP was < 140/90 mmHg (Reappraisal ESH 2009). Data recorded included cardiovascular (CV) risk factors, subclinical organ damage and established CV or renal disease. Study obtained the approval of an independent ethics committee (Hospital Clinic, Barcelona).

**Results:** A total of 12,961 hypertensive patients (52.0% women) were included. Mean age was 66.3 ± 11.4 years. The most common CV risk factors were dyslipidaemia (56.2%), sedentarism (53.7%) and abdominal obesity (48.8%). 26.2% were diabetic, 7.9% had left ventricular hypertrophy, 13.8% heart disease and 6.2% established nephropathy. 63.6% of patients were treated under combination therapy (44.1% 2 drugs, 15.4% 3 drugs and 4.1% more than 3 drugs). The mean SBP was 135.6 ± 14.5 mmHg and the mean DBP was 79.2 ± 9.5 mmHg. 61.6% (95% CI: 60.8-62.4) presented good SBP and DBP control, 64.7% (95% CI: 63.9-65.5) only SBP control and 85.0% (95% CI: 84.4-85.6) only DBP control. Patients with poor BP control were older, had greater waist circumference and BMI and presented more CV risk factors, subclinical organ damage and associated CV disease than those patients with optimum BP control (p < 0.01).

**Conclusion:** The results of PRESCAP 2010 study show that 6 out of 10 Spanish hypertensive patients treated in PC have an optimum BP control. Factors that can have determined this degree of BP control are the high percentage of antihypertensive combinations used and the Reappraisal of ESH/ESC 2007 Guidelines (Reappraisal ESH 2009).

**PP.1.21 INTERRELATION OF ARTERIAL HYPERTENSION WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN POPULATION OF THE INTERNALLY DISPLACED PEOPLE OF 20-59 YEARS, LIVING IN SUMGAYIT CITY**


The Azerbaijan State Institute for Improvement of Physicians named after A.Alyev, Baku, Azerbaijan Chronic obstructive pulmonary disease (COPD) along with an arterial hypertension (AH) has got paramount value for public health services of the majority of the advanced countries nowadays. AH in patients with COPD represents one of frequent comorbidity conditions. Similar comorbidity at all its practical importance has ambiguous treatment concerning pathogenesis communications between AH and COPD. The purpose: To study the interrelation of AH and COPD in internally displaced people of 20-59 years living in Sumgayit city.

**Materials and methods:** Object of the research is representative sample of the internally displaced people of 20-59 years living in Sumgayit city. 865 men and 952 women have passed final screening. All surveyed have been divided into age groups of 20-29 year, 30-39, 40-49 and 50-59 years. AH was registered at arterial pressure 140/90 mm Hg. COPD was diagnosed on the basis of complaints, spirography and radiography of organs in thorax. Statistical processing was done according to a technique for reception of parametrical data with the use of 4-criterion Student.

**Results:** It was found out that frequency of registration of AH was practi- cally identical in persons with COPD and without it (34.25 ± 1.12% and 37.04 ± 2.92%, < 0.05): in the age groups of 20-29 and 40-49 years AH was more in the presence of COPD, and at 30-39 and 50-59 years - in the absence of COPD. In the absence of COPD the frequency of registration of AH was statistically authentic from 20.29% (95% CI: 14.9-31.7) till 50-59 years (70.76 ± 2.15%, p < 0.01), in the presence of COPD decreased till 40 years, then raised to a maximum in 50-59 years (25.00 ± 21.65% and 50.00 ± 15.81%, p > 0.05). The size of average values of systolic blood pres- sure and diastolic blood pressure also statistically did not authentically differ.
Results: As a result of the research it has been determined that as a whole the AH was registered in 37.2% surveyed men, however its frequency authentically raised from the minimum value of 19.5% in 20-29 years to maximum 55.6% (p < 0.05) in 50-59 years. AH, revealed for the first time among men of 20-29 years has made 75.9%, in 30-39 years - 57.3%, in 40-49 years - 57.3% and in the group of 50-59 years - 47.3%. From examined who knows about presence of AH, only 5.16% of persons in group of 20-29 years receive antihypertensive therapy, 17.8% in 30-39 years, 23.6% in 40-49 and 22.0% in 50-59 years. Adequate treatment was received in the group of 20-29 years - 3.44%, in 30-39 years - 13.6%, in 40-49 years - 8.2%, and in 50-59 years - 2.66% out of the surveyed.

Conclusions: In the given population of men there was marked a high prevalence of AH, and its treatment in the majority was inadequate. Today, a priority task is carrying out of some actions for active revealing of persons with AH and appointment of adequate therapy with modern antihypertensive preparations.

**PP.1.22 PREVALENCE OF ARTERIAL HYPERTENSION IN WOMEN WITH VIOLATION OF CARBOHYDRATE EXCHANGE**


The Azerbaijan State Institute for Improvement of Physicians named after A.Aliev, Baku, Azerbaijan Recent years the growth of prevalence of a metabolic syndrome (MS) among female population, especially in the senior age groups was observed. One of the important criteria of MS are violation of a carbohydrate exchange (VCE) and an arterial hypertension (AH). At the same time in each population prevalence of these components MS can influence differently the forecast and preventive maintenance measures, as MS, and cardiovascular heart diseases. The purpose: To study prevalence and interrelation of VCE and AH among able-bodied women at the age of 20-59 years living in Sumgait.

**Materials and Methods:** An epidemiological inspection was carried out among women at the age of 20-59 years living in Sumgait. All 952 surveyed women have been divided into 4 age groups: 20-29, 30-39, 40-49 and 50-59 years. All surveyed women were undergone the following researches: filling of a questionnaire of Rose, 2 multiple measurement of arterial pressure on the right hand, calculation of index Ketle and an electrocardiogram inspection, also definition of cholesterol concentration in blood, triglycerides and HDL cholesterol, glucose fasting and glucose tolerance test (GTT).

**Results:** The received results testified that prevalence of AH was statistically authentically above in the presence of VCE in comparison with its absence (45.4 ± 5.1% and 27.6 ± 1.5% accordingly, p < 0.001). This picture was observed exclusively in the age groups of 40-49 and 50-59 years. In the group of 20-29 years even in the presence of VCE AH was absent. Maximum showing of AH has been noted in the group of 40-49 years. In the absence of VCE as a whole frequency AH progressively increased from 4.4 ± 1.5% at the age of 20-29 years to 62.3 ± 3.3% in the group of 50-59 years (p < 0.001).

**Conclusion:** 1. In the female population of the age group senior 40 years AH is often met enough, both in group with VCE, and without VCE. 2. AH is much more met at VCE only in the senior age groups of 40-49 and 50-59 years.

**PP.1.23 CHARACTERISTICS OF EPIDEMIOLOGICAL SITUATION CONCERNING ARTERIAL HYPERTENSION AMONG THE MASCULINE POPULATION OF ZAQATALA REGION OF AZERBAIJAN**


The Azerbaijan State Institute for Improvement of Physicians named after A.Aliev, Baku, Azerbaijan Despite the considerable progress of clinical medicine, cardiovascular diseases (CD) still dominate in structure of disease and death rate in the developed countries. One of starting elements in development of this terrible pathology is the arterial hypertension (AH). Research objective: To study prevalence of AH among the masculine population of 20-59 years living in Zaqatala region of Azerbaijan Republic.

**Materials and methods:** 1295 men in the age of 20-59 years were surveyed. All surveyed men have been divided into the following age groups: 20-29, 30-39, 40-49 and 50-59 years. The examination included filling in the questionnaire for revealing principal chronic nonsurgical diseases, levels of physical activity, presence of a habit of smoking and alcohol consumption, anthropometry with calculation of a biomass index (Ketle), kg/m², an electrocardiogram - research in 12 acknowledged leads, measurement of blood pressure on the right hand twice with calculation of an average arithmetic mean, definition of the average concentration of total cholesterol (TC), triglycerides (TG) and HDL cholesterol of high density in blood plasma after 12 to 14-hour starvation of average concentration. Presence of AH was registered during the case when systolic arterial pressure (SAP) was ≥ 140 mm Hg and / or diastolic arterial pressure (DAP) ≥ 90 mm Hg.
CURRENT ANTIHYPERTENSIVE THERAPY IN SWITZERLAND

R. Brenner1, B. Wieser2, Y. Alleman1. 1Department of Cardiology, University Hospital Bern, Bern, Switzerland; 2Division of Pathophysiology, Centre Hospitalier Universitaire Vaudois Et Universite De Lausanne, Lausanne-Switzerland

Objective: Current antihypertensive prescription practice of Swiss primary care providers is largely unknown. We aimed therefore to evaluate it across all regions of Switzerland.

Design and Method: A cross-sectional visit-based survey of ambulatory hypertensive patients was performed in 2009 in Switzerland. 300 randomly selected physicians from all geographic regions provided data on 5 consecutive treated hypertensive patients showing up in their practices for blood pressure (BP) follow-up. Data on comorbidities and current medication were analogously collected.

Results: Data from 1378 hypertensive patients was available. 1.6% of the patients had no pharmacological therapy, 33.9% had monotherapy and 64.5% had combination therapy with 71.6% of them taking at least one fixed dose combination. Overall, diuretics (51.7%) and angiotensin receptor blockers (ARB, 51.4%) were prescribed with the highest frequency, followed by beta-blockers (36.2%) and ACE inhibitors (27.3%). In patients treated in mono-therapy, ARBs were used preferentially (41.8%), followed by ACE inhibitors (21.5%) and beta-blockers (20.8%). The fixed combination therapy associating an ARB and a diuretic was most popular (figure).

Conclusion: In Switzerland, ARBs are the most prescribed antihypertensive drug class. This might reflect the efficient BP lowering effect associated with the favorable adverse effect profile of this drug class. On the other hand, efficient marketing strategies may also influence the prescription habits. Fixed combinations are frequently prescribed in Switzerland, most probably because of greater efficiency, patient convenience and in order to improve adherence. The combination of an ARB with a diuretic is the most prescribed combination but results from ACCOMPLISH and ASCOT-BPLA may change these habits.

PREVALENCE OF ARTERIAL HYPERTENSION AND OTHER CARDIOVASCULAR RISK FACTORS IN AN ADULT GIPSY POPULATION FROM ROMANIA

D. Bartos, E. Badila, G. Oprea, R. Lungu, M. Hostiuc, A. Nastac. Emergency Hospital Bucharest, Bucharest-Romania

Background: As an ethnic group, the gipsy population from Romania are known with severe CV diseases which appear at premature age compared with the Romanian caucasian population.

Objectives: To assess the prevalence of hypertension and other main cardiovascular risk factors in a gipsy population from Romania.

Methods: Our study included 511 gipsy subjects (age range 18-83 years), a representative sample for this ethnic group. Each selected subject was examined by anthropometric and blood pressure (BP) measurements and laboratory tests (glycemia and total cholesterol). The diagnosis of hypertension was based on 3 separate measurements (BP ≥ 140/90 mmHg) or antihypertensives medication. The visceral obesity was defined as waist circumference > 102 cm in males and > 88 cm in females.

Results: See table.

Conclusions: Hypertension affects 30.3% of the gipsy adult population; the prevalence of newly diagnosed cases being lower than known cases. The number of hypertensives undergoing treatment and the control of HT are apparently better in this ethnic group compared with the adult population from Romania. Concerning the other CV risk factors, there are a very high prevalence of hypercholesterolemia, diabetes mellitus and obesity (both visceral and BMI) in the gipsy population.
in the study and randomly allocated to antihypertensive therapies based on either an ACE-inhibitor or Diuretic regimen. Following randomization, the subjects were followed till major cardio vascular events, death from any cause or end-of-study period. It was planned to have at least two visits for each subject within a year. General physicians or study nurses recorded BP of each of the subject during visits. The primary outcome of interest is ‘in-study’ BP control which has been defined as the average of systolic BP (SBP) and diastolic BP (DBP) being <140/90 mmHg respectively. All available BP records for a subject were averaged and Cox regression was used to identify factors associated with BP control.

**Results:** Each subject had an average 11 ± 3 follow-up visits (n = 6064, 1-24 visits), and the last BP record was available for a subject following randomization was between 37 and 2270 days. The in-study BP control was achieved among 29% (n = 1752) of the subjects (29% achieved systolic and 97% achieved diastolic BP control), with BP better controlled amongst males. Subjects with higher systolic BP levels at baseline, changing physicians during the follow-up period, receiving ACE-inhibitor and using more than one anti-hypertensive drug had less control of in-study BP. In contrast, better control was achieved in subjects with high DBP at baseline. The in-study BP control also varied by the drug had less control of in-study BP. In contrast, better control was achieved in subjects treated with diuretics. Surprisingly, current smoking was also associated with better BP control in women; mean age 48.8 ± 2008. In addition to data collected during the examination, complete pharmacological treatment was reported. BP for controlled subjects was defined as systolic BP ≤140 mmHg and diastolic BP ≤90 mmHg. BP control was evaluated among untreated and treated subjects. BP control was evaluated in each category of treatment, smoking, alcohol drinking, increased BMI, raised cholesterol, low HDL cholesterol, increased plasma creatinine and in-study factors (e.g. treatment group, change of physician and number of anti-hypertensive drug).

**Conclusion:** These findings identify the difficulties in achieving the SBP targets in elderly hypertensives. Further strategies, directed towards both GPs and patients, including targeted education, to improve BP control in elderly hypertensives is needed.

**PP.1.29**  
**BLOOD PRESSURE CONTROL DEPENDS ON ENVIRONMENTAL FACTORS**  
B. Pannier, F. Thomas, A. Benlmauden, K. Bean, N. Danchin. *Centre IPC, Paris- France*

**Objective:** To evaluate the role of environmental factors such as tobacco and physical activity on the quality of blood pressure (BP) control among untreated and treated subjects.

**Design and Method:** The population included 68,315 (42,202 men and 26,113 women; mean age 48.8 ± 130 years and 48.5 ± 12.6 years respectively) who had a health checkup at the IPC Center between January 2005 and December 2008. In addition to data collected during the examination, complete pharmacological treatment was reported. BP for controlled subjects was defined as systolic BP <140 mmHg and diastolic BP <90 mmHg. BP control was evaluated among non-treated and treated subjects. BP control was evaluated in each category of treatment with monotherapy: diuretics (D), calcium channel blockers (CB), beta-blockers (BB), ACE inhibitors (ACEI) or angiotensin II receptor blockers (ARB) or bitherapy (D+BB, D+ACEI/ARB, CB+BB, CB+ACEI/ARB). BP control was evaluated according to gender, tobacco consumption and a regular physical activity.

**Results:** Among untreated subjects, 79.9% (77.7% among men and 83.7% among women) were controlled. Among treated subjects, 54.3% (48.2% among men and 54.9%) among women. The gender effect on BP control was significant. Among treated and untreated subjects, women were better controlled than men (p < 0.0001). In the overall population, the proportion of controlled subjects according to each therapy was as follow: 43.9% with D, 38.4% with CB, 54.1% with BB, 43.6% with ACEI, 43.6% with ARB, 45.2% with D + BB, 40.1% with D + ACEI/ARB, 37.8% with DBP and 39.9% with CB + ACEI/ARB. Smoking increased the percentage of controlled BP in treated subjects. In subjects treated with diuretics, BP control was observed for 42.9% among non-smokers vs 59.4% among current smokers (p < 0.003); among those treated with ACEI, BP control was 39.8% and 59.1% (p = 0.0001) respectively. With other treatments, moderately similar results were observed. Physical activity increased the percentage of controlled BP in treated HTN vs untreated patients in all monotherapy and bitherapy groups. Regardless of the treatment, BP control was significantly better among physically active subjects.

**Conclusion:** Anti-hypertensive treatment provides 50% of BP control in France. Women were better controlled than men. Physical activity more than once a week was associated with better control of BP with both monotherapy and bitherapy. Surprisingly, current smoking was also associated with better BP control; this was mainly observed with D and ACEI treatments. Gender and environmental factors influence BP control. The effects of pharmacological treatment are notably modulated by physical activity and tobacco.

**PP.1.30**  
**PREVALENCE OF METABOLIC SYNDROME IN CITIES OF RUSSIAN FEDERATION**  
A. Erina1, R. Libis1, E. Iseaeva2, D. Savshin3, O. Rotar1, V. Solntsev1, S. Zagranichnaya1, A. Konradi1, E. Shlyakhto1. *Almagol Central Federation of Heart, Blood and Endocrinology, Saint-Petersburg-Russia, *Orenburg State Medical Academy, Orenburg-Russia

**Objectives:** The aim of the study was to assess prevalence of metabolic syndrome (MS) in the different regions of Russian Federation (RF): Saint-Petersburg, Kursk, Orenburg, Kaliningrad.

**Methods:** 817 inhabitants of RF were screened in their centers (199 inhabitants of SPb, 171 of Kursk, 291 of Orenburg; 77156 of Kaliningrad). All subjects were interviewed with special questionnaire about lifestyle factors and medical history. Blood pressure, height, and anthropometry were performed. Serum lipids and glucose were measured by Hitachi-902 equipment (Roche reagents).

**Results:** Hypertension (HTN) was diagnosed according to elevation BP over 130 and/or ≥ 85 mm Hg, abdominal obesity (AO) according to waist circumference ≥ 94/80 cm m2, hypertriglyceridemia (HTG) ≥ 1.7 mmol/L, hyperglycemia ≥ 5.6 mmol/L, decreased HDL < 1.29/03 mmol/L for w/m. In Saint-Petersburg 67.2% of subjects had HTN, 64.1% – AO, 31.0% – HTG, 44.4% – hyperglycemia, 25.3% – decreased HDL, 42.5% – MS. In Kursk 69.6% of subjects had HTN, 73.0% – AO, 27.2% – HTG, 29.6% – hyperglycemia, 51.1% – decreased HDL, 31.9% – MS. In Orenburg 62.5% – HTN, 69.3% – AO, 23.6% – HTG, 42.9% – hyperglycemia, 58.7% – decreased HDL, 39.2% – MS. In Kaliningrad 71.7% – HTN, 67.5% – AO, 29.4% – HTG, 33.3% – hyperglycemia, 34.0% – decreased HDL, 42.8% – MS.

**Conclusions:** Population of all regions had high prevalence of metabolic syndrome. Inhabitants of Kaliningrad had the highest prevalence of hypertension and of Kursk: of obesity. Especially feature of Orenburg population was high rate of dyslipidemia.

**PP.1.31**  
**ANALYSIS OF POSITIVE SCREENING IN CARDIOVASCULAR PREVENTION PROGRAM**  

**Introduction:** It is known that cardiovascular prevention is insufficient, but there is little information about what factors are associated with positive screening blood pressure (BP), total cholesterol (TC), fasting plasma glucose (FGP) in the adult population.

**Methods:** Population-based observational design aimed at the population = 40 years of age, involving all health centers in the Valencia Community (5 million people). Screenings are performed for BP, TC and FGP, according to the criteria of the Preventive Activities and Health Promotion Programme of the Spanish Society of Family and Community Medicine. The variables measured are age, sex, smoking history, hypertension, diabetes mellitus, dyslipidemia and two secondary prevention situations: Coronary heart disease and cerebrovascular disease. Bivariate and multivariate analysis were performed and the confidence limits at 95% were calculated.

**Results:** The magnitude of positive BP screening was 27.9% (27.4 to 28.4). The multivariate model was highly significant (p < 0.001) and explained 76.3% of variability. The associated variables are for BP: male (p = 0.0001), ≥ 55 years (p = 0.00001), not being a smoker (p = 0.0028) and having a history of dyslipidemia (p = 0.0017), diabetes (p = 0.001), CI (p = 0.0001) and stroke (p = 0.0001). For hypercholesterolemia the percentage of positive screening was 58.2% (57.6 to 58.8), the multivariate model was significant (p < 0.001) and explained 60.1% of variability. The variables are: =55 years (p = 0.0001), not having diabetes (p = 0.0001), and dyslipidemia (p = 0.0001). For FGP, was 3.9% (3.7 to 4.1). The multivariate model was significant (p < 0.001) and explained 87.7% variability. The variables are: male (p = 0.0001), ≥55 years (p = 0.00001) and having a history of hypertension (p = 0.0001) and dyslipidemia (p = 0.005).

**Conclusions:** High percentage of positive screenings indicating a failure of preventive activities in clinical practice. The situation is worrying in the detection of DM, as their rates are higher in those with increased cardiovascular risk.
for primary prevention, but much worse in the detection of hypertension, and positive screenings are higher in individuals with greater cardiovascular risk, in both primary and secondary prevention.

### PR.1.32 ARTERIAL HYPERTENSION AND DIABETES MELLITUS IN LIVER CIRRHOSIS: THE EXPERIENCE OF A SINGLE CENTRE

S. Leoni, S. Flori, B. Stagni, I. Serio, L. Bolondi. Division of Internal Medicine, Bologna-Italy

**Introduction:** Liver cirrhosis is characterized by haemodynamic disfunctions (hyperkinetic circulation, reduced effective volume) with predominant normo-hypertension. However, arterial hypertension is present in some cirrhotic patients, as confirmed in literature (prevalence 3-10%). Moreover, recent data underline the role of diabetes in cirrhosis, in particular as risk factor for hepatocellular carcinoma (HCC). Aim of this retrospective study was investigate the prevalence of arterial hypertension and diabetes in cirrhotic patients referred to our Liver Unit.

**Methods:** The charts of 420 cirrhotic patients were analyzed (M/F = 322/98, mean age 63 ± 11years) Aetiology of cirrhosis was: viral hepatitis in 325 patients (69 hepatitis B -HBV-, 236 hepatitis C, 12 HBV + HCV), alcohol in 76 patients, autoimmune liver diseases in 7 patients, Wilson disease in 2 patients, cryptogenic in 18 patients. Mean follow-up was 39.2 months. Diagnosis of hypertension and diabetes was respectively made when arterial pressure was >140/80 mmHg and plasma glucose was >126 mg/dl in 2 different blood samples (or when patients were treated with anti-hypertensive or anti-diabetic drugs during overall follow-up).

**Results:** Arterial hypertension was confirmed in 38/420 (9%) patients with cirrhosis and was persistent during the follow-up (39.2months). In 204(47%) cirrhotic patients with initially hypertension data showed a progressive normalization of arterial pressure during the follow-up. Diagnosis of diabetes was confirmed in 19.7% cirrhotic patients (23.5% of cirrhosis with HCC and 13.1% of cirrhosis without HCC). Diagnosis of diabetes was established in 47.5%, 27.5% and 21.3% of patients with HCC and respectively cryptogenic, alcoholic and viral cirrhosis.

**Conclusion:** In our experience the prevalence of persistent arterial hypertension in cirrhosis results 9%. Instead, a small group of cirrhotics presents a progressive normalization of arterial blood pressure, probably due to progression of liver disease. Diabetes could be considered as a risk factor for HCC in cirrhotic patients, prevalently in cryptogenic cirrhosis.

### PR.1.33 TRENDS AND AGE PECULIARITIES OF MORTALITY FROM CARDIOVASCULAR DISEASES AND CORRELATION WITH ARTERIAL HYPERTENSION

E. Efimova, I. Konocheevskaya, R. Karpov. Research Institute of Cardiology of Tomsk, Tomsk-Russia

**Aim:** To study trends of mortality from cardiovascular diseases in a Siberian city.

**Design and methods:** Standardized questionnaires for deceased persons, archival data of the statistical office, data of the regional forensic bureau of Tomsk were used.

**Results:** Among 41075 deceased under the age of 63 years men prevailed over women (p < 0.001), at the age of 64 and older women prevailed over men. Total mortality for the period of 1990-2005 was 889-1588 men and 509-784 women per 100000 inhabitants with the lowest values in 1990 and the highest values in 1993-1995. Mortality rates from cardiovascular diseases for the period 1990-2005 were 330-569 men and 140-758 women per 100000 inhabitants with the lowest values in 1990 and the highest values for men in 1993-1995 and for women - in 2002, 2005. Cardiovascular diseases were on the first place in the structure of total mortality (35.6% among men and 44.7% among women). The frequency of fatal stroke and myocardial infarction in hypertensive patients was significantly increased.

**Conclusion:** Growth of total mortality and mortality from cardiovascular diseases was revealed during 15 year period taken for analysis. Trend of mortality for men is twice higher than for women. It is necessary to correct risk factors of cardiovascular diseases (such as arterial hypertension and other risk factors) for mortality reduction.
adjusted for age (± 2 years) and sex (case-control matched). Predictors for the multivariable model were selected using a backwards elimination strategy.

**Results:** Analysis of 362 patients (181 matched pairs) showed subjects with HTN had Odds Ratios of 3.41, 95% confidence interval CI 2.12–5.48 for CAD and 4.86 (CI 2.75–8.37) if lived in an urban area. According to the univariate analysis for HTN, OR for other risk factors such as Body Mass Index (BMI), Heart Rate, Family History of Cardiovascular Disease (CVD), and Stress were 1.13 (CI 1.05–1.23), 3.38 (CI 1.53–7.43), 2.92 (CI 1.51–5.62) and 1.70 (CI 1.12–2.58) respectively. In the multivariable model only higher BMI (CI 1.04–1.35) and family history of CVD 7.25 (CI 1.99–26.37) retained significance for HTN.

**Conclusion:** Our data show that living in an urban environment together with poor lifestyle factors significantly increases odds of developing high blood pressure in the Romanian subjects. Combination of HTN and urban living play a significant role in these subjects who develop CAD at younger age. In the developing economies transition from rural to urban areas may pose a significant risk to the heart by increasing blood pressure which needs confirmed in larger studies.

**PP.1.36 RESULTS OF POLISH NATIONAL HEALTH TEST SHOW HIGH PREVALENCE OF CORRECTABLE CARDIOVASCULAR RISK FACTORS AMONG “NETIZENS”**

J. Tyszkiełowicz, B. Symonides, Z. Gacjong, E. Figurny-Puchalska, P. Kołodziajak, M. Niemczyk. 1Medical University of Warsaw, Warsaw-Poland, 2Onet.PI, Education and Health Websites, Kraków-Poland

Cardiovascular (CV) risk factors remain undetected in general population and simple and efficient whole-population screening and prevention programs are needed to reduce general morbidity and mortality. Since individual assessment of CV risk based on classical questionnaires is time consuming and depends on direct responder-to-respondent relation we have created unique interactive mass-screening tool for CV risk assessment. In collaboration with internet company MedOnet Polska, an intuitive questionnaire consisting of 20 questions concerning general health, CV risk factors and family history, was designed and posted on 43 days on major internet website during “Polish National Health Test” campaign (www.medonet.pl/zdrowie-na-co-dzien,akcja-okresowa,888800,1,1,test-infographic). Results-abnormal

<table>
<thead>
<tr>
<th>N (% total)</th>
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<tr>
<td>42 699 (36.85%)</td>
<td>86 029 (74.24%)</td>
<td>92 711 (80.0%)</td>
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**Know their results-normal**

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<tr>
<td>73 181 (63.15%)</td>
<td>29 851 (27.61%)</td>
<td>23 169 (20.0%)</td>
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**Know their results-abnormal**

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<th>N (% total)</th>
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<tr>
<td>8 598 (7.42%)</td>
<td>8 242 (7.11%)</td>
<td>12 520 (10.8%)</td>
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**Correctable risk factors for cardiovascular diseases are highly prevalent in the netizens population of Poland yet their knowledge and awareness about the risk remains low. Results show the efficacy of internet interactive health tests as a powerful screening tool, facilitating selection of respondents with elevated CV risk.**

**PP.1.37 EPIDEMIOLOGICAL STUDY IN PATIENTS WITH HYPERTENSION SECONDARY TO RENAL ARTERY STENOSIS IN A GENERAL HOSPITAL**

M.I. Poveda-Garcia, M.A. Esteban-Moreno, M.D. Del Pino Y. Pino, M.C. Prados Soler. Torrecardenas Hospital, Almería-Spain

**Purpose:** Hypertension due to atherosclerotic stenosis of the renal artery or its main branches, is one of the most common causes of secondary hypertension and primary renal loss of renal function. Renal angiosclerosis and ischemic heart disease. The combination of arterial hypertension and metabolic disturbances might be the result of RAS activation, development of systemic inflammation and oxidative stress.

**Materials And Methods:** A retrospective study of the patients admitted in the nephrology area of a general hospital with a diagnosis of renovascular hypertension from January 2000 until October 2010. We analyzed the main epidemiological and clinical variables of patients with renovascular hypertension.

**Results:** 53 patients were objectified with renovascular hypertension: 59 ± 14 years, 64% male / 36% female. 26% diabetes mellitus type 2 (14 patients), 38% dyslipidaemia (20 patients), 45% were smokers (24 patients), 60% chronic kidney disease (32 patients), 35% cardiovascular disease (19 patients), 54 with diagnosis of renal artery stenosis and one patient with renal fibrolymphasia. Focusing our study on patients with renovascular hypertension secondary to renal artery stenosis, we tried to establish clinical correlation between the degree of stenosis and epidemiological variables (Chart 1) Out of the 52 patients with renal artery stenosis 47% (25 patients) had no significant stenosis (< 70%) and 53% (27 patients) had significant stenosis (>70%) < 70% stenosis versus > 70% stenosis: 44% males /66% vs females (P = 0.05); Smoking 35% vs 40% (p 0.06); Kidney disease 9% vs 57% (p 0.0001) 55% of our patients were treated with more than 3 antihypertensive medications /ACE inhibitors 27% (12 patients); Angiotensin 2 receptor antagonists 49% (26 patients); Diuretics 62% (25 patients); Calcium channel blockers 24% (13 patients) Alpha-Blockers 24% (13 patients) Beta-Blockers 47% (25 patients).

**Conclusion:** A statistically significant correlation was established between higher degrees of stenosis and older age, male predominance, higher incidence of mellitus diabetes and renal disease. Out of the 52 patients showing chronic kidney disease stage. In patients with chronic Kidney Disease the most frequent cases were those of patients in stage 3. We must identify renovascular hypertension as a rare but reversible cause of secondary hypertension in our patients.
POSTER SESSION 02

LIFESTYLE CHANGES

**PP.2.39** SUPERVISED EXERCISE TRAINING IN HYPERTENSIVE PATIENTS, BEYOND BLOOD PRESSURE CONTROL

M. Iuriciuc1, S. Urovnii1, S. Iuriciuc1, A. Avram2, C. Marin1, D. Duda-Seiman3, S. Mancas1, 1University of Medicine Timisoara, Timisoara-Romania, 2Medicovery Clinic, Timisoara-Romania, 3West University, Timisoara-Romania

**Background:** Cardiovascular events have their greatest impact in the morning period. This is thought to be associated with and dependent on morning blood pressure surge (MBPS). Comprehensive rehabilitation programs are effective in lowering blood pressure (BP).

**Objectives:** To show that exercise training, may improve some of the hemodynamic and stiffness parameters.

**Design and Methods:** We selected 180 patients with essential hypertension, aged: 40–70 years. They were under unchanged medication at least 1 month and at target BP. They were divided into 2 groups: group A (trained – supervised exercise training) 85 patients and group C (untreated – control) 95 patients. We evaluate these patients before and after 4 months. We studied the ambulatory blood pressure monitoring/24h parameters: systolic blood pressure (SBP), diastolic blood pressure (DBP), mean blood pressure (MBP), pulse pressure (PP), heart rate (HR), ambulatory arterial stiffness index (AASI) defined as 1-alfa; (alfa = regression slope between TAD and TAS), MBPS1 = mean SBP in the first 2h after awaken – the average of the lowest 3 nocturnal values, MBPS2 = mean SBP in the first 2h after awaken – mean SBP value in the first 2h pre awake; smoothness index (SI); normalized smoothness index (SIn); the reduction homogeneity index (RDH). For the ankle brachial index (ABI) we divided these the patients into to groups: with ABI ≤ 0.963 (p = 0.0021); for ABI* 1.254 to 1.121 (p = 0.0014).

**Results:** Comparing the group C to group A our results are: for SBP 129.14 to 122.91 mmHg (p = 0.0426); for DBP 72.12 to 71.89 mmHg (p = 0.0426); the PP 57.02 to 50.99mmHg (p = 0.0018); for MABS1 21.82 to 17.07 mmHg (p = 0.0019); for MABS2 17.69 to 13.49 mmHg (p = 0.0008); for SI(SBP) we obtained 5.19 to –0.9 (p = 0.0002). For ABI 0.917 to 0.863 (p = 0.0021); for ABI* 1.254 to 1.121 (p = 0.0014).

**Conclusions:** Rehabilitation programs can improve some of the hemodynamic parameters: SBP, MABP, and HR. Exercise training, may decrease MBPS. Physical training may also improve some of the parameters that describe arterial stiffness: AASI and PP. Rehabilitation programs are a safe and effective method for reducing cardiovascular risk.

**PP.2.40** THE STUDY ON LIFESTYLE-INTERVENTION IN SUBJECTS WITH IMPAIRED FASTING GLUCOSE AND PRE-HYPERTENSION A 5 YEARS RANDOMISED CLINICAL TRIAL (2 YEARS PRELIMINARY RESULTS)

Z. Gasimov. Research Institute of Cardiology Named after Acad.J. Abdullayev, Bakas-Azerbaijan

The study on lifestyle-intervention in subjects with impaired fasting glucose and pre-hypertension a 5 years randomised clinical trial designed to evaluate the prevalence of prehypertension, impaired fasting glucose and the cardiovascular risk factors and the effect of a combined diet and physical activity intervention on impaired fasting glucose and pre-hypertension in a cohort at increased risk for developing type 2 diabetes and AH. Preliminary screening among pedagogical staff from State Pedagogical University, conducted between March 2008 and October 2008. In total, 265 subjects (women) with an increased risk of having impaired fasting glucose level more than 100mg/dl.

Pre-hypertension was defined as a systolic blood pressure of 120 to 139 mm Hg, and/or a diastolic blood pressure of 80 to 89 mm Hg. Impaired fasting glucose was detected in 94 subjects (35.5%), 9 type 2 diabetes (type 2DM, 3.4%), Pre-hypertension was detected in 102 women(38.5%). Both increasing age and BMI were strongly related to the prevalence of pre-hypertension and diabetes. During the 2-year follow-up, 2.6% of the total population (1.3% per year, 95% CI 0.9–1.8%) developed diabetes. Of those with IVG at baseline, 6.4% (3.2% per year, 95% CI 1.6–5.2%) progressed to diabetes, but only 1.2% (0.6% per year, 95% CI 0.3–1.0%) of normoglycemic people did so. Other significant predictors of progression to diabetes were higher waist–hip ratio (WHR), triglyceride and non HDL levels.

were drawn after a 8-hour fast. Impaired fasting glucose was defined as a fasting glucose level more than 100mg/dl.

**PP.2.41** FROM CHANGING NUTRITION HABITS TOWARDS NEW STRATEGIES OF AN ACTIVE LIFESTYLE - A EUROPEAN STUDY ON OVERWEIGHT AMONG CHILDREN AND ADOLESCENTS

B. Schau1, M. Biefeldt2. 1Omron Healthcare Europe, Mannheim-Germany, 2Perleberg Pharma Partner, Barcelona-Spain

**Objectives:** Overweight is a growing health epidemic worldwide. Increasing efforts have been made to prevent overweight among children and teenagers. However, most strategies focused primarily on healthy nutrition as a sole solution facing strong motivational barriers. The present study explores the psychosocial background and suggests new integrated strategies for overcoming these barriers.

**Methods:** We undertook a qualitative research in 5 European countries (Germany, UK, France, Italy, Spain) to get insight into attitudes and expectations of overweight children and teenagers (N = 81) and their mothers (N = 15), the involved physicians (N = 20) and health care authorities (N = 15).

**Results:** Our study revealed that parents and children face important motivational barriers when changing eating habits/reducing food intake because the latter are perceived as deprivation of psychological needs (good taste, joy, self-esteem) and social requirements (reward, parents-child bond). Healthcare professionals and families therefore emphasized the importance of avoiding these negative experiences. Thus, successful new strategies should focus on adding immediate psychosocial values to the children’s and teenager’s life (physical activity) that compensate perceived negative changes (food reduction) and thus relapses towards unhealthy eating behaviors. The overall goal should be guidance to a more active lifestyle consisting of daily physical movement and tailored approaches according to the different interests of the family and its members.

**Conclusions:** To successfully address the challenge of overweight among children and teenagers, and thus reduce future cardiovascular health problems, we need to implement strategies and programs emphasizing positive psychological and social values of the individual and the family whereas changing nutrition is just one part of an integrated approach. This can be achieved by focusing more on behavior change towards an active lifestyle.

**PP.2.42** THE EFFECT OF SOME EATING HABITS ON BLOOD PRESSURE OF SCHOOL CHILDREN

K. Paurovic1, G. Belojevic2, B. Jakovljevic3, V. Stojanov3. 1Institute of Hygiene and Medical Ecology, School of Medicine, Belgrade-Serbia, 2Clinical Centre of Serbia, Belgrade-Serbia

**Objectives:** The aim of this study was to assess the influence of some eating habits on blood pressure of school children.

**Design and Methods:** A cross-sectional study was performed on 1113 school children (533 boys and 580 girls) aged 7–11 years, who attended 8 primary schools in Belgrade. Blood pressure (BP) was measured in the morning, in the school setting, using mercury sphygmomanometer. Body mass index (BMI) was calculated from child’s weight and height. Child’s eating habits, such
as drinking soda drinks, drinking mineral water, eating salty food and eating
snacks were assessed using a self-reporting questionnaire.

**Results:** Children’s blood pressure was significantly correlated to their
BMI and daily number of glasses of soda drinks. Children who drink 3 or
more glasses of soda drinks have significantly higher systolic and diastolic
BP (SBP = 103.0 mmHg vs. SBPref = 99.9 mmHg; DBP = 60.2 mmHg vs.
DBPref = 59.1 mmHg; both p < 0.05), as well as higher BMI compared to
non-consumers (BMI = 18.8 kg/m² vs. BMIfref = 17.6 kg/m²; p = 0.002).
Children who eat very salty food have numerically higher systolic and dia-
stolic pressure compared to those eating non-salty food (SBP = 103.6 mmHg
vs. SBPref = 100.0 mmHg; DBP = 58.8 mmHg vs. DBPref = 58.1 mmHg;
both p > 0.05), and have significantly higher BMI (BMI = 19.3 kg/m² vs.
BMIfref = 17.6 kg/m²; p = 0.003). No association was found between chil-
dren’s blood pressure and the frequency of eating snacks or the frequency of
drinking mineral water. Children who drink mineral water every day have sig-
nificantly higher BMI; compared to non-consumers (BMI = 19.7 kg/m² vs.
BMIfref = 18.4 kg/m²; p = 0.001). Multiple linear regression, after allowing for
gender, age and BMI showed significant positive correlation between number
of glasses of soda drinks and children’s systolic pressure (B = 0.550, t = 2.189;
p = 0.048), and diastolic pressure (B = 0.657, t = 2.031; p = 0.026).

**Conclusion:** Children’s eating habits, especially drinking soda drinks, and eat-
ing salty food may be are associated with higher systolic and diastolic pressure
in school children.

**PP2.43**

**LONG-TERM EFFECTS OF A BERBERINE BASED NUTRACEUTICAL ON BODY WEIGHT AND INSULIN-SENSITIVITY IN NON DIABETIC HYPERLIPIDAEMIC PATIENTS**

A. Cicero1, G. Derosa2, P. Maffioli2, B. Gerocarni1, E. Grandi1, C. Borghi2.
1Internal medicine, Aging, Kidney Disease Dept., University of Bologna, Bologna-Italy; 2Internal Medicine and Therapeutics Dept., University of Pavia, Pavia-Italy

**Objective:** Preclinical and preliminary short-term clinical data suggest that high
dosages of berberine are associated to a significant improvement of insulin-sen-
sitivity in type 2 diabetes, besides frequent gastrointestinal disturbances. Our
aim was to evaluate the long-term effect of low-dosed berberine on body mass
index (BMI) and insulin-resistance related parameters (fasting plasma glucose-
FPG, fasting plasma insulin-FPI, HOMA-index).

**Design and Methods:** This is a 12-months, randomized clinical trials. We
enrolled 269 non smoker hyperlipidaemic patients in primary prevention for
cardiovascular disease, 214 of which completed the trial with a good compli-
ance. All subjects were non diabetics nor treated with antihyperlipidaemic
drugs. 79 normoweight normoweight subjects (Group1) were treated with a
berberine containing nutraceutical (500 mg berberine, Armolipid Plus®-ALP,
Rottapharm-Madaus SpA, Monza, I) associated with a standardized TLS (3rd
NCEP-ATP), 85 overweight with ALP-TLS (Group 2), and 50 overweight with
just TLS (Group 3). Educational reinforcements were planned each
4 months.

**Results:** The overweight treated with TLS experienced a significant improve-
ment in BMI (-0.3 ± 0.1 kg/m²; p < 0.05), FPG (-11 ± 13 mg/dL; p < 0.05), FPI
(-3.5 ± 4.2 mU/mL; p < 0.05), and HOMA index (-1.2 ± 1.3; p < 0.05). The
overweight subjects treated with ALP-TLS experienced a significant improve-
ment in BMI (-0.6 ± 0.8 kg/m², p < 0.05), FPG (-21 ± 15 mg/dL, p < 0.05), FPI
(-4.3 ± 4.8 mU/mL, p < 0.05), and HOMA index (-1.6 ± 1.5, p < 0.05). The
normoweight subjects treated with ALP-TLS experienced a significant improvement
in BMI (-0.3 ± 0.1 kg/m², p < 0.05) and HOMA index (-0.2 ± 0.8, p < 0.05), but
not in FPG and FPI. BMI and FPG improved significantly more in Group 2 than
in Group 1 and 3 (p < 0.05), while FPG decreased more significantly in Group 3
than in Group 1 (p < 0.05). TC and LDL-C more in Group 1 than in group 3, TG
more in Group 2 than in Group 1 (p < 0.05). The treatment was very well toler-
ated along the study.

**Conclusion:** The tested nutraceutical containing a low dosage of berberine, if
assumed on the long-term improve the effect of a standard TLS on BMI and
Insulin-sensitivity, especially in overweight subjects.

**PP2.44**

**INFLUENCE OF ANXIOUS-DEPRESSIVE SYNDROME ON PRIMARY PREVENTION OF CARDIOVASCULAR DISEASE**

M. Colotto, A. D’Angelo, F. Vinci, A. Renzi, E. D’Erasmo, A. Castello, G. Barbarossa, R. Ros, P. Coleta. Policlinico Umberto I-Sapienza University of Rome, Roma-Italy

**Objective:** Longitudinal studies have recently suggested that anxious-depressive
syndrome (ADS) may represent an independent risk factor for cardiovascular
disease (CVD). The aims of our study (1) to better cardiovascular risk
factors of patients affected by ADS in primary prevention for CVD with respect to a
to control-group 2) to verify whether ADS plays a role in patients’ adherence
to therapy.

**Design and Method:** A retrospective case-control study including 340 patients
visited for cardiovascular primary prevention was performed. 150 subjects pre-
sented a well documented history of ADS (patient group); the control group
was made up of 190 subjects with no evidence of psychiatric disorders.
Patients with psychotic disease, epilepsy, Parkinson’s disease and alcohol
or drug addiction as well as patients affected by cancer were excluded. For both
patients and controls anthropometric parameters, glycometabolic profile, num-
ber of risk factors, cardiovascular risk score, adherence to therapy were evalu-
ated at base line and at a second visit.

**Results:** Patients with ADS present more cardiovascular risk factors at base-
line compared to controls. Patients show a greater BMI (p < 0.001), a higher
blood pressure (p = 0.001) as well as a greater prevalence of metabolic syn-
drome (p = 0.031) and type 2 diabetes mellitus (p = 0.014) with respect to
controls. Moreover, in patients affected by ADS there is lower adherence to a
healthy diet (p < 0.001) and physical activity (p < 0.001) as prescribed at
baseline (fig. 1). In our study compliance to drug therapy does not seem to be
influenced by the presence of ADS (p = 0.836).

**Conclusions:** A careful evaluation of the psycho-pathological background of
patients must be considered as a key step for a proper cardiovascular preven-
tion based on therapeutic lifestyle changes and drug therapy.

**Fig 1: Adherence to Diet and Physical Activity in ADS patients compared to controls**
body mass excess (p = 1), 38.1% (48) of patients with arterial hypertension effectively controlled their blood pressure (p < 0.01). Among patients with glucose and metabolic disorders HbA1c plasma level < 6.5% was found in 22 (11) (p > 0.05), 70.1% (94) of patients, to whom B-blockers were prescribed, received it (p < 0.01), 44.4% (63) – statins (p < 0.01), 76.2% (96) – ACE- inhibitory, ARB II (p < 0.01), 79.7% (114) – antihypertensives (p < 0.01); 76.7% (66) – nitrates (p < 0.01); 73.1% (38)calcium channel blockers (p < 0.01); 67.1% (47) – diuretics (p < 0.01).

Conclusion: These results show very poor IHD modifiable risk factors control efficacy. The only effectively controlled risk factor is AH. The majority of patients don’t want to quit smoking, are still overweight, centrally obese and have raised cholesterol. Compliance to therapy remains on suboptimal level. Administration of every medication group by the patients after acute coronary syndrome is insufficient.

In addition, HDL-C levels in smokers with CAD were significantly lower than non-smokers with CAD (39% vs. 52% ± 14 mg/dL, p = 0.019). Smokers were younger than non-smokers (60 ± 11yrs, vs. 66 ± 11yrs, p < 0.0001), and smokers with CAD were younger than non-smokers with CAD as assessed by MDCT (63 ± 10yrs. vs. 68 ± 9yrs., p < 0.0001).

Finally, we divided the patients with CAD into quartile according to age (39-69yrs., 60-67yrs., 68-73yrs., 73yrs. ± 14yrs). HDL-C levels in the first group were significantly lower than that in the fourth group (p = 0.031). Percentage of smoker [54%(first group), 39%(second), 26%(third), 17%(fourth)] significantly lower than that in the fourth group (p = 0.031). Percentage of smoker [54%(first group), 39%(second), 26%(third), 17%(fourth)] significantly increased as the age decreased (trend p = 0.0053). In conclusion, smoking associated with lower HDL-C levels may increase the risk of early atherosclerosis onset. For this reason, we analyzed whether HDL-C levels in smokers and non-smokers associate with onset of coronary artery disease (CAD) as assessed by MDCT coronary angiography as screening. The subjects consisted of 513 consecutive patients and underwent MDCT. Although there was no significant difference in percentage of CAD patients between smokers and non-smokers (27% vs. 29%, p = 0.623), CAD in smokers was more severe than that in non-smokers [48/40/13 (vessel disease, 1/2/3) vs. 68/22/11, p = 0.0488]. Smokers were younger than non-smokers (60 ± 11yrs. vs. 66 ± 11yrs, p < 0.0001), and smokers with CAD were younger than non-smokers with CAD as assessed by MDCT (63 ± 10 yrs. vs. 68 ± 9 yrs., p < 0.0001).

In addition, HDL-C levels in smokers with CAD were significantly lower than those in non-smokers with CAD (46 ± 14mg/dL vs.52 ± 14 mg/dL, p < 0.019). Finally, we divided the patients with CAD into quartile according to age (39-69yrs., 60-67yrs., 68-73yrs., 73yrs. ± 14yrs). HDL-C levels in the first group were significantly lower than that in the fourth group (p = 0.031). Percentage of smoker [54%(first group), 39%(second), 26%(third), 17%(fourth)] significantly increased as the age decreased (trend p = 0.0053). In conclusion, smoking associated with lower HDL-C levels may increase the risk of early onset of CAD as assessed by MDCT.

In recent years, a number of studies have reported that exposure to smoking reduces serum HDL cholesterol (HDL-C) levels and smoking increases the risk of early arteriosclerosis onset. For this reason, we analyzed whether HDL-C levels in smokers and non-smokers associate with the onset of coronary artery disease (CAD) as assessed by MDCT coronary angiography as screening. The subjects consisted of 513 consecutive patients and underwent MDCT. Although there was no significant difference in percentage of CAD patients between smokers and non-smokers (27% vs. 29%, p = 0.623), CAD in smokers was more severe than that in non-smokers [48/40/13 (vessel disease, 1/2/3) vs. 68/22/11, p = 0.0488]. Smokers were younger than non-smokers (60 ± 11yrs. vs. 66 ± 11yrs, p < 0.0001), and smokers with CAD were younger than non-smokers with CAD as assessed by MDCT (63 ± 10 yrs. vs. 68 ± 9 yrs., p < 0.0001).

The main objective of this study is to raise the standard of preventive cardiology through more lifestyle intervention, good control of cardiovascular risk factors and optimal use of prophylactic drug therapies in order to reduce the risk of developing cardiovascular disease in high risk individuals. One key point in the protocol is to assess the efficacy of treatment in EuroAspire III patients through optimizing the medication according to current guidelines, so that every patient receives the appropriate cardiovascular prevention treatment.

Conclusion: The tested combined nutraceutical maintained its antiatherosclerotic activity and its perfect tolerability over 12 months.

Conclusion:

The reduction of cholesterolemia by conventional drugs is associated to significant improvement in some biomarkers of vascular remodeling, namely metalloproteinases (MMP) 2 and 9 and their inhibitors, in patients with CAD. The aim was to evaluate the 12 month efficacy of systemic inflammation reduction by a largely used antiatherosclerotic combined nutraceutical when added to a Therapeutic Life-Style (TLS) against TLS alone.

Design and Methods: This is a 12-months, randomized clinical trials. We enrolled 269 non smoker hyperlipidaemic patients in primary prevention for cardiovascular disease, 214 of which completed the trial with a good compliance: 129 men and 85 women. All subjects were non diabetics nor treated with antihyperlipidaemic drugs. 79 nonweight normoweight subjects (Group 1) were treated with a combined nutraceutical (Armolipid Plus® - ALP, Rotapharm-Madaus SpA, Monza), 1 associated with a standardized TLS (third Adult Treatment Panel of the National Cholesterol Education Program), 85 overweight with ALP-TLS (Group 2), and 50 overweight with just TLS (Group 3). Educational reinforcements were planned each 4 months.

Results:

The overweight treated with TLS experienced a significant improvement in MMP-2 (-279 ± 255 ng/mL, p < 0.05), MMP-9 (-17 ± 54 ng/mL, p < 0.05), TIMP-1 (-31 ± 74 ng/mL, p < 0.05), and TIMP-2 (-19 ± 65 ng/mL, p < 0.05). All parameters improved significantly more in Group 2 than in group 3, while MMP-9, TIMP-1 and TIMP-2 more in Group 1 than in group 3. No significant difference has been observed in improvement between Group 1 and 2. The treatment was very well tolerated along the study.

Conclusion: The tested combined nutraceutical maintained its antiatherosclerotic activity and its perfect tolerability over 12 months.

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Design and Methods: This is a 12-months, randomized clinical trials. We enrolled 269 non smoker hyperlipidaemic patients in primary prevention for cardiovascular disease, 214 of which completed the trial with a good compliance: 129 men and 85 women. All subjects were non diabetics nor treated with antihyperlipidaemic drugs. 79 nonweight normoweight subjects (Group 1) were treated with a combined nutraceutical (Armolipid Plus® - ALP, Rotapharm-Madaus SpA, Monza), 1 associated with a standardized TLS (third Adult Treatment Panel of the National Cholesterol Education Program), 85 overweight with ALP-TLS (Group 2), and 50 overweight with just TLS (Group 3). Educational reinforcements were planned each 4 months.

Results:

The overweight treated with TLS experienced a significant improvement in MMP-2 (-279 ± 255 ng/mL, p < 0.05), MMP-9 (-17 ± 54 ng/mL, p < 0.05), TIMP-1 (-31 ± 74 ng/mL, p < 0.05), and TIMP-2 (-19 ± 65 ng/mL, p < 0.05). All parameters improved significantly more in Group 2 than in group 3, while MMP-9, TIMP-1 and TIMP-2 more in Group 1 than in group 3. No significant difference has been observed in improvement between Group 1 and 2. The treatment was very well tolerated along the study.

Conclusion: The tested combined nutraceutical maintained its antiatherosclerotic activity and its perfect tolerability over 12 months.

Conclusion:

The reduction of cholesterolemia by conventional drugs is associated to significant improvement in some biomarkers of vascular remodeling, namely metalloproteinases (MMP) 2 and 9 and their inhibitors, in patients with CAD. The aim was to evaluate the 12 month efficacy of systemic inflammation reduction by a largely used antiatherosclerotic combined nutraceutical when added to a Therapeutic Life-Style (TLS) against TLS alone.

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care physician offices, consisting in lifestyle advice and medical recommendation update.

Results: The weight has decreased from 78.78 ± 16 to 75 ± 15.03 kg (p = 0.018); the body mass index has decreased from 28.64 ± 5.3 to 27.87 ± 4.89 (p = 0.054); the male’s waist circumference (cm) has decreased from 102.2 ± 10.9 to 98.89 ± 11.3 (p = 0.353) the women’s waist circumference (cm) has decreased from 93.75 ± 13.6 to 91.71 ± 12.57 (p = 0.19); the total cholesterol (mg/dl) has decreased from 214.39 ± 44.17 to 203.8 ± 42.26 (p < 0.001); the HDL cholesterol (mg/dl) has decreased from 127.78 ± 37.51 to 118.5 ± 35.51 (p < 0.001); the LDL cholesterol (mg/dl) has decreased from 56.14 ± 15.38 to 54.20 ± 14.48 (p = 0.098); the triglycerides has increased from 128.5 ± 48.5 to 140 ± 49.5 (p = 0.160). The number of patients who reached the target for total cholesterol has increased from 60 to 198. The number of patients who reached the target for LDL cholesterol has increased from 32 to 160.

Conclusions: Our results show the importance of lifestyle changes throw the multidisciplinary intervention on this kind of high risk patients. The empowerment in primary care practise is the key of long term patients risk reduction.

PP2.50 THE IMPACT OF FRUIT AND VEGETABLE INTAKE ON BLOOD PRESSURE IN PATIENTS WITH CORONARY HEART DISEASE

V. Heazlewood, K. Kotsева, E.L. Turner, D. Wood. 1Caboolture Hospital Queensland Health, Caboolture-Australia, 2Imperial College, London-United Kingdom, 3London School of Hygiene and Tropical Medicine, London-United Kingdom.

Objective: Though previous studies have demonstrated that healthy eating behaviour favourably affects blood pressure, we examined the specific effect of a reasonable intake of fruit and vegetables on this parameter.

Design and Method: A post-hoc analysis of 942 patients with coronary heart disease in the intervention arm of the cluster randomised controlled EUROACTION study conducted in 6 European countries assessed degree of blood pressure control after 12 months of >400 g of fruit and vegetables per day (5 or more servings). The multidisciplinary cardiovascular disease prevention programme involved intervention with both lifestyle and medical risk factor management. Achievement of blood pressure target (<140/90 or <130/85 for people with diabetes) as well as mean systolic and diastolic blood pressure outcomes were measured.

Results: The unadjusted odds ratio (OR) of this target fruit and vegetable consumption achieving blood pressure target was 1.37, CI 1.02,1.84, p = 0.035, controlling for multiple confounding factors, though it was attenuated when controlling for study centre (1.21, CI 0.85,1.71, p = 0.294) and clinical diagnosis (1.29, CI 0.96,1.74, p = 0.093). However, for both these factors, an association between attaining fruit and vegetable target and blood pressure target was demonstrated (p < 0.001). Lower systolic (mean difference 3.9 mm Hg, CI 1.16,6.6, p = 0.006) and diastolic (mean difference 2.2 mm Hg, 0.7,3.8, p = 0.004) pressures were noted in those achieving fruit and vegetable target. A negative correlation was found between daily fruit and vegetable consumption and diastolic pressure (r = 0.0797, p = 0.014) with a similar trend for systolic pressure (r = -0.0582, p = 0.074).

Conclusions: Fruit and vegetable intake of > 400 g per day benefits blood pressure control in free-living patients with coronary heart disease in a broad clinical context and timeframe, thereby having the potential for considerable economic and population health gains.

PP2.51 CONCORDANCE OF HEALTHY EATING BEHAVIOURS AND LIFESTYLE IN PATIENTS WITH CORONARY HEART DISEASE UNDER MULTIDISCIPLINARY CARE

V. Heazlewood, K. Kotsева, E.L. Turner, D. Wood. 1Caboolture Hospital Queensland Health, Caboolture-Australia, 2Imperial College, London-United Kingdom, 3London School of Hygiene and Tropical Medicine, London-United Kingdom.

Objective: Since compliance with certain behaviours, such as fruit and vegetable intake, yields benefits on blood pressure, we wanted to explore the possibility of such healthy behaviours clustering in individuals seeking to achieve blood pressure control.

Design and Method: In a post-hoc analysis of the cluster randomised controlled intervention EUROACTION trial performed in 6 European countries involving a multidisciplinary cardiovascular disease prevention programme addressing lifestyle and medical risk factor management, we studied 942 intervention patients with coronary heart disease (CHD) after 12 months. Using the continuous vari-

able of daily fruit and vegetable intake (g per day) as a comparator, various lifestyle and dietary behaviours (such as smoking status, alcohol consumption, physical activity and dietary intake of fish and saturated fat) were examined for possible association with the comparator.

Results: Higher fruit and vegetable consumption was associated with non-smoking status (p < 0.001), general (white and oily) fish consumption (p < 0.001), oily fish consumption (p = 0.026), alcohol limitation target (p = 0.004) and physical activity target (p = 0.01) achievements. Similarly, positive correlations were demonstrated between fruit and vegetable intake and intake of general (r = 0.1695, p < 0.001) and oily fish (r = 0.2022, p < 0.001); negative correlations were shown for saturated fat intake (r = -0.1901, p = 0.0003) and alcohol ingestion (r = -0.0817, p = 0.012).

Conclusions: CHD patients motivated to consume a higher intake of fruit and vegetable per day demonstrate other healthy eating (saturated fat, general and oily fish) and alcohol drinking behaviour, physical activity and non-smoking status, indicating concordance of these desirable behaviours which cumulatively can greatly enhance health outcomes.

PP2.52 EFFECT OF A HIGH-CALCIUM ENERGY-REDUCED DIET ON INFLAMMATORY STRESS AND ENDOTHelial FUNCTION IN BRAZILIAN OBESE SUBJECTS


Background: Obesity is characterized by lower-grade systemic inflammation, which has been linked to increased risk of endothelial dysfunction. Recent evidence suggests that, in obese individuals, calcium-rich diets help reduce adiposity and inflammation, but it is not known if it also helps reduce endothelial dysfunction.

Objective: To evaluate, during energy restriction, the effects of dietary calcium on inflammation, fibrinolysis and endothelial function in obese subjects.

Methods: Randomized clinical trial. Fifty subjects with grade 1 obesity, both gender, aged 22-55 years, with stable body weight and a low habitual calcium intake (<500mg/day) were randomized into a low calcium diet (LCD; <500mg/day; n = 25) or a high calcium diet (HCD; ≥1200mg/day; n = 25), supplemented with nonfat powdered milk (60g/day). Both groups were instructed to follow an energy restricted diet (-800Kcal/day) with similar levels of macronutrients, throughout the study (16 weeks).

Results: After 16 weeks of intervention subjects in HCD compared with those in LCD exhibited a greater reduction in body weight (-5.1 ± 0.8 vs.-3.8 ± 0.6kg), however the observed difference between the 2 diets was not statistically significant. Participants HCD and LCD presented similar reductions in serum levels of plasminogen activator inhibitor-1 (-5 ± 3 vs. -1,1 ± 0.9, respectively, p = 0.79); biomarkers of inflammation [C-reactive protein (-0.05 ± 0.02 vs.0.06 ± 0.4mg/l, respectively, p = 0.76) and tumor necrosis factor-α (–0.1 ± 0.3 vs. –0.7 ± 0.4pg/ml, respectively p = 0.64)]; and biomarkers of endothelial dysfunction [vascular cell adhesion molecule-1 (–15 ± 6 vs. –24 ± 11pg/dl, respectively p = 0.87), intracellular adhesion molecule-1 (–115 ± 57 vs. –52 ± 41pg/dl, respectively p = 0.53) and E-selectin (–3.2 ± 1 vs. –2.4 ± 1pg/dl, respectively p = 0.55)].

Conclusion: The present study suggests that a high calcium diet does not enhance the beneficial effects of energy restriction on inflammatory state, fibrinolysis and endothelial function in obese individuals.

PP2.53 THE EFFECT OF DIETARY COUNSELING ON LONG-TERM WEIGHT LOSS IN HYPERTEensive PATIENTS WITH EXCESS BODY WEIGHT


Background: Several studies have shown that body mass index (BMI) is directly associated with blood pressure and prevalence of hypertension. Overweight and obese hypertensive patients are advised to lose weight to ideally reach a BMI lower than 25 kg/m². However, decreases in blood pressure occur before reaching the desirable body weight. Clinically significant weight loss can be obtained with relatively short-term (6m to 1y) dietary interventions. However, weight regain is a common problem, and the effect of dietary counseling on long-term weight change is unclear.
Objective: To evaluate the effect of dietary counseling on long-term weight loss in hypertensive individuals with excess body weight.

Methods: Longitudinal study. In this study, were included patients who had a first individual consultation with a nutritionist scheduled between January 2002 and December 2005 and were followed-up for 4y in a Hypertension Clinic. Patients who had at least 4 consultations during the follow-up period were included in the dietary counseling group (DCG). Subjects who scheduled their first consultation but missed the appointment or had less than 4 consultations during the follow-up were allocated in the control group (CG). Energy intake was formulated to provide 20-25 kcal/kg actual body weight/day with ± 15-20% of calories from protein, ± 25-30% from fat and ± 50-60% from carbohydrate.

Results: 102 subjects with mean age 55 ± 1y (58 in DCG; 44 in CG) were included in the analyses. Participants in DCG compared with subjects in CG exhibited significantly greater reduction in body weight (-3.6 ± 0.8 vs 0.8 ± 0.7kg, p = 0.001), that remained significant after controlling for the use of different drugs. Weight loss between 5.0% and 9.9% was observed in a significantly higher percentage of individuals in DCG (28 vs.11%). Only participants in the DCG presented weight loss of 10% or more. Comparisons between groups of changes, during follow-up, in metabolic variables and blood pressure values, showed that in CG all these parameters did not present a significant change. However, in DCG there was a significant reduction in total cholesterol and triglycerides. The percentage of participants who increased the number of antihypertensive agents and/or increased the dose of these drugs in DCG was significantly lower than in CG: 36 vs.64%(p = 0.007).

Conclusion: The findings of the present study suggest that long-term dietary counseling may have beneficial effects on weight loss in hypertensive patients with excess body weight.

Introduction: Menopause transition is characterized by ovarian failure with consequent redistribution of body fat that predisposes women to cardiovascular disease and metabolic syndrome.

Objectives: To identify the effect of a hypocaloric diet and aerobic physical exercise on cardiovascular risk factors of obese women in fertile age and after menopause.

Patients and Methods: Sixty one overweight/obese people were divided in four groups, Group 1 (G1):9 men, Group 2 (G2):18 menopausal women, Group 3 (G3):10 fertile women without oral contraception pills and Group 4 (G4):24 fertile contraceptive users women. We evaluated: i) anthropometric parameters; ii) hemodynamic parameters, (Flinpress); iii) autonomic nervous system, (Fast Fourier Transform). Baroreceptor spontaneous gain (alpha index) in tracing with cross-spectral coherence. Follow up of one year with implementation of Mediterranean diet and prescription of aerobic physical exercise.

Results: Means difference between First (F) and Last (L) Evaluation. (F/L Evaluation) Weight G1: - 5.4 ± 1.5p < 0.00), G2: -6.3 ± 5.0p < 0.00), G3: -6.3 ± 3.7p < 0.00), G4: – 6.1 ± 3.0p < 0.00); (F/L Evaluation) BMI G1:– 1.6 ± 0.7p < 0.00), G2:– 2.5 ± 2.0p < 0.00), G3:– 2.6 ± 1.4p < 0.00), G4:– 2.4 ± 1.2p < 0.00); (F/L Evaluation)WC G1:– 4.6 ± 2.8p < 0.00), G2:5.2 ± 4.3p < 0.00), G3:– 5.2 ± 2.8p < 0.00), G4:– 7.1 ± 5.5 (p < 0.00); (F/L Evaluation) SBP G1:– 16.2 ± 18.9p < 0.03), G2: – 19.7 ± 11.4p < 0.00), G3:– 14.1 ± 12.1 (p < 0.04), G4:– 15.9 ± 12.5p < 0.00); (F/L Evaluation)DBP G1:– 13.6 ± 11.8p < 0.00), G2:– 15.2 ± 11.7 (p < 0.00), G3:– 12.8 ± 12.2p < 0.00), G4:– 12.6 ± 11.1p < 0.00); (F/L Evaluation)HR G1:– 5.7 ± 10.8 (p < 0.00), G2: – 7.3 ± 7.9p < 0.00), G3:– 10.5 ± 8.5p < 0.00), G4:– 5.3 ± 6.7p < 0.00); (F/L Evaluation) BF_RR G1:440.7 ± 32.4 (ns), G2:– 300.1 ± 17.7p < 0.05), G3:– 40.3 ± 27.5 (ns), G4:– 78.5 ± 20.7 (ns); (F/L Evaluation) LF SBP G1:– 2.1± 1.7p < 0.02), G2:– 2.2± 0.5p < 0.00), G3:– 2.3± 0.6p < 0.00), G4:– 1.6± 1.04 (p < 0.00); (F/L Evaluation) BR td G1:1.43 ± 1.0 (ns), G2:3.3 ± 0.7p < 0.00), G3:2.5 ± 0.5p < 0.00), G4:4.2 ± 0.6p < 0.00); (F/L Evaluation)Adrenaline G1:– 1.6 ± 1.0, G2:– 3.8 ± 2.2 (ns), G3:– 7.7 ± 4.1 (ns), G4:– 5.6± 3.6 (ns); (F/L Evaluation) LF G1:± 4.8 ± 3.9p < 0.00), G2:– 5.9 ± 4.0p < 0.00), G3:– 5.8 ± 2.6 (p < 0.00), G4:– 3.4 ± 2.9p < 0.00).

Conclusions: The implementation of a Mediterranean type diet with aerobic physical exercise presented benefits in men and women, menopausal or fertile, with or without oral contraception. We must highlight the improvement of autonomic and endothelial dysfunction in menopausal women.
mmHg) and DBP (+3 mmHg) increase, in a different way people who ate a full vegetable side dish had a decrease of both SBP (-2 mmHg), and DBP (-4 mmHg). As regards beverage intake we didn’t observe any different trend among who drunk water, wine or beer and even invasive beverages (coffee, tea or coke).

**Conclusions:** By the light of these data we can conclude that after a habitual meal SBP and DBP lightly decrease except for hypertensive subjects on pharmacological therapy, and for those who had a high glycemic index meal or a completely animal protein composed meal. These data seems to confirm that glycemic peak may be associated with blood pressure variation, may be for a prompt rise of insulin secretion. On the other side not-starchy vegetables intake may be protective.

**PP2.57 QUALITY OF LIFE AND HYPERTENSION IN THE ELDERLY**


First Department of Propaedeutic Medicine, Medical School of Athens, Athens-Greece

**Objective:** The quality of life represents a significant factor that must be taken under careful consideration during the management and follow up of a hypertensive patient. The purpose of this study to examine the influence of arterial hypertension and its pharmacological medication to the quality of life of patients over 65 years old.

**Design and Method:** The study population consisted of 400 individuals members of a Community center for elderly in Athens. They were divided in two groups. Group A (250 persons) were known hypertensives under treatment. Group B (150 persons) were normotensives. They all had A complete medical examination, including medical history, physical examination, and standard laboratory tests. Moreover they all answered a WHOQL-BREF (100) questionnaire which is examines quality of life concerning the following parameters physical, psychological, environmental and public relationships.

**Results:** The demographic parameters were similar in the two groups except of blood pressure which showed a statistical significant difference (group A mean BP = 145.9/84.1 mmHg, group B mean BP = 139.8/80.9 mmHg). The quality of life indicators (QLI) showed a deterioration with age in both groups in all the participants. There was no difference in the QLI between the two groups.

**Conclusions:** As indicated from the results of our study, the age and not the hypertension and its treatment, influences the quality of life of the elderly persons. This is an important element that must be taken under consideration from doctors treating patients with hypertension.

**PP2.58 RELATIONSHIP BETWEEN BLOOD PRESSURE CONTROL STATUS AND LIFESTYLE IN HYPERTENSIVE OUTPATIENTS**

Y. Otta, T. Tsuchihashi, K. Kiyohara. National Kyushu Medical Center, Fukuoka-Japan

**Objective:** Lifestyle modification as well as combination antihypertensive therapy is necessary to achieve strict blood pressure (BP) control advocated by the guidelines for the treatment of hypertension. The aim of this study is to investigate the relationship between BP control status and lifestyle in hypertensive outpatients after the publication of the Japanese Society of Hypertension guideline (JSH 2009).

**Design and Method:** Subjects are 661 hypertensive outpatients (mean age: 66 ± years; Male 299, Female 362) who had been followed at National Kyushu Medical Center, Fukuoka, Japan. We assessed BP control status based on the average clinic BP on two occasions between May and June in 2010. In addition, we investigated the adherence to the individual items of lifestyle modification by a questionnaire.

**Results:** In all subjects, average BP in 2010 was 129 ± 10/71 ± 11 mmHg and overall rate of achieving goal BP significantly increased from 2008 to 2010 (45.5 vs. 60.1%). This improvement was observed in each category of target BP (elderly <150/80 mmHg: 74.5% vs 83.3%, young/middle age <140/85 mmHg): from 42.3% to 56.7% and diabetes mellitus (DM)/chronic kidney disease/myocardial infarction (<130/80 mmHg: from 26.4% to 45.5%). Although Ca channel blockers and AII receptor blockers were mainly prescribed in all BP category groups, diuretics were more frequently prescribed in 2010 than in 2008 (20.1 vs. 10.8%). Adherence to each item of lifestyle modification advocated by JSH 2009 was as follows: Patients who answered to be conscious about salt restriction was 80.9 %, those with increased intake of fruits/vegetables was 79.0%, reduced intake of cholesterol/saturated fatty acids was 67.9%, presence of obesity was 37.7%, daily exercise for ≥ 30 min was 31.9%, habitual alcohol intake was 38.0 %, habitual smoking was 9.8%. Only 22.5 % of the patients had no lifestyle items to be modified. The other hand, 32.0 % of patients had one, 25.9 % of patients had two, and 19.6% of patients had more than three items to be modified. Subjects with more than 3 lifestyle items to be modified are more frequently found in young, male, and obese groups. The patients with uncontrolled BP tended to have more lifestyle items to be modified.

**Conclusion:** We conclude that the prevalence of patients achieving goal BP significantly increased by the intensive combination therapy including diuretics. The young, male and obese patients had more lifestyle items to be modified, suggesting the importance of leading these patients to modify individual lifestyle items.

**PP2.59 DYSLIPIDEMIA AGGRAVATES QUALITY OF LIFE OF HYPERTENSIVES**

V. Kati, G. Souretis, D. Tousoulis, C. Vlachopoulos, C. Stefanadis, I. Kallikazaros. Hippokration Hospital, Athens-Greece

**Background:** Essen al hypertension (EH) has a negative impact on health related quality of life (H-rQoL) while dyslipidemia very often accompanies the hypertensive sequela. We assessed the hypothesis that the combination of EH and dyslipidemia may have an additive effect on H-rQoL.

**Methods:** We studied 145 subjects with newly diagnosed stage I-II untreated EH patients (aged 56 ± 7 years; 47 ± dyslipidemic, office blood pressure = 156/92 mmHg). Venous sampling was performed for estimation of lipidemic profile. The validated Greek version of Short Form 36 (SF-36) General Health Survey questionnaire was administered. The 8 subscales of SF-36 were further grouped into two summary scales: the physical component summary scale (PCS) and the mental component summary scale (MCS). Non-parametric Mann-Whitney and Spearman rho tests were performed.

**Results:** Dyslipidemic hypertensives demonstrated significantly lower scores in all SF-36 dimensions compared to non dyslipidemic (Table). There was a negative correlation between scores in general health and the total SF-36 score with serum triglycerides level (r = -0.284 p = 0.009, r = -0.287 p = 0.014, respectively).

**Conclusions:** Dyslipidemia exerts an additive detrimental effect on quality of life in the setting of essential hypertension. Whether the above mentioned association contributes to the high cardiovascular risk observed in those patients remains to be determined in future studies.

**Comparison of SF-36 scores between dyslipidemic and non dyslipidemic hypertensives**

<table>
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<tr>
<th></th>
<th>DYSLIPIDEMIA (n=47)</th>
<th>NO DYSLIPIDEMIA (n=98)</th>
<th>P-VALUE</th>
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<td>51.76</td>
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<td>Bodily Pain</td>
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<td>Total SF-36 SCORE</td>
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</tbody>
</table>

**PP2.60 THE INFLUENCE OF PHYSICAL ACTIVITIES IN BLOOD PRESSURE IN ADOLESCENTS**

V. C. Romero Martinez, E.R Silva, J.J Villasmil, G.A Bermudez, F Madueño. Instituto De Investigacion Y Estudios De Enfermedades Cardiovasculares, Maracaibo-Venezuela
Objective: This study examined the relationship between physical activities (PA) with Blood Pressure (BP) in adolescents.

Design and Methods: The participants were 3725 adolescents, males (n = 1645) and females (n = 2080), age- mean = 14 years, (SD = 1.7) who were blood pressure recorded in two school days, in sitting position and using oscillometric method (DINAMAP). All adolescents answered questions about presence of physical activity with two options to answer: practice physical activity or not practice physical activity and hours per week.

Results: The presence of practice physical activity was 85.3% (n = 3179) and 14.7% (n = 1559) for adolescents who do not practice physical activity, in all adolescents. As for the hours of physical activity per week we have that 41, 14.7% (n = 546) for adolescents who do not practice physical activity, in all adolescents. The Pearson correlation showed significant correlation 0.001 between diastolic blood pressure and physical activity (Pearson correlation: r = .105**/I p = .000).

Conclusions: Physical activity reduces diastolic blood pressure in adolescents. Therefore be included as a healthy habit of daily exercise program for all adolescents.

PP.2.61 EFFECT OF PROTEIN DIET IN BLOOD PRESSURE AND HEALTH RISK

Nieves Escribano, Pilar Zaffrilla, Jose A. Gomez, Jose Abellan, Juana Mulero. Ucam, Murcia-Spain

Purpose of Study: To evaluate the effect of a protein diet on blood pressure and Health Risk.

Materials and Methods: We conducted a descriptive study, in which the sample population included 50 individuals of both sexes (24% male and 76% female) aged between 18 and 68 years old. All patients included in the study signed the consent, in accordance with international recommendations on Clinical Investigation of the Declaration of Helsinki. The study was performed in Murcia (south-east Spain). All patients were overweight (BMI = 25) or obese (BMI = 30). Patients were not treated with antihypertensive drugs. Patients were subjected to a protein diet for 4 months with samples taken every 15 days during the active phase, in which their physical state (current weight, changes in their eating habits, entry or expansion of physical exercise), blood pressure, and dietary reeducation were recorded. To assess the Health Risk, we used the criterion proposed by WHO, which states that there is a direct relationship between BMI and the increase of digestive and respiratory diseases, cancer, cardiovascular disease and Type 2 Diabetes Mellitus. Data were processed using SPSS v. 15.0.

Results: The initial mean systolic blood pressure of the sample population was 128.4 ± 14.6 mmHg (men: 128.7 ± 11.4 mmHg; women: 128.3 ± 15.4 mmHg (p = 0.05)). The initial average diastolic blood sample population was 78.8 ± 9.8 mmHg (men: 80.7 ± 11.5 mmHg; women: 78.4 ± 9.4 mmHg (p = 0.05)). After 4 months of protein diet the average systolic pressure in the sample population was reduced 13.1 ± 9.8 mmHg, being higher the average decrease in systolic pressure in women than in men (10.0 ± 1.6 mm Hg and 9.1 ± 2.7 mmHg respectively (p = 0.05)). The mean diastolic blood pressure also decreased 7.8 ± 7.2 mmHg, showing a greater decrease in men (8.0 ± 2.4 mmHg) than in women (7.0 ± 1.1 mmHg), although no significant differences were found (p = 0.05). In contrast, the mean systolic and diastolic blood pressure did not change during 4 months in patients who underwent a hypocaloric diet (1200-1500 Kcal/day). The population sample initially had the following Health Risks: 14% very high Health Risk, 16% high, 42% moderate and 28% low Health Risk. After 4 months of follow-up protein diet very high Health Risk decreased from 14% to 0%, high risk from 16% to 4% of, and moderate risk from 42% to 14%. Low Health Risk increased from 28% to 50%.

Conclusions: The protein diet and lifestyle habits associated with this type of diet are effective in lowering the systolic and diastolic blood pressure and also reduces the health risk associated with BMI.

PP.2.62 ADAPTED PHYSICAL ACTIVITY AND PULSE PRESSURE IN ELDERLY PEOPLE WITH CHRONIC OBSTRUCTIVE BRONCHOPNEUMOPATHY

F. D’amico1, R. Grasso2, L. Bitto1. 1 Department of Geriatrics Hospital of Patti-School of Medicine University of Messina, Messina-Italy, 2Department of Geriatrics Hospital of Patti, Messina-Italy, School of Medicine University of Messina, Messina-Italy

Objective: Exercise for elderly subjects must match their physical ability. Our goal is to evaluate the effects of adapted physical activity (APA) on Pulse Pressure (PP) in elderly people affected by chronic obstructive bronchopneumopathy.

Design and Methods: 27 sedentary ageing people (18 Males mean age 71 ± 5, 7 Females mean age 66 ± 3) (grade I and II according to 2007 GOLD guidelines) were included. They were split in a randomised way into group APA and group Control (C). APA subjects underwent an indoor aerobic training on a 3 days per week, 60 min. each time basis programme for 6 months. Design of the study included before and after follow-up: 1) Spirometry; 2) Oxygen saturation; 3) Ambulatory Blood Pressure Measurement (ABPM); 4) SF-12 Questionnaire for Quality of Life Measurement.

Results: Before and after follow-up among cardiorespiratory indexes we detected 1) FVC 2.82 ± 1.2 vs 2.99 ± 1.0 (p < 0.001); 2) O2 Sat% 93.7 ± 1.5 vs 97.5 ± 1.7 (p < 0.01); 3) SBB 155 ± 22 vs 136 ± 15 mmHg (p < 0.01), DBP 96 ± 14 vs 85 ± 15 mmHg (p < 0.01), PP 78.18 ± 4 vs 62.10 ± 3 mmHg (p < 0.05). The score 31 vs 25 in SF-12 (p < 0.001) before and after the follow-up showed an improvement of both physical and mental state.

Conclusion: An adapted physical activity in elderly people affected by chronic obstructive bronchopneumopathy can improve exercise endurance, vital forced ability and oxygen saturation. It can also induce a reduction of BP values, especially PP values, when combined with an effective antihypertension treatment.
The relationship between hyperuricemia and glucose metabolism values in patients with essential arterial hypertension

V. Bozhko, S. Koval, L. Reznik, M. Penkova. Institute of Therapy Amc of Ukraine, Kharkov-Ukraine

The work is aimed to evaluate a relationship between hyperuricemia (HU) and carbohydrate exchange parameters in patients with essential hypertension (EH).

Materials and Methods: 138 patients with essential hypertension were examined. Among them were 52 persons with HU and 86 persons with normal blood uric acid (UA). The examination included standard clinical methods, oral glucose tolerance test (OTT), measuring insulin and UA blood level. HU diagnosed in blood UA level > 360 μmol/l.

Results: Some significant differences were revealed in carbohydrate exchange values between the hypertensive patients with and without HU. The frequency of glucose intolerance was higher in patients with EH and HU (18.5% in males and 12.0% in females) with hypertensives without HU (2.4% in males, p < 0.05 and 2.2% in females, p < 0.05, correspondingly). In this case there were significant differences in fasting abnormal glycemia in both group of patients. Glucose concentration in dynamics of OTT was reliably higher in hypertensives with HU (5.96 ± 0.12 mmol/l for males, p < 0.05 and 5.75 ± 0.13 mmol/l for females compared with patients who had EH without HU (5.12 ± 0.09 mmol/l for males, p < 0.05 and 5.09 ± 0.13 mmol/l for females, p < 0.05, correspondingly). The fasting blood glucose level had no differences between two groups of patients in this case. In males with EH and HU blood insulin level was significantly higher compared with hypertensives males without HU (17.7 ± 4.9 μU/ml vs 10.9 ± 1.9 μU/ml p < 0.05, correspondingly). Among hypertensive females there were no differences blood level depending on HU. Insulin resistance index (HOMA-IR) was found to be higher in hypertensive males with HU compared without EH (4.68 ± 0.13 vs 2.40 ± 0.22 correspondingly, p < 0.05). Among hypertensive females such differences were absent.

Conclusions: There is a reliable elevation in frequency of glucose intolerance in patients with EH and HU compared with those who have normal UA blood level. Hyperinsulinemia and insulin resistance is attributed to hypertensive males with HU. The data obtained show that HU is plaid a significant role in glucose metabolism abnormalities from hyperinsulinemia to glucose intolerance.

Arterial blood pressure and heart rate variability in persons after smoking cessation

M. Poreba, R. Poreba, P. Gac, W. Pilecki, M. Sobieszczanska. Wroclaw Medical University, Wroclaw-Poland

Introduction: Arterial hypertension and smoking habit are regarded as main risk factors for cardiovascular diseases. Analysis of heart rate variability (HRV) is a non-invasive and feasible method of evaluation of the autonomic nervous system function.

Aim: The aim of the study was to evaluate arterial blood pressure and parameters of time domain HRV in persons who quitted smoking.

Material and Methods: The study included 95 randomly selected (51 women, 44 men) aged 47.15 ± 9.34 years old. On the basis of the declaration of smoking habit in special questionnaires the participants were divided into 3 groups: group I consisted of 35 regularly smoking people; group II – 24 non-smokers, who quitted smoking at least 5 years ago; and group III – 36 individuals who have never smoked. In each of the examined subjects, basic anthropometric data were collected, as well as arterial blood pressure measurements with application of Korotkov method. 24-hour ECG Holter monitoring was also performed. Time domain parameters of HRV were analyzed: SDNN, SDNNi, SDANN, rMSSD and pNN50.

Results: There were no significant differences between mean values of arterial blood pressure in the study groups. Mean values of systolic and diastolic blood pressures were not significantly lower in group III than in group II, and lower in group II in comparison with group I (p > 0.05). ECG Holter analysis showed that the study groups did not differ in mean and minimal heart rate. Time domain HRV analysis revealed statistically significant lower values of SDNNi and SDANN, treated as markers of the sympathetic tone, in group I in compari- son with groups II and III (p < 0.05). The rest parameters of time domain HRV analysis in group I were only insignificantly statistically lower than in groups II and III; (p > 0.05). There were no significant differences between groups II and III; all the parameters of HRV time domain analysis were also not significantly lower in group II, of former smokers, than in group III (p > 0.05).

Conclusions: In smoking individuals lower values of HRV time domain analysis were present in comparison with non-smokers and with non-smokers who formerly quitted the habit. Persons who quitted smoking and who at least 5 years are non-smokers and non-smokers who have never smoked are charac- terized by similar values of time domain HRV analysis.

Analysis of cardiovascular risk in first-degree relatives of patients with acute myocardial infarction (FAMIU study).

M.D. Blanco1, I. Chucoev2, S. Del Pozo3, J. Ferrer2, M.A. Franco1, S. Balanzar1, I. Tovar1, P. Martin2, M. Leal1, J. Abeblan1, 1Hospital Rafael Mendez, Lorca-Spain, 2Universidad Catolica De Murcia, Murcia-Spain, 3Hospital Virgen De La Arrixacar, Murcia-Spain

Objectives: To analyze the cardiovascular risk (CVR) in first-degree relatives of infarcted patients and in a control group with no previous familiar cardiopathy. To evaluate the CVR according to the classic factors and study its correlation with new biochemical markers of CVR.

Design and Methods: A group of 96 first-degree relatives of infarcted patients was selected (FIAMG) and a control group (CG) of 46 individuals with no first-degree relatives with previously diagnosed coronary ischemia. The following variables were selected: age, sex, weight, height, body mass index (BMI), waist perimeter, blood pressure (BP), antecedents of hypertension, dyslipid- emia, diabetes, tobacco, alcohol consumption and physical activity. A complete analysis was performed with the following determinations: glucose, lipid profile (cholesterol, HDLc, LDLc, triglycerides), fibrinogen, von Willebrand factor, ultrasensitive PCR, interleukin-6 (chemiluminescence immunoassay), homocysteine, myeloperoxidase (MPO) and oxidized LDL ELISA. CVR was determined according to the Framingham and SCORE charts.

Results: The mean values in the FIAMG vs the CG were the following: glucose: 112,03 mg/dl ± 36,75, 104,65 mg/dl ± 21,28 (p = 0,210), choles- terol: 200,54 mg/dl ± 41,41, 195,95 ± 35,90 (p = 0,510), HDLc: 45,83mg/ dl ± 14,14, 48,17 mg/dl ± 14,09 (p = 0,367), LDLc: 126,40 mg/dl ± 54,92, 113,76 mg/dl ± 23,79 (p = 0,034), triglycerides: 129,91 mg/dl ± 82,63, 110,12 mg/dl ± 60,15 (p = 0,15), ultrasound PCR: 5,17 mg/dl ± 8,4, 4,13 mg/dl ± 3,18 (p = 0,293), IL-6: 5,05 pg/dl ± 6,9, 3,36 ± 3,4 (p = 0,059), LDL oxidative: 30,09 UI/ml ± 17,7, 26,84 U/ml ± 14,46 (p = 0,252), MPO: 1,44 U/L ± 0,85,1,13 U/L ± 0,79 (p = 0,037) and homocysteine: 14,66 umol/L ± 5,35, 19,74 umol/L ± 10,85 (p = 0,004). CVR measured by the Framingham chart in the FIAMG was of 16,3 ± 34,7 and in the CG 10,4 ± 10,9; ns. CVR measured by the SCORE chart in the FIAMG was of 17 ± 2,4 and in the CG 1,5 ± 2,5; ns.

Conclusions: The values of classic and emergent CVR factors were higher (except for HDL and homocysteine) in first-degree relatives of infarcted patients than in the control group. Nevertheless, no higher CVR in FIAMG, according to the Framingham and SCORE charts, was detected comparing with the CG.
PP.3.66 ECONOMIC BURDEN OF HYPERTENSION IN RUSSIAN FEDERATION
A. Kontocevaya, A. Kalinina. National Research Center for Preventive Medicine, Moscow-Russia

Purpose: To study the economic burden of hypertension in Russian Federation in 2006-2009.

Methods: The economic burden was calculated by the cost of illness method. The calculations included direct costs of healthcare system and indirect costs, associated with premature death and disability. We used official statistics of healthcare resources utilization, associated with hypertension (hospital days, outpatient visits, emergency visits), the results of pharmacoepidemiological surveys of hypertension, mortality and disability statistics in Russia in 2006-2009. The calculations did not include the costs of hypertension complications, such as stroke.

Results: The total economic burden of hypertension increased from 1.7 billions of euro in 2006 till 2.9 billions of euro in 2009 what was equal to 0.3% of GDP of Russian Federation. The increasing of the burden was mainly caused by the price increasing. Direct costs accounted 52.5% of total cost of hypertension, indirect costs – 47.5% in 2009. Direct cost associated with hypertension was 707.3 million of euro in 2006 and 1.4 billions of euro in 2009. In-hospital care represented 32.9% of direct costs, out-hospital visits – 42.8%, medication – 18.9% and emergency care 6.3% of direct costs in 2009, respectively.

Conclusion: Hypertension is a big public health challenge in Russia. The results of economic burden assessment should help policy makers evaluate policy impact and prioritize expenditures.

PP.3.67 PREVENTION OF CARDIOVASCULAR DISEASE: WHAT PHYSICIANS, WHO TREAT HYPERTENSIVE PATIENTS, KNOW ABOUT THEIR HEALTH
G. Radchenko1, I. Marzovenko2, Yu. Sirenko1. 'National scientific Center Institute of Cardiology, Kiev-Ukraine, 2Cardiology dispanser of Sum, Summy-Ukraine

The aim of study was to evaluate the prevalence of cardiovascular risk factors among physicians, who treated hypertensive patients. There were questioned 95 physicians who work and live in one of the Ukraine region. The questions included place of living, age, gender, when graduated, specialization, anthropometric data. When evaluating hemodynamic parameters average arterial blood pressure was 153/89 mm Hg. The level of professional stress is closely related with social factors and family history of early CVD. The methods of the research: psychological testing, Reeder scale of psychological stress. The first group includes 52 workers of the same profession with low stress level (45,8%). Acute psychotraumatic factors occurring in the first group were significantly higher (p<0,001) than in the second one. Group 1 was dominated by persons with lower education in 3 times (28,8 and 9,0% respectively; p<0,01). However, group 1 was dominated by single and divorced persons in 3 times compared with group 2 (26,9 and 8% respectively; p<0,01). The first group night sleep was on average 2.5 hours a day and in the second group it was 3,0 ± 1.0 hours (p<0,01). When evaluating, basic CVD risk factors showed that the family history of early CVD occurs with equal frequency in both groups (57.7 ± 18.9% respectively; p<0,01). In the first group sleep was 2.5 ± 0.6 hours a day and in the second group it was 3.0 ± 1.0 hours (p<0,01). When evaluating hemodynamic parameters average arterial blood pressure appeared to be at the level 121,5 ± 5,2/80,7 ± 2,1 in group 1. It was higher than average blood pressure at persons from group 2 (118,0 ± 3,8/75,4 ± 4,5) exceeding 3,3/3,3 (p<0,001). In the first group beer was drunk 2.5 ± 0.3 times in more than those with a moderate level of anxiety (90,3% and 65,6% respectively, p<0,01). Thus, the results indicate the influence of stress on behavioral risk factors such as: irregular meals, low physical activity, obesity, alcohol abuse, smoking. It determines the higher cardiovascular risk factors, dyslipidemia, elevated blood pressure. The level of professional stress is closely related with social factors (education level and marital status).

PP.3.68 ARTERIAL HYPERTENSION, RISK FACTORS AND INTEGRAL CARDIOVASCULAR RISK IN UNORGANIZED POPULATION OF MEN AGED 35 - 55 YEARS IN TYUMEN REGION
S. Shalaev1, V. Berezina1, I. Shutova2, S. Yartzev2, Z. Safiullina3. 1Tyumen Regional Clinical Hospital, Tyumen-Russia, 2Tyumen Health Administration, Tyumen-Russia, 3Tyumen Medical Academy, Tyumen-Russia

The aim of investigation was to determine prevalence of arterial hypertension, other cardiovascular diseases, risk factors of ischemic heart disease, to estimate the level of integral cardiovascular risk of fatal cardiac outcomes in unorganized population of men aged 35-55 years in Tyumen during prophylactic medical examination.

Material and Methods: From 1862 men of able-bodied population, which underwent medical examination, in the present research were included 1350 persons (72,5%) aged 46 ± 5.8 years. On base of the results of clinical examination, revealed risk factors, all investigated were divided into groups according to the level of one risk factor and the risk of other cardiovascular events. Model SCORE was used for calculation of risk of fatal cardiovascular events.

Results: The performed examination showed high efficacy in identification of new cases of arterial hypertension and diabetes mellitus. Number of cases of arterial hypertension increased from 27,5% to 36,4%, diabetes mellitus from 1,3% to 2,6%, ischemic heart disease from 7,9% to 8,6%. Among investigated men aged 35-55 years prevalence of arterial hypertension consisted 36,4%. At the age of 35-39 years – 116,5/1000 of corresponding age, at the age of 40-44 years – 406,4/1000, at the age of 45-49 years – 295,1/1000, at the age of 50-55 years – 568,0/1000. Revealing of new cases of arterial hypertension was the greatest among men aged 35-49 years. Among patients without cardiovascular diseases or their equivalents older than 40 years was estimated integral risk of fatal cardiovascular events according to model SCORE. Prevalence of fatal cardiovascular events among them consisted 11,9% at the age of 40-44 years, 19,1% at the age of 45-49 years, 26,1% at the age of 50-55 years.

Conclusion: The performed examination of men aged 35-55 years showed high efficacy in identification of patients with high risk of fatal cardiovascular events.

PP.3.69 THE INFLUENCE OF PROFESSIONAL STRESS LEVEL ON BEHAVIOURAL RISK FACTORS IN MEN OF STRESSFUL PROFESSION
I. Osipova1, O. Antropova1, A. Zalzman1, N. Pyritkova1, I. Komissarova1, I. Kurbatova1. 1Altay State Medical University, Barnaul-Russia, 2Departmental Clinical hospital of the Barnaul Station, Barnaul-Russia

The aim of this research is to study the effect of stress on behavioral risk factors.

The objective of the research: 96 men aged 22-55 years working as machinists and machinists-assistants at the depot were examined. Particular working conditions: Driving high-speed train in monopoly, prolonged stay in a forced pose, constant readiness for urgent action.

The methods of the research: psychological testing. Reeder scale of psychological stress, self-esteem scale of personal anxiety by Spielberg-Hanina, anthropometric measurements and risk factors for cardiovascular diseases(CVID) including total cholesterol.

The results of the research: 2 men groups were formed according to Reeder scale of psychological stress results. The first group includes 52 workers of locomotive brigades with high level stress (54,2%). The second one includes 44 workers of the same profession with low stress level (45,8%). Acute psychotraumatic factor as falling somebody down was met in the first group 1,5 times more frequently (p<0,001) than in the second one. Group 1 was dominated by persons with higher education in 3 times (28,8 and 9,0% respectively; p<0,01). However, group 1 was dominated by single and divorced persons in 3 times compared with group 2 (26,9 and 8% respectively; p<0,01). In the first group night sleep was on average 6,8 hours a day and in the second group it was 8,3 ± 0,3 hours a day that is 1,5 hours more (p<0,01). When evaluating, basic CVD risk factors showed that the family history of early CVD occurs with equal frequency in both groups (57.7 ± 18.9% respectively; p<0,01). In the first group blood pressure was 153.7/90.0 mm Hg. The level of professional stress is closely related with social factors (education level and marital status).

PP.3.70 KNOWLEDGE ON THE CAUSES AND COMPLICATIONS OF ARTERIAL HYPERTENSION IN RANDOMLY SELECTED STUDENTS FROM POLISH CITIES
P. Gac, R. Poreba, M. Poreba, M. Lemanski, K. Lewczuk, M. Zawadzki, K. Pawlas. Wroclaw Medical University, Wroclaw-Poland
**Introduction:** Arterial hypertension constitutes a well-known risk factor for cardiovascular diseases (CVD). It has been shown that the appropriate level of knowledge on CVD contributes to the effective decrease in the development of CVD complications in populations.

**Aim:** The aim of the study was to evaluate the extent of knowledge on the causes and complications of arterial hypertension in randomly selected students from Polish cities: Kielce, Wrocław and Zielona Góra.

**Material and Methods:** The study was carried out in a group of 232 students (mean age: 23.14 ± 1.23 years), among them students from Kielce constituted 37.5% of participants (group I, n = 87), students from Wrocław 29.7% (group II, n = 69), and students from Zielona Góra 32.8% (group III, n = 76). A special questionnaire filled anonymously by students was used in the study. In questionnaire questions on causes of arterial hypertension and its complications were included, as well as on dietary habits, physical activity, smoking habits, alcohol consumption, present health status, previous diseases, family history and environmental data.

**Results:** Among causes of arterial hypertension the most commonly selected answer was overweight and obesity (93.97% of the answers), drinking coffee (75.43%), stress (72.14%), smoking habit (71.12%), alcohol consumption (67.67%) and excessive consumption of salt (66.38%). Some participants indicated migraine headaches as the cause of arterial hypertension (29.31%), drinking excessive amounts of carbonated water (10.34%) and the impairment of visual acuity (8.19%). The incorrect answer chosen most often was drinking high amounts of coffee (75.43%). On the other hand, the most commonly missed important factor predisposing to the development of arterial hypertension was the incidence of kidney diseases (only 28.02% answers suggested the possible relation). Students have chosen myocardial infarction (89.22%), coronary artery disease (70.26%) and stroke (67.24%) as the common complications of arterial hypertension. The majority of respondents (76.29%) did not indicate chronic renal failure as the possible consequence of arterial hypertension.

**Conclusions:** Knowledge on arterial hypertension and its complications among students from randomly selected big Polish cities: Kielce, Wrocław and Zielona Góra is not sufficient and corresponds with the lack of the knowledge on CVD in general population.

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**PP3.72 PREDICTIVE ROLE OF ARTERIAL HYPERTENSION AND OTHER RISK FACTORS AFTER MYOCARDIAL INFARCTION: A PROSPECTIVE STUDY**

I. Sichkaruk, A. Yagensky, N. Sydor, L. Dukhnevych. Lutsk City Clinical Hospital, Lutsk-Ukraine

**Objective:** Cardiovascular mortality in Ukraine is one of the highest in Europe. Study was performed to assess prevalence, control and predictive role of risk factors in patients (pts) after myocardial infarction (MI).

**Design and Methods:** Representative sample of 333 pts with previous MI (69.6% men, mean age 62.5 ± 9.8 years) was selected from 2229 patients hospitalized in 2000-2005 with MI in Ukrainian city Lutsk. Mean time between MI and inclusion into the study was 902.5 ± 577.6 days. At baseline the home-based questionnaire, drug treatment assessment, blood pressure (BP), anthropometric measurements and laboratory tests were performed. Cardiovascular mortality (CVM) as well as composite cardiovascular endpoint (CCE) of recurrent MI, stroke and CVM was assessed. Mean time of observation was 1559.3 ± 374.4 days.

**Results:** At baseline AH prevalence was 84.1%, obesity – 58.0%, diabetes mellitus (DM) – 13.8%, hypercholesterolemia – 55.4%, smoking – 18.3%, hypodynamia – 21.6%. CVM rate was 17.4%, recurrent MI occurred in 6.6% pts, stroke – in 8.1% pts without gender difference. Pts who died were older (60.0 ± 8.1 vs 61.7 ± 10.0 years, p < 0.01), had higher BMI (30.7 ± 6.2 vs 29.3 ± 4.6 kg/m², p = 0.046), systolic BP (158.6 ± 30.3 vs 149.1 ± 28.1 mmHg, p = 0.023), HR (75.5 ± 12.0 vs 71.0 ± 12.9 bpm, p = 0.020), blood glucose level (7.3 ± 4.0 vs 5.8 ± 2.2 mmol/l, p < 0.01). AH was controlled only in 21.3% pts. CVM in pts with uncontrolled AH was significantly higher (20.6% vs 7.0% in controlled AH, p = 0.02). CVM was also higher in smokers (26.2% vs 15.4%; p = 0.04) and pts with DM (34.8% vs 14.6%; p < 0.01). Age (β = 0.04; β = 0.02, HR = 2.3), DM (β = 0.8; δ = 0.03, HR = 3.1), smoking (β = 0.7; δ = 0.02, HR = 2.0) were independent predictors for CVM in Cox proportional multiple regression analysis. CCE was reached by 26.7% of pts. Pts who reached CCE were older (66.3 ± 8.5 vs 61.0 ± 9.9, p < 0.01), had significantly higher systolic BP (157.8 ± 30.1 vs 148.2 ± 27.7 mmHg, p < 0.01) and blood glucose level (6.7 ± 3.6 mmol/l vs 5.8 ± 2.2 mmol/l, p = 0.02). Pts with uncontrolled AH more often had recurrent MI and stroke, and reached CCE in 30.5% vs 19.3% with controlled AH (p = 0.09). Age (β = 0.06; δ < 0.01, HR = 3.3) and smoking (β = 0.7; δ = 0.01, HR = 1.7) were found as factors independently associated with CCE.

**Conclusions:** High prevalence as well as inappropriately low level of AH and other risk factors control was found in pts after MI in urban Ukrainian area. Higher systolic BP and uncontrolled AH were associated with CVM. But independent predictors for CVM in patient after MI were age, smoking, and DM, for CCE only age and smoking.

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**PP3.73 EFFECT OF SEASONAL TEMPERATURE CHANGE FOR PATIENTS WITH FIXED DOSE COMBINATION TREATMENT**

C. Grassou1, D. Gourlis2, A. Pittaras3. 1Hypertension Unit, Cardiovascular Department, Western Attika Hospital, Athens-Greece, 2Private Hypertension Office, Neu Erythrea- Greece, 3Mediton Medical Center, Athens-Greece

**Objective:** The current ESH guidelines do not mention if the patient's anti-hypertensive treatment should be modified during extended periods of heat, for instance during the warm summer months in the southern Mediterranean. Hypertensive treatment should be modified during extended periods of heat, and patients who have been prescribed a fixed dose combination (FDC) of antihypertensive drugs should be advised to change their medication regimen to a single agent that is more effective in the heat. In this study, we evaluated the prevalence of hypertension among CVD patients living in the areas of Athens, and we investigated whether the patient's anti-hypertensive treatment should be modified during extended periods of heat.

**Results and Conclusions:** Preliminary results from our analysis show that the prevalence of hypertension among Canadians of 20 years and over is 18.3% (95% CI: 17.7% to 18.9%) for women and 17.6% for men. Age is a significant risk factor for hypertension, with a prevalence of 3.3% for the 20-39 age group, reaching 42.0% for people between 60 and 79 years of age. Propensity to take medication for controlling hypertension is weaker among the 20-39 age group (47.6%) than the 60-79 age group (54.9%). Geographical variations in hypertension prevalence at all scales (from provinces to health regions) also play a role, with lower rates in the western part of the country (British Columbia 16.0%) and higher rates in the eastern provinces (Newfoundland 23.2%). By using a geographical approach to analyze hypertension data, we hope to provide regionalized knowledge to public health decision makers, helping them adapt public health programs to regional characteristics. Fail results from our research will be presented at the conference.
Method: We compared the mean systolic and mean diastolic home measurements. The analysis was made using the unpaired t-test.

Results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean Systolic BP</th>
<th>Mean Diastolic BP</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARB + CCB Winter Systolic BP</td>
<td>135.54 ± 7.42</td>
<td>84.13 ± 8.21</td>
<td>0.009</td>
</tr>
<tr>
<td>ARB + CCB Winter Diastolic BP</td>
<td>135.29 ± 7.39</td>
<td>82.71 ± 6.84</td>
<td>0.2701</td>
</tr>
<tr>
<td>ARB + CCB Summer Systolic BP</td>
<td>134.53 ± 6.64</td>
<td>81.36 ± 6.70</td>
<td>p&lt;0.001</td>
</tr>
</tbody>
</table>

Conclusion: During the warm summer period in Greece, patients on HCTZ have lower blood pressure values compared to the fixed dose CCB combination. Greater scale analyses are warranted and the new guidelines should address this common issue for the southern European countries, further.

PP.3.74 **EFFECT OF HIGH BLOOD PRESSURE AND OVERWEIGHT ON PLASMA LIPID LEVELS IN SEVEN YEARS OLD CHILDREN IN EASTERN SLAVONIJA AND BARANJA, CROATIA**

M. Katic, V. Tomac, N. Aberle. Clinical Hospital Center Osijek, Osijek-Croatia

Objective: So far in Croatia, especially in Eastern Slavonija and Baranja, no larger studies have been published on the frequencies of the cardiovascular risk factors as hypertension, dyslipidaemia and hyperglycemia in seven years old children. AIM was to examine the presence of blood lipid abnormalities in overweight children (BMI > 95 pctl) and to determine if the prevalence of dyslipidaemia is different in overweight children with HBP (> 95 pctl) compared with overweight children with NBP (< 90 pctl).

Methods: Cross-sectional study on 494 children at the age of 7 in Eastern Slavonija and Baranja has been conducted to determine plasma lipid levels, blood pressure, plasma glucose in overweight children. Additionally, liver enzymes, ionogram and glycylated hemoglobin (HbA1c) levels were measured.

Results: Elevated blood pressure (> 95c) was detected in 25% study objects. The rates of abnormal plasma lipid levels were high among overweight children with both NBP and HBP. Significantly more boys with HBP had low HDL-cholesterol levels compared to boys with NBP (49.4% vs 27.6%). Significantly more severely obese boys had lower HDL-cholesterol compared to moderately obese boys (40.3% vs 29.3%). The prevalence of HBP was much higher in severely obese boys and girls (46.5% vs 39%) than moderately obese boys and girls (28.1% vs 23.1%). There was no difference in plasma glucose levels, liver enzymes levels, ionogram and glycylated hemoglobin (HbA1c) levels among children with NBP and children with HBP.

Conclusion: Arterial hypertension was significantly associated with overweight and hyperlipidemia and low levels of HDL-cholesterol in 7-year old boys, but not girls. Hypertension was not associated with hypercholesterolemia. This study suggests that overweight children (boys particularly) with hypertension have at least one additional risk factor (hyperlipidemia) than overweight children with normal blood pressure for cardiovascular disease in adulthood.

PP.3.76 **A STUDY OF VITAMIN D LEVELS AND CIRCULATORY RISK FACTORS IN PRIMARY CARE**

A. Mastan, A. Bokhari, R. Aghamohammadzadeh, A.M. Heagerty. University of Manchester, Manchester-United Kingdom

Background: A growing body of data suggests that low 25-hydroxyvitamin D levels may adversely affect cardiovascular health. 1,25-hydroxyvitamin D has shown to suppress renin and density of this vitamin may predispose to hypertension and left ventricular pathology. Hypovitaminosis D has also been suggested to be associated with an increased prevalence of diabetes mellitus and hyperlipidemia. Accordingly it was decided to seek evidence that vitamin D levels are correlated with such disorders.

Method: Data were obtained from a prospective cohort of 100 patients from an inner city primary care centre through the practice database and telephone consultations. Demographic data included age, gender, ethnicity, occupation, pregnancy, BMI, past medical history and current medication. Associations between those with vitamin D deficiency and hypertension and other co-morbidities was assessed statistically.

Results: The majority of the patients was aged 20-35 years, 80% were female and 65% were of Asian background. The cohort comprised of 83 patients with vitamin D deficiency (< 15μg/L) and 17 with normal plasma vitamin D levels (> 15 μg/L). Hypertension (> 140/90mmHg) was found in 22/83 and 2/17 (P>0.001). Diabetes mellitus was found in 15/83 and 1/17 (P<0.001). Hyperlipidaemia was found in 22/83 and 2/17 (P>0.001).

Conclusion: There was a significant association between measured vitamin D deficiency and hypertension. Similar associations were seen with diabetes and hyperlipidaemia. These results could have substantial public health implications as plasma 25(OH)D levels could be increased with relatively cheap and effective interventions. The findings also imply a potential role for vitamin D metabolism and intake in metabolic syndrome comprising of hypertension, hyperlipidaemia and insulin resistance.

PP.3.77 **ORGANIC POLYPHOSPHATES AS PROGNOSTIC FACTORS OF HYPERTENSION PROGRESS IN WOMEN**

A. Sadykova, R. Baykeev, A. Shamkina, R. Gifyatullova. Kazan State Medical University, Kazan-Russia

Objectives: To develop the method of 5-year risk evaluation of arterial hypertension (AH) progress in women by means of new biochemical parameters.

Background: Adenosinetriphosphate (ATP) and 2, 3-biphosphoglycerate (BPG) in the significant extent define an energetic status, stability of nuclear-free human erythrocyte and in the same time mediate effects of all rest factors on oxygen-carrying function of blood. Changes of their erythrocyte contents reflect biochemical status of surrounding tissues in AH.

Methods: 58 hypertensive and 11 normotensive Caucasian women at age 25-59 were explored by the 31P nuclear magnetic resonance spectroscopy method on erythrocyte contents of ATP and BPG. All women were twice conducted clinical examination within 5 years. Non-parametric descriptive statistics and plural nonlinear regression method was used.

Results: No reliable differences had been found between the control and clinical groups of women concerning the values of BPG and ATP by U test (P>0.2). Nevertheless the mean value of ATP in patients with AH was decreased in 37% (statistical significance p<0.05 by Chi-square comparison) compared with the control group. The equation of nonlinear regression was formed using the results of recurrent clinical examination of patients in 5 years: nonlinear plural regression model was built with incremental excluding of insignificant factors and equation with the determination factor R square 25% (p=0.07) was received, including such parameters as age, ATP and BPG contents.

Conclusion: The results of determinations of five-year risk of progress on specified factors in women were represented in the manner of color nomographs.
PP.3.78 PREVALENCE AND TRENDS IN CARDIOVASCULAR RISK FACTORS IN ELDERLY PATIENTS FROM GENERAL PRACTICE SETTING IN POLAND: THE RESULTS OF LIPIDOGRAM2004 AND LIPIDOGRAM2006 SURVEYS

J. Gasowski1, J. Jozwiak2, M. Klonowski3, A. Winak1, M. Mastej3, J. Prihartono2.
1Department of Cardiology, University of Silesia, Katowice-Poland, 2Department of Internal Medicine, University of Udine, Udine-Italy

Background: Although several epidemiologic studies addressed the issue of secular trends in principal risk factors in patients aged ≥60 years drawn from general practices across Poland. A questionnaire was administered enquiring into history of complications and medication use, data on hypertensive status, antihypertensive treatment, treatment with lipid lowering drugs. The examinations included anthropometric measures (body weight and height, waist-hip ratio), and standardized, central assessment of lipid profile.

Results: The average age of 10461 patients enrolled in both surveys was 67.7 ± 5.6 years. Among the 5331 participants of 2004 survey 37.0% were men which exceeded the corresponding number in the 2006 assessment (35.2%, p < 0.05). Between 2004 and 2006 hypertension increased from 65.2% to 69.0%, p < 0.0001. There was no difference in prevalence of diabetes mellitus (19.9% vs. 18.7%, p = 0.11). The body mass index (BMI) was similar (28.6 ± 4.5 kg/m²) in both cohorts. The mean waist circumference in the 2004 cohort was 94.4 ± 13.2 cm and was smaller than in the 2006 cohort (95.3 ± 12.4 cm, p < 0.001). Active smoking decreased from 10.2% to 7.9% (p < 0.0001) and the prevalence of dyslipidaemia fell from 61.7% to 59.3%, p = 0.01. This was reflected by change in total cholesterol (5.53 ± 1.16 vs. 5.76 ± 1.11, mmol/l, p < 0.0001), LDL cholesterol (3.28 ± 1.02 vs. 3.46 ± 1.30, mmol/l, p < 0.0001) and triglycerides (1.67 ± 0.68 vs. 1.75 ± 0.97, mmol/l, p < 0.0001). In the subgroup of patients with history of MI and diagnosis of dyslipidaemia, the percentage of individuals receiving a statin preparation was 75.7% in both surveys. Corresponding percentage for fibrates was 6.7%. The data regarding physical activity were available in 3336 persons and smoking habits were recorded. For statistical analysis Microsoft Office Excel was used, while gender comparison was calculated by T-test.

PP.3.80 PREVALENCE OF OBESITY AND SMOKING IN STUDENTS OF GREECE: TWO IMPORTANT CARDIOVASCULAR RISK FACTORS

S. Patakas, K. Rousos. Microbiological Laboratory of General Hospital of Greece, Thessaloniki-Greece

Objective: Investigation of prevalence of obesity and smoking in students of our country, correlation and distribution according to sex.

Material and Method: The study included students from different universities of Thessaloniki in 2009. 240 students (177 female and 66 male, age 18-25) were participated. Digital scales were used (accuracy ±100gr). BMI was calculated, while smoking habits were recorded. For statistical analysis Microsoft Office Excel was used, while gender comparison was calculated by T-test.

Results: As you can see at the table.

Conclusions: To sum up, smoking and obesity as risk factors are present in high frequency in Greek students. More specifically: 1. The majority of students have normal weight (Specifically, 67.5% of students have BMI < 25 kg/m², 62.71% are women and 80% are men. The prevalence of overweight and obese students is 32.5%, 37.27% are women and 19% are men. 2. Regarding smoking, 61.2% of the sample are smokers and 38.8% are non-smokers. 76.2% of men and 55.9% of women are smoking.

PP.3.79 PATIENT COMPLIANCE ON HYPERTENSIVE MANAGEMENT AND ITS RELATED FACTORS IN DEVELOPING COUNTRY: A STUDY OF COMMUNITY DIAGNOSIS IN PONDOK KELAPA, EAST JAKARTA, INDONESIA

F. Abshari1, D. Notosusanto2, M. Fitrur Purnama2, E. Renjana2, D. Utama2, J. Prihartono2. 1On Behalf of Faculty of Medicine, University of Indonesia Erasmus MC, University Medical Centrum, Rotterdam-The Netherlands, 2Faculty of Medicine, University of Indonesia, Jakarta-Indonesia

Community diagnosis is a reference in handling of health care problem in a community. According to survey of primary care center (Puskesmas) during 2008-2009, Pondok Kelapa community faces problem of health transition from infectious disease to degenerative disease, the most populated disease is hypertension. Management of hypertension mainly covers medical treatment and non-medical form including diet modification, exercise and smoking cessation. Long term hypertensive management could lead to non-compliance and non-adherence behaviour. Patient compliance can be influenced by demographical as well as psychosocial factor, hypertensive stage, disease complexity, and health care facility. This study aims to determine the level of community adherence or compliance on hypertensive management and several related factors including diet. Cross-sectional study within the community diagnostic workflow was undertaken. Ninety nine patients with hypertension, who have been registered and treated in Puskesmas or their care giver who met inclusion and exclusion criteria, were included to participate. Subjects were physically examined for blood pressure with standardized sphygmomanometer and were interviewed using a standardized compliance-adeherence score questionnaire as well as food recall questionnaire. The result of this study revealed that the overall level of community compliance to hypertensive management was distributed in 30% of compliant and 70% of non-compliant. There were several significant related factors on compliance such as the distance between houses and primary care facility (p = 0.006), hypertensive complications (p = 0.029), health worker counselling (p = 0.034). There was no statistically significant on other factors. We concluded that compliance on hypertensive management in Pondok Kelapa community is relatively low. Therefore, we suggested to do further follow up on accessibility of community to primary health care by opening public transportation route, special treatment to hypertensive related complication by early detection and brief referral system, and increasing counselling approach for newly diagnosed hypertension by health workers in community.

Distribution of sample according to BMI

<table>
<thead>
<tr>
<th></th>
<th>Total (N = 240)</th>
<th>Male(N = 63)</th>
<th>Female(N = 177)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal weight</td>
<td>162(67,5%)</td>
<td>51(80%)</td>
<td>111(62,71%)</td>
</tr>
<tr>
<td>Overweight</td>
<td>66(27,5%)</td>
<td>12(19%)</td>
<td>54(30,5%)</td>
</tr>
<tr>
<td>Obese</td>
<td>12(5%)</td>
<td>6(7,77%)</td>
<td>6(5,59%)</td>
</tr>
</tbody>
</table>

Distribution of sample according to smoking

<table>
<thead>
<tr>
<th></th>
<th>Total(N = 240)</th>
<th>Male(N = 63)</th>
<th>Female(N = 177)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smokers</td>
<td>147(61,2%)</td>
<td>48(76,2%)</td>
<td>99(55,9%)</td>
</tr>
<tr>
<td>Non-smokers</td>
<td>93(38,8%)</td>
<td>15(23,8%)</td>
<td>78(44,1%)</td>
</tr>
</tbody>
</table>

PP.3.81 LP(A) LEVELS ARE ASSOCIATED WITH INSULIN RESISTANCE AND HYPERINSULINEMIA IN HYPERTENSIVE PATIENTS

L. Marzano, C. Catena, G.L. Colussi, L.A. Sechi. Hypertension Unit, Department of Internal Medicine, University of Udine, Udine-Italy

Objective: To assess the burden and secular trends in principal risk factors in patients aged ≥60 years drawn from general practices across Poland. A questionnaire was administered enquiring into history of complications and medication use, data on hypertensive status, antihypertensive treatment, treatment with lipid lowering drugs. The examinations included anthropometric measures (body weight and height, waist-hip ratio), and standardized, central assessment of lipid profile.

Conclusions: To sum up, smoking and obesity as risk factors are present in high frequency in Greek students. More specifically: 1. The majority of students have normal weight (Specifically, 67.5% of students have BMI < 25 kg/m², 62.71% are women and 80% are men. The prevalence of overweight and obese students is 32.5%, 37.27% are women and 19% are men. 2. Regarding smoking, 61.2% of the sample are smokers and 38.8% are non-smokers. 76.2% of men and 55.9% of women are smoking.
Objective: Lipoprotein(a) [Lp(a)] is an emergent cardiovascular risk factor that is related with the presence and severity of organ damage in hypertensive patients. In these patients, insulin-resistance and hyperinsulinemia are frequently detected. Population studies have reported an inverse relationship between plasma Lp(a) and insulin levels. The aim of this study was to examine the relationships between Lp(a) and glucose metabolism variables in essential hypertension.

Design and Methods: In 389 consecutive hypertensive patients (age 55 ± 12 yr., 46% women), we measured the anthropometric indexes, lipid profile including Lp(a) levels, fasting glucose, insulin and C-peptide, we calculated the Homeostatic Model Assessment (HOMA index) to estimate insulin resistance, and assessed the renal function. For statistical analysis, patients were divided according to tertiles of the HOMA index.

Results: Age (P < 0.05), BMI (P < 0.0001), waist circumference (P < 0.0001), fasting glucose (P < 0.0001), insulin (P < 0.0001), C-peptide (P = 0.0001), tri-glycerides (P < 0.0001), and the LDL/HDL ratio (P < 0.01) were progressively higher with increasing values of the HOMA. Conversely, plasma Lp(a) levels (P < 0.01) decreased progressively with increasing HOMA. Univariate regression analysis showed that Lp(a) was significantly and inversely related to HOMA (r = –0.145; P < 0.01), fasting glucose (r = –0.144; P < 0.01), insulin (r = 0.119; P < 0.01), C-peptide (r = 0.102; P < 0.05), creatinine clearance (r = 0.187; P < 0.0001), and alcohol intake (r = 0.131; p < 0.05). Multiple regression analysis adjusted for age, sex, BMI, creatinine clearance, triglycerides, HDL, and alcohol intake, showed that the HOMA (β = 0.147; P < 0.05) and creatinine clearance (β = 0.196; p < 0.01) were independently and inversely related to Lp(a) levels.

Conclusions: Lower Lp(a) levels are associated with insulin resistance and hyperinsulinemia in hypertensive patients. This association should be considered in the assessment of cardiovascular risk in these patients.

PP.3.82 LIPID PROFILE OF PATIENTS ADMITTED WITH ACUTE CORONARY SYNDROME TO THE TOLEDO HEALTH CARE AREA BETWEEN 2005 AND 2008


Objective: To evaluate the lipid profile of patients admitted with acute coronary syndrome (ACS) to the Toledo Health Care Area between 2005 and 2008.

Design and Method: An epidemiological transverse analysis of total cholesterol (TC), low-density-lipoproteins cholesterol (LDLc), high-density-lipoproteins cholesterol (HDLc) and triglyceride (TG) levels (mg/dL) in patients admitted with acute myocardial infarction (AMI) or unstable angina (UA) to the Toledo Hospital Complex between January 1st 2005 to December 31st 2008. Blood laboratory tests were deemed valid if obtained up to 6 months before and 24 hours after admissions. Data from Hospital admissions and biochemical laboratory were evaluated by the use of several tabulated databases. To assess the sensitivity and specificity of the final results, the data obtained were compared with that from the general hospital database in a random sample of 80 patients; no false negatives (more laboratory results in the general hospital database than in the final patient data) or false positives (unavailable results) were found. Descriptive analyses and means comparison were performed using the statistical tests Chi-square, Student’s t test and ANOVA, and were carried out using the SPSS statistics package, version 15.1.

Results: Out of the 3,896 patients admitted with ACS during the defined period 1,381 (34.6%) had a complete lipid profile and were therefore included in the study. The mean age was 67.8 ± 12.9 years (72.4% men). AMI/UA was diagnosed in 61.378.3% of patients, respectively, and 76.3% were first-time events and 23.7% were recurrent events. The mean TC was 180 ± 43.4, LDLc 115 ± 38.0, HDLc 44.1 ± 12.3, and TG 145.3 ± 92.4 mg/dL, with statistically significant differences between men and women in LDLc (116.3 ± 37.8 vs. 111.6 ± 38.5 mg/dL, p = 0.04) and HDLc (42.3 ± 11.6 vs. 48 ± 13.2 mg/dL, p = 0.0001). The mean LDLc for AMI and UA were 117.3 ± 37.7 and 111.4 ± 38.3, respectively (p = 0.005). The mean lipid levels for first-time event and recurrent event were, respectively, TC 179.1 ± 43.1 and 174.5 ± 44.1 (p < 0.05), LDLc 116.5 ± 38.4 and 110 ± 36.5 (p < 0.007), HDLc 44.1 ± 12.2 and 44.2 ± 12.9 (p < 0.05), and TG 141.2 ± 81.7 and 158.5 ± 119.7 (p = 0.03). The LDLc/HDLc ratio for first-time and recurrent events were 2.8 ± 1.3 and 2.6 ± 1.1 (p = 0.015), respectively. When LDLc, HDLc and TG mean levels were grouped on first-time and recurrent events no significant differences were found. Optimal levels of LDLc (< 70 mg/dL) and HDLc (> 60 mg/dL) were found in 14.1 and 11.6%, respectively, of patients with recurrent episodes.

Conclusions: Patients admitted with first-time ACS to the Toledo Health Area were found to have a lipid profile according to current guidelines. Only 10% of those with recurrent ACS presented optimal LDLc and HDLc levels. Further studies should be conducted to investigate the lipid profile and other variables related to primary and secondary prevention of coronary heart disease.

PP.3.83 INCIDENCE OF CARDIOVASCULAR RISK FACTORS ON LIPID METABOLISM IN A MOROCCAN POPULATION


The global burden of disease and mortality due to cardiovascular diseases is huge, and in this respect Morocco is no exception. In this context, this study aimed to describe the prevalence and the incidence of cardiovascular risk factors on lipid profiles in a representative sample of Casablanca population. Our study concerned 405 subjects, mean-age of 54.10 ± 11.03 years-old. Anthropometric measurements (waist circumference, waist-to-hip ratio, blood pressure, BMI) and lipid profile (TC, HDL, LDL, and TG) were assessed. Our population has been subdivided into: obese, diabetics, hypertensives and hypertensives and controls groups. Patients showed higher BMI, waist circumference, waist-to-hip ratio and blood pressure as compared to controls. They also presented lipid profile alterations including the increase of TC, LDL and TG and the decrease of HDL. Type 2 diabetes mellitus was 5 fold higher than type 1 diabetes in diabetic group and diabetic and hypertensive group. 74.1% of our population were current smokers and 53.58% had sedentary lifestyle, all of which lead to atherogenic lipid profiles. The emergence of diabetes, during the last decade, is associated with social and demographic transition of Moroccan population. Sedentary lifestyle, tabagism, and obesity contribute to the apparition of insulin-resistance syndrome. Our study revealed that the Moroccan population is at high risk of cardiovascualar disease. Results of our study seem really alarming. Consequently, there is an urgent need for improved epidemiological investigations for planning, execution, and assessment of CVD management programs at the national ladder.

PP.3.84 NON HIGH DENSITY LIPOPROTEIN CHOLESTEROL IS MORE STRONGLY ASSOCIATED TO CAROTID PLAQUES THAN LDL CHOLESTEROL IN AN ITALIAN HYPERTENSIVE POPULATION

V. Spagnuolo, F. Cetraro, N. Greco, T. Bartolillo, M. Sprovieri, M. Ferraro, Azienda Ospedaliera Di Cosenza, Cosenza-Italy.

Several reports, in populations with and without cardiovascular disease, have recently showed the prognostic utility of non high-density lipoprotein-cholesterol (non-HDL-c) levels. Non-HDL-c level is determined by subtracting the high-density lipoprotein cholesterol level from the total cholesterol level and thus encompasses not only low-density lipoprotein cholesterol (LDL-c), but also the cholesterol contained in atherogenic, triglyceride-rich particles like remnants. Indeed, in other studies, discriminatory power of non-HDL-c in detecting prevalence of subclinical atherosclerosis was not clear. Our study compares non-HDL-c and LDL-c with the prevalence of carotid plaques, that is a marker of subclinical atherosclerosis, in a group of Italian hypertensive out-patients. Biochemical measurements of non-HDL-c and LDL-c and echo of carotid artery were determined in 84 hypertensive patients, aged 70.56 ± 11.51 years. We evaluated the prevalence of carotid plaques (defined as intima-media lesions ≥ 1.2 mm) in all this patients. Patients with increasing levels of non-HDL-c (≥ 130 mg/dL) showed higher prevalence of carotid plaques (expressed as number of plaques/patient) vs patients with lower values of non-HDL-c (rate 1.28 vs 0.94). Patients with higher LDL-c levels (≥ 110 mg/dL) showed similar prevalence of carotid plaques vs patient with lower LDL-c levels (rate 0.92 vs 1).

Our data support the use non-HDL-c above LDL-c for identifying hypertensive patients with atherosclerotic plaques of carotid arteries.
Poster Session 04
Blood Pressure Measurement

**PP.4.85** The SUSPPUP Ratio in Patients with Essential Hypertension and Dipping and Non-Dipping Pattern of Nocturnal Blood Pressure

J. Porzezinska-Furtak, A. Brzeska, T. Miazgowksi, K. Widecka. Pomeranian Medical Academy, Szczecin-Poland

**Purpose:** Our purpose was to assess the SUSPPUP ratio, plasma aldosterone concentration (ALDO), plasma renin activity (PRA) and aldosterone to renin ratio (ARR) in patients with dipping and non-dipping pattern of nocturnal blood pressure.

**Material and Methods:** The study was performed on 59 subjects (28 females aged 41 ± 16.9 years, 31 males aged 32.7 ± 12.8 years) with primary hypertension. In all patients a 24-h blood pressure monitoring (ABPM) protocol was performed using a Spacelabs 90207 monitor (Spacelabs Healthcare; Issaquah, WA). Blood pressure was measured every 20 min during the daytime (from 06.00 to 22.00) and every 30 min at night-time (22.00-06.00). The non-dipper hypertension was defined if declines in blood pressure at night were below 10% of the daytime values. After an overnight fast, blood samples were drawn in a supine position for ALDO, PRA concentrations, serum sodium and serum potassium. A 24-hour urine collection was taken for sodium and potassium excretion. The SUSPPUP ratio (Na x K/u Na x K/u) and ARR were calculated.

**Results:** Of 59 patients studied we identified 27 non-dippers (12 F, 15 M) and 32 dippers (16 F, 16 M). Serum sodium and potassium, urinary sodium and potassium excretion, and ABPM parameters were comparable between dippers and non-dippers. We did not find statistically significant differences between dippers and non-dippers in the SUSPPUP ratio (3.37 ± 2.05 vs. 2.85 ± 1.64), ALDO (155.7 ± 85.4 vs. 140.2 ± 69.16, P > 0.1), PRA (6.26 ± 1.94 vs. 4.69 ± 1.8 ng/ml/h) and ARR (11.4 ± 7.42 vs. 12.73 ± 9.19). However, in the whole group of patients with essential hypertension we found positive correlations between the SUSPPUP ratio and ALDO (R = 0.29; P = 0.036) and urinary potassium excretion (R = 0.59; P < 0.0001). We also found positive correlations between urinary potassium excretion and ALDO (R = 0.33; P < 0.04) and ARR (R = 0.29; P < 0.05).

**Conclusions:** 1. In patients with essential hypertension there is no association between the SUSPPUP ratio and dipping or non-dipping hypertension. 2. Positive correlation of the SUSPPUP ratio with ALDO and 24-h urinary potassium excretion may suggest the clinical utility of this ratio in patients with essential hypertension.

**PP.4.86** Usefulness of Ambulatory Blood Pressure Measurement in Evaluation of Cardiovascular Complications in the Group of Hypertensive Patients

L. Woznicka-Leskieziewicz, I. Klorek, A. Posadzy-Malaczynska. University of Medical Science, Poznan-Poland

**Keywords:** Ambulatory Blood Pressure Measurement (ABPM), Blood Pressure Variability (SD), Left Ventricular Posterior Wall Dimension (LVPWd), hypertension (HTN).

**Objectives:** Usefulness of ABPM in evaluation of cardiovascular complications in the group of hypertensive patients based on echosonography (ECHO) parameters.

**Design and Methods:** We evaluated 34 patients with HTN (10 women and 24 men). The average age of them: 52.4yrs. Following Measurements Were Taken: BMI, serum levels of: HDL, LDL, total cholesterol (Tchol), triglycerides (TCH), fasting plasma glucose, urea, creatinine, uric acid; eGFR. We also performed ECHO with the evaluation of LVPWd and 24-h ABPM with evaluation of Blood Pressure Variability (SD) of SBP, DBP and other parameters.

The t-student test was used for the statistical analysis, p Spearman was taken to analyze the correlation of statistically significant values.

**Results:** We revealed following results in this group: BMI[kg/m²]: 29.1; eGFR[nl/min]-105.4; LVPWd[cm]:1.11; SD SBP:17.72; SD DBP:13.46; serum level of Tchol[mmol/l]:5.7; LDL[kg/m²]:3.6; TG[mmol/l]:1.6; HDL-[mmol/l]:1.41; glucose[mmol/l]:5.4; urea[mmol/l]:5.68; creatinine[mmol/l]:82.4; uric acid[mg/dl]:5.6. We revealed positive correlations between LVPWd and SD SBP (p = 0.033) and between LVPWd and SD DBP (p = 0.017).

**Conclusions:** Blood Pressure Variability in ABPM is significantly associated with myocardial hypertrophy in the group of hypertensive patients.

**PP.4.87** Impact of Daytime Ambulatory Blood Pressure on Cardiac Artery Intima-Media Thickness in Prehypertensive Patients

E. Manios, F. Michas, E. Korobek, K. Stamateopoulos, V. Chouzourii, A. Dimitriou, C. Papamichael, N. Zakopoulos. Department of Clinical Therapeutics, University of Athens, Alexandra Hospital, Athens-Greece

**Objectives:** Recent studies have reported that prehypertension is associated with increased values of common carotid artery intima-media thickness (CCA-IMT). The aim of this study was to assess the impact of daytime ambulatory blood pressure (BP) levels on the association of prehypertension with CCA intima-media thickening in prehypertensive subjects.

**Methods:** A total of 815 subjects with office systolic BP < 140 and diastolic BP < 90mmHg, underwent 24-hour ambulatory BP (ABP) monitoring and carotid artery ultrasonographic measurements. The study population was divided into 3 groups according to office and daytime ABP levels: normotensives, prehypertensives with normal daytime ABP levels and prehypertensives with elevated daytime ABP levels. Statistical analysis was performed by means of ANOVA, ANCOVA tests.

**Results:** Prehypertensive patients with elevated daytime ABP levels had higher (p < 0.01) CCA-IMT values (0.713mm; 95% CI: 0.698-0.725) than prehypertensives with normal daytime ABP levels (0.656mm; 95% CI: 0.641-0.656) and normotensives (0.656mm; 95% CI: 0.641-0.670) even after adjustment for baseline characteristics. Normotensives and prehypertensives with normal daytime ABP levels did not differ significantly regarding CCA-IMT values (p > 0.05).

**Conclusions:** Patients with office BP levels in the prehypertensive range, who also have elevated daytime ABP levels, had higher CCA-IMT values than patients with prehypertension with normal daytime ABP values and normotensive individuals.

**PP.4.88** Long-Term Effects of Telemetric Blood Pressure Monitoring in Adequately Treated Patients with Arterial Hypertension


**Background and aim:** Studies confirm that an optimized blood pressure (BP) adjustment, compared to a standard attended control-group, can be achieved with the help of a 3-month telemetric blood pressure measurement (TBPM) in inadequately treated patients with arterial hypertension. This recent analysis should clarify if these effects lead to a better control in the middle and in long term.

**Methods:** 57 patients (including 3 dropouts) with initially inadequately treated arterial hypertension were evaluated in the former intervention study concerning BP adjustment after 3 month of TBPM (besides standard supply the TBPM group was supported additively by a telemetry supply for the daily transfer of the measured BP values at home to the physician. In case of an insufficient BP control or non-compliance, the physician was able to counteract for example in form of changing medication or intervention via phone). In conclusion an ABPM could be carried out with 18 (TBPM) and 22 patients (controls), respectively, after a period of 617 and 576, respectively, days on average. Those patients were compared concerning BP-target values (ABPM > 130/80

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or >125/75 mmHg with diabetes/renal failure) with the terminal data after the initial 3-month BP adjustment period.

Results: After a 3-month experimental period significantly more percent of those patients belonging to the TBPM group achieved the asked target values than those ones belonging to the control group (TBPM: 54%, controls: 36%; p = 0.007). A similar distribution was also confirmed after 617 and 576 days, respectively (TBPM: 56%, controls: 40%; p = 0.024).

Conclusion: TBPM allows not only an optimized BP control during the initial 3-month BP adjustment in patients with inadequately treated arterial hypertension, it also allows a better adjustment of BP target values compared to standard supply in the long term. Interventional TBPM creates a long time effect by an optimized therapy adjustment in the titration period and on the other hand by an amelioration of patient compliance in the long term.

PP.4.89 THE INFLUENCE OF DEPRESSION IN BLOOD PRESSURE AND PULSE IN ADOLESCENTS


Objective: To determine the effects of depression (D) on increase in diastolic blood pressure (DBP) and pulse (P) in adolescents.

Design and Methods: This study was carried out in a random sample of schools from Maracaibo, Venezuela. The participants were 123 adolescents, males (n = 41) and females (n = 82), age-mean = 14, 23 years and standard deviation = 1, 7. The Blood Pressure and pulse were recorded in two schools day, in sitting position and using oscilometric method (Dinamap) for all the adolescents. The adolescents completed the Zung self-rating depression scale to assess depression symptoms, and they were classified according the result of this scale in 3 categories: Normal (N), Minimum Depression (Md) and Moderate Depression (MoD).

Results: The One-way ANOVA was used to study the effects of depression on the DBP levels and P Results: The prevalence of Md was 69, 9% (n = 86) and it was 9, 0% (n = 12). The mean and standard deviation DBP was: 89, 09 ± 15,14 and for P was: 59, 74 ± 6, 4641 in all the adolescents. The results of the One-way ANOVA showed a significant effect for (D) factor (F = 3,829 p = 0.024) on the increase in (DBP) and (F = 4,327 p = 0.015) on the increase in (P).

Conclusions: The present results provide evidence for an association between depression disorders and increase in diastolic blood pressure and pulse in the adolescent population, which would mean that Depression may influence Diastolic Blood Pressure and Pulse in this group that is more vulnerable to Depression by hard changes typical of life stage. It is possible that there is a relationship between symptoms of depression and some indications of abnormal autonomic nervous function that elevate diastolic blood pressure and pulse.

PP.4.90 SEVEN-DAY AMBULATORY BLOOD PRESSURE: THE HYGIA PROJECT

Seven-day ABPM demonstrates large day-to-day variability of SBP and DBP. Support MSM 0021622402


Objectives: The alteration of the circadian blood pressure (BP) pattern characterized by the lack of a proper nighttime BP decline (non-dipping) has been associated with an increased end-organ damage and cardiovascular risk. Elevated urinary albumin excretion and decreased glomerular filtration rate have also been shown to predict future cardiovascular morbidity and mortality in hypertensive subjects as well as in the general population. Some relatively small studies have suggested non-dipping is highly prevalent among subjects with chronic kidney disease (CKD). Accordingly, we studied the impact of CKD on the circadian BP pattern in subjects participating in the Hygia Project, designed to evaluate prospectively cardiovascular risk by ambulatory BP monitoring (ABPM) in primary care centers of Northwest Spain.

Methods: We studied 6117 subjects (3326 men/2791 women), 61.7 ± 13.5 years of age. Among them, 1650 had CKD (glomerular filtration rate < 60 and/or microalbuminuria; 1554 hypertensives). Hypertension was defined as an awake mean ≥ 135/85 mmHg for systolic/diastolic BP or an asleep mean ≥ 120/70 mmHg. DBP-lowering treatment was measured at 20-min intervals from 07:00 to 23:00 and at 30-min intervals at night for 48h. During monitoring, subjects maintained a diary listing the times of going to bed at night and awaking in the morning.

Results: Among subjects without CKD, the prevalence of extreme-dipper, dipper, non-dipper and riser BP patterns were 4.7, 47.2, 42.3 and 5.9%, respectively. The prevalence of non-dipping and rising were significantly higher among subjects with CKD (49.8 and 16.5%, respectively; P < 0.001). Elevated nighttime BP above the thresholds provided above was the main cause for diagnosis of hypertension in CKD; thus, 92.5% of the uncontrolled hypertensive subjects with CKD had nocturnal hypertension, while only 71.3% had diurnal hypertension.

Conclusions: This cross-sectional study documents the high prevalence of an altered circadian BP pattern in CKD. The prevalence of rising, associated with the highest cardiovascular risk of all BP patterns, is almost three times higher among subjects with CKD. The elevated nighttime BP mean in CKD leads to a very high prevalence of nocturnal hypertension and, thus, to misdiagnosis of hypertension when relying only on clinic or even awake BP mean values. These findings support ABPM as a requirement for proper diagnosis and cardiovascular risk assessment in subjects with CKD.

PP.4.92 INFLUENCE OF DIPPING CLASSIFICATION ON FASTING GLUCOSE IN SUBJECTS WITH OR WITHOUT ELEVATED AMBULATORY BLOOD PRESSURE: THE HYGIA PROJECT

J. Siegelova1, A. Havelkova1, B. Fiser1, J. Dusek1, M. Pohanka1, L. Dunklerova1, M. Dominguez-Sardiña2, P.A. Callejas1, P. Eiroa1, J.J. Crespo1, J.L. Salgado1, A. Otero2, M.J. Fontao3, S. Lorenzo3, R.C. Hermida1, On Behalf of Hygia Project Investigators. ’Complejo Hospitalario Universitario, Orense-Spain,’University of Vigo, Vigo-Spain.

Objectives: A diminished relative sleep-time blood pressure (BP) decline (non-dipping) has been identified as a significant marker of cardiovascular risk, independent of the BP level. Independent prospective studies have also found that the sleep-time BP mean is a better predictor of cardiovascular risk than the awake or 24h BP means Moreover, elevated fasting glucose is also linearly correlated with increased cardiovascular morbidity and mortality. Accordingly, we evaluated and compared the relative influence of the sleep-time relative BP decline, sleep-time BP mean, and awake BP mean on fasting glucose in subjects participating in the Hygia Project, designed to evaluate prospectively cardiovascular risk by ambulatory BP monitoring (ABPM) in primary care centers of Northwest Spain.

Methods: We studied 6120 subjects (3328 men/2792 women, 5370 hypertensive, 61.8 ± 13.5 years of age. Hypertension was defined as an awake BP
mean ≥ 135/85 mmHg for systolic/diastolic BP, or an asleep BP mean ≥ 120/70 mmHg, or BP-lowering treatment. BP was measured at 20-min intervals from 07:00 to 23:00h and at 30-min intervals at night for 48h. During monitoring, subjects maintained a diary listing the times of going to bed at night and awakening in the morning. Subjects were divided in four groups according to BP level (normal or high BP, using the thresholds provided above) and to sleep-time relative systolic BP decline (diurnal or non-diurnal).

**Results:** Fasting glucose was significantly higher in non-dippers than in dippers both among those with normal BP (108.0 vs. 105.1 mg/dl; P = 0.011) as well as in subjects with elevated ambulatory BP (111.8 vs. 105.2 mg/dl; P < 0.001). Mean glucose was comparable between dipper subjects with normal and high BP (P = 0.886). When subjects were classified according to the level of awake and asleep BP means, glucose was significantly greater in subjects with high sleep-time BP mean, independently of the value of awake BP (P < 0.001).

**Conclusions:** Plasma glucose is significantly elevated with a progressive loss in proper sleep-time BP regulation and the corresponding decrease in sleep-time (P level of awake and asleep BP means, glucose was significantly greater in subjects with true masked HTN and thus high CVD risk. Both awake and sleep-time BP means are not significantly correlated with glucose when results are cor-

**RESULTS:**

**PP.4.95** AUTOMATED OFFICE BLOOD PRESSURE MEASUREMENT BY USING THE BPTRU DEVICE FOR THE DIAGNOSIS OF RESISTANT HYPERTENSION

**G. Crippa1, A. Cassi1, M. Bosi1, M.L. Fares1, 1Guglielmo da Saliceto Hospital, Aus Piacentina, Piacenza-Italy, 2Universita' Cattolica del Sacro Cuore, Piacenza-Italy**

Resistant hypertension (unmet blood pressure goal despite three or more drugs, including a diuretic) is a clinical challenge often faced by primary care clinicians and specialists. The diagnosis of resistant hypertension requires a precise blood pressure (BP) measurement technique since, in this setting it is crucial to rule-out pseuodopression due to white coat phenomenon. In this study we compare three different techniques of BP measurement – office BP (OBP), automated office BP (AOBP) and ambulatory BP (ABP) for the diagnosis of resistant hypertension. We considered 65 hypertensive patients presenting with OBP (average of 3 sphygmomanometric readings) > 140/90, despite 3 or more antihypertensive drugs, including a full diuretic dose. During a second visit, in which resistant hypertension was confirmed, all patients underwent OBP measurement using the BpTRU device (VSM MedTechLtd, Canada) BpTrue is an oscillometric monitor, designed to take a first reading while the physician is present, and then 5 measurements with the patients alone in the consulting room. The device provides the average of the last 5 readings. Data obtained with OBP and AOBP were compared with daytime mean ABP values, obtained by using a validated monitor (TM 2430, A&D Co LTD, Japan). The main results of the analysis are shown in the table.

<table>
<thead>
<tr>
<th>BP Type</th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>OBP</td>
<td>169 ± 19</td>
</tr>
<tr>
<td>AOBP</td>
<td>156 ± 20</td>
</tr>
<tr>
<td>ABP</td>
<td>155 ± 19</td>
</tr>
</tbody>
</table>

As expected, OBP measurement, even performed under strictly standardized conditions, overestimated patients’ BP values. In fact, taking daytime ABP values as reference, OBP was classified 14 subjects (12.5%). Conversely, AOBP resulted definitely more precise since identified all-but-one of resistant hypertensive subjects.

In conclusion, also in the particular setting of resistant hypertension in which exact BP values are extremely important for diagnosis, prognosis and treatment decisions, AOBP performed by using the BpTRU device, provided extremely reliable information on the real BP status of the patients.

**DISCORDANT ESTIMATION OF THE PREVALENCE OF MASKED HYPERTENSION ACCORDING TO DAYTIME OR NIGHTTIME BLOOD PRESSURE IN SUBJECTS WITH CHRONIC KIDNEY DISEASE: THE HYGIA PROJECT**

**R.C. Hermeda1, A. Otero2, L. Piñero1, D.E. Ayala2, A. Moya1, E. Sineiro1, M.J. Fontao1, A. Møjón2, J.R. Fernandez3, on behalf of Hygia Project Investigators. 1University of Vigo, Vigo-Spain, 2Complejo Hospitalario Universitario, Orense-Spain, 3Complejo Hospitalario Universitario, Pontevedra-Spain, 4Greece of Atenion Primaria, Pontevedra-Spain**

Objectives: Several prospective studies have documented that sleep-time blood pressure (BP) determined by ambulatory monitoring (ABPM) is a stronger predictor of cardiovascular (CVD) risk than awake or 24h BP. However, discrepancies in the diagnosis of hypertension (HTN) between clinic and ambulatory BP (isolated-office and masked HTN) are commonly defined by comparing clinic with awake BP, disregarding the value of sleep-time BP, frequently in subjects with chronic kidney disease (CKD). Accordingly, we evaluated the impact of sleep-time BP in the real prevalence of isolated-office and masked HTN in subjects with CKD participating in the Hygia Project, designed to evaluate prospectively cardiovascular risk by ABPM in primary care centers of Northwest Spain.

**Methods:** We studied 1650 subjects with CKD (glomerular filtration rate ≥ 60 and/or microalbuminuria), 940 men/710 women, 67.4 ± 12.6 years of age. Among these, 1554 had HTN, defined as an awake BP mean ≥ 135/85 mmHg for systolic/diastolic BP, or an asleep BP mean ≥ 120/70 mmHg, or BP-lowering treatment. BP was measured at 20-min intervals from 07:00 to 23:00h and at 30-min intervals at night for 48h. During monitoring, subjects maintained a diary listing the times of going to bed at night and awakening in the morning. Results: Among uncontrolled hypertensive patients with CKD, 92.5% had nocturnal HTN. Using both awake as well as sleep-time BP thresholds in comparison with clinic BP (140/90 mmHg), the prevalence of normal BP, isolated-office HTN, masked HTN and sustained HTN were 17.3, 16.1, 16.9 and 49.7%, respectively. Using only awake BP in comparison with clinic BP, the prevalence of the four classes were 25.8, 26.7, 8.4 and 39.1%, respectively (P < 0.001 compared to the previous classification). However, the prevalence obtained using only asleep BP for classification was 18.2, 20.2, 16.0 and 45.6%, respectively, very close to the classification obtained by using both awake and asleep BP means.

Conclusions: Elevated sleep-time BP mean is a major factor for the proper diagnosis of HTN in patients with CKD. The common use of only awake BP mean in comparison with clinic BP values does not allow proper identification of over 50% of subjects with true masked HTN and thus high CVD risk. Both awake and asleep BP derived from ABPM must be used to diagnose HTN and to properly stratify CVD risk, especially in subjects with CKD.
Introduction and Objectives: Ambulatory blood pressure monitoring (ABPM) defines circadian variation and is the method of BP measurement that best defines the cardiovascular risk (CV) of hypertensive patients. The aim of this study was to analyze the prognostic value of ABPM in a cohort of hypertensive patients after 12 years of monitoring.

Material and Methods: Cohort study in a random sample (years 1998-1999) of 432 patients diagnosed with essential hypertension and without cardiovascular disease (CV) prior. In all cases, clinical assessment, biological and MAP-24 h using SpaceLab monitors and individualizing all reports. The monitoring of patients was performed by review of medical history, recording the type of event (peripheral arterial disease, PAD, Coronary Disease-CD, heart failure-HF or stroke) and recording the event date.

Results: Completed follow-up 405 patients (218 women, mean age 55.5 years) who provided a comment by 3721.7 patient-years. During the 12.5 years of follow-up study, there were 174 events with an incidence rate of 4.68 events/100 patient-years. Observed 21 cases of DBP (Incidence Rate: 0.56 / 100 patient-years), 59 CD (IR: 1.59 per 100 patient-years), 56, HF (IR: 1.50 / 100 patient-years) and 38 of stroke (IR: 1.02 / 100 patient-years). Of the clinical variables, diabetes (IR Ratio [95% CI]: 2.35 [1.74 to 3.18]), impaired renal function (IRR [95% CI]: 2.49 [1.85 to 3.37]) and microalbuminuria (IRR [95% CI]: 2.66 [1.96 to 3.50]) influence the prognosis and increase incidence of CV events. ABPM values which showed higher prognostic correlation were nocturnal BP (IRR [95% CI]: 2.32 [1.53 to 3.52]) and non-dipper profile (IRR [95% CI]: 3.56 [2.39 to 5.27]) and riser profile (IRR [95% CI]: 7.09 [4.64 to 10.86]). The Kaplan-Meier curve shows that riser and non-dipper profile have a less time without events.

Conclusions: The nocturnal blood pressure and decreasing in depth of BP objectified by ABPM are the parameters that are associated with a worse cardiovascular prognostic in hypertensive patients, regardless of subclinical target organ, which confirms the importance of prognostic value of ABPM in the diagnosis and treatment of hypertension.
Conclusions: It is shown the need to determine the awake/sleep periods in every 24h ABPM record individually for each patient. If it is the patient himself who deserve these periods with “manual” measurements, the reproducibility of the BP circadian pattern increases up to 80% improving diagnostic and prognostic value of 24-hour ABPM.

PP.4.100 AGE DEPENDENCY OF CENTRAL AND PERIPHERAL SYSTOLIC BLOOD PRESSURES: CROSS-SECTIONAL AND LONGITUDINAL OBSERVATIONS IN EUROPEAN POPULATIONS

W. Wojciechowska, 1 K. Stolarz-Skrzypek, 1 V. Tikhonoff, 1 T. Richart, 2 J. Seidlerová, 4 M. Cwynar, 5 K. Kawecka-Jaszcz, 1 M. O’Rourke, 7 J. Staessen, 3 J. Seidlerová, 4 M. Cwynar, 5 L. Thijs, 3 Y. Li, 6 T. Kuznetsova, 3 J. Filipovská, 4 E. Casiglia, 2 T. Grodzicki, 2 K. Kawecka-Jaszcz, 1 M. O’Rourke, 1 J. Staessen, 1 on behalf of the European Project on Genes in Hypertension (Ephesos).

Investigators. 1First Department of Cardiology and Hypertension, Jagiellonian University Medical College, Krakow-Poland, 2Department of Clinical and Experimental Medicine, Padova-Italy, 3Department of Cardiovascular Diseases, University of Leuven, Leuven-Belgium, 4Faculty of Medicine in Pilsen, Charles University, Pilsen-Czech Republic, 5Department of Internal Medicine and Gerontology Medical College, Jagiellonian University, Krakow-Poland, 6Center for Epidemiologic Studies and Clinical Trials and the Center for Vascular Evaluation, Shanghai-China, 7Saint Vincent’s Clinic, University of New South Wales, Sidney-Australia.

Background: As arteries become stiffer with ageing, reflected waves move faster and determine these periods pressure. We investigated the age dependency of peripheral (pSBP) and central (cSBP) systolic pressure, pressure amplification (PA: pSBP – cSBP), and peripheral (pSA) and central (cSA) systolic augmentation (maximal systolic pressure minus the first peak of the pressure wave).

Methods: We randomly recruited 1420 White Europeans (mean age, 41.7 years; none on antihypertensive treatment). pSBP (brachial) and cSBP were measured in the supine position by means of an oscillometric sphygmomanometer and pulse wave analysis, respectively.

Results: In cross-sectional analyses (731 women and 689 men), cSBP and cSA increased more (P < 0.001) with age than pSBP and pSA (0.63 vs. 0.39 mmHg/year and 0.35 vs. 0.03 mmHg/year). These age-related increases were greater in women than men (P < 0.001). The age-related increase in AP (~0.24 mmHg/year) was similar (P = 0.59) in both sexes. In longitudinal analyses (208 women and 190 men), the annual increases in cSBP and cSA were steeper (P < 0.001) than those in pSBP and pSA (1.26 vs. 1.07 mmHg and 0.53 vs. 0.09 mmHg) with no sex differences (P > 0.068), except for pSA which was larger in women (0.10 vs. 0.02 mmHg; P = 0.002). Longitudinally, PA decreased more with age in women than men (~0.27 vs. ~0.23 mmHg/year; P = 0.012). In multivariable-adjusted analyses, age was the overriding determinant of pSP and cSP.

Conclusion: With ageing, pSP approximates to cSP. This might explain why in older subjects pSP becomes the main predictor of cardiovascular complications.

PP.4.101 TELECARE IS A VALUABLE TOOL FOR HYPERTENSION MANAGEMENT, A META-ANALYSIS

W. Verberk, 1 F. Kosels, 1 T. Thiën, 1 ‘MicroLife Corporation, Taipei-Taiwan, 2Department of Clinical Epidemiology and Technology Assessment, University Hospital Maastricht, Maastricht-The Netherlands, 3Radboud University, Medical Center, Department of General Internal Medicine, Nijmegen-The Netherlands.

Background: There is an increasing interest for using Telecare (TC) in the management of hypertension but the benefit is not totally clear.

Methods: A systematic review to the use of blood pressure (BP) measurement in TC has been performed (Medline/PubMed, Embase and Cochrane Library), selecting randomized clinical trials (RCT) that compared TC with usual care (UC) for hypertension management (treatment and/or coaching).

Results: Nine RCT’s were selected (n = 2501, 61.4 ± 0.6 years, 42 ± 2.7% male). Overall there was a significant larger decrease in the TC group than in the UC group for systolic (5.2 mmHg [95% CI 2.3–8.1 mmHg; P < 0.001]) and diastolic BP (2.1 mmHg [95% CI 0.5–3.7 mmHg; P < 0.001]). When studies were separated in studies with and without antihypertensive treatment modification during the study systolic BP difference decrease between the TC and UC groups (ΔTC – ΔUC) tended to be significantly lower (5.1 mmHg [95% CI 0.5–10.7 mmHg] lower) with treatment modification as compared to non-treatment modification where the ΔTC–ΔUC was 8.6 mmHg (95% CI 3.9–13.2 mmHg), p = 0.07.

Conclusion: TC led to a greater decrease in systolic and diastolic BP than UC. The differences between TC and UC for systolic BP tend to become larger when no treatment modification is applied. TC is a valuable tool for hypertension management.

PP.4.102 AMBULATORY ARTERIAL STIFFNESS INDEX (AASI) FOR THE PREDICTION OF ANTHYPERTENSIVE TREATMENT RESPONSE

G. Marakomicielakis, V. Sevastanos, N. Skiros, A. Missiakoulid, D. Pavlopoulou, E.J. Diamantopoulos. 4th Dept of Internal Medicine and Unit of Vascular Medicine, Evangelismos State General Hospital, Athens-Greece.

Objective: Ambulatory Arterial Stiffness Index (AASI), derived from 24-hour ambulatory blood pressure (BP) monitoring recordings, represents a reliable marker of arterial stiffness especially in patients with resistant hypertension and a potential predictor of cardiovascular risk. Furthermore, it has recently been shown that some drugs exhibit a beneficial effect on AASI, particularly in subjects who do not achieve BP control with monotherapy. However, it remains to be clarified if the assessment of AASI before the commencement of antihypertensive management can also contribute to the prediction of BP treatment response.

Design and Methods: Overall, 738 individuals with essential hypertension (362 men and 376 women, aged 20-86 years, mean age 64.3 years) were followed for a mean period of 84 years. AASI was calculated from the ambulatory BP recordings and was defined as 1 minus the regression slope of diastolic on systolic BP. Before treatment initiation the mean AASI of the total population was 0.36 ± 0.59 (range 0.21–0.55). The subjects were classified according to AASI quartiles into four groups (group A: AASI < 0.32, very low; group B: AASI 0.32–0.36, low; group C: AASI 0.37–0.40, middle; group D: AASI > 0.40, very high). BP control level was set at 140/90 mmHg, even though lower levels were targeted for diabetics and high-risk persons. Category and number of required antihypertensive drugs were also considered. Simple intergroup nonparametric tests and a logistic regression model were applied to identify correlation of AASI and therapy response.

Results: The overall control rate was 50.8%. Group A showed a significantly better response to therapy than group D (54.8 vs. 47%, p = 0.044). Moreover, in group D 6 out of 10 subjects required more than 3 drugs whereas in group A only 4 out of 10 (p < 0.05). AASI was found to be independently associated to therapy response after adjustment for sex, age, height, BMI and diastolic BP (OR = 1.37, 95% CI = 0.97–1.95, p = 0.034).

Conclusions: AASI is closely related to the antihypertensive treatment response. This may prove to be useful when initiating drug therapy particularly in hypertensives with a very high AASI who may have to begin with an intensified drug treatment in order to achieve BP control.

PP.4.103 HEALTH CARE PROFESSIONALS’ KNOWLEDGE AND ATTITUDES TOWARDS HOME BLOOD PRESSURE MEASUREMENT

L. Cloutier, M.E. Leblanc. 3University du Quebec a Trois-Rivieres, Trois-Rivieres-Canada.

Introduction: The Canadian Hypertension Education Program (CHEP) published guidelines for home blood pressure measurement (HBPM) in 2005. Recognizing the need to support health care professionals with patient education, the CHEP Implementation Task Force has developed videos, cue cards, posters and a teaching booklet. These tools are made available to health care professionals across Canada in both French and English. To assess health care professionals’ knowledge of and beliefs for HBPM, a survey was undertaken among nurses and physicians participating in an educational seminar.

Method: A 30-item self-administered questionnaire with multiple choice and short development questions regarding HBPM was distributed to 149 volunteers at an educational seminar held in Quebec, Canada. The questionnaire was completed just before the seminar began. The results were analyzed according to descriptive statistics.

Results: One hundred thirty-four participants were nurses with an average of 16 years in the profession and 15 participants were physician with 22 years of experience. The vast majority of participants (86%) indicated that physicians are supporting HBPM use for their patients. Most of them know that CHEP has included HBPM for the diagnosis (88%) and the treatment (86%) of hypertension. It is interesting that although most of them (72%) believed that patients wish to get involved in HBPM, only 9% of the participants believed that the patient knows how to perform properly HBPM. Most participants (78%) correctly recognized reference hypertension values based on HBPM (135/85 mm Hg) although 15%...
applied the office threshold (140/90 mm Hg). When asked specific questions about the protocol to be followed by patients, only a little more than 50% of respondents could correctly identify the required number of measurements and schedule, number of days and appropriate patient position and preparation.

**Conclusion:** HBPM is popular among patients and can contribute to better blood pressure control but its clinical benefit can be undermined by poor patient practice. Health care professionals must pursue their involvement in patient education, as HBPM is an area where collaboration between physicians, pharmacists and nurses is necessary and can produce good results.

### PP.4.104 BLOOD PRESSURE AND HEART RATE RESPONSE TO EXERCISE IN PATIENTS WITH ISOLATED NOCTURNAL HYPERTENSION

C. H. Lee1, M. S. Cho1, J. Y. Lee1, E. Hwang2, C. Park1. 1Asan Medical Center, University of Ulsan College of Medicine, Seoul- South Korea, 2Myong Ji Hospital, Kwandong University College of Medicine, Goyang-South Korea

**Backgrounds:** The characteristics of blood pressure (BP) and heart rate (HR) response to exercise remains unknown in patients with isolated nocturnal hypertension (iNHT). We tried to compare the BP and HR response of iNHT to those of normotension (NT), isolated daytime hypertension (iDHT) and sustained hypertension (sHT) during exercise.

**Methods:** Between 2002 and 2005, a total of 571 patients (53.0% male; mean age: 51 ± 11 years) underwent exercise treadmill test according to Naughton-Balke protocol and 24-hour ambulatory blood pressure monitoring (ABPM) in Asan-ABPM registry. The study population divided into four groups (NT, n = 51; iDHT, n = 17; iNHT, n = 109; sHT, n = 394) based on 24-hour ABPM. The iNHT was defined as a nighttime blood pressure of ≥120 mmHg systolic or 70 mmHg diastolic. The iDHT was diurnal blood pressure of ≥135 mmHg systolic or 85 mmHg diastolic.

**Results:** Responses of systolic blood pressure (SBP) to dynamic exercise at 2 to 6 minutes in iNHT were significantly smaller than those in sHT (7.3 ± 27.7 vs. 13.8 ± 19.5, p = 0.044). Difference between peak SBP and resting SBP in iNHT was significantly lower than in NT and sHT (31.5 ± 23.0 vs. 43.0 ± 26.9, p = 0.038; 31.5 ± 23.0 vs. 41.5 ± 25.8, p = 0.002). The iNHT had significantly higher values of diastolic blood pressure (DBP) than NT group during exercise (p < 0.001). Heart rate recovery values from the maximal heart rate to first minute heart rate in iNHT were statistically lower than those in NT (22.7 ± 11.9 vs. 27.6 ± 13.3, p = 0.022).

**Conclusions:** We found that the patients with iNHT had lower SBP responses to dynamic exercise and delayed recovery of heart rate after peak exercise. These characteristics of blood pressure and heart rate response during exercise may be associate with the circadian blood pressure profile in patients with iNHT.

### PP.4.106 ANALYSIS OF TWENTY-FOUR-HOUR CENTRAL BLOOD PRESSURE PROFILE – A FEASIBILITY STUDY

P. Jankowski1, A. Bednarek1, A. Olszanecka1, A. Windaki, D. Czarnecka1, K. Kawecka-Jaszcz2. 1Department of Cardiology and Hypertension, Jagiellonian University Medical College, Cracow-Poland, 2Department of Family Medicine, Jagiellonian University Medical College, Cracow-Poland

**Objective:** In recent years it was proven that there is a difference between central and peripheral blood pressure (BP) and may be clinically important. Central BP better predicts cardiovascular risk and is more closely associated with the extent of organ damage than peripheral BP. The available evidence strongly supports the thesis that 24-hour peripheral BP monitoring is a better predictor of cardiovascular complications than office BP measurement. The 24-hour central systolic BP (cSBP) profile has not been analyzed so far, therefore the aim of our study was to assess the feasibility of such monitoring.

**Design and Method:** Forty subjects (15 women and 25 men) were included into the study. In this group 21 patients were never treated hypertensives (mean age 37.19 ± 10.63 years, body mass index 28.47 ± 3.96 kg/m², 7 subjects grade 3 HT, 14 grade 2 HT, and 1 subject grade IHT) and 19 persons were normotensive (mean age 38.21 ± 12.75 years, body mass index 25.39 ± 7.81 kg/m²). Applanation tonometry of the radial artery and “n-point forward moving average” method have been used to derive 24-hour cSBP (BProw, HealthSTATS). Measurements were performed every 15 minutes during 24 hours.

**Results:** The mean office systolic blood pressure was 138.82 ± 14.01 mmHg and diastolic blood pressure was 89.8 ± 7.99 mmHg. The 24-hour mean value of cSBP was 122.3 ± 18.18 mmHg. The mean value of the daytime (6:00-22:00) cSBP was 125.55 ± 17.79 mmHg, and the nighttime cSBP (22:00-6:00) was 115.72 ± 17.11 mmHg (p = 0.0139). 24-hour cSBP profile is shown on the graph.

**Conclusions:** Twenty-four hour noninvasive cSBP monitoring is a promising technique, which may have clinical application. The value of cSBP at night is significantly lower than cSBP during the day. However, further clinical trials are required to provide evidence for the prognostic value of cSBP.
PP.4.107 IS ANTIHYPERTENSIVE TREATMENT ADAPTATION FROM HOME BLOOD PRESSURE MEASUREMENT OPTIMAL? A PILOT STUDY IN GENERAL PRACTICE

J.M. Boivin1, E. Boute1, R. Fay1, P. Rossignol1, F. Zannad1. 1Cir-P, Vandœuvre les Nancy-France, 2Département de Medecine Generale Universite Henri Poincare, Vandoeuvre les Nancy-France

Background: Home Blood Pressure (HBP) was shown to be useful for anti-hypertensive treatment adjustment. Guidelines suggest a target HBP below 135/85mmHg, corresponding to a target office BP (OBP) below 140/90mmHg. There is a “grey zone” corresponding to OBP controlled patients but with a systolic HBP between 131-140mmHg, for which the decision to change treatment is not resolved.

Objectives: Principal: To assess the proportion of OBP controlled patients with a systolic HBP in the “grey zone” of 131-140mmHg. Secondary: Compare the decision to change treatment based on OBP, HBP or ambulatory blood pressure measurement (ABPM).

Methods: In 3 general practices, hypertensive patients with controlled OBP (<140/90 mmHg) were assessed simultaneously with HBP measurements (ESH guidelines) and 24h ambulatory BP Measurements (ABPM). The decision to change treatment was compared as to whether it was based on OBP, HBP or ABPM.

Results: In 52 patients with controlled OBP (<140/90mmHg) 12 were found to have systolic HBP within the “grey zone” (131-140mmHg). Based on HBP, 14/52 required a treatment escalation (systolic HBP ≥135mmHg). However, among these patients and comparatively to daytime ABPM, HBP was found retrospectively to overestimate SBP control in 5 and underestimate SBP in 3. The correlation between systolic ABP and HBP was 85% (p <0.0001).

Conclusions: Agreement between different BP measurements methods is not fully established. A significant number of patients controlled on OBP fall into a “grey zone” using HBP. Target OBP are not defined and all hypertension titrals are based on target OBP. Large-scale randomized studies demonstrating the prognostic value of HBP specifically in treated patients are needed.

PP.4.108 SHISHA (NARGHILE, WATERPIPE) SMOKING AND ITS EFFECT ON THE ARTERIAL STIFFNESS, PULSE WAVE VELOCITY AND OTHER HEMODYNAMIC PARAMETERS

M. Al-Kubati1, A. S. Al-Kubati2, A. A. Gunaid3. 1Faculty of Medicine, Masaryk University, Brno-Czech Republic, 2Nlep, Taiz-Yemen, 3Faculty of Medicine and Health Sciences, Sana’a University, Sana’a-Yemen

Objectives: The aim of this study was to investigate the acute effect of Shisha Smoking (ShS) on the arterial stiffness, pulse wave velocity (PWV) and other hemodynamic parameters.

Design and Methods: In ten healthy men, age 31 ± 8 years (mean ± SD), Arterial stiffness measurements were investigated by non-invasive Applanation tonometry (Sphygmo-Cor) over the right radial and carotid arteries, while in seated position, after 15 minutes rest, during optimal conditions and at the same diurnal time. The first measurements were taken before (ShS), (after > 12 hours of smoking cessation with a complete stopping of alcohol, coffee or tea drinking). The measurements for the Pulse Wave Analyses (PWA) for radial (-ra) and aortic (-ao) blood pressure in mmHg (systolic: SP, diastolic: DP; pulse: PP and mean: MP), heart rate (HR), augmentation pressure (AP) in mmHg, augmentation index (Aix), MP-ao (14.12 versus 13.41, p = 0.0257), and subendocardial viability ratio (SEVR%) and pulse wave velocity (PWV) were repeated after the (ShS) session, which lasted 30 min. for smoking 5 grams of fruit-flavoured tobacco (Ma’assel).

Results: Compared with before smoking, an increase after (ShS) was found in HR (76.5 ± 6.62 versus 93.6 ± 8.46 beats/min; p = 0.00067), carotid-radial pulse wave velocity (brachial-PWV) (7.02 ± 1.18 versus 8.24 ± 1.18 m/s, p = 0.041). Increases were found in SP-ra (p = 0.082 NS), DP-ra (p = 0.023) MP-ra (p = 0.082 NS), non-significant (NS) increases in SP-ao, DP-ao (p = 0.064) and MP-ao. Decreases after (ShS), were found in AP (4.2 ± 4.59 versus 0.5 ± 4.43 mmHg, p = 0.0412), Aix (10.9 ± 10.25 versus 0.2 ± 13.41, p = 0.0257), and (SEVR%) (156 ± 14.12 versus 134 ± 29.94, p = 0.00579) but an increase in (EDV%) (35.3 ± 2.26 versus 39.9 ± 4.07, p = 0.00759) was found.

Conclusion: The results confirm that the Shisha smoking (ShS) has a significant effect on arterial tone and acutely increases arterial blood pressure, heart rate and arterial stiffness.

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PP.4.109 AMBULATORY BLOOD PRESSURE MONITORING AFFECTS SLEEP QUALITY AND BLOOD PRESSURE

V. Katsi, G. Souretis, N. Kalovidouris, I. Vlasseros, A.N. Koumoulidis, Christakopoulos, D. Tsachris, C. Masoura, D. Papoutsis, M. Dvani, N. Alexopoulos, Ch. Vlahopoulos, Ch. Stefanidis, I. Kallikazaros. Hippokration Hospital, Athens-Greece

Objective: During nocturnal non-invasive ambulatory blood pressure monitoring (ABPM), inevitably an undesirable external stimulus due to pump noise and pressure produced by cuff inflation may affect the quality of sleep, influence the physiological nocturnal blood pressure fall and consequently affect dipping status. We assessed the hypothesis that blood pressure monitoring provokes awakenings may affect sleep quality, thus blood pressure and/or heart rate.

Design and Method: The study population consisted of 108 consecutive subjects with stage I-II essential hypertension (aged 54 ± 9 years, 59 male, office BP = 148/97 mm Hg). Participants were divided into two groups according to whether they underwent ambulatory blood pressure monitoring (group A, n = 60), or not (group B, n = 48). Repeated measurements of blood pressure were registered with non-invasive automatic blood pressure monitors (SpaceLabs 90207, Welch Allyn 6100S devices) every 20 min. Self-reported data regarding the quality of sleep, numbers and duration of arousal were obtained via standardized questionnaire.

Results: Group A compared to group B demonstrated a small but significant increase in the number of nocturnal awakenings (2.8 vs 1.2, p = 0.045), although their duration did not significantly differ (p = NS). However, the two groups exhibited similar mean values of nocturnal blood pressure and heart rate (121/73 vs 119/71 mm Hg, 67 vs 65 beats/min, p = NS in both cases). The reported sleep quality did not differ between the two groups but both sleep quality and higher numbers of awakenings (> 3) were associated with non-dipping status (p < 0.05, in both cases).

Conclusions: Our findings indicate that even though ambulatory blood pressure monitoring induces modest sleep disturbances, it can accurately evaluate nighttime blood pressure profile and heart rate, without affecting sleep efficiency and quality. Sleep evaluation may be particularly useful in essential hypertension, as poor quality of nocturnal sleep were associated with non-dipping status.

PP.4.110 PREVALENCE OF HIGH BLOOD PRESSURE DURING SCHEDULED VISITS IN FAMILY PRACTITIONER

B. Symonis1, M. Cieplak1, E. Kudraszew1, C. Ducki2, Z. Gaciong1. 1Medical University of Warsaw, Warsaw-Poland, 2Fundacja “S´yjmy Zdrowo” [Foundation “For Better Health”], Warsaw-Poland

Background: BP measurements should be performed during all visits in GP since they are essential for hypertension [HT] diagnosis and treatment.

Objective: Assessment of blood pressure [BP] and the BP control in consecutive patients emerging in GP practice.

Design and Methods: The study was performed in 71 selected GP practices all over the Poland. At the beginning short questionnaire was collected including weight and height for BMI calculation, data on HT diagnosis, antihypertensive treatment, CV and renal diseases and the indications for consultation (emergency or planned). Two measurements of SBP and HR with OMRON M3 device were made by trained nurses using standardised protocol, and mean values were included in the final analysis.

Results: In 11 769 consecutive pts. (M/F 4440/3329, mean age 58.5 ± 15.6 yrs.) visiting GP for either a planned (n = 9108) or an emergency visit (n = 2571) HT had been diagnosed previously in 56.7% pts., history of coronary heart disease was positive in 32.5%, peripheral arterial disease in 17.7%, pts, renal disease in 7.8% pts, stroke in 4.3%, MI in 8.6%. Mean SBP/DBP was 142/90 ± 21/mmHg, HR 76 ± 12/min; BMI 27 ± 4.6 kg/m². BP was uncontrolled (≥140/90 mmHg) in 53.1%, (SBP in 50.7%, DBP in 19.0%). In 3957 pts. without the history of HT on planned visit (M/F 1479/2478, age 51.2 ± 16.2 yrs.), SBP/DBP was 132/77 ± 18/10 mmHg, HR 76 ± 11/min, BMI 25.4 ± 4.2 kg/m². BP was uncontrolled in 33.4% pts. (SBP in 31.0%, DBP in 11.4%). In HT pts. on planned visit (n = 5241, M/F 1919/3322; age 64.7 ± 12.3 yrs.) mean SBP/DBP was 147/81 ± 20/12 mmHg, HR 76 ± 12/min, BMI 28.4 ± 4.4 kg/m². Despite the fact 95.9% pts. were on or were on antihypertensive treatment, BP was uncontrolled in 65.7% pts. (SBP uncontrolled 63.3%, DBP uncontrolled in 22.0%). HT pts. with uncontrolled HT were older (65.4 ± 12.1 vs. 63.5 ± 12.4 years, p < 0.001), had better SBP/DBP (158/84 ± 16/11 vs. 127/74 ± 9/8 mmHg, both p < 0.001), higher HR (77 ± 12
Conclusions: High BP values are very prevalent in pts. during planned visits in GP office. Ignorance of this fact leads to underdiagnosis and undertreatment of hypertension. The study was supported by unrestricted grant from MSD Poland inc.

The hypertensives, the great majority (59%) showed concentric LVH, while the great majority (59%) showed concentric LVH, while the hypertensives. With regard to left ventricular geometry, 53% (46 pt) and 15% (13 pt) vs. 17.2 ± 11.0 (min, p < 0.001) and higher BMI (28.6 ± 4.5 vs. 27.9 ± 4.4 kg/m²; p < 0.001).

Objective: To determine whether blood pressure (BP) readings obtained using standard and large cuffs vary when using an automated device, and if so, to establish whether the difference applies over a range of arm circumferences.

Design and Method: Using an Omron I2A BP monitor, we measured BP on 220 pregnant and 224 non-pregnant participants. Eight BP measurements were taken from each participant, four using a standard sized cuff and four using a large cuff, in randomized order. The upper AC of each participant was also measured.

Results: Pregnant women with AC ≥ 32 cm were more likely to be hypertensive than women with AC < 32 cm. Measured BP was lower using the large cuff both in pregnancy (DBP/DBP - 5 ± 6/2.5 ± 5 mmHg, large-small, p < 0.001) and in the non-pregnant subjects (DBP/DBP -5 ± 8/3 ± 5 mmHg, large-small, p < 0.001). However, we were unable to demonstrate any relationship between these measured BP differences (due to cuff size) and AC, nor between these differences and increasing BP.

Conclusions: The Omron I2A apprds higher BP readings using a standard cuff than a large cuff in most, but not all cases. BP readings are more dependent on cuff size than on AC. It is difficult to predict the effect of cuff size in an individual. Our study challenges the current practice of using a large cuff for large arms in automated BP measurement, and does not support the arbitrary 32 cm cut-off specified for the Omron I2A device. It is no longer clear how BP should be measured in pregnancy.

Objective: To study changes in chronobiological parameters of circadian pattern of blood pressure (BP) in patients with moderate arterial hypertension (AH) receiving chronotherapy with a beta-blocker (bisoprolol) under the conditions of circumpolar shift work.

Methods: 307 male patients aged 48.1 ± 6.1 years with moderate AH were examined (work in the North 17.3 ± 6.8 years, shift work 12.5 ± 6.6 years). All the subjects underwent ambulatory blood pressure monitoring (ABPM). Standard analysis and individual cosinar analysis of ABPM data were performed. 97 patients received bisoprolol monotherapy 5 mg daily for a year. 65 subjects were treated with chronotherapy (Group 1), 32 patients received usual treatment (Group 2).

Results: 24-hour BP by ABPM was 138.0 ± 9.3/92.2 ± 7.4 mmHg. In systolic BP, diipper pattern was recorded in 35.2% of patients, non-dipper in 50.5%, over-dipper in 2.9%, and no dipper in 11.4%. There were the following chronotypes of BP defined: normotension in 29.3% of patients, allomornotension in 11.8%, isomohotension in 3.6%, meso-hypertension in 33.6%, aperiodic AH in 1.9%, phase (reversed) meso-hypertension in 16.3%, amplitude AH in 3.3%, amplitude-phase (reversed) AH in 0.33%. Group 1 showed a reduction in 24-hour, daytime and nighttime values of systolic BP (SBP) and diastolic BP (DBP), in nighttime variability of SBP and DBP, in 24-hour variability of DBP, and an increase in 24-hour indices of SBP (from 7.0 ± 6.4 to 9.8 ± 4.8, p = 0.0077) and DBP (from 7.3 ± 7.3 to 11.6 ± 6.5, p = 0.0012). In Group 2 there was a tendency to reduction in 24-hour indices of SBP (from 8.0 ± 6.5 to 6.1 ± 4.0, p = 0.2282) and DBP (from 8.3 ± 6.8 to 6.3 ± 3.8, p = 0.3350).

Conclusions: The course of AH under the conditions of circumpolar shift work is characterized by significant abnormalities in circadian BP pattern. Chronorregulation of beta-blocker therapy (bisoprolol) in patients with moderate AH improves the parameters of circadian BP pattern, but it leads to desynchronosis in HR and BP which influences the clinical tolerability of the drug.

Objective: To determine whether blood pressure (BP) readings obtained using standard and large cuffs vary when using an automated device, and if so, to establish whether the difference applies over a range of arm circumferences.

Design and Method: We studied 106 patients (90 females and 16 male) hospitalized in our Geriatric Institute (Pio Albergo Trivulzio of Milan) over 90 years old (mean age 95 years; range 90-106 yrs). They underwent a clinical visit including BP and HR values, blood samples, EKG, echocardiogram and 24-h ambulatory BP. Clinic blood pressure was the mean of three measurements and ABPM readings were performed with Spacelab device. Left ventricular hypertrophy (LVH) was defined by two gender-specific criteria (LVMI ≥ 125 g/m² in men and 110 g/m² in women, LVMI ≥ 51 g/m² in men and 47 g/m² in women). We considered dipping status as a fall in blood pressure during night-time period > 10% for both SBP and DBP; reduced dipping and non-dipping profile as ≤ 5% and ≤ 5% respectively. During the study, 20 patients died or didn’t give their consensus at the execution of instrumental exams, and therefore they didn’t undergo echocardiogram and/or ABPM.

Results: We observed that prevalence of hypertension and cognitive impairment were respectively 57% (61 pt) and 68% (72 pt). 64% of subjects with an history of hypertension (39 pt) was affected by cognitive impairment, and 54% (39 pt) of patients with cognitive impairment showed an anamnesis of hypertension. 69% of patients (59 pt) showed LVH (mean LVMI: 125 ± 41 g/m²; 55±19.5 g/ h²); 63% (37 pt) of these had an history of hypertension. 75% of total patients (64 pt) had diastolic dysfunction (E/A < 1); 58% of these (37 pt) were hypertensive. With regard to left ventricular geometry, 53% (46 pt) and 15% (13 pt) of total patients had concentric and eccentric LVH, respectively; 19% (16 pt) had a concentric remodelling and 13% (11 pt) showed a normal pattern. Among the hypertensives, the great majority (59%) showed concentric LVH, while the other patterns were equally distributed (16% eccentric LVH, 14% concentric remodelling, 12% normal pattern). With regard to ABPM profile, we found a reverse pattern in 49% and 29% of patients for SBP and DBP, respectively; a non dipping profile in 21% (SBP) and 40% (DBP); a reduced dipping in 10% (SBP) and 17% (DBP); a dipping profile in 20% (SBP) and 14% (DBP), respectively.

Conclusions: Our results suggest that the great majority of very elderly have a LVH, especially with a concentric pattern, and show a non dipping or even a reverse pattern of 24 h blood pressure profile.
Abstracts e181

Cardiologia Pediatrica Fondazione Irccs Ca Granda Ospedale Maggiore Policlinico Milano, Milano-Italy; ’Dip Toraco Polmonare E Ce Universita’ E Uo Medicina Cv Fondazione Policlinico Milano, Milano-Italy; ’Policlinico Universitario Messina, Messina-Italy; ’Dpt Scienze Cardiovascolari E Neurologiche Policlinico Universitario Cagliari, Cagliari-Italy; ’Uo Nefrologia E Dialisi Pediatrica Fondazione Irccs Ca Granda Ospedale Maggiore Policlinico Milano, Milano-Italy

Background: Recent data suggest that casual office blood pressure measurement (CBP) in children may not be as sensitive as ABPM for detecting hypertensive patients. However ABPM is not feasible in toddlers (for the lack of reference standards) and it can be difficult and/or misleading in hyperactive children or incontinent adolescents. We have developed a method of BP measurement, named OBPM: Office Blood Pressure Measurement, alternative to ABPM for investigating BP in children. The present study compares the results obtained with OBPM and ABPM in 59 children referred for suspected or confirmed hypertension.

Methods: OBPM utilizes the same recorder and cuff as ABPM (SpaceLab 90207) to perform ten BP measurement in 1 hour just before the ABPM. The readings are introduced in a specific software (developed with FileMaker) that calculates the coefficient of variation (CV) of systolic and diastolic BP, after having excluded outlier values (defined as those measurements below the 5th and above the 95th of the recorded values). The CV provides an index of reliability of the calculated mean; we suggest to discard OBPMs with a CV > 15%. The system finally calculates the mean of the remaining values and the z-score for age, gender and height according to the American Academy Reference values (Pediatrics 2004;114:555-576). The correlation between OBPM and ABPM was analyzed as Pearson’s correlation coefficient.

Results: The table shows the findings obtained from 59 children (25F), referred to 3 Centres, with a mean age of 11.8±3.5, who underwent both OBPM and ABPM on the same day.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean ± SD 1st rec.</th>
<th>Mean ± SD 2nd rec.</th>
<th>P</th>
<th>Mean difference ± SD</th>
<th>RC</th>
<th>%M</th>
<th>%MV</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBP mmHg</td>
<td>121.8 ± 14.8</td>
<td>120.8 ± 14.3</td>
<td>0.819</td>
<td>0.47 ± 8.8</td>
<td>&lt;0.0001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBP mmHg</td>
<td>72.1 ± 11.3</td>
<td>71.5 ± 9.4</td>
<td>0.77</td>
<td>0.28 ± 7.0</td>
<td>&lt;0.0001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Conclusions: Preliminary analysis indicates that OBPM may represent a reliable and promising tool for investigating BP in children as an alternative to ABPM. The software for OBPM is available online at the following website: www.childproject.org

PP4.117 REPEATABILITY OF THE MORNING BLOOD PRESSURE SURGE IN NEVER TREATED HYPERTENSIVE PATIENTS

A. Prebijuz, G. Kowalewski, K. Paschalis-Purtak, B. Pucilowska-Jankowska, M. Makowiecka-Ciesla, M. Klik, E. Florczak, M. Kabat, A. Januszewicz. Institute of Cardiology, Warsaw-Poland

Objective: The objective of the study was to evaluate the repeatability of morning blood pressure surge (MBPS) in patients with untreated hypertension.

Design and Methods: From the group of 121 patients with never treated hypertension we included 94 patients (72M, 22F; mean age 37 ± 10; range 18-58 yrs) with valid two ABPMs taken 7 days apart on the same week day. MBPS was defined: sleep-trough MBPS – average of systolic and diastolicBP during first 2 hours after wake up minus average of sysBPs during first 2 hours after wake up minus average of systolicBP during first 2 hours after wake up. We assessed cusum plot height of blood pressure from 03:00 to 9:00h from a plot of cumulative sums. We evaluated the agreement between paired ABPMs by Bland and Altman’s method. The repeatability coefficient (RC) for the evaluation of the repeatability was employed. The repeatability coefficient as a percentage of the mean of the repeat measurements (%M) and the percentage of close to maximal variation (%MV) were also calculated.

PP4.116 OFFICE BLOOD PRESSURE MONITORING (OBPM): A POSSIBLE NEW TOOL FOR EVALUATING BLOOD PRESSURE IN CHILDREN AND ADOLESCENTS

P. Salice1, G.B. Danzi1, F. Magrini1, F. De Luca1, S. Ghiglia1, A.M. Colli1, M.A. Galli1, L. Mamari1, P.P. Bassareo1, L. Bac2, D. Li Vecchi1, G. Ardissino1. ‘Uo

Objective: To evaluate the repeatability of morning blood pressure surge (MBPS) in patients with untreated hypertension.

Design and Methods: From the group of 121 patients with never treated hypertension we included 94 patients (72M, 22F; mean age 37 ± 10; range 18-58 yrs) with valid two ABPMs taken 7 days apart on the same week day. MBPS was defined: sleep-trough MBPS – average of systolic and diastolic BP during first 2 hours after wake up minus average of systolicBP during first 2 hours after wake up minus average of systolicBP during first 2 hours after wake up. We assessed cusum plot height of blood pressure from 03:00 to 9:00h from a plot of cumulative sums. We evaluated the agreement between paired ABPMs by Bland and Altman’s method. The repeatability coefficient (RC) for the evaluation of the repeatability was employed. The repeatability coefficient as a percentage of the mean of the repeat measurements (%M) and the percentage of close to maximal variation (%MV) were also calculated.
Results: Patients were characterized by relatively low MBPS indices. There were no significant differences in all three MBPS indices between 1 and 2 recordings (r = 0.824, 0.827, 0.840 indices were characterized by good reproducibility indices RC, %M and %MV (Table).

Conclusions: In never-treated hypertensive patients all three MBPS indices are characterized by good reproducibility.

Conclusions: Six months following an exercise prescription, SBP and DBP were reduced with no change in HRV. Home BP monitoring did not reduce BP further. There was a small negative correlation between DBP and HRV suggesting that the autonomic nervous system may be involved in DBP reduction.

**PP.4.118** EMOTIONAL INTELLIGENCE, PSYCHOLOGICAL FACTORS MAY INFLUENCE THE DIFFERENCE BETWEEN CLINICAL AND AMBULATORY BLOOD PRESSURE LEVELS IN PATIENTS WITH HYPERTENSION

G. Andreev1, O. Lerman1, D. Lyusin1, A. Deev1, V. Gorbonou1, 1National Research Centre for Preventive Medicine, Moscow, Russia, Moscow-Russia, 2Institute of Psychology of Russian Academy of Sciences, Moscow-Russia

Objective: The aim of study was to define if the emotional intelligence (EI) and psychological status (PS) of patients with arterial hypertension (AH) can moderate the difference between clinical and ambulatory blood pressure (CABP) level.

Design and Methods: We assessed 214 ambulatory blood pressure monitoring (ABPM) data of AH patients. ABPM monitor (SpaceLab 90207) was applied after the washout period. The CABP discrepancy was assessed as the difference between clinical BP and mean daytime BP measurement. After ABPM session patients completed the PS and EI questionnaire: “Minnesota Multiphasic Personality Inventory” (MMPI short form) and “EmIn Questionnaire” (Lyusin D.). We used Spearman Partial Coefficient for correlation analysis adjusted for age, sex and duration of AH.

Results: The mean daytime BP was (M ± SD): systolic (SBP) - 141.1 ± 14.2; diastolic (DBP) - 89.1 ± 9.5 mm Hg. We found correlations (r) between PS and CABP difference: 1) positive - between psychological and emotional impulsivity (3, 4 MMPI scales) (r = 0.190 and 0.277) combined with social conform, self-control (7, K MMPI scales) (r = 0.263 and 0.178); 2) negative - with psychological predisposition, leadership traits, aggression level, (F, 6 MMPI scales) (r = -0.204 and -0.177). Also, we found relationship between EI and CABP discrepancy: emotion self-awareness and management of others’ emotions (ES/A, MOE scales of EmIn) (r = 0.33 and 0.38).

Conclusion: The degree of CABP difference is associated with high social conform and self – control, emotion self-awareness combined with psychological and emotional impulsivity, wish for management of others’ emotions. CABP difference is less probable in patients with high aggression level, psychological disadaptation, leadership traits.

**PP.4.119** EFFECTS OF EXERCISE PRESCRIPTION AND REMOTE BLOOD PRESSURE MONITORING ON HEART RATE VARIABILITY IN A RURAL POPULATION WITH METABOLIC SYNDROME

M.I. Stuckey1, K.J. Sabourin2, S. Shapiro2, C. Munoz3, R.J. Petrella2.

1The University of Western Ontario, London-Canada, 2Lawson Health Research Institute, London-Canada, 3Gateway Rural Health Research Institute, Seaforth-Canada

Objective: This study tested the hypothesis that exercise prescription would reduce systolic and diastolic blood pressure (SBP, DBP), that changes would be greater in a group with home BP monitoring equipment, and that changes in heart rate variability (HRV) would accompany reduced BP.

Design and Methods: 48 participants with metabolic syndrome risk factors (56.7 ± 10.2y; 13 male) were randomized to the intervention group (IG) and 47 (59.7 ± 7.9y; 11 male) to the control group (CG). All participants reported to the clinic at baseline and following six months for measurement of BP, weight and waist circumference (WC), HRV assessment, exercise testing and individualized exercise prescription. R-R intervals (RRi) were collected during 5 min of supine rest and analysed for time and frequency domain HRV. IG received a Blackberry smartphone with Healthymind where monitoring application and a home BP monitor for measurement of threice-weekly BP.

Results: There were no differences in changes between IG and CG. SBP decreased from 141 ± 2mmHg to 131 ± 2mmHg (p < 0.001) and DBP decreased from 84 ± 1mmHg to 82 ± 1mmHg (p < 0.001). RRi increased from 973 ± 18ms to 1009 ± 19ms (p = 0.029) and HR decreased from 63 ± 10bpm to 60 ± 10bpm (p = 0.021), but there were no changes in any HRV indices. Low frequency (LF) and total power (TP) of HRV were negatively correlated with DBP (LF: r = -0.263, p < 0.001; TP: r = -0.194, p = 0.007). HRV was not associated with weight, WC or fitness.

Conclusion: Exercise prescription and remote blood pressure monitoring resulted in BP reduction. HRV indices improved suggesting that the autonomic nervous system may be involved in DBP reduction.

**PP.4.120** ARTERIES IN DISEASED PATIENTS ADMITTED IN GENERAL HOSPITAL

M.A. Esteban-Moreno, M.I. Poveda-Garcia, F.J. González-Martínez, M.D. Del Pino, Y. Pino. Torrecardenas Hospital, Almeria-Spain

Purpose: Blood pressure (BP) has a physiological circadian rhythm with a decrease of the values during sleep. Patients with diabetes mellitus show an absence of the nocturnal physiological lowering of BP (non dipping pattern) more frequently than the rest and has been associated with an increased cardiovascular risk.

The aim of our study was to observe the behaviour of the BP in a real clinical setting in a random sample of patients.

Materials and Methods: Prospective study of 105 hypertensive patients. The sample calculation was performed on a universe of 1030 discharged patients from the emergency department of a general hospital from April until June 2010. ABPM was determined by using a device (worn by the patients) that takes blood pressure measurements over 24 hours, usually every 15 to 20 minutes during the daytime and every 30 to 60 minutes during sleep. Two comparison groups were established: patients with Diabetes Mellitus Type 2 (D Group) and non-diabetic ones (ND Group). The data were analyzed by using SPSS 18.0 statistical package.

Results: In a sample of 105 hypertensive patients, 35 were diabetic (33.3%) and 70 were non diabetic (66.6%). The following variables were studied: age 63 ± 12 years old/DG and NDG males 65 ± 11 years (P: NS) and sex DG Males: 14 / Females: 16; NDG Males: 26 / Females: 26 (P: NS). We analyzed the need for antihypertensive therapy: 23 patients (22.3%) with 1medicine, 45 patients (43.6%) with 2 medicines, 28 patients (27.1%) with 3 medicines and 7 (6.7%) with 4 medicine. Analyzing therapeutic families: ACE inhibitors 53% (55 patients)Angiotensin 2 receptor antagonists 27% (28 patients)

Diuretics 62%(64 patients)Calcium channel blockers 22%(23 patients)AlfA-Blockers 11%(11 patients)β-Blockers 17%(17 patients) Analyzing the subgroup of diabetic patients: average HbA1c 7.3%. In diabetic patients nighttime blood pressure (nondipping pattern) was observed but without reaching statistical significance (P: 0.06), probably due to the volume of the sample (n = 103).

Conclusions: ABPM is a useful technique to assess the circadian rhythm of BP, when we suspect white coat hypertension or episodic hypertension (e.g., pheochromocytoma), hypertension resistant to an increasing use of medicines and hypotensive symptoms while taking antihypertensive drugs.

Non dipping has also been associated with microalbuminuria and faster progresses of nephropathy in patients with diabetes mellitus. We must pay special attention to these patients to provide an individual antihypertensive treatment, thereby reducing cardiovascular complications so frequent in these patients.

**PP.4.121** ARTERIAL BLOOD PRESSURE MONITORING USEFULNESS IN HYPERTENSION DIAGNOSTIC AND HYPERTENSION TREATMENT CONTROL (2000-2011)

P. Cortes Hausmann, J. Bisbe Company, V. Bisbe Company, H. Briñego Garcia, S. Soler Simon, J.C. Trullas Vilà. Hospital Sant Jaume, Olot-Spain

Objective: The aim of this study was to evaluate the usefulness of Ambulatory blood pressure monitoring (ABPM) in rural and urban communities and to verify the control ratio of hypertension patients under treatment and the ratio of White coat hypertension in the ABPM made to diagnose hypertension (patients without treatment).

Design and Method: From February 2000 to January 2011, we prospectively evaluated all ABPM made in our Hospital (automatic SpaceLab®).

Results: 1. We made 1624 ABPM. 434 to diagnose office hypertension patients and 1190 in office hypertension patients under treatment.

2. 434 to diagnose office hypertension patients:
a) There were 178 patients (41%) with ambulatory normal pressure (White Coat Hypertension) so they didn’t need treatment.
b) There were 256 patients (59%) with real ambulatory hypertension so they needed treatment.

3. 1190 patients with office hypertension under treatment:
a) 630 patients (53%) with ambulatory hypertension, so we had to change or increase the treatment in these patients.
b) 183 patients (15.4%) with low ambulatory blood pressure (hypotension), so we had to reduce the treatment in these patients.
c) 377 patients (31.7%) with ambulatory normal pressure (White coat effect), so we could avoid a change in the treatment.

Conclusions: We know that there are many patients (53%) under treatment with ambulatory hypertension although we don’t know that there are many patients (15.4%) under treatment with office hypertension but too low ambulatory blood pressure so we had to reduce the treatment after the ABPM.
**PP.5.122 AGE RELATED INTIMA–MEDIA THICKNESS DYNAMICS IN ELDERLY PATIENTS WITH ARTERIAL HYPERTENSION**

L. Malinova, L. Sadgaya, L. Tikhonova. Saratov Scientific Research Institute of Cardiology, Saratov-Russia

**Background and Purpose:** To investigate relationships among plaque formation, increasing intima–media thickness (IMT), and age. We examined ultrasonographically carotid arteries of elderly hypertensive patients who had no clinical signs of atherosclerotic disease.

**Methods:** We studied 179 elderly patients with arterial hypertension (100 women, 79 men; age range, 60 to 88 years) and no history of diabetes mellitus, or atherosclerotic disease. Mean intima-media wall thickness (IMT) of common carotid arteries at plaque-free sites and prevalence of plaques were evaluated by B-mode ultrasonography.

**Results:** Mean common carotid IMT increased in nonlinear manner with age: stable phase lasted from 60 up to 74 years old, then occurred significant intima-media thickness increase with mean rate of 0.157 mm per year. In senile patients intima-media complexes were diffusely thickened (IMT 1.03 mm ± 0.62). Time function, first derivative and phase pattern of intima-media thickness changing revealed two sinks in phase plane “intima-media thickness time function – it’s first derivative”, both corresponded to 60 and 75 years old, respectively. Plaque prevalence increased up to the seventh decade of life. IMT and plaque prevalence were closely associated in the seventh and eighth decades of life. No significant correlation within IMT and arterial pressure (systolic, diastolic, pulse, general), medication spectrum was revealed in studied patients.

**Conclusions:** The present study suggests that increased IMT is a physiological effect of aging that corresponds to diffuse intimal thickening, and that IMT is distinct from pathological plaque formation even in patients with arterial hypertension.

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**PP.5.123 RELATIONSHIP BETWEEN VITAMIN D STATUS AND EARLY ARTERIAL CHANGES IN PRIMARY HYPERTENSION. PRELIMINARY DATA**

F. Tornese1, C. Scaczone2, R. Arsena1, L. Guarino1, A.C. Fornaci1, E. Ajello1, G. Mule1, G. Cerasola2, S. Cottone3. 1 Dipartimento Di Medicina Interna E Specialististica-University of Palermo, Palermo-Italy; 2 Dipart Di Biotecnologie Mediche E Medicina Legale, Sezione Di Biochimica Medica-University of Palermo, Palermo-Italy

**Objective:** Hypertensive disease is characterized by arterial stiffening as indicated by abnormal pulse wave velocity (PWV). The pathophysiology of these abnormalities is still not clear. We present the preliminary data of an ongoing cross-sectional study aimed at analyzing the possible relationship between vascular alterations and vitamin D hormonal status.

**Design and Method:** In 40 (19 F, 21 M) stable and uncomplicated patients having primary hypertension and normal renal function (eGFR-MDRD: 90.6 ± 19.6 ml/min), aged 47.3 ± 12.4 years, serum 25-hydroxyvitamin d (25(OH)D3), PTH, Endothelin-1 (ETI) and 24h blood pressure levels were analyzed.

**Results:** 25(OH)D3 serum levels were lower than normal cut-off values (30 μg/L), whereas PTH values were within normal range. Vitamin D3 correlated negatively with PWV (r = –0.72, p = 0.0001), with ETI (r = –0.57, p = 0.0001) and with PTH (r = –0.42, p = 0.005).

**Conclusions:** These preliminary results show decreased levels of vitamin D3 in primary hypertensive patients notwithstanding normal glomerular filtration rate and PTH plasma concentrations. The correlations of vitamin D with both PWV and ET-I suggest a relationship between vitamin D status and early vascular changes characterizing arterial hypertension.

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**PP.5.124 ORTHOSTATIC HYPOTENSION AND INTIMA MEDIA THICKNESS: IS THERE ANY ASSOCIATION?**

A. Fedorowski, P. Nilsson, G. Enström, B. Hedblad, O. Melander. Skåne University Hospital, Malmö-Sweden

**Objective:** Presence of orthostatic hypotension (OH) predicts all-cause mortality and incident cardiovascular disease. Whether or not OH is associated with progression of atherosclerosis remains largely unknown.

**Design and Method:** Within a HOMA subcohort of a prospective Malmö Diet and Cancer Study we analyzed data on common carotid artery intima media thickness (CCA-IMT) at baseline and after a mean follow-up of 6 yrs in relation to prevalence of OH at follow-up examination. OH was defined according to the international consensus criteria as decrease of systolic blood pressure (SBP) ≥ 20 mmHg, or decrease of diastolic blood pressure (DBP) ≥ 10 mmHg on standing. Study sample consisted of 692 diabetes-free individuals (294 men and 398 women; mean age at follow-up, 64.0 ± 5.9 yrs) without a known diagnosis of OH.

**Results and Conclusions:** During follow-up examination, 38 participants (5.5%) were found to have OH. No biometric (age, gender, and BMI), metabolic (presence of metabolic syndrome, quartiles of insulin sensitivity), and haemodynamic (resting SBP and DBP, resting heart rate) baseline and follow-up parameters significantly differed between those with and without OH. In contrast, at baseline, OH positive as compared to OH negative individuals had significantly greater CCA-IMT (in mm, 0.80 ± 0.21 vs. 0.73 ± 0.15, p = 0.008), and this trend was preserved through follow-up examination (0.89 ± 0.29 vs. 0.83 ± 0.18, p = 0.048). In a multivariate logistic regression model, adjusted for baseline age, gender, BMI, resting SBP and DBP, resting heart rate, and HOMA index, increased CCA-IMT at baseline was the strongest individual predictor of a positive orthostatic test at follow-up examination (odds ratio [per 0.10 mm], 2.05; 95% confidence interval, 0.32–13.2; p = 0.001). In conclusion, development of orthostatic haemodynamic impairment among middle-aged diabetes-free adults without known autonomic dysfunction may be associated with progression of subclinical atherosclerosis as indicated by increased common carotid artery intima media thickness.

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**PP.5.125 A DEVELOPING STORY: TWINS AND EARLY ATHEROSCLEROSIS PREVENTION**

D. L. Tarnoki1, A. D. Tarnoki1, R. Cotichini1, C. Fagnani1, F. Fanelli2, C. Baracchini4, G. Meneghetti1, G. Schillaci1, R. G. Kos2, A. Lamer3, L. Littvay4, A. A. Molnar1, V. Nambi10, Z. Garami11, V. Berczi1. 1 Department of Radiology and Oncotherapy, Semmelweis University, Budapest-Hungary; 2 Genetic Epidemiology Unit, National Centre of Epidemiology, Istituto Superiore di Sanità, Rome-Italy; 3 Vascular and Interventional Radiology Unit, Department of Radiological Sciences, La Sapienza Univ., Rome-Italy; 4 Department of Neurosciences, University of Padua School of Medicine, Padua-Italy; 5 Department of Internal Medicine, Angiology and Arteriosclerosis Disease, Dept. of Clinical and Expertism, M. Padua-Italy; 6 Department of Cardiology, State Health Center, Budapest-Hungary; 7 Semmelweis University, Faculty of Pharmacy, Budapest-Hungary; 8 Central European University, Budapest-Hungary; 9 Research Group for Inflammation Biology and Immunogenomics of Hungarian Academy of Sciences, Budapest-Hungary; 10 Baylor College of Medicine and the Methodist DeBakey Heart and Vascular Center, Houston-USA; 11 The Methodist Hospital DeBakey Heart and Vascular Center, Houston-USA

**Objective:** Atherosclerosis is an inflammatory process in which the artery wall thickens as a result of plaque deposition but this process may be preceded by increased arterial stiffness.

**Design and Method:** 223 monozygotic (MZ) and 144 dizygotic (DZ) Hungarian, Italian and American twin pairs (mean age 53 ± 14 years) underwent arterial stiffness (Augmentation index on brachial artery (AixBr), pulse wave velocity on aorta (PWVArm)) (TensioMed Arteriograph), carotid intima media thickness (IMT) (Carotid Analyzer) and carotid Doppler (Peak Systolic
Results: We estimated co-twin correlation (CC) in MZ and DZ pairs separately, and then fitted univariate quantitative genetic models to estimate genetic, shared and unshared environmental components of variance for each parameter, adjusted by age. CC of Aixbra and PWVao were 0.65 (95% CI, 0.55–0.72) and 0.46 (95% CI, 0.33–0.57) in MZ, 0.42 (95% CI, 0.24–0.57) and 0.28 (95% CI, 0.08–0.47) in DZ pairs; heritability 0.45 (95% CI, 0.12–0.71) and 0.42 (95% CI, 0.02–0.57), respectively. The heritability of the investigated IMT’s ranged between 0% and 38%. A large proportion of variance was attributable to unshared environmental factors.

Conclusions: The investigated parameters appeared to be only moderately influenced by genetic factors. Environmental factors of relevance for these measures appeared not to be shared within family but related to individual experience (e.g., smoking habits, diet and physical activity). Atherosclerosis detection at an early stage is necessary for treatment to prevent serious complications such as stroke and heart attack.

The research was supported by Medexpert Ltd, Twins Days Festival Committee, Balassa Institute Hungarian Scholarship Board Office, Ministry for Foreign Affairs of Republic of Italy.

PP.5.126

HDL DIMINISHES MMP-9 PRODUCTION IN A S1P3/β3-DEPENDENT MANNER

M. Schuchardt, M. Tölle, T. Huang, W. Zidek, M. Van Der Giet. Charité, Berlin-Germany

Objectives: Different studies ruled out a relevant role of matrix metalloproteinase-9 (MMP-9) in atherosclerotic plaque rupture. One potent inhibitor of MMP-9 production is the transforming growth factor beta (TGF-β). Similar to this, we also observed inhibitor effects by sphingosine 1-phosphate (S1P), a lysophospholipid accumulating in high density lipoprotein (HDL), which presumably suppresses MMP-9 production. The aim of this study was to reveal the inhibitory influence of HDL on MMP-9 production and the molecular mechanisms behind these processes.

Methods: Rat vascular smooth muscle cells (VSMC) were stimulated with interleukin-1β (IL-1β). MMP-9 expression was quantified by real-time PCR and activity by zymography. For receptor knockdown studies, cells were transfected with siRNA against S1P3 receptor.

Results: TGF-β significantly down-regulated IL-1β stimulated MMP-9 expression (78.6% ± 5.4 decrease; p < 0.05). This inhibition could be significantly blocked with the TGF-β receptor inhibitor R1 (36.7% ± 2.9 vs. 78.6% ± 5.4 decrease; p < 0.05). Like S1P, HDL also significantly suppressed the IL-1β stimulated MMP-9 expression (S1P: 42.2% ± 8.3 decrease n = 5; HDL: 44.3% ± 9.8 decrease; p < 0.05). To reveal if there is any cross-communication between the TGF-β and S1P receptors, we also tested the TGF-β receptor inhibitor in the IL-1β/HDL and IL-1β/S1P costimulation, which significantly reversed the effect of the TGF-β inhibitor (12.2% ± 4.6 vs. 44.3% ± 2.4 decrease; p < 0.05) and S1P (42.2% ± 3.5 vs. 72.3% ± 8.3 decrease; p < 0.05). Investigation of the MMP-9 activity via zymography showed corresponding results after TGF-β and S1P treatment in the absence and presence of the inhibitor. The specific down-regulation of the S1P3 receptor by siRNA abolished the HDL/S1P induced TGF-β signaling. For intracellular signal transduction, Smad2/3 were phosphorylated not only by TGF-β, but also by HDL/S1P.

Conclusions: The HDL/S1P-mediated inhibition of MMP-9 expression could be diminished by a TGF-β receptor inhibitor and by S1P3 receptor knockdown. Therefore, HDL and its component S1P could cross activate the TGF-β signal transduction pathway via the S1P3 receptor.

PP.5.127

FOOD PEPTIDES REDUCE ANGIOTENSIN II- OR INTERLEUKIN 1β-INDUCED CYCLOOXYGENASE-2 EXPRESSION IN VASCULAR FIBROBLASTS

M. García1, M. Quijones1, M. Galán1, R. López-Fandíño1, M. Salacces1, M. Miguel2. 1CIAL (Ctic-Uam), Madrid-Spain; 2Fac Med, Dept Farmacol & Terapeut (Uam), Madrid-Spain

Background/Aims: Adventitial layer, mainly composed by fibroblasts (FB), plays a critical role in the regulation of the vascular structure and function and it is the principal source of superoxide anion that contributes to vascular remodeling and cell differentiation and proliferation. Moreover, this tissue has an important expression of cyclooxygenase-2 (COX-2) induced by angiotensin II (Ang II) and proinflammatory cytokines like IL-1β, which may contribute to the production of prostanoids in the inflammatory process related to cardiovascular pathologies as hypertension or atherosclerosis. Bioactive peptides are certain fragments within the sequence of food proteins that may show biological activity once released by enzymatic hydrolysates. In our previous research we demonstrated the antihypertensive properties of some of these peptides (Miguel et al. J Food Protect, 2004, 67:1914-20; Miguel et al. J Agric Food Chem 2006, 54:726-31; Miguel et al. J Agric Food Chem 2007, 55:10615-21). The aim of this study was to investigate the effect of antihypertensive peptides derived from food proteins on COX-2 expression in adventitial fibroblasts stimulated by Ang II or IL-1β.

Methods: Investigations were performed in isolated FB from aorta of Sprague-Dawley rats. The FB were incubated with different peptide sequences (RADHP, YAEERPYL, IVF, IFF, VPP, ESIFIN, YPI, RDILNQ, YRGCLEPINF, 100 μM, 1 hour before the incubation with Ang II (0.1 μM) or IL-1β for 4 hours. COX-1 and COX-2 expression were determined by Western blot analysis. To evaluate if the peptides could affect to expression at the transcriptional level, we performed transcriptional co-transfection in FB with a reporter plasmid containing COX-2 promoter and a plasmid containing β-galactosidase gene to quantify luciferase activity and to normalize with beta-galactosidase activity.

Results: The treatment with Ang II or IL-1β induced COX-2 expression on adventitial FB. However, COX-2 expression induced by Ang II was inhibited in the presence of the sequences VPP, RDILNQ and YRGCLEPINF. None of our peptides modify COX-1 expression. Transiently transfected cells incubated with Ang II or IL-1β showed significant induction of lucerase activity compared with the control cells, however, transfected cells incubated with RDILNQ, YRGCLEPINF and VPP showed a significant and differential reduction of lucerase activity to almost basal levels according to stimuli.

Conclusion: Our results suggest that the inhibitory properties in COX-2 expression induced by Ang II or IL-1β observed in the sequences RDILNQ, YRGCLEPINF and VPP may be involved in the capacity of regulated the arterial blood pressure.

PP.5.128

PREDICTORS OF SUBCLINICAL ATHEROSCLEROSIS AND INCipient MYOCARDIAL DYSFUNCTION IN ASYMPTOMATIC YOUNG HYPERTENSIVE SUBJECTS

Ragab Mahfouz, EL Sayed Farag. Cardiology Department. Zagazig University, Zagazig-Egypt

Background and Objective: Several studies have shown an association between symptomatic coronary artery disease and increased carotid-intima media thickness (C-IMT), a surrogate index of atherosclerosis. This study was planned to study the relation between C-IMT, coronary flow reserve (CFR) and cardiac function in asymptomatic young hypertensive subjects.

Subjects and Methods: This study included 82 asymptomatic young subjects with essential hypertension (mean age was 9.2 ± 3.46 years), and 65 healthy subjects (mean age was 29.8 ± 7.9) were studied as a control group. C-IMT was assessed with B-mode ultrasonography for all subjects. Treadmill exercise test and CFR with echo-Doppler using dipyridamole were performed to all subjects included in the study.

Results: C-IMT was significantly higher compared with normotensive subjects (0.91 ± 0.13 versus 0.52 ± 0.11, p < 0.01). The CFR was significantly lower in asymptomatic young hypertensive subjects than in control subjects (1.9 ± 0.44 versus 3.0 ± 0.53, p < 0.003). Out of the hypertensive subjects 31 (37.8%) had positive exercise test (stress induced myocardial ischemia). Hypertensive subjects with stress induced myocardial ischemia had a significantly higher C-IMT compared to those with negative stress induced ischemia (1.2 mm ± 0.59 mm versus 0.86 ± 0.52 mm, p < 0.005). Moreover the CFR in asymptomatic hypertensive subjects with stress induced myocardial ischemia was significantly lower than in those without stress induced myocardial ischemia (1.5 ± 0.29 versus 2.1 ± 0.42, p < 0.02). The diastolic function was significantly impaired in young hypertensive patients with stress induced myocardial ischemia compared to those without stress induced myocardial ischemia (E/A ratio was 0.7 ± 0.03 versus 1.02 ± 0.09, P < 0.05, and IVRT was 198.5 ± 27.3 versus 152.8 ± 15.1 msec, P < 0.002). Multiple linear regression analyses showed that increased C-IMT was related to reduced CFR (r = –0.66, P < 0.001) and a lower diastolic function of asymptomatic young hypertensive (E/A, r = –0.52, P < 0.003 and IVRT, r = 0.88 ± 0.0001).

Conclusion: There was a relation between C-IMT and the stress-induced myocardial ischemia, decrease in coronary flow reserve and diastolic dysfunction in asymptomatic young hypertensive. The C-IMT 1.2 mm is a strong cut-off predictor of reduced CFR < 2.0 and stress induced myocardial ischemia ST-segment.
changes in those patients. So, C-IMT could be considered an index for early
adverse events and ischaemic heart disease. We investigated the single param-
eter in regards of their contribution to RHI in coronary artery disease (CAD).
Methods: Bilateral baseline PWA and RHI was measured with the Endo-PAT
2000 in 78 patients (mean age, 56 ± 7 years) to 15 months after coronary angiog-
raphy for CAD assessment. After an equilibration period for baseline assessment,
a blood pressure cuff was inflated to suprasystolic pressures for five minutes on the
right arm. The consecutive period provided the hyperaemia PW A signal. Baseline
PWA signals on both index fingers were averaged for further calculations.
Results: The cohort contained 39 patients with CAD and normal coronary
arteries. There was no significant difference between the CAD and normal coronary
group for height, weight, intake of vasocactive substances (16/23 vs. 16/23), systolic and diastolic blood pressure (P > 0.05). The CAD group had lower age (54.2 ± 7.7 years; P = 0.045) and cholesterol levels (4.4 ± 1.0 vs. 5.2 ± 1.2 mmol/l; P = 0.006). Due to frequent dominance of the right arm its baseline PWA was the higher (710 ± 427 vs. 672 ± 426, P = 0.003). The average baseline PWA was associated with CAD (797 ± 462 vs. 585 ± 354; P = 0.026), whereas the isolated post hyperemia signal is only borderline (1553 [1043; 2063] vs. 1840 [850; 2830]; P = 0.06). Consequently the base-
line PWA was inversely correlated with the log RHI (r = -0.486, p < 0.001).
Conclusion: Next to the hyperaemia response baseline PWA is important to
predict coronary artery disease. Its inverse correlation with RHI suggests a gen-
eral limitation of the post hyperaemia response. Although unclear the find-
ing could be related to artherosclerotic arterial enlargement allowing increased
blood flow at baseline.

PP.5.130 EFFECT OF HYPERTENSION ON CORONARY
ATHEROSCLEROSIS IN PATIENTS WITH STABLE
CORONARY HEART DISEASE
O. Lomakovsky. Institute of Cardiology, Kiev-Ukraine

The purpose of this study was to identify the connection of progression of coro-

nary atherosclerosis with concomitant hypertension in patients with stable coro-

nary artery disease.

Materials and Methods: A total of 172 patients with stable angina. The median
age was 56 (50-63) years. The first group included patients with CHD without
concomitant hypertension (n = 41), the second group - patients with coronary
heart disease with concomitant hypertension-first to the second degree (AD 140-
179/90-109 mm Hg) (n = 131). Drug treatment in two groups of patients did not
differ - 7 (4-9) and 7 (6-10) scores (p = 0.38). Selective coronary angiography
was carried out by method MP Judkins (1967).

Results: Patients first and second groups did not differ in age - 54 (48-64) and
58 (5-63) years (p = 0.16), duration of clinical manifestations of coronary heart
disease - 3 (1-8) and 4 (2-9) years (p = 0.30), frequency of occurrence of clinical
manifestations of coronary artery disease to 45 years - 34 and 24% (p = 0.23).
There were no differences between the first and second groups of the occur-
rence of other major risk factors: hypercholesterolaemia - 42 and 42% (p = 0.72),
hypertriglyceridaemia - 34 and 38% (p = 0.45), tobacco smoking - 20 and 13% (p = 0.69), overweight - 46 and 57% (p = 0.23), diabetes mellitus - 8 and 11% (p = 0.62). Analysis of complications and peculiarities of coronary atherosclero-
sis showed in the first and second groups of patients with the same incidence of
postinfarction cardioischemia - 49 and 44% (p = 0.68), congestive heart failure
- 11 and 5% (p = 0.60), chronic coronary stenosis - 30 and 20% (p = 0.34). These
coronary angiography in the first and second groups of patients show that the
number of affected coronary artery by Gensini GG (1983) - respectively - 68
(28-96) and 50 (25-86) scores (p = 0.40). Average number of diseased coronary
arteries in the first and second groups was 2.2 ± 0.8 and 2.2 ± 0.8 conditions.
Units. (p = 0.97). Stress tests show the same stress tolerance in the first and
second groups – 110 (50-113) and 107 (101-111) W (p = 0.82) and the same
double product at the threshold of the load – 124 (53-147) and 130 (114-142)
conditions. units. (p = 0.59). Occurrence of III-IV functional class in the first and
second groups of patients were 63 and 65% (p = 0.68).

Conclusion: The presence of concomitant hypertension first-second degree in
patients with stable coronary artery disease does not affect the progression of
coronary atherosclerosis according to coronary angiography and the develop-
ment of complications such as myocardial infarction, coronary artery disease and
heart failure.

PP.5.131 ESTIMATION OF ANTIOX-LDL
AUTOANTIBODIES IN PATIENTS WITH ACUTE
CORONARY SYNDROME IN ASSOCIATION WITH
PREVIOUS STATIN THERAPY
on behalf of. 1st Department of Medicine, University of Debrecen Medical and
Health Science Center, Debrecen-Hungary, 2Institute of Immunology
Rikshospitalet University of Oslo, Oslo-Norway, 3Department of Rheumatology,
University of Debrecen Medical and Health Science Center, Debrecen-

Hungary

Antibodies to oxidized LDL (aoxLDL Abs) in the human sera have an associa-
tion with the development of plaques in atherosclerosis. We investigated the prog-
nostic value of aoxLDL Abs and their relationship with statin therapy in patients
with acute coronary syndrome (ACS). Fifty-four patients with ACS and forty-one
matched healthy controls were involved in this prospective clinical study. Sera
aoxLDL Abs were detected by ELISA. We found significantly higher level of
aoxLDL Abs in patients with ACS compared to healthy controls (22.8 ± 23.3
EU/ml vs. 7.5 ± 5.27 EU/ml, p < 0.0001). AoxLDL titers were significantly higher
in ACS patients with unstable clinical complications (circulatory insuffi-
ciency, malignant arrhythmias, recurring ischemic pain, positive stress-test, need
for urgent coronary intervention and death) during the period of hospitalization
compared to those without such complications (30.03 EU/ml vs. 11.67 EU/ml,
p < 0.001). We used multivariable comparison model to evaluate the association
between statin use and the level of aoxLDL Abs. Of the 54 patients, 12 (22%)
were taking statins. Statin-taking group had a reduction in clinical complica-
tions (33%) compared to non-statin group (61%) and parallely aoxLDL levels
differed between these two groups (statin users: 11.4 EU/ml vs. non-statin-users:
25.8 EU/ml, p = 0.03). The level of aoxLDL Abs correlated with the subsequent
development of unstable coronary events. The level of aoxLDL Abs significantly
decreased, as a response to statin therapy independently from its lipid-lowering
effect. These results are exciting and may have an indirect clinical evidence for the
role of aoxLDL Abs in inflammatory processes, leading to plaque destabilization.

PP.5.129 DETAILED ANALYSIS OF PARAMETERS DERIVED
FROM PERIPHERAL ARTERIAL TONOMETRY IN
CORONARY ARTERY DISEASE
U. Neissiu1, S. Rossi2, A. Dominica3, C. Delles1. 1University of Glasgow,
Institute of Cardiovascular and Medical Sciences, Glasgow-United Kingdom,
2University of Glasgow, Faculty of Medicine, Glasgow-United Kingdom

Background: Reactive hyperaemia peripheral arterial tonometry (RH-PAT) is
an evolving noninvasive measurement of endothelial function. The correspond-
ing reactive hyperaemia index (RHI), the ratio between the pulse wave ampli-
tude (PWA) after hyperemia and baseline, was demonstrated to predict cardiac
arteries. There was no significant difference between the CAD and normal
arteries. Reactive hyperaemia peripheral arterial tonometry (RH-PAT) is
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ing reactive hyperaemia index (RHI), the ratio between the pulse wave ampli-
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arteries. There was no significant difference between the CAD and normal
arteries.

Methods: The consecutive period provided the hyperaemia PW A signal. Baseline
PWA signals on both index fingers were averaged for further calculations.

Results: The cohort contained 39 patients with CAD and normal coronary
arteries. There was no significant difference between the CAD and normal coronary
group for height, weight, intake of vasocactive substances (16/23 vs. 16/23), systolic and diastolic blood pressure (P > 0.05). The CAD group had lower age (54.2 ± 7.7 years; P = 0.045) and cholesterol levels (4.4 ± 1.0 vs. 5.2 ± 1.2 mmol/l; P = 0.006). Due to frequent dominance of the right arm its baseline PWA was the higher (710 ± 427 vs. 672 ± 426, P = 0.003). The average baseline PWA was associated with CAD (797 ± 462 vs. 585 ± 354; P = 0.026), whereas the isolated post hyperemia signal is only borderline (1553 [1043; 2063] vs. 1840 [850; 2830]; P = 0.06). Consequently the base-
line PWA was inversely correlated with the log RHI (r = -0.486, p < 0.001).

Conclusion: Next to the hyperaemia response baseline PWA is important to
predict coronary artery disease. Its inverse correlation with RHI suggests a gen-
eral limitation of the post hyperaemia response. Although unclear the find-
ing could be related to artherosclerotic arterial enlargement allowing increased
blood flow at baseline.
Conclusion: Al-PS accumulation was associated with high macrophages and lymphocytes content in endarterectomy plaques and may be a useful tool for imaging of metabolically active areas of atherosclerotic lesions.

PP5.133 CHRONIC PERIODONTITIS AND ALBUMIN EXCRETION IN HYPERTENSIVE PATIENTS: A POSITIVE ASSOCIATION BEYOND SYSTEMIC INFLAMMATION

A. Kasiakogias, C. TsiofuS, C. Thomopoulos, N. Soldatos, K. Kintis, I. andrikou, C. Stefanadis. First Cardiology Clinic, University of Athens, Hippokration Hospital, Athens-Greece

Objective: We investigated the association of periodontitis severity to urinary albumin excretion in states of low and high systemic inflammation, in the setting of untreated hypertension.

Design and Method: We performed a cross-sectional study on 242 patients (mean age 51 ± 9 years) with untreated hypertension and periodontitis of varying severity. Subjects underwent ambulatory blood pressure monitoring, echocardiography and periodontal examination evaluating mean clinical loss of attachment (MCLA), gingival bleeding index (GI) and maximum probe depth (PD). From fasting blood samples we assessed metabolic profile and high-sensitivity C-reactive protein (hsCRP). The albumin to creatinine ratio was estimated from 2 morning non-consecutive urine samples.

Results: Based on the median values of hsCRP and ACR (1.67mg/L and 10mg/g respectively), our population was split into four groups: low ACR/low hsCRP (n = 65), low ACR/high hsCRP (n = 63), high ACR/low hsCRP (n = 51) and high ACR/high hsCRP (n = 63). Patients with high ACR had significantly higher 24-hour systolic blood pressure compared to those with low ACR, while the periodontal indices differed among all groups. All periodontal indices, hsCRP and the interaction of each periodontal index with hsCRP were independent predictors of ACR. Among periodontal indices, MCLA was the strongest determinant of the high ACR/high hsCRP pattern.

Conclusions: In untreated hypertensive patients, urinary albumin excretion is dose-dependently associated with severity of periodontal disease, and systemic inflammation further magnifies this association.

PP5.134 AORTIC STIFFNESS AND WAVE REFLECTIONS IN RELATION TO ADVANCED GLYCATION END PRODUCTS IN CHINESE

Q. Huang, F. Li, C. Sheng, J. Zou, B. Hu, Y. Li, J. Wang. Shanghai Institute of Cardiopulmonary Medicine, Shanghai-China

Background: Advanced glycation end products (AGEs) was associated with large arterial stiffness in diabetic patients. However, there were few such studies in relatively healthy population, especially in Chinese. We therefore investigated the relationship between plasma AGEs, aortic stiffness and arterial wave reflections in a Chinese general population.

Methods: The study subjects were recruited from a newly established residential area in the suburb of Shanghai in 2009. Using the Sphygmocor system, we measured carotid-femoral pulse wave velocity (cf-PWV), and central (CAI) and peripheral (PAI) augmentation indexes. The plasma concentration of AGEs was measured by the ELISA method.

Results: The 684 study participants included 421 (61.5%) women, 262 (38.3%) hypertensive patients, and 39 (5.7%) being diagnosed as diabetes mellitus. The average age was 55.8 ± 12.7 years (ranging from 19 to 85 years). Multiple regression analysis showed that plasma AGEs were influenced by age, sex and Total-to-HDL cholesterol ratio. In unadjusted analysis, plasma AGEs was associated with PAI (r = 0.10, P = 0.008) and CAI (r = 0.10, P = 0.01), and cf-PWV (r = 0.11, P = 0.006). After adjustment for age, sex, body mass index, mean arterial pressure and other covariables, log-transformed plasma AGEs remained significantly associated with PAI (β = 5.8, P = 0.004) and CAI (β = 1.92, P = 0.003), but not with cf-PWV (β = 0.19, P = 0.31). Sensitivity analyses in non-diabetic subjects were confirmatory.

Conclusions: In a Chinese general population, plasma AGEs was associated with increased arterial wave reflections rather than aortic stiffness.

PP5.135 MICROALBUMINURIA AND ITS CORRELATION WITH Atherosclerosis IN ESSENTIAL HYPERTENSION

M. Gjata, V. Duraj, E. NelaJ, L. Collaku, J Kllesi, M Tase. UHC Mother Teresa, Tirana-Albania

Objective: Increased urinary excretion of albumin ranging between 30 and 300 mg/dl (microalbuminuria) has been found in a relatively large number of patients with essential hypertension. The aim of the study is to evaluate factors that correlate with microalbuminuria in patients with hypertension

Subjects and Method: The study is cross-sectional. In this study were examined 65 patients (35 men, 30 female), admitted, during 2009, near the Service of Internal Medicine and Hypertension of the University Hospital Centre "Mother Teresa" of Tirana, Albania. Hypertension was defined as systolic blood pressure (SBP) > 140mmHg and diastolic blood pressure (DBP) > 90mmHg. All patients were hypertensive and under therapy. Patients with ischemic heart disease, valvular heart disease, congestive heart failure, atrial fibrillation, severe anemia, inflammatory disease, malignant disease and serum creatinine > 2.0mg/dl were excluded. Blood and urine were sampled early in the morning after overnight fasting. Values of P < 0.05 were assumed to be significant.

Results: The prevalence of microalbuminuria was higher in men than in women. Statistical analysis shows that microalbuminuria was correlated with low-density lipoprotein (LDL) cholesterol (p < 0.05), systolic blood pressure (p < 0.05), pulse pressure (p < 0.001), C-reactive protein (p = 0.05) and fibrinogen (p = 0.001).

Conclusions: Pulse pressure, CRP and fibrinogen are independently associated with microalbuminuria in patients with essential hypertension under medication. This correlation suggests that microalbuminuria reflects vascular inflammation and the progression of atherosclerosis in hypertensive patients.
A study of long-term prognosis in patients with stable coronary artery disease verified by coronary angiography: Results of observation for patients included in the register of national research center for preventive medicine

A. Malycheva, S. Martsevich, S. Tolpygina, Yu. Polyskaya, E. Gofman, A. Deev, V. Mazaev. National Research Centre for Preventive Medicine, Moscow-Russia

Purpose: To assess the long-term prognosis in patients with coronary heart disease (CHD), verified by coronary angiography (CAG), in real clinical practice.

Materials and Methods: There has been compiled the Register of patients who hospitalized in National research center for Preventive Medicine from 01.01.2004 to 31.12.2007, who lived in Moscow region a ad diagnosis of CHD verified by CAG. Patients or relatives were contacted by phone in order to ascertain the exact status and complications of CHD. In case of death we tried to find out circumstances from relatives. The primary endpoint was death from all causes, death from cardiovascular events, nonfatal myocardial infarction (MI), nonfatal stroke, unplanned hospitalization due to cardiac chest pain, revascularization percutaneous coronary intervention (PCI) and coronary artery grafting (CABG).

Results: Collection of information about patients hospitalized in 2004-2005 has been completed. The total number of patients with CAG for this period was 296. 62 (20.9%) patients did not have significant stenosis-stenosis less than 50%). Significant stenosis was detected in 234 (79.1%) patients (44 women, 190 men minimal age was 27 years, maximal age was 83, average age was 56.9 years). Observation period was 4 ears. Phone contact was established with 208 patients (88.9%), 26 patients (11.1%) were failed to find. During the observation period 23 patients (11%) died from cardiovascular complications, 2 patients (1% ed from other causes, 26 patients (12.5%) had nonfatal MI, 3 patients (1.4%) – stroke, 30 patients 4.4%) – PCI, 31 patients (14.9%) – CABG, 63 patients (30.3%) hospitalized due to cardiac chest pain, absence of any endpoint was observed in 70 patients (33.7%).

Conclusion: Despite the relatively low rate of mortality, CHD are complicated by other events: unplanned hospitalization due to cardiac chest pain, necessity of revascularization. Further analysis will be aimed at studying factors of CHD bad prognosis.

Preclinical atherosclerosis in diabetic hypertensive patients


Objective: The flow-mediated vasodilatation (brachial FMD) technique is one of the most widely used noninvasive methods of assessing endothelial function and it’s closely related with cardiovascular risk. The aim of this study was to evaluate subclinical atherosclerosis evaluated by brachial FMD and its relationship with lipid profile, serum uric acid levels and HbA1c concentration in hypertensive patients with type 2 diabetes mellitus (T2DM).

Material and Method: Our prospective study included 85 hypertensive patients diagnosed with T2DM, aged 62 ± 9 years. Measurements of endothelium-dependent flow-mediated vasodilatation were performed in all patients by high-resolution two-dimensional ultrasonographic imaging of the brachial artery. Total cholesterol, triglycerides, and high-density lipoprotein-cholesterol were measured using standard analyzers. HbA1c concentration was measured using Roche Cobas Integra (immunoturbidimetric method).

Results: Brachial FMD values were negatively associated with total cholesterol levels (r = –0.54; p < 0.01), triglycerides levels (r = 0.56; p < 0.01), LDL-cholesterol levels (r = 0.54; p < 0.01) and serum uric acid levels (r = –0.57; p < 0.01). Brachial FMD values were significantly correlated with HDL-cholesterol levels (r = 0.616; p < 0.01). HbA1c was negatively associated with FMD (r = –0.54, p < 0.01).

Conclusions: Brachial FMD is correlated with lipid profile, serum uric acid levels and levels of glycemia reflected by HbA1c concentration in hypertensive patients with T2DM. Measurement of FMD is non-invasive, repeatable, cheap, and easy to perform method that can evaluate endothelial dysfunction in these patients.
cency of carotid plaques and cognitive function in the elderly and suggest the possible use of this method to identify subjects at increased risk of developing dementia.

**PP.5.141**

**STRUCTURAL AND FUNCTIONAL ARTERIAL PARAMETERS USED IN CARDIOVASCULAR RISK ASSESSMENT AND SUBCLINICAL ATHEROSCLEROSIS DIAGNOSIS: REFERENCE VALUES FOR A YOUNG URUGUAYAN POPULATION**

D. Bia1, Y. Zocalo1, I. Farro1, J. Torrado1, F. Farro1, L. Florio1, M. Molinari1, A. Olascoaga2, W. Alafón1, R. Lliberas1, R. Armentano1. 1Centro Universitario Investigación, Innovación Y Diagnóstico Arterial, Montevideo-Uruguay. 2Departamento de Laboratorio Clínico, Hospital de Clínicas, Montevideo-Uruguay.

**Introduction:** Early identification of subjects at increased cardiovascular (CV) risk would allow developing efficient strategies of prevention. To this end; considering the limitations of traditional approaches based in the evaluation and treatment of CV risk factors the non-invasive evaluation of the vascular structure and function has been proposed. That evaluation would allow to assess the individual CV risk and to diagnose subclinical atherosclerosis. However, for a widespread and adequate clinical use normal and/or reference values for the vascular parameters, in different populations, are necessary. Moreover, considering they could differ depending on the population studied. In this work we show results obtained with a comprehensive non-invasive approach used for the vascular evaluation of young Uruguay subjects.

**Objective:** 1) To apply a comprehensive non-invasive approach for vascular evaluation, 2) To determine the normal and reference values of the structural and functional vascular parameters in the population studied.

**Methods:** Young (21 ± 3 years) healthy subjects (n = 220) were studied. Using gold-standard techniques based on echography and tonometry we evaluated: 1) carotid and femoral diameter and intima-media thickness (DC, IMTC and DF, IMTF; respectively), 2) carotid (DC%) and femoral distensibility (DF%), 3) carotid-femoral pulse wave velocity (VOP), 4) endothelial function (flow mediated dilatation FMD, automated method), 5) central systolic aortic pressure (PSa) and peripheral systolic and diastolic (PSp, Pdp) pressure, 6) aortic wave parameters, 7) ankle-brachial index. Lipids profile, creatinine and glycaemia were determined.

**Main Results:** There were no atheromatous plaques. Total cholesterol was above 200 mg/dl in 38%. Mean ± standard deviation (10th percentile upper limit – 90th percentile lower limit) for vascular and haemodynamic parameters: DC (mm): 6.25 ± 0.50 (5.63 – 6.90); IMTC (mm): 0.493 ± 0.089 (0.385 – 0.611); DF (mm): 6.82 ± 0.85 (5.84 – 7.97); IMT (mm): 0.502 ± 0.073 (0.441 – 0.556), DC%: 9.3 ± 2.9 (6.1 – 13.4); DF%: 7.2 ± 3.9 (2.9 – 12.5); VOP (m/s): 7.2 ± 1.5 (5.6 – 9.0); FMD (%): 10.4 ± 7.5 (3.8 – 19.4); PSa (mmHg): 104 ± 11, Psp (mmHg): 126 ± 19 and Pdp (mmHg): 70 ± 7. In 18% of the studied subjects the PSa was above the 90th percentile; 72% of whom also showed hypertensive levels of PSp.

**Conclusion:** The comprehensive non-invasive approach employed allowed, for the first time, to characterize structural and functional vascular parameters, to establish the individual CV risk and to determine normal/reference values for vascular parameters in a Uruguay (South America) population. A widespread use of the proposed approach in different subgroups would be useful to identify individuals with increased CV risk, to early diagnose vascular disease and to develop individualized strategies for CV diseases prevention and treatment.

**PP.5.142**

**HDL-CHOLESTEROL, OBESITY AND EARLY ATHEROSCLEROSIS IN YOUNG PEOPLE**

A. Starouduba1, G. Storozhakova1, O. Kislak1, V. Govorun2, V. Sergioienko2, L. Djedjeva1, A. Kopelev1, S. Koscury1. 1Russian State Medical University, Moscow-Russia. 2Research Institute of Physicochemical Medicine, Moscow, Moscow-Russia.

**Objective:** To evaluate the association between HDL-C, obesity and intima-media thickness (IMT) in young people.

**Design and Method:** 150 young people (74 males, 15-25 y.o., mean age 19.12 ± 3.45 y.o., 59% obese) were examined. Body mass index (BMI) was 18.50 kg/m^2 (mean 30.96 ± 5.6 kg/m^2). We analyzed anthropometric parameters, common carotid artery and femoral artery IMT, serum concentrations of lipids, including high-density lipoprotein (HDL) cholesterol.

**Results:** We did not observe any differences between female and male groups in common carotid artery IMT, HDL-C. Carotid IMT was 0.517 ± 0.075 mm (0.4-0.88 mm), 0.502 ± 0.067 mm in males, 0.53 ± 0.075mm in females (p > 0.05). 8 pts had carotid atherosclerosis. Femoral IMT was higher in males (0.50 ± 0.15 vs 0.42 ± 0.1 mm, p < 0.01). Female obese pts had lower HDL-C levels then female nonobese pts (1.32 ± 0.32 vs 1.48 ± 0.24 mmol/l, p = 0.02), there were no HDL-C differences between male obese and non-obese groups. HDL-C correlated with femoral IMT (R = -0.20), body mass (R = -0.33), and metabolic syndrome (R = -0.48) in overall group. In males there were positive correlation between HDL-C and BMI (R = 0.31), waist circumference (R = 0.32). In females HDL-C correlated with common carotid artery IMT (R = -0.31), femoral IMT (R = -0.43), BMI (R = -0.34), waist circumference (R = -0.33), metabolic syndrome (R = -0.48) [p < 0.01]. In females the results of univariate linear regression analysis showed correlation between common carotid artery IMT and BMI (R = 0.53), waist circumference (R = 0.40), hypertension (R = 0.29), and between femoral IMT and BMI (R = 0.33), systolic blood pressure (R = 0.33) (p < 0.05). On multivariate analysis, BMI (beta = 0.41), waist circumference (beta = 0.41), HDL-C (beta = 0.35) were found to be independent predictors of common carotid artery IMT values; and BMI (beta = 0.38), HDL-C (beta = 0.34) and hypertension (beta = 0.29) were found to be independent predictors of femoral IMT in females (p < 0.05), but not in males.

**Conclusions:** We suggest that low HDL-C concentrations independently associated with high risk of early atherosclerosis in young female subjects, but not in young male subjects. It is important to determine HDL-C for evaluation of cardiovascular risk in young obese female patients.
PP.6.143 CAN LOW VITAMIN D LEVELS IN SUMMER BE ASSOCIATED WITH DECREASED ENDOTHELIAL VASODILATOR FUNCTION IN NORMOTENSIVE, NON-ALCOHOLIC WOMEN?

S. Ertek1, E. Akgul2, S. Cehreli2, G. Erdogar1. 1Üfuk University Medical Faculty, Dr. R. Ege Hospital, Department of Endocrinology and Metabolism, Ankara-Turkey; 2Üfuk University Medical Faculty, Dr. R. Ege Hospital, Department of Cardiology, Ankara-Turkey, 3Bologna University Department of Internal Medicine, Aging and Kidney Dis., Bologna-Italy

Vitamin D has recently elucidated role in different mechanisms other than bone and calcium, including endothelial functions and blood pressure. In this study we aimed to compare the reactive hyperemia index (RHI) in women measured by EndoPat device which records changes in arterial tone after inducing arterial occlusion by sphygmomanometer, from sensors placed on fingertips. Our hypothesis was low vitamin D parallels worse vasodilator functions. We had 34 patients with low 25-hydroxy vitamin D (< 20ng/mL), and 23 controls (normal 25-hydroxy vitamin D ≥ 20 ng/mL). The patients were all women, they were normolipidemic, normotensive, non-smoker, non-diabetic, euthyroid, they were not using any drugs including vitamins and calcium, none were anemic. All measurements were done in 2010 summer. RHI and heart rate were calculated and recorded during measurement in a calm and quite room at 26°C. Blood samples were taken during minimum 8 hours fasting for glucose and lipid measurements and 25-hydroxy vitamin D, calcium, ionized calcium, phosphorus, parathormone (PTH), thyrotropin (TSH), and albumin levels. Two groups were compared by independent samples t test and linear regression was used to analyze factors related with RHI. RHI (p = 0.042) was only significant difference between two groups, with slight but not statistically significant difference in PTH (p = 0.051). RHI measurement was related with 25-hydroxy vitamin D (p = 0.002), albumin (p = 0.013) and inversely with calcium (p = 0.047) levels, although ionized calcium has no relationship. As a conclusion these results may indicate a relationship between vitamin D levels and endothelial function as arterial toms even in normotensive, normolipidemic, normoglycemic and non-smoker women, and this may be related with its action on vascular toms and one of the mechanisms for blood pressure effects.

PP.6.144 VISCERAL OBESITY IS A “NEW” MARKER OF ENDOTHELIAL DYSFUNCTION AMONG SUBJECTS AFFECTED BY CHRONIC KIDNEY DISEASE

S. Vettoretti1, C. Cafforio1, C. Alfieri1, C. Bonanomi1, R. Floreani1, G. Danzi1, P. Messa1. Fondazione IRCCS Cà Granda Ospedale Maggiore Policlinico, Milan-Italy

Introduction: Patients affected by chronic kidney disease (CKD) have an increased cardiovascular morbidity and mortality. Endothelial dysfunction is a precocious index of worse cardiovascular prognosis. We evaluated the relationship between endothelial function and other possible cardiovascular risk factors in a population of subjects affected by CKD.

Methods: We evaluated 191 patients affected by CKD (stage 1-4 NKF-KDOQI) and free for previous cardiovascular (CV) events. Each patient underwent to: 1) collection of medical history and measurement of anthropometric parameters; 2) blood and urinary examinations; 3) ultrasonographic evaluation of flow mediated dilation of the brachial artery (FMD). Renal function was assessed by means of measured creatinine clearance (mCrCl), MDRD (eGFR) and Cockcroft-Gault (eCrCl) formulae. Albuminuria was determined both as the mean value of three first morning samples of albumin/creatinine ratio (A/C) and as a 24 hours urinary collection (ProtU).

Results: Characteristics of our cohort were: MF 127/65; age 62 ± 14 yrs; diabetes 48%; hypertension 84%; SBP 137 ± 21 mmHg; DBP 79 ± 12 mmHg; MAP 99 ± 14 mmHg; PP 58 ± 17 mmHg; BMI 28.4 ± 4.9 Kg/m²; waist circumference 100.4 ± 13.7 cm; total cholesterol 219 ± 83 mg/dL; HDL 53 ± 16 mg/dL; LDL 136 ± 74 mg/dL; triglycerides 144 ± 74 mg/dL. Patients were homogeneously distributed between CKD stages; mCrCl 64 ± 34 ml/min; eGFR 58 ± 231 ml/min; eCrCl 53 ± 31; logA/C 1.19 ± 0.91; ProtU 1.27 ± 2.24; FMD of brachial artery was 13 ± 8.3%. At univariate analysis, FMD correlated with: age (r = -0.153; p = 0.04) and waist circumference (r = -0.20; p = 0.00086) while it was not significantly correlated with any renal index or CV risk factor. Furthermore, when FMD was considered as the dependent variable of a multivariate regression analysis in witch main CV risk factors and indices of renal function were the independent variables, waist circumference was maintained as the only independent variable associated with FMD.

Conclusion: Our results indicate that in a population of subjects affected by CKD visceral obesity is a independent and modifiable risk factor associated with endothelial dysfunction and may be consequently associated with worse CV prognosis.

PP.6.145 A COMPARATIVE ANALYSIS OF THE LEVEL OF HIGH SENSITIVE C-REACTIVE PROTEIN IN THE PEOPLE WITH AND WITHOUT HYPERTENSION

B. Naghshtabrizi, F. Dadras, F. Emami, F. Khoshjou, M. Gharakhani, A. H. Moadab, A. Mozayanimonfared. Hamedan Medical University, Hamedan-Iran

Objective: hs CRP is an available measured serum marker for detecting blood vessel inflammation and endothelial dysfunction. It is demonstrated that these two mechanisms have pivotal role in pathogenesis and progression of hypertension. We conjecture and confirm in this study that the level of hs CRP is higher in hypertensive patients.

Design and Method: We enrolled 77 hypertensive patients with the following distribution in the case group (male: 27.7%; female: 72.3%; mean age: 58.1 year, mean systolic blood pressure: 15.4 mmHg, mean diastolic blood pressure: 90.4mmHg) and 77 matched normotensives, in the control group. Patients with heart failure, renal failure (cr > 2mg/dl), diabetes mellitus, infective disorder, severe systemic disorder and malignancy were excluded. Their blood pressure were measured by the same digital Richter sphygmomanometer(ce0124 Ri-fit.).The hs CRP was measured by CRP HS ELISA (enzyme immunoassay for quantitative determination of CRP in human serum.)(The normal range was 0.068–8.2 mg/l. Finally, the data were analyzed using the SSPS-10 software.

Results: The mean level of hs CRP in case and control groups were 4.29 and 2.43 respectively.(P value < 0.001).

Conclusions: Our study shown that the level of hs CRP is elevated in hypertensive patients and reflected the role of inflammatory process in pathogenesis of hypertension.

PP.6.146 HEART RATE DEPENDENT ASSOCIATION BETWEEN ENDOTHELIAL FUNCTION AND HEART RATE VARIABILITY

T. Horvath, A. Pinter, M. Kollai. Semmelweis University, Budapest-Hungary

Objective: A significant direct relationship between carotidvagal heart rate variability (HRV) parameters and brachial artery flow mediated dilation (FMD) has been demonstrated in healthy subjects. In this study we aimed to determine if the relationship was influenced by the subjects’ heart rate, which is primarily under vagal control.

Design and Methods: 56 young, healthy males participated in the study (age 23 ± 9 yrs.). Endothelial function was assessed by FMD and normalized FMD (nFMD). HRV indices were determined in time (pNN50, RMSSD) and frequency domain (HF). The study population was divided into tertiles, based on the subjects’ mean RR intervals (T1: 649-864 ms; T2: 877-980 ms; T3: 999-1283 ms). Variables among tertiles were compared with ANOVA. Within tertiles, association between nFMD and HRV was assessed by univariate correlation analysis.

Results: There were no differences among tertiles regarding to age, blood pressure and nFMD. However BMI, pNN50 and RMSSD showed significant
The normal reaction of brachial artery in response to reactive hyperaemia is a rough estimate of cardiac vagal control. We speculate that endothelial function influences cardiovascular activity through vasculoneural communication and this influence is most effective at mid-range heart rates. 

Conclusion: The relationship between endothelial function and cardiovascular HRV parameters is restored by resting cardiac cycle length, which is a rough estimate of cardiac vagal control. We speculate that endothelial function influences cardiovascular activity through vasculoneural communication and this influence is most effective at mid-range heart rates.

PP.6.147 DYNAMICS OF INDEXES OF ENDOTHELIAL FUNCTION IN PATIENTS WITH MYOCARDIAL INFARCTION AT THE BACKGROUND OF ARTERIAL HYPERTENSION

I. Malynovska, V. Shumakov, L. Tereshkevych, L. Prohna, O. Yanus.
Institute of Cardiology, Kiev-Ukraine

The endothelial dysfunction is one of the main factors of progression of atherosclerotic damage of coronary arteries and clinical manifestation of ischemic heart disease. Taking into account high rate of development of myocardial infarction on the background of arterial hypertension the object of present investigation was to study the restoration of endothelial function in patients with myocardial infarction which was accompanied with arterial hypertension. Determination of endothelial function by index which is defined as increasing the diameter of brachial artery in a response to reactive hyperaemia – flow-mediated dilatation, physical load at the bicycle ergometer were carried out in 81 patients with myocardial infarction. Arterial hypertension was diagnosed in 53 of them (1st group), the rest patients were included into the 2nd group. They were examined in acute phase, in 3 and 6 months. All of them received standard basic medication. At the 1st exam it was established the significant disturbances of endothelial function. The normal reaction of brachial artery in response to reactive hyperaemia was registered in 17,5% patients at 1st, in 33,3% - at 2nd and in 36,0% patients in 3rd exam in 1st group and in 16,6%, 32,4% and 71,1% in 2nd group, respectively. The progressive improvement of endothelial function was observed in 6 months after myocardial infarction in 2nd group. It was increased from 6,5 ± 0,6 to 10,3 ± 0,7 and 12,3 ± 0,6% (p < 0,05) in comparison with 1st group, in which this index increased from 6,4 ± 0,7 to 8,6 ± 0,6 and 10,3 ± 0,7% (p < 0,05). Nevertheless this index became normal in 3 months after myocardial infarction in patients without arterial hypertension and only in 6 months in patients with arterial hypertension. According to the received results it was established that after myocardial infarction the endothelial function was restored gradually and achieved the highest values in 6 months; at the same time the presence of arterial hypertension prolonged this process in such patients.

PP.6.148 RECOVERY TIME POST NITROGLYCERIN IN FOLLOWING UP ENDOTHELIAL DYSFUNCTION IN ESSENTIAL ARTERIAL HYPERTENSION

V. Aursulesei, M.D. Datcu.
University of Medicine and Pharmacy Gr. T. Popa, Iași-Romania

Objective: Secvencial follow-up of endothelial dysfunction (ED) in treated arterial hypertension is an important objective in prospective studies. It would be useful to have a parameter with predictive value on NO-dependent ED evolution. We have proposed post nitroglycerin recovery time (NTTG) for this purpose. On our knowledge there are no similar reports in hypertensive patients.

Design and Methods: 152 patients with arterial essential hypertension were studied before and after 6, 12 months of treatment with two different regimens (IACE/channel calcium blocker + Indapamide). ED was assessed using brachial vascular ultrasound and Compilor method coupled with pharmacodynamic study. We tested procentual/absolute variation of arterial diameter with hyperemia (flow mediated vasodilation-FMD, hyperemia) and NTG 0,5 mg (DNTG5%, DNTG). The Compilor studied parameter was procentual variation of carotid-femoral (C-F) pulse wave velocity with Ventolin spray (BRC-F) and NTG 0,5 mg (BRC-NTG). DNTG was defined as recovery time of brachial arterial diameter and pulse wave velocity after stimulation with NTG. In all patients we evaluated cardiovascular risk factors, left ventricular mass index (LVMl), arterial remodeling parameters (intima media thickness-IMT, cross sectional area-CSA).

Results: NTG has a mean basal value of 695,57±, with a large interindividual variability. After 12 months of treatment the parameter is significant lower (99,04%, p ≤ 0,001) and has a more uniform distribution. NTG is related with BRC-F after 6 and 12 months of treatment (r = 0,39, r = 0,43 respectively, p < 0,05). The relationship is strongly influenced by age and duration of arterial hypertension (t-test) irrespective the arterial site. After adjustment for brachial IMT and CSA (ANCOVA), NTG is related also with FMD (r = 0,41, p = 0,002) but not with Dipyremer. Adjustment for other risk factors does not influence our results.

Conclusions: NTG could be a useful parameter for predicting ED evolution and conducting antihypertensive treatment, after a carefully adjusted analysis for arterial remodeling parameters. A prolonged basal value is related with a more adequate response of NO-dependent ED.

PP.6.149 ALDOSTERONE DOES NOT MODIFY GENE EXPRESSION IN HUMAN ENDOTHELIAL CELLS

A. Verhove1, T.A. Williams1, V. Crudo1, J. Burrello1, M. Covella1, G. Leone1, E. Berra1, F. Fallo1, B. Fabris1, F. Amenta1, C.E. Gomez-Sanchez1, E. Veglio1, P. Mulatero1.
1University of Torino, Torino-Italy, 2University of Padova, Padova-Italy, 3University of Trieste, Trieste-Italy, 4University of Camerino, Camerino-Italy, 5University of Mississippi, Jackson-USA

The toxic effects of aldosterone on the vasculature, and in particular on the endothelial layer, have been postulated having an important role in the cardiovascular pathology observed in mineralocorticoid-excess states. In order to characterize the genomic molecular mechanisms driving the aldosterone-induced endothelial dysfunction, we performed an expression microarray on transcripts obtained from both human umbilical vein endothelial cells (HUVEC) and human coronary artery endothelial cells (HCAEC) stimulated with aldosterone 10^-7 M for 18 hours. To our surprise, we found that aldosterone did not determine any significant changes in gene expression in either cell type. These results were confirmed by a time-course qRT-PCR analysis on transcripts obtained from HCAEC targeting a group of genes known to be involved in the control of the endothelial function or previously described as regulated by aldosterone. A luciferase-reporter assay using a plasmid encoding a mineralocorticoid and glucocorticoid-sensitive promoter showed no activation of the mineralocorticoid receptor (MR) following aldosterone stimulation. Our data indicate that the status of non-functionality of the MR expressed in cultured HUVEC and HCAEC does not allow aldosterone to modify gene expression and provide evidence against either a beneficial or a harmful genomic effect of aldosterone on healthy endothelial cells.

PP.6.150 COCOA IMPROVES ENDOTHELIAL-DEPENDENT VASODILATION BUT NOT ALTERS BLOOD PRESSURE AND PULSE VELOCITY IN HYPERTENSIVES

M. Knibbel1, L. Nogueira1, M. Rodrigues1, D. Valença1, J. Nogueira Neto2, A. Cunha1, M. Torres1, M. Guedes1, C. Lima1, A. Sanjuliani1.
1Rio de Janeiro State University, Discipline of Clinical and Experimental Pathophysiology. Clinics Hospital, Rio de Janeiro-Brazil, 2Rio de Janeiro State University, Lipids Laboratory, Rio de Janeiro-Brazil, 3Rio de Janeiro State University, Rio de Janeiro-Brazil

Background: Recent evidence suggests that the consumption of chocolate 70% cocoa decreases blood pressure and relates this effect to a possible action of cocoa flavonoids on endothelial function.

Objective: To evaluate in stage 1 hypertensive Brazilian subjects, the effects of chocolate 70% cocoa intake on ambulatory blood pressure, endothelial function and pulse wave velocity.

Methods: Intervention clinical trial. Twenty stage 1 hypertensive subjects without previous antihypertensive treatment, of both sexes, aged 18-65years were included in the present study. All patients received 50g of chocolate 70% cocoa/day (containing 2135mg polyphenols) for 4 weeks. To avoid weight gain during the study period, patients were instructed to reduce their habitual energy intake in 280Kcal/day. Endothelial function was evaluated the study period, patients were instructed to reduce their habitual energy intake in 280Kcal/day. Endothelial function was evaluated by peripheral artery intima media thickness and cross sectional area.

Results: Comparison of pre versus post intervention data revealed that ambulatory blood pressures levels remained almost unchanged during the study period. 24h systolic blood pressure changed from 132.2 ± 2.4 to 132.7 ± 2.6mmHg, p = 0.42, while diastolic blood pressure was modified from 84 ± 1.9 to 82.81 ± 2.54mmHg, p = 0.90. The assessment of endothelial function through the index of reactive hyperemia showed a significantly increase after the consumption of chocolate 70% cocoa, from 1.94 ± 0.18 to 2.22 ± 0.08, p = 0.01.
Pulse wave velocity (carotid-femoral and carotid-radial) did not change significantly after 4 weeks of chocolate 70% cocoa intake.

Conclusion: The findings of the present study suggest that the consumption of chocolate 70% cocoa has beneficial effect on endothelial function.

**PP.6.151 THE TREATMENT WITH OUABAIN ANTAGONIST REDUCES BLOOD PRESSURE IN HYPERTENSIVE ANIMALS AND IMPROVES ENDOTHelial FUNCTION OF RESISTANCE ARTERIES FROM DOCA-SALT HYPERTENSIVE RATS**

C.F. Wenceslau, L.V. Rossoni. Department of Physiology and Biophysics, University of Sao Paulo, Sao Paulo-Brazil

**Objective:** The hypertension is related to increase of endogenous ouabain levels and it is associated with elevated mortality in patients. In this context, it seems reasonable to assume that a new antihypertensive drug that antagonizes the deleterious effects provided by ouabain might be a specific pharmacological tool for the hypertension treatment. Thus the aim of the present study was evaluate the effect of the rostafuroxin (ROSTA), an ouabain antagonist developed by Ferrari et al. (1998), on mortality, systolic blood pressure (SBP) and endothelial function of mesenteric resistance arteries (MRA) in DOCA-Salt hypertensive rats.

**Methods:** Male Wistar rats were anesthetized with a mixture of ketamine, xylazine and acepromazine (64.9: 3.20 and 0.78 mg/kg, i.p.) for the right nephrectomy and after one week of recovery, these animals received desoxycorticosterone acetate plus water containing 1% of NaCl and 0.2% of KCl (DOCA-salt) or vehicle plus tap water (SHAM). After five weeks of DOCA-salt treatment, some of these animals were co-treated with ROSTA (10 mg/kg/day, gavage) for three weeks. SBP was measured by tail-cuff method before and weekly during all treatment. Afterwards, the 3rd branches of MRA were dissected and the rings mounted in a wire myograph. Acetylcholine (ACh, 0.01nM-30μM) and sodium nitroprusside (SNP, 0.1nM-300μM)-induced relaxation were evaluated. Reactive oxygen species (ROS) generation was assessed in MRA from DOCA-salt rats.

**Results:** DOCA-salt increased mortality by 21% and ROSTA co-treatment was effective in reducing this parameter to 15%. SBP was greater in DOCA-salt rats and partially reduced in ROSTA co-treated rats as compared to SHAM (Sham: 112 ± 3 (n = 8) vs. DOCA: 184 ± 6 (n = 6) vs. ROSTA: 153 ± 4 **mmHg** (n = 7)). The relaxation induced by ACh in MRA from DOCA-salt rats was impaired. However, ROSTA co-treatment restore this response (SHAM: 92 ± 2 (n = 8) vs. DOCA: 40 ± 8 (14) vs. ROSTA: 78 ± 6 % (n = 11) % of relaxation). On the other hand, the SNP-induced relaxation did not alter among groups. In addition, ROSTA co-treatment reduced ROS generation (48% #) and increased eNOS protein expression (49% #) in MRA to SHAM level.

**Conclusion:** Taken together, these results confirm the deleterious effect of ouabain in DOCA-salt hypertension since ROSTA decreased SBP, improved the endothelial dysfunction of the MRA and consequently increased the survival of animals. The improvement in the endothelial function was associated with increase in the synthesis and bioavailability of nitric oxide. Financial Support: CNPq and FAEPESP.

**PP.6.152 ENDOTHELIAL DYSFUNCTION AND INSULIN RESISTANCE IN PERSONS WITH VARIOUS CARDIOVASCULAR RISK FACTORS**


**Background:** Besides classical risk factors of lifestyle insulin resistance and endothelial dysfunction may lead to cardiovascular complications. The aim of our study was to appreciate indicators of endothelial dysfunction (ED) and insulin resistance (IR) at persons with various risk factors of cardiovascular diseases.

**Methods:** 64 relatively healthy persons of one district of St. Petersburg were screened. The examination included: questionnaire, characterizing the lifestyle, heredity, chronic disease history, anthropometry (body mass index (BMI), waist circumference (WC), hip circumference (HC), neck circumference (NC) and measurement of blood pressure (BP). ED was detected by systolic and diastolic blood pressure, peripheral vascular resistance (R), brachial artery flow-mediated dilation (FMD) and nitroglycerin-induced vasodilation (NI). IR was assessed by HOMA-IR (fasting glucose * insulin/22,5).

**Results:** 64 persons (55 women and 9 men) with mean age 59.9 ± 12.6 years were observed. IR (HOMA-IR > 2.27) was detected in 27 (42%) patients. ED (RHI < 1,67) in 16 (25%), hypercholesterolemia (total cholesterol > 5,0 mmol/l) in 47 (73%), hyperglycemia (fasting glucose > 5,6 mmol/L) in 29 (45.3%), obesity (BMI > 25) in 50 (78%) patients. Males had higher prevalence of ED: 4 men (44%) versus 12 women (21,8%), but females more often IR: 24 women (44%) versus 3 men (33%). In the total group RHI correlated with total cholesterol (r = 0,36), WC (r = 0,41), HC (r = 0,44), NC (r = 0,34), BMI (r = 0,38); HOMA-IR with WC (r = 0,34), HC (r = 0,48), NC (r = 0,30), BMI (r = 0,57), p < 0,05 for all. In females significant correlations with anthropometric indicators were identified for both indicators of endothelial function RHI (with WC r = 0,41, HC r = 0,49, BMI r = 0,46), and insulin resistance HOMA IR (with WC r = 0,73, BMI r = 0,53), p < 0,05 for all. In males significant correlations were found only for HOMA IR (WC r = 0,73, HC r = 0,88, BMI r = 0,84), p < 0,05 for all correlation coefficients. Only in hypertensive patients BP > 140/90 mm Hg the relationship of ED with IR (r = 0,94, p < 0,05) was verified, in this group 42% of patients had RHI < 1,67.

**Conclusions:** Thus, we identified, that endothelial dysfunction was more common in men, but insulin resistance in women. The relationship between endothelial function and insulin resistance with hypercholesterolemia and anthropometric parameters was detected. Correlation of endothelial dysfunction with insulin resistance was found only in patients with hypertension.

**PP.6.153 NON-INVASIVE EVALUATION OF THE ENDOTHELIAL FUNCTION IN MENOPAUSAL WOMEN**

F. Margulis, A. Villamil, M. Romero, J. Zilberman. Hospital Dr. Cosme Argerich, Buenos Aires-Argentina

**Aim:** Evaluate noninvasively the endothelial function in menopausal and non-menopausal women.

**Methods:** In our study 34 women were evaluated: 23 menopausal patients (56.7 ± 7 years) and 11 non-menopausal patients (42,9 ± 6 years). Menopause was defined as a one year amenorrhea. Body Mass Index (BMI) and Waist Circumference (WC) were measured. Blood Pressure (BP) was measured pursuant to EU guidelines. Patients with controlled BP (SBP/DBP ≤ 140/90 mm Hg) and no associated cardiovascular (CV) risk factors were included.

**Arterial Stiffness and endothelial function were measured by analysis of digital volume pulse (DVP) waveform obtained by Pulse Trace system. To assess endothelial dependent arterial vasodilatation (EI-VD), 300 μg of nitroglycerin (NTG) was administered sublingually. The arterial vasodilatation, dependent on or independent of endothelial function, was defined as the maximum difference in RHI between baseline and the post-Salb period, or post-NTG period, respectively.

**Results:** No significant differences were found in BMI (27.9 ± 4 vs 27.5 ± 8) and WC (95.2 ± 9 vs 92.2 ± 18 cm) between menopausal and non-menopausal women. In basal conditions in both groups, there were no significant differences in BP (124 ± 13 / 77 ± 9 vs 115 ± 8 / 77 ± 11 mmHg), SI (10.2 ± 3 vs 8.9 ± 2 μs/m), RI (0.69 ± 1) and RHI (3 ± 5.7 ± 1 %) between menopausal and non-menopausal women (4.8 ± 3 vs 5.7 ± 1 m/s p = 0.03 and 62 ± 12 vs 52 ± 8 % p = 0.01 respectively). No significant difference was found in SI post NTG (6.3 ± 3 vs 5.2 ± 0.4 μs/m, but there was significant difference in RHI (48 ± 16 vs 36 ± 9 % p = 0.04, ED-VE and EI-VE were significantly lower in menopausal women than in non-menopausal women (8.4 ± 3 vs 5.7 ± 1 m/s p = 0.03 and 62 ± 12 vs 52 ± 8 % p = 0.01 respectively). No significant difference was found in SI post NTG (6.3 ± 3 vs 5.2 ± 0.4 μs/m, but there was significant difference in RHI (48 ± 16 vs 36 ± 9 % p = 0.04, ED-VE and EI-VE were significantly lower in menopausal women than in non-menopausal women (8.4 ± 3 vs 5.7 ± 1 m/s p = 0.03 and 62 ± 12 vs 52 ± 8 % p = 0.01 respectively).

**Conclusions:** even though in basal conditions there were no significant differences in the SI and the RI between menopausal and non-menopausal women, the endothelial function in menopausal women was significantly low.

**PP.6.154 ADVANCING AGE INCREASES CONTRACTILE PROSTANOIDS RELEASE IN AORTA OF FEMALE SENECEENCE ACCELERATED MOUSE**


**Objective:** The present study investigates the effects of aging on vascular reactivity to U46619, a stable analog of thromboxane A2 (TXA2), and the modulation by prostaglandins in aorta from female senescence-accelerated mice (SAMP8), a murine model of senescence, and from senescence resistant mice (SAMR1).

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**Design and Methodology:** Female SAMP8 (n = 24) and SAMR1 (n = 24) mice were divided into three groups: 5-, 6- and 10-months old mice. Mice were sacrificed and vascular rings (4 mm long) from thoracic aorta were mounted for isometric recording of tension in organ bath and concentration response curves for U-46619 (10⁻¹⁰ to 10⁻⁶ M) were performed in absence and in presence of indomethacin (10⁻⁵ M). A segment of thoracic aorta was immediately frozen for protein expression studies and a sample of blood was collected from each mouse before sacrifice.

**Results:** TXA2 receptor expression and maximal contraction to U46619 of SAMP8 aorta were markedly higher than in SAMR1 at 3-, 6- and 10-months old mice, indicating that senescence increases contractile response. The presence of indomethacin (10⁻⁵ M), a cyclooxygenase inhibitor, increased the maximal contraction to U46619 in SAMR1 and SAMP8 aorta from 3-months old groups, suggesting the production of prostacyclin in young animals. By contrast, in 6-months old SAMR1 group, indomethacin decreased the sensitivity to U46619 and in 10-months old group decreased both the sensitivity and maximal contraction, indicating that aging induces a release of contractile prostanoids in aorta. These effects were significantly enhanced in aorta from SAMP8 of 6- and 10-months old mice. Plasma levels of estradiol did not change among female mice of all the groups.

**Conclusions:** The results reveal that senescence enhances contractile responses to TXA2 in aorta from female mice by increasing the synthesis and release of contractile prostanoids. This process occurs earlier in aortas from SAMP8 mice. As plasma estradiol levels were similar in all groups the increased synthesis of contractile prostanoids may be an effect related to aging. Supported by Ministerio de Ciencia e Innovación, ISCIII (FIS 10/00518, RED HERACLES RD06/0009); Conselleria de Sanidad, GV (AP-131/10, AP-117/10 and GE-02/10).

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**PP6.155 ENDOTHELIAL DYSFUNCTION AND VITAMIN D STATUS IN ESSENTIAL HYPERTENSION. PRELIMINARY RESULTS**

F. Tornese1, C. Scaczone1, R. Arseni1, L. Guarino1, A. Ocello1, A. Bono1, G. Cerasola1, S. Cottone1, 1Dipartimento Di Medicina Interna E Specialistica-University of Palermo, Palermo-Italy, 2Dipar Di Biotechnologie Mediche E Medicina Legale. Sezione Di Biochimica Medicina-University of Palermo, Palermo-Italy.

**Objective:** The exact mechanism by which vitamin D deficiency may determine an increased cardiovascular risk has not yet been elucidated. The current ongoing study evaluates the possible relationships among vitamin D status, endothelial dysfunction and inflammation.

**Design and Methodology:** In 40 primary hypertensives (mean 47.3 ± 12 years; mean blood pressure 137/97 ± 20/24 mmHg) and having normal renal function (eGFR-MDRD: 90 ± 25 ml/min) plasma concentrations of 25-hydroxyvitamin D3, parathormone (PTH), ICAM and VCAM (markers of endothelial dysfunction) high sensitivity PCR and TNF-alpha (markers of inflammatory activation), 24h blood pressure were evaluated.

**Results:** 25-hydroxyvitamin D3 levels were deficient in all patients (mean 26.5 ± 7 μg/L, cut-off values < 30 μg/L) and were inversely correlated with ICAM (r = -0.37, p = 0.01), VCAM (-0.35, p = 0.02), hsPCR (-0.35, p = 0.02), TNF-alpha (r = -0.38, p = 0.01) and PTH levels (r = -0.42, p = 0.005).

**Conclusions:** These preliminary results show that vitamin D3 levels are reduced in hypertensives, although PTH, calcium and phosphorus levels, and glomerular filtration rate were within normal range. Furthermore, these data suggest that low vitamin D3 levels are associated with endothelial dysfunction and with markers of inflammatory activation in patient with primary hypertension.

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**PP6.156 MICROALBUMINURIA AND ENDOTHELIAL DYSFUNCTION IN HYPERTENSIVE PATIENTS WITH METABOLIC SYNDROME**

M. O. Gonzalez Albarran, Sara Calvo, Marta Carrasco, Marta Cano, Gilberto Perez, Jesus Gomez. Hospital Ramon Y Cajal, Madrid-Spain.

**Objectives:** To study the possible relationship between endothelial function and microalbuminuria levels in patients with hypertension and metabolic syndrome (MS).

**Methods:** We studied 28 hypertensive patients with MS, according to NCEP-ATPIII criteria. IR was estimated by HOMA index. The endothelial dysfunction was brachial artery ultrasonographic (Echo Blaster 128; transducer 7.5 MHz), endothelial dependent-vasoaldilation (EDV) was measured during reactive hyperaemia (%change in the diameter of brachial artery after 1 min of hyperaemia). The endothelial independent-vasodilation (EIV) was measured by the nitroglycerin (0.4 mg sublingually) administered after at least 10 minutes of rest following reactive hyperemia. The maximum vasodilation occurs three to four minutes after administration. Urinary albumin excretion was classified in normalalbuminuria (< 30 mg/24h, n = 12), microalbuminuria between 30-300 mg/24h, n = 14). According to OGTT (75g), we divided into two groups: Patients with normal glucose tolerance (Fasting glucose < 100 mg/dL and 2h glucose < 140mg/dL) (NG group = 8 patients) and patients with abnormal glucose tolerance (9 subjects with glucose intolerance and 11 patients with type 2 diabetes).

**Results:** AG patients had more insulin resistance than subjects in NG group. Moreover, AG subjects were elderly (67.2 ± 4.5 vs. 46.8 ± 5.6; p < 0.05). Patients with microalbuminuria had more insulin resistance than patients with normalalbuminuria (p < 0.05). Moreover, AG patients (with DM) showed higher levels of microalbuminuria than those with NG (p < 0.05). The percentages of change in EDV and EIV were: 19.54 ± 12.5 y 6.68 ± 5.2, respectively. In AG group (n = 20), the percentage of change in EDV was lower (10.1 ± 6.2%) than NG group (29.34 ± 15%, p < 0.05). Patients with microalbuminuria had less EDV (9.8 ± 4.9% vs. 25.1 ± 14%; p < 0.001) than normalalbuminuria ones. A negative correlation between microalbuminuria levels and EDV was found(r = -0.49; p = 0.007) and with insulin resistance measured by HOMA (r = -0.44; p = 0.019).

**Conclusions:** In our hypertensive patients with metabolic syndrome, microalbuminuria is associated with more insulin resistance, glycemic abnor-malities and more endothelial dysfunction.

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**PP6.157 HAEMOSTASIS PARAMETERS DISTURBANCES IN HEALTHY INDIVIDUALS WITH HIGH NORMAL BLOOD PRESSURE**


High normal blood pressure(HNBP) seems to be related to increased cardiovascular risk in healthy normotensive subjects, while essential hypertension is associated with haemostasis balance disturbances. Aim of our study was to examine the impact of HNBP on haemostasis parameters in healthy individuals with HNBP and to compare the findings to those of healthy normotensives(HN) with normal blood pressure (BP) levels. Two hundred-four (96 M, 108 F) HN, mean age 57 ± 7 years and Body Mass Index (BMI) 23 ± 1.6 Kg/m² were studied. Systolic and diastolic (SBP, DBP) blood pressure were measured. Serum fibrinogen (F), thrombomodulin (TM), and the antigens of plasminogen activator-inhibitor-1 (PAI-1 Ag) and tissue plasminogen activator (tPA-Ag) were deter mined in the whole population. Eighty-eight (46 M, 42 F) subjects had HNBP, (Group A) and 136 (70(M), 66(F)) (Group B) had normal BP. The two groups were matched for age, sex, BMI.

Subjects with HNBP had significantly higher F (300 ± 50 vs. 280 ± 40/mg/dL p < 0.01), TM (6.5 ± 0.7 vs 6.0 ± 0.8 IU/mL p < .001),PAI-1 Ag (8.5 ± 1.3 vs. 7.8 ± 0.7 mg/dL p < 0.01) and tPA-Ag (22 ± 10 vs. 18 ± 11mg/dL p < 0.01)levels compared with subjects with NBP.

**Conclusions:** Our findings indicate that high normal blood pressure is associated with haemostasis disturbances predisposing to hypercoagulability and impaired fibrinolysis. This observation may be of prognostic value for future cardiovascular events in this group and needs further investigation.

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**PP6.158 ENDOTHELIAL FUNCTION DYNAMICS UNDER THE INFLUENCE OF DIFFERENT VASOCATIVE ANTIHYPTERTENSIVE AGENTS**

O. Fedorishina1, K. Pratosov1, A. Dzizinsky1, E. Trunova2, M. Makarenko2, N. Gakh1. 1Institute of Advanced Medical Studies, Irkutsk-Russia, 2Medical-Diagnostic Center, Angarsk-Russia.

**Aim:** To investigate and compare the endothelium-dependent vasorelaxation dynamics when administering beta–blockers carvedilol, nebivolol and calcium antagonist amlopidine to patients with essential arterial hypertension (AH).

**Material and Methods:** Ninety patients with 1-2 grades AH aged 30-55 years were studied. All patients were randomized to receive carvedilol, nebivolol and calcium antagonist amlopidine at initial daily doses of 25, 5 and 5 mg respectively. In two weeks if office BP level of 140/90 mmHg was not attained the dose of medicine was doubled. In four weeks in cases of uncontrolled AH the
indapamide 1.5 mg was added. The length of administering period was 8 weeks. Endothelial function (EF) was evaluated with the help of flow mediated dilation (FMD) test. The ambulatory BP monitoring (ABPM) was held.

Results: An average daily dose of carvedilol, nebivolol and amloidipine amounted to 31.4 ± 16.2, 5.7 ± 2.4 and 6.4 ± 2.6 mg. Mean 24-h systolic and diastolic BP significantly decreased in all groups. We also observed that the degree of brachial artery FMD reliably increased by +5.5%, +1.6% and +4.6% under the influence of carvedilol, nebivolol and amloidipine respectively. At the same time the share of patients with full recovering of EF (brachial artery FMD > 10%) increased significantly only in carvedilol group – from 4.5% to 27.3% (p<0.001).

Conclusion: In hypertensive patients the brachial artery endothelial function significantly increased under the influence of vasoactive antihypertensive drugs carvedilol, nebivolol and amloidipine. The greatest effect on brachial artery flow mediated dilation was observed in carvedilol group.

PP.6.159 CORRELATION OF LIPID, CARBOHYDRATE AND PURINE METABOLISM AND ENDOTHELIAL DYSFUNCTION IN PATIENTS WITH ARTERIAL HYPERTENSION AND ABDOMINAL OBESITY
K. Hanchar, L. Yankovskaya, I. Karaulko, E. Kezhun, E. Trojan, A. Lelevich, L. Kezhun. Grodno State Medical University, Grodno-Belarus

Aim: Evaluate parameters of lipid, carbohydrate and purine metabolism in patients with arterial hypertension(AH) and abdominal obesity (AO) and correlations between them.

Methods: There were healthy person group (n = 13, age 39.4 ± 10.1year), comparable group 1 of outpatients with AH (n = 12, age 44.4 ± 10.5year), comparable group 2 of outpatients with AH (mild and moderate) and AO (n = 17, age 44.0 ± 5.2 year) and senior group 3 of outpatients with AH (mild and moderate) and AO (n = 22, age 56.5 ± 3.9 year, p < 0.05) with no diabetes mellitus in any group examined. Everybody was tested for waist/hip) and hip circumference(HC) in cm, body mass index (BMI, kg/m2) and WC/HC ratio were calculated; glucose (mM/L), uric acid (mM/L), cholesterol (mM/L), HDL (mM/L), LDL (mM/L), triglycerides (mM/L) were determined in blood serum; endothelium dependent vasodilatation (EDV) in% was measured by reovasographic method after reactive hyperemia (normal ≥ 12%). Statistical analysis was performed using STATISTICA 6.0 (StatSoft Inc, USA) software.

Results: BMI and WC were higher in all group (p < 0.05) accordingly to healthy person group (23.5 ± 1.6kg/m2) There were higher WC/HC ratio in groups 2 and 3 (0.96 ± 0.06, 0.95 ± 0.07) accordingly vs. healthy person group and group 1 (0.85 ± 0.08, 0.89 ± 0.07). Patients of group 2 had higher cholest erol (5.95 ± 1.18), uric acid (419.2 ± 151.63) and lower HDL (134 ± 0.51) vs. healthy person group (4.98 ± 0.72; 281.6 ± 88.39; 1.92 ± 0.5, accordingly). In group 3 LDL was higher (4.15 ± 1.4, p < 0.05) and HC at the same level like in healthy person group (2.97 ± 1.18, 1.92 ± 0.5, accordingly). EDV was reduced in all group vs. healthy person group. Endothelial dysfunction was determined in 12 patients (100%) of group 1, in7 persons (64%) of group 2 and in 12 patients (57%) of group 3.

Conclusions: AO appear negative influence on lipid, carbohydrate and purine metabolism parameters, which by turn have negative effect on endothelium function.

PP.6.160 ENDOTHELIAL DYSFUNCTION AND ARTERIAL STIFFNESS IN HYPERVENTSIVE PATIENTS WITH OBESITY

Aims: An inverse correlation between endothelial dysfunction and arterial stiffness was reported in healthy subjects, while this interrelationship has been poorly explored in subjects at high risk of cardiovascular disease, such as patients with arterial hypertension or obesity. In this study this relationship has been evaluated in hypertensive patients with or without obesity.

Results: Hypertensive patients with obesity (n = 67) showed lower flow-mediated dilation (3.3 ± 2.0 vs 5.0 ± 3.2%, p < 0.0001) than without obesity (n = 65), while nitroglycerine response was similar. Aortic pulse wave velocity was higher in patients with obesity than in patients without obesity (10.3 ± 12.2 vs 8.8 ± 1.4 m/s, p < 0.0001). The difference remained statistically different (p = 0.003) when mean blood pressure, age and body mass index were considered as covariates. An increased aortic pulse wave velocity, defined on the basis of the cut-off of 8.3 m/s, was found in 84% of patients with obesity and in 64% of patients without obesity (p = 0.006). Age (r = 0.25, p = 0.002), systolic blood pressure (r = 0.28, p = 0.001), body mass index (r = 0.27, p = 0.003), and flow-mediated dilation (r = 0.24, p = 0.03), were independently related to aortic pulse wave velocity (full model r = 0.45). In patients with obesity, flow-mediated dilation (r = 0.11, p = 0.003), systolic blood pressure (r = 0.14, p = 0.006) and body mass index (r = 0.08, p = 0.02), remained independent predictors of aortic pulse wave velocity in obesity patients.

Conclusion: We demonstrated that increased aortic stiffness is associated with endothelial dysfunction in hypertensive obese patients. The absence of this correlation in patients without obesity, who have lower aortic stiffness and better endothelial function, suggests specific mechanisms related to obesity.

PP.6.161 SALT LOADING IN CANOLA OIL FED SHRSP RATS INDUCES ENDOTHELIAL DYSFUNCTION
A. Papazova1, L. Lexis2, P. Lewandowski. 1 Deakin University, Geelong-Australia, 2Latrobe University, Melbourne-Australia

Objective: Canola oil (CO) intake as the only dietary fat source shortens the lifespan of stroke-prone spontaneously hypertensive (SHRSP) rats. SHRSP rats fed CO have a 15-20% reduced life span following NaCl loading when compared to SHRSP rats fed soybean oil (SO) with NaCl loading. This study aimed to: (1) determine if 50 days of CO intake causes endothelial dysfunction in SHRSP rats, and; (2) determine if NaCl loading with CO leads to endothelial dysfunction.

Design and Method: Male SHRSP rats were fed the following diets for 50 days: 10 wt/wt% CO, or 10 wt/wt% CO, each given tap water; 10 wt/wt% SO, or 10 wt/wt% CO, each given with 1%/NaCl. Male Wistar Kyoto (WKY) rats were used as a normotensive control and were fed 10 wt/wt% SO for 50 days. Contractile responses to norepinephrine, and endothelium-dependent and -independent vasodilating responses to acetylcholine (ACh) and sodium nitroprusside (SNP), respectively, were measured in thoracic aortic rings.

Results: The ACh dilating responses were not significantly different (p > 0.05) between the SHRSP rats fed CO and SO alone. CO fed SHRSP rats with NaCl loading showed a significantly impaired (p < 0.05) endothelium-dependent relaxation response and impaired ACh responses in SHRSP rats, and; (2) determine if NaCl loading with CO leads to endothelial dysfunction.

Conclusion: CO intake did not induce endothelial dysfunction in SHRSP rats. However, CO intake with 1% NaCl loading significantly impaired endothelial dysfunction in SHRSP rats when compared to CO intake alone.

PP.6.162 ALBUMINURIA IS RELATED TO CIRCULATING SOLUBLE RECEPTOR FOR ADVANCED GLYCATION END PRODUCTS AND BIOMARKERS OF ENDOTHELIAL FUNCTION IN HYPERTENSION
K. Dimitriadis, C. Tsiofis, M. Almyroudi, K. Kinits, L. Lioni, D. Flessas, D. Sryseloudis, C. Stefanadis. First Cardiology Clinic, University of Athens, Hippokration Hospital, Athens-Greece

Objective: The soluble receptor for advanced glycation end-products (sRAGE) participates in the development and acceleration of atherosclerosis, while albu minuria, L-arginine and asymmetric dimethylarginine (ADMA) are related with vascular dysfunction. In this study we estimated the relationship of albuminuria to creatinine ratio (ACR) with sRAGE, ADMA and L-arginine in essential hypertensives.

Design and Method: Our population consisted of 180 newly diagnosed untreated non-diabetic patients with stage I to II essential hypertension [118 men, aged 49 years, office blood pressure (BP) = 153/97 mmHg]. According to the ACR values determined as the mean of two non-consecutive morning spot urine samples, the study population was divided into microalbuminurics (n = 12) (mean ACR = 30-300 mg/g) and normoalbuminurics (n = 148) (mean ACR < 30 mg/g).

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Results: Microalbuminurics compared to normoalbuminurics had higher 24-h systolic BP (142 ± 11 vs 131 ± 9 mmHg, p = 0.001), while did not differ regarding metabolic profile (p = NS). Moreover, microalbuminurics compared to normoalbuminurics exhibited lower levels of sRAGE (1022 ± 453 vs 1501 ± 578 pg/ml, p = 0.003), whereas had higher levels of ADMA (0.58 ± 0.04 vs 0.43 ± 0.05 μmol/l, p < 0.0001) and L-arginine (105 ± 5.6 vs 86 ± 7.3 μmol/l, p < 0.0001), independently of confounders. In the total population, ACR was positively related to 24-h systolic BP (r = 0.415, p < 0.0001), ADMA (r = 0.324, p = 0.01) and L-arginine (r = 0.248, p = 0.03), whereas it was negatively correlated with sRAGE (r = -0.274, p = 0.019). Regarding sRAGE, it was associated with 24-h pulse pressure (r = -0.365, p = 0.001) and ADMA (r = -0.225, p = 0.002). Multiple regression analysis revealed that age, 24-h systolic BP, sRAGE and ADMA were the independent predictors of ACR (R^2 = 0.52, p < 0.0001).

Conclusions: In essential hypertensives, microalbuminuria is accompanied by attenuated levels of sRAGE, augmented ADMA and higher L-arginine, reflecting pronounced vascular dysfunction. Moreover, the association of ACR with sRAGE and ADMA, further supports the integrative role of albuminuria in hypertension.

Antihypertensive Medication Improves Endothelial Dysfunction in Hemodialysis Patient?


Introduction: The measurement of endothelium-dependent vasodilatation is considered the “gold standard” in the estimation of endothelial dysfunction in vivo. The most important stimulus responsible for endothelial-dependent vasodilation is the friction or shear stress of the arterial wall. Which is directly related to the speed and blood viscosity measured near the vessel wall and inversely with vessel diameter. The accurate measurement of friction stress in vivo involves so much difficulty, but driving in arteries where blood flow is unidirectional laminar shear rate measurement is the relationship between blood velocity and vessel diameter can be considered a proxy measure for adequate estimation of shear stress, regardless of viscosity.

Material and Methods: We studied 20 patients after hemodialysis by measuring Doppler ultrasound in the brachial artery of arterio-venous fistula arm, high fistula flow is arterial dilatation occurs through the increase of shear stress. We measured caliber, blood velocity, blood flow, and shear rate estimated as the ratio between speed and caliber of the vessel, we considered shear rate as the dependent variable. We considered whether or not taking antihypertensive medication, antihypertensive drug administered, the age, sex, presence of ischemic heart disease, diabetes and regard them as independent variable. We used SPSS 15, univariate analysis was performed using Chi2 test and risk estimates, mean comparison test using the Student t and then multivariate logistic regression analysis to assess the association between these variables.

Results: 5 patients were not taking any antihypertensive medication, 4 were taking a beta-blocker, calcium antagonist January 1, and the remaining 10 were taking ACE inhibitors / ARB alone or in combination.15 patients were males and 5 females. 13 were diabetic, ischemic heart disease the had 7 patients. The average value of shear rate was 118.68 / - 60.82, median: 106. We found no differences when comparing the mean value of shear rate between different groups of antihypertensive therapy in univariate analysis using Chi2 test, with risk analysis, we found that the OR man / woman to have a low value of shear rate is: 0.059 95% CI: (0.006, 0.628), (Chi2: 0.0001), 11.250, p = 0.01) not taking antihypertensive medication / if taking antihypertensives has an OR of presenting a low value of shear rate of: 7.33, 95% (1.742, 30.873), Chi2: 5, p: 0.04. In multivariate logistic regression found that male sex was 10 times higher risk of low shear rate than women. Not taking antihypertensive medication was a risk factor increased by 7 times the risk of a low value of shear rate.

Conclusion: In our hemodialysis patient population studied being male and not taking antihypertensive medication are presented risk factors for low values of shear rate on the measurement by ultrasound, a situation that predisposes to intimal hyperplasia and stenosis / thrombosis.

Endothelial Function and Intima-Media Thickness in Patients with Hypothyroidism and Hypertension

M. Grozdyk, O. Mitchenko, V. Romanov. Institute of Cardiology, Kyiv-Ukraine

Aims: To examine endothelial function and intimal-medial thickness (IMT) in patients with hypothyroidism and arterial hypertension

Methods: 140 participants (men (n = 33), mean age 65.4 ± 8.5 years; women (n = 107), mean age 62.0 ± 6.9 years) with arterial hypertension were included in this study: 1-st group (n = 80) with euthyroidism, 2-nd group (n = 20) with overt hypothyroidism, 3-rd group (n = 20) with subclinical hypothyroidism and 4-th group (n = 20) on levothyroxin treatment. Measurements were made of growth, weight, body mass index, waist and thighs, TSH, FT3, FT4, lipids profile. Also we measured IMT common carotid artery, endothelium-dependent (EDV) and endothelium-independent (EIV) vasodilation using brachial artery ultrasonography.

Results: The plasma concentration of TSH was closely associated with cholesterol levels (r = 0.39, p < 0.001) and LDL-cholesterol (r = 0.46, p < 0.001) in the 2-nd and in the 3-rd groups, inversely associated with EDV (p = 0.04; p < 0.001) and EIV (r = 0.53; p < 0.001). The IMT of patients in the 1-st group were lower (0.89 ± 0.22 mm, p < 0.05) than in other groups. EDV in 4-th group (11.3%) was significantly higher compared with 2-md (7.8%, p < 0.05) and 3-rd (8.2%, p < 0.05) groups, but not 1-st (13.2%, p < 0.05). EIV in 4-th group (10.8%, p < 0.05) was significantly higher compared with 2-md (8.2%, p < 0.05) and 3-rd (9.2%, p < 0.05) groups, but not 1-st (13.2%, p < 0.05). Our results showed that hypothyroidism has atherosclerotic potential.

Conclusion: Overt hypothyroidism and subclinical hypothyroidism are associated with an increase hypercholesterolemia and IMT, has a stronger influence on endothelial dysfunction. Thyroid replacement therapy improves EDV and EIV in patients with hypothyroidism.
PP.7.165  MECHANISMS OF PERIPHERAL TISSUE BLOOD FLOW INFLUENCED BY HIGH SALT DIET IN YOUNG HEALTHY FEMALE HUMAIN SUBJECTS
A. Cavka1, I. Grizelj1, B. Jelakovic2, J.H. Lombard3, I. Mihaljevic4, A. Koller5
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Several studies have shown that endothelial dysfunction is an early manifestation of adverse effect of high salt loading. However, mechanisms by which high salt intake affect endothelium are still unknown.

The Aim: of this study was to investigate the effect of acute salt loading and in particular the role of cyclooxygenase (COX I, 2) in tissue blood flow regulation. Eleven healthy female medical students, volunteered to participate in this study. All participants maintained low salt diet (intake < 40 mmol Na/day) throughout 7 days. Simultaneously they were divided in high salt (HS) group (intake > 200 mmol Na/day) and placebo (LS) group. Laser Doppler Flowmetry (LDF) was used to assess relative changes in peripheral tissue blood flow between baseline and reactive hyperemia, provoked by 1 minute (endothelium-mediated response) and 2 minute (effect of peak vasoactive metabolite release, maximal response) vascular occlusion. Participants were tested twice, before and after diet protocol, in basic conditions and 90 minutes after 100 mg of per oral indomethacin intake. 24 hours urine collection and venous blood sampling (plasma electrolytes, aldosterone and plasma renin activity (PRA)) were done before and after diet period.

Results: of LDF measurements during basic conditions in HS group have shown statistically significant impairment in reperfusion tissue blood flow after 1 min occlusion, while after 2 min occlusion reperfusion flow was nearly the same before and after HS diet period. Indomethacin intake eliminated reduction in reperfusion blood flow in HS group. 24 hour urine sodium excretion was significantly higher in HS group and significantly lower in LS group. PRA and aldosterone levels decreased in HS and increased in LS group, as expected.

The results of this study have shown that one week of high salt intake have caused impaired peripheral tissue blood flow that was restored to control condition after indomethacin intake. These observations suggest that vasconstrictor metabolite of COX could play role in impaired tissue blood flow in subjects taking high salt diet for one week.

PP.7.166  ASSESSMENT OF PERIPHERAL VASCULAR FUNCTION WITH PHOTOPLETHYSMOGRAPHIC PULSE AMPLITUDE: A POPULATION STUDY
T. Kuznetsova1, G. Szczesny2, L. Thijis1, D. Jozeau2, J. Staessen1, T. Kuznetsova, G. Szczesny, L. Thijis, D. Jozeau, J. Staessen
1University of Leuven, Leuven-Belgium, 2Flomedi Company, Brussels-Belgium
Objective: Vasodilatation of the peripheral arteries after reactive hyperemia depends in part on release of nitric oxide from endothelial cells in response to the increased shear stress. Previous studies mainly employed a fingertip tonometry device to derive pulse wave amplitude and, therefore, measure pulse amplitude hyperemic changes. Another approach to derive information about arterial pulse wave is based on photoplethysmography (PPG). We sought to evaluate the correlates of digital PPG pulse amplitude hyperemic responses as a measure of peripheral vascular function in the general population.

Design and Method: Using a fingertip photoplethysmography (PPG) device, we measured digital pulse wave amplitude in 63 subjects enrolled in a population study (55.5% women; mean age, 55 years; 58.7% hypertensive subjects) at baseline and in 30-second intervals for 4 minutes during reactive hyperemia induced by 5-minute forearm cuff occlusion. We performed stepwise regression to assess the independent correlations of the hyperemic response ratio for each 30-second interval after cuff deflation with sex, age, body mass index, heart rate, systolic and diastolic blood pressures, total cholesterol and smoking.

Results: With age forced in the models, the explained variance for the PPG pulse amplitude ratio totaled from 17.1% at 210-240-second time interval and 27.1% at 30-60-second time interval. The hyperemic response at each 30-seccond interval was significantly higher in women compared to men (P < 0.001). The PPG pulse amplitude changes at 0- to 60-second intervals decreased with higher blood pressure (P < 0.03). These associations with sex and systolic blood pressure were mutually independent.

Conclusions: Our study is the first to describe in a sample of a general population the determinants of pulse amplitude hyperemic changes measured by PPG technique. We demonstrated that measurement of hyperemic response by PPG is a sensitive tool in the detection of endothelial dysfunction associated with hypertension and male gender.

PP.7.167  SPHINGOSINE-1-PHOSPHATE IN CALCIUM SENSITIZATION OF SMALL MESENTERIC ARTERIES IN SPONTANEOUSLY HYPERTENSIVE RATS
C. Aoqui, R. Eissler, S. Chmielewski, C. Schmuderer, D. Sollinger, U. Heemann, M. Baumann. Dept. of Nephrology, Klinikum Rechts Der Isar, Technische Universitat Munchen, Munich- Germany
Objective: The bioactive sphingolipid metabolite sphingosine-1-phosphate (SIP) exerts its vasoactive effects as an extracellular ligand to membrane receptors in endothelial and smooth muscle cells and as a second messenger mobilizing calcium stores. Hypertension is associated with marked alterations in sphingolipid homeostasis that can be partially due to a dysfunctional endothelium, causing a misbalance between signals inducing dilation and constriction. Our aim was to gain additional insight into the role of SIP concerning calcium-induced constriction of small mesenteric arteries (SMA) in a genetically determined model of hypertension - spontaneously hypertensive rats (SHR) with known endothelial dysfunction.

Design and Methods: SMA (diameter < 350 μm) from 12-week-old SHR and Wistar-Kyoto (WKY) (n = 6/group) were mounted in a wire myograph. In viable arteries, the calcium sensitivity was assessed by stepwise increases of extracellular calcium concentration (Ca2+ 0 to 3 mmol/L) and constriction responses were analyzed. We tested the extracellular effect of SIP, incubating arterries with 0.1 μM for 10 minutes. The role of endothelium was tested with pre-incubation with 100 μM of the nitric oxide synthase inhibitor NG-Nitro-L-arginine methyl ester (L-NAME).

Results: SMA from SHR showed increased constriction compared to WKY (Ca2+ max. ± 2.7 mN/mm vs. Ca2+ max. ± 2.2 mN/mm, p < 0.001). Incubation with SIP resulted in increased constriction in WKY (Ca2+ max. ± 2.4 mN/mm vs. Ca2+ max. ± 2.7 mN/mm, p < 0.05) and no effect on constriction in SHR (Ca2+ max. ± 3.7 mN/mm vs. Ca2+ max. ± 2.3 mN/mm). In the presence of L-NAME the response to SIP was completely abolished in WKY (Ca2+ max. ± 19.9 mN/mm vs. Ca2+ max. ± 19.0 mN/mm) and remained absent in SHR (Ca2+ max. ± 37.5 mN/mm vs. Ca2+ max. ± 38.9 mN/mm).

Conclusion: Increased sensitivity to extracellular calcium but lack of increase in response after incubation with SIP in SHR might be due to an already excessive calcium-dependent activation of the contractile apparatus. Incubation with L-NAME abolished the constrictor effect of SIP in WKY, simulating SHR response, which suggests that a dysfunctional endothelium may be involved in the misbalance that leads to excess of constriction signals. SIP can play an important role on the contractile apparatus sensitization to calcium in SMA, which may be involved in the pathophysiolog of hypertension in SHR.

PP.7.168  THERE IS A PARALLEL ESCALATION BETWEEN RETINAL VASCULAR ALTERATIONS AND ARTERIAL STIFFNESS IN ESSENTIAL HYPERTENSION
V. Katsi, G. Souretis, I. Vlasseros, S. Christakopoulos, C.H. Vlachopoulos, C. Masoura, C.H. Stefanidis, I. Kalliakazos. Hippokration Hospital, Athens-Greece
Background: The clinical and prognostic significance of hypertensive retinal changes, an established hypertension-related target organ damage remains controversial. We assessed the hypothesis that there is a relationship between retinal alterations and arterial stiffness, an index strongly correlated to increased cardiovascular morbidity and mortality.

Methods: We examined 268 consecutive newly diagnosed, untreated, essential hypertensives (aged ≥ 60 ± 13 years, 151 female, office blood pressure = 152/90 mmHg), without any history of cardiovascular disease or any other evident comorbidity. Venous blood samples were drawn for determination of metabolic profile and all participants underwent ambulatory blood pressure monitoring (ABPM). All subjects underwent fundoscopy examination and were distributed to five groups according to Scheie’s grading system. (Groups A, B, C, D and E for Scheie’s scale 0, I, II, III and IV, respectively). Arterial stiffness was evaluated on the basis of carotid to femoral pulse wave velocity (c-f PWV) by means of a computerized method (Complior SP).

Results: The five groups (including 39, 87, 99, 35 and 8 subjects respectively) did not differ with regard to age, gender, ABPM parameters and their metabolic profile (fasting glucose, serum lipids, uric acid) as well. However, hypertensives of higher Scheie’s category exhibited significantly greater values of c-f PWV (8 ± 1.3, 9.1 ± 1.8, 9.4 ± 2.1, 9.8 ± 2.9 and 9.9 ± 2.4 m/sec respectively, p = 0.005). Notably, there was a statistically significant difference on pulse pressure among groups (53mmHg, 60mmHg, 63mmHg, 65mmHg and 67, respectively) (p = 0.04), another surrogate marker of arterial stiffness. Multivariable regression analysis showed that age, fundus classification and systolic arterial pressure were independent determinants of c-f PWV.

Conclusions: In hypertensive subjects there is a progressive stiffening of the aorta in parallel to the evolution of the fundus lesions according to Scheie’s scale. A possible explanation derives from the fact that same pathophysiological processes, like wall remodeling or endothelium impairment occur in small and in large vessels in the setting of essential hypertension.

Results: The AVR significantly increased in both eyes after 6 months of treatment. In right eye, AVR increased from 0.7367 + 0.0589 to 0.8149 + 0.056 after 6 months of treatment. In left eye, AVR increased from 0.7748 + 0.062 to 0.8143 + 0.061 after 6 months of treatment; (p < 0.001, in both cases). Arteriolar diameter increased significantly in both eyes. In the right eye, arteriolar diameter increased from 5.688 mm to 6.019 mm. In the left eye increased from 5.764 mm to 6.051 mm (p < 0.001, in both cases). After 6 months of treatment no differences in venular diameter. These results were similar with both methods: linear and snake.

Conclusions: In our study, in a sample of 139 hypertensive patients with 278 eyes fundus, the AVR increased after 6 months of intensive antihypertensive treatment, due to increase in arteriolar diameter. This translates betterment in the retinal microcirculation of hypertensive patients. We have an objective way to quantify the early damage of retinal microcirculation in hypertensive patients: the low AVR.

PP.7.169 RETINAL MICROCIRCULATION IMPROVEMENT AFTER THE CONTROL OF BLOOD PRESSURE WITH ARB-II IN HYPERTENIVE PATIENTS

M. Pena-Seijo1, J.L. Díaz Díaz2, J.A. Díaz Peromingo3, M. Suárez Tembra4, R. Monte Secades5, M. González Penedo6, I. Méndez Naya7, A. Hermida Ameijeiras1, J.E. López Paz1, C. Calvo Gómez2, F. Gómez-Ulla Irazazabal3, A. Pose Reino3. 1Internal Medicine. University Hospital Complex of Santiago, Santiago De Compostela-Spain, 2Barbanza Hospital, Ribeira-Spain, 3San Rafael Hospital, A Coruña-Spain, 4Xeral Calde Hospital, Lugo-Spain, 5Artificial Vision Group. Computer Department. University of A Coruña, A Coruña-Spain, 6Econometry Department. University of Santiago De Compostela, Santiago De Compostela-Spain, 7Econometry Department. University Hospital Complex of Santiago, Santiago De Compostela-Spain

Introduction: The retina is the window to the systemic vasculature. The analysis of the retina allows the detection of target organ damage in various vascular diseases such as hypertension. Alterations in the retina are common in hypertensive mild and moderate but difficult to quantify in early stages.

Objective: Our group has worked on a method to calculate the arteriovenous ratio (AVR) in retinal microvasculature as a way to objectively quantify the early damage in the retina of hypertensive patients. Through AVR we can also quantify its evolution and improvement with adequate control of blood pressure.

Material and Methods: We have included 139 hypertensive patients with 278 eyes fundus. Patients have been treated during 6 months with Telmisartan. We included patients with mild-moderate hypertension without prior antihypertensive treatment or hypertensive patients who have not achieved optimal blood pressure control. Digital photographs of retinal were taken baseline and after 6 months of antihypertensive treatment. During the follow up period, ARB-II dose was increased to achieve control of blood pressure, and if it was necessary combined with Hydrochlorothiazide. In the photographs, AVR is calculated as ratio of arteriolar and venular mean diameter of the retinal vessels. The observer identifies in each photograph the vessels into arteriole or venule, select 20 points (10 points for arteriolar and 10 for venules) and automatically the diameters for each select point of the vessels is measured. According to previous studies AVR decreased translates retinal microcirculation damage. The AVR is calculated in two ways. Through the linear Method; a simple method of image processing, and validated previously. And through the snake method, a novel method using elastic curves translated retinal microcirculation damage. The AVR is calculated in two ways.

Conclusions: Our data indicates that gap junctions involved to sustained HPV reflecting a novel pathway for signaling during hypoxia in pulmonary artery.
Conclusions: The dependence was negative, $R = -0.67$, $p$.

Results: Mössbauer spectroscopy (the lower amount of oxyHb reflects higher ability of release O$_2$ by detecting the content of oxyHb in red blood cells (RBCs) with using ABPM) were collected. In addition, for each patient we assessed erythrocytological parameters and systolic and diastolic blood pressure (obtained by ABPM). All patients carried out laser Doppler flowmetry (LDF) on the back of forearm. Serum uric acid (SUA) and functional reserve of microcirculation in the patients with Essential Hypertension (EH).

Design and Method: Data on serum concentration of creatinine, fasting glucose, total cholesterol, LDL, HDL, fibrinogen, CRP, as well as eGFR, standard morphological parameters and systolic and diastolic blood pressure (obtained by using ABPM) were collected. In addition, for each patient we assessed erythrocyte deformability by the shear stress laser diffactometry and erythrocyte ability to release O$_2$ by detecting the content of oxyHb in red blood cells (RBCs) with Moessbauer spectroscopy (the lower amount of oxyHb reflects higher ability of giving up O$_2$ by erythrocytes).

Results: Statistically significant correlation was observed between eGFR and oxyHb: the dependence was negative, $R = -0.67$, $p < 0.001$, what indicates higher erythrocyte oxygen release ability in patients with higher eGFR. Also, eGFR and RBC deformability showed a statistically significant correlation: RBC deformability increases with increasing eGFR, $R = 0.77$, $p < 0.004$ (see the figure).

Conclusions: Our results indicate that in untreated hypertensive patients the mechanical properties of erythrocytes as well as the erythrocyte ability to release oxygen worsen when the glomerular filtration rate decreases. This observation may indicate the existence of a negative feedback mechanism: 1) hypertension causes a decrease in the glomerular filtration ability, 2) erythrocytes undergo adverse changes during impaired filtration process, 3) the worsening of RBC deformability and RBC ability to release oxygen increases the severity of hypertension.

Design and Methods: We examined 36 consecutive untreated hypertensives (aged 57.9 years, 12 males, all Caucasian) with indications of myocardial ischaemia and normal coronary arteries in coronary angiography. CFR was calculated by a 0.014 in. Doppler guidewire (Flowire, Volcano) in response to bolus intracoronary administration of adenosine (60 μg). SEVR was calculated non-invasively by radial application tonometry and constitutes a pressure–time integral ratio derived from pressures measured in the aorta and left ventricle. The numerator of the ratio, the diastolic pressure–time integral, is the area under the aortic and left ventricular pressures in diastole and the denominator, the systolic pressure–time integral, is the area under the left ventricular pressure curve in systole. Diastolic function was evaluated by means of transmural flow and tissue doppler imaging.

Results: Based on a CFR cut-off value of 2.5 hypertensives were classified into those with normal ($n = 12$) and low ($n = 24$) CFR. Hypertensive patients with low CFR compared to those with normal CFR exhibited significantly decreased SEVR by 24.5% ($p = 0.002$). In hypertensives with low CFR, CFR was correlated with SEVR ($r = 0.651$, $p = 0.001$). After applying multivariate linear regression analysis, age, left ventricular mass index, Em/Am, 24h diastolic BP and SEVR turned out to be the only independent predictors of CFR (adjusted $R\,\text{square} = 0.718$).

Conclusions: Estimation of SEVR by using application tonometry may provide a reliable tool for the assessment of coronary microcirculation in essential hypertensives with indications of myocardial ischemia and normal coronary arteries.

Objective: The aim of our study was to investigate association of serum uric acid (SUA) and functional reserve of microcirculation in the patients with Essential Hypertension (EH).

Design and Method: 19 EH pts (15 M, 4 F) grade 1, $\text{age} 43.7 \pm 3.4$ years, without antihypertensive therapy for 2 weeks before study were investigated. Patients with acute inflammatory diseases, were not included in the study. Serum uric acid (SUA) was defined by a UF method on the uricase selective analyzer.

All patients carried out laser Doppler flowmetry (LDF) on the back of forearm. The analysis of an amplitude-frequency spectrum of LDF spent based on operation of wavelet transform. Amplitude of the basal microvascular endothelial rhythm (M） was assessed in the respective frequency bands (Hz). For estimation of microvascular dilatation reserve (MDR) carried out arterial occlusion at the level of shoulder for 5 minute. Recorded the basal LDF-parameters (Pb) and the LDF-parameters of maximum reactive hyperemia (Pmax). The level of MDR was calculated by the formula: $\text{Pmax}(\text{Pb}) \times 100\%$. The statistical analysis was carried out by nonparametric method of Spearman with STATISTICA 6. The data is presented as M ± m.

Results: In the group EH patients 24-h SBP was 136.7 ± 3.6 mm Hg, 24-h DBP - 81.3 ± 2.5 mm Hg. SUA - 342.0 ± 22 μmol/l, Increase of SUA level (>410μmol/l) was marked in 3 pts (16%). Av. Pb 14.7 ± 1.3 perfusion units (PU), av. Pmax 16 ± 5.2 PU, av. MDR 390 ± 104% (N 382 ± 28%). Decrease of MDR was marked in the 10 pts (52%). Occlusion test showed tendentious correlation between SUA and the MDR (r = -0.45; $p = 0.057$).

Conclusion: The level of uric acid is associated with the worsening of adaptive reserves of microcirculation in the EH patients.

Design and Method: 19 EH pts (15 M, 4 F) grade 1, $\text{age} 43.7 \pm 3.4$ years, without antihypertensive therapy for 2 weeks before study were investigated. Patients with acute inflammatory diseases, were not included in the study. All patients carried out laser Doppler flowmetry (LDF) on the back of forearm. The analysis of an amplitude-frequency spectrum of LDF spent based on operation of wavelet transform. Amplitude of the basal microvascular endothelial rhythm (M） was assessed in the respective frequency bands (Hz). For estimation of microvascular dilatation reserve (MDR) carried out arterial occlusion at the level of shoulder for 5 minute. Recorded the basal LDF-parameters (Pb) and the LDF-parameters of maximum reactive hyperemia (Pmax). The level of MDR was calculated by the formula: $\text{Pmax}(\text{Pb}) \times 100\%$. The statistical analysis was carried out by nonparametric method of Spearman with STATISTICA 6. The data is presented as M ± m.
Results: In the group EH patients 24-h SBP was 136.7 ± 3.6 mm Hg, DBP - 81.3 ± 2.5 mm Hg, SUA – 342.0 ± 22 μmol/l, UAU – 5.0 ± 1.6 mmol/day. Increased SUA level (> 416 μmol/l) was marked in the 3 pts (16%). Increased UAU level (> 4.43 mmol/day) was marked in the 4 pts (21%). Arterial stiffness was increased in 95% pts. We found tendentious association SUA and the amplitude of the MER (r = -0.42; p = 0.07). The significant association was found for UAU and MER (r = -0.64; p = 0.009). No significant association was found between SUA, UAU and baPWV.

Conclusion: Our study showed association SUA, UAU with basal microcirculation endothelial dysfunction, but not baPWV. These results suggest that moderate elevation of uric acid level associated with an impairment of microvascular NO activity, but not with vascular wall structure.

PP.7.175 EVALUATION OF MICROVASCULAR CORONARY LESION IN HYPERTENSIVES WITH LEFT VENTRICULAR HYPERTROPHY AND ISCHEMIC-LIKE ST SEGMENT CHANGES

A. Kisko1, J. Kneč1, M. Babčák1, M. Vereš1, M. Vytýcková1, J. Cencarík1, P. Gaszič2, J. Stasko2, J.A.Reiman University Hospital and Secov Polyclinic, Pressov University, Pressov-Slovak Republic, 3Cardiology, J.A.Reiman University Hospital, Pressov-Slovak Republic, Internal Diseases, J.A.Reiman University Hospital, Pressov-Slovak Republic

Patients (pts) with hypertension frequently complain of chest pain and exhibit ischemic-like ST segment changes on stress electrocardiography (SECG) with normal coronary angiography (CA). The aim of the study was to assess the accuracy of 99mTc-tetrofosmin myocardial perfusion SPECT (MPS) in these pts for detecting ischemia.

We studied 248 hypertensives with left ventricular hypertrophy (LVH), angina-like chest pain, preserved left ventricle systolic function, with no history of myocardial infarction, coronary revascularization or diabetes mellitus. Each of them underwent a standard exercise (bicycle ergometry) or pharmacological maneuvering (intravenous dobutamine 0.84 mg/kg) stress testing. In 48 pts (19.4%, 28 males, age 48-75 years, mean 61.6 ± 12.4) it showed a positive result (80 ms from the J point ST-segment depression > 1.0mm). MPS and CA as a gold standard for detecting coronary artery disease (> 50% narrowing of at least one epicardial artery) were performed in each case.

CA revealed significant coronary lesions in 20 pts (41.7%) and was normal in 28 pts (58.3%). MPS showed to be positive in 27 pts (56.3%) and negative in 21 pts (43.7%), sensitivity 100%, specificity 75%, diagnostic accuracy 85%, positive predictive value 74%, negative predictive value 100%. Hypertensives with LVH can be affected with angina for significant epicardial coronary stenosis or microvascular disease with normal CA. SECG is positive in both conditions. In our group of pts we found the high sensitivity, good specificity and diagnostic accuracy of MPS in detecting ischemia. We recommend MPS in hypertensives with LVH and ischemic-like ST segment changes on SECG, because when negative, it excludes significant epicardial lesion and should be considered as a predictor of microvascular disease.

PP.7.176 WALL-TO-LUMEN RATIO OF RETINAL ARTERIOLES IS RELATED TO ALTERATIONS OF AORTIC PULSE WAVE IN PATIENTS WITH A HISTORY OF A CEREBROVASCULAR EVENT

M. Ritt1, J. Harazny2, P. Schelling1, D. Baleanu3, S. Schwab1, G. Michelon1, R. Schmieder1. 1Department of Nephrology and Hypertension, University of Erlangen-Nürnberg, Erlangen-Germany, 2Department of Human Physiology, University of Ołoczyn, Ołoczyn-Poland, 3Department of Neurology, University of Erlangen-Nürnberg, Erlangen-Germany, *Department of Ophthalmology, University of Erlangen-Nürnberg, Erlangen-Germany

Objective: Wall-to-lumen ratio of retinal arterioles represents a potential future parameter for vascular damage. We hypothesized that changes in wall-to-lumen ratio of retinal arterioles is associated with alterations of aortic pulse wave in patients with a history of a cerebrovascular event.

Methods: In this pilot study 14 patients (5 female and 9 male patients) with a mean age of 60.2 ± 9.8 years, mean blood pressure levels of 132 ± 14/79.1 ± 11 mmHg and a history of a cerebrovascular event have been enrolled. Wall-to-lumen ratio of retinal arterioles was assessed in vivo using scanning laser Doppler flowmetry (Heidelberg Retina Flowmetry, Heidelberg, Germany). Pulse wave analysis to determine aortic augmentation index and aortic augmentation pressure were performed in vivo using applanation tonometry (Sphygmocor, AtCor Medical Pty Ltd, NSW 2114, Australia).

Results: Pulse pressure (r = 0.593, p = 0.025), but not systolic, diastolic or mean arterial pressure was related to wall-to-lumen ratio of retinal arterioles. Age, body mass index, waist circumference as well as parameters of glucose and lipid profile did not reveal a relation to wall-to-lumen ratio of retinal arterioles. Aortic augmentation index (r = 0.546, p = 0.043) and aortic augmentation pressure (r = 0.559, p = 0.038) were both related to wall-to-lumen ratio of retinal arterioles even when aortic augmentation index and aortic augmentation pressure were corrected for a mean heart rate of 75 bpm (r = 0.572, p = 0.032 and r = 0.616, p = 0.019, respectively).

Conclusion: In our cohort of patients with a history of a cerebrovascular event wall-to-lumen ratio of retinal arterioles was related to alterations of aortic pulse wave thereby indicating parallel vascular changes in the micro- and macrovasculature.
lary recruitment. After 6 months, the same protocol was repeated in all patients. Anthropometric and laboratory variables were measured in patients and controls and repeated after 6 months.

Results: We studied 27 patients (16 men) mean age 46.4 ± 1.3 years. Mean systolic and diastolic blood pressure respectively decreased from 149.9 ± 1.8 mmHg to 120 ± 1.9 mmHg and from 96.7 ± 1.8 mmHg to 79 ± 1.25 mmHg (p < 0.001). No significant differences before and after treatment were found between BMI, waist-to-hip ratio, glucose, creatinine, C-reactive protein and blood lipids. In controls, mean baseline CD and during PORH were respectively between BMI, waist-to-hip ratio, glucose, creatinine, C-reactive protein and blood lipids. In controls, mean baseline CD and during PORH were respectively between BMI, waist-to-hip ratio, glucose, creatinine, C-reactive protein and blood lipids.

Conclusion: A six-month course of anti-hypertensive therapy partially reversed functional capillary rarefaction in untreated hypertensive patients.

**PP.7.179 SOLUBLE FMS-LIKE TYROSINE KINASE 1 (SFLT) IS ELEVATED IN ANCA ASSOCIATED VASCULITIS AND DECLINES DURING THERAPY**

S. Lovric, T. Kirsch, H. Haller, M. Haubitz. Hannover Medical School, Hannover-Germany

Objective: Fms-like tyrosine kinase-1 (Flt-1) is one of the major receptors for the vascular endothelial growth factor (VEGF). Its soluble form (sFLT) is described to act as a decoy receptor for VEGF in the circulation and modulates VEGF bioavailability. Hence, increased level of sFLT may disturb VEGF signalling and lead to endothelial dysfunction. Elevated serum levels of sFLT-1 have been found in sepsis and preeclampsia and correlated with disease severity. In Wegener’s granulomatosis higher VEGF levels have been reported in patients with major disease activity compared to those with minor activity. Therefore, the following study was intended to determine sFLT serum level in ANCA-associated vasculitis.

Design and Method: Plasma sFLT-1 level were determined in patients with ANCA-associated vasculitis at initial diagnosis and after 1, 3, 6 and 12 months (n = 14). Disease activity was assessed in accordance with the Birmingham Vasculitis Activity Score (BVAS). BVAS, C-reactive protein, creatinine and ANCA titres were recorded at baseline and during follow-up.

Results: In patients with active ANCA- associated vasculitis median level of sFLT-1 were increased (162 pg/mL, p < 0.05) compared to those without activity, and declined during follow-up. The reported increase in sFLT-1 serum level in active patients correlates with disease activity (BVAS) (r = 0.55, p < 0.05) and CRP levels (r = 0.59, p < 0.05).

Conclusions: sFLT-1 serum level are elevated in patients with severe ANCA associated vasculitis and decline during treatment. sFLT may therefore act as a robust marker for disease activity.

**PP.7.180 IMPAIRED MICROCIRCULATION AND CEREBROVASCULAR PERFUSION IN MILD HYPTENSIVES ALONG THE PROGRESSION OF METABOLIC SYNDROME**

P. Nazzaro, G. Schirotto, D. Mezzapica, M. Petruzelli, G. Grandolfo, L. De Benedittis, L. Pascasio, F. Federico. University of Bari, Italy-Italy

Introduction: Ischemic stroke represents the most invalidating vascular event in patients with hypertension (HTN) and metabolic disorders which may be clustered establishing the metabolic syndrome (MetS). Aim of the study was to recognize if mild HTNs, that show capillary rarefaction, with increasing number of components of MetS, may be affected by microvascular damage and impaired cerebral blood flow.

Methods: 22 normotensives with no component of MetS (NTN-0), 20 HTNs with no (HTN-0), 30 with 1 (HTN-1), 29 with 2 (HTN-2), 27 with 3 (HTN-3) and 25 with all the components of MetS (HTN-4), underwent routine check-up, ABPM and videocapillaroscopy. Baseline (CAP) and structural (CVC) skin capillarity were computed. Cerebral vasodilating reserve, by breath-holding index (BHI), via transcranial Doppler, was estimated in HTN-1 and HTN-2.

Results: ABPM confirmed the similar hypertensive state. CAP and CVC were reduced in all HTN but CVC was progressively lower only in HTN with MetS.

**PP.7.181 ANGIOGENIC THERAPY IN HYPTENSIVE PATIENTS WITH CHRONIC LIMB ISCHEMIA IMPROVES MICROCIRCULATION AND PROMOTES COLLATERAL FORMATION**

K. Talitskii, O. Bulkina, A. Fedorovich, A. Samko, Y. Parfyonova, Y. Karpov. Russian Cardiology Research Centre, Moscow-Russia

Background: Therapeutic angiogenesis is a new treatment option for patients with chronic limb ischemia who are not candidates for interventional treatment. Some studies show improvement of ischemia after angiogenic gene therapy, but the microcirculatory involvement in these patients is poorly understood.

Methods: 35 hypertensive patients with Fontaine IIb-IV atherosclerotic limb ischemia and no option for surgery or angioplasty received vascular endothelial growth factor (VEGF) gene therapy (GT, n = 20), blood-derived stem cell therapy (SC, n = 5) or conventional treatment (CT, n = 10). Patients were assessed by laser doppler and transcutaneous oximetry, collateral angiogenesis was characterized by quantitative angiography.

Results: 3 months after treatment GT and SC patients show modest improvement of microcirculatory indices at rest and significant changes during position test and thermal test indicating improvement of endothelial function. Tissue oximetry shows moderate increase of oxygen pressure in decubitus position with significant increase during position test and reduction of ischemic recovery time. Angiographic assessment shows significant increase of Rentrop score, modified collateral index and number of visible collateral vessels. We found a strong correlation between microcirculatory, angiographic and Rutherford scale improvement.

Conclusions: Angiogenic stimulation with VEGF-plasmid or blood-derived stem cells significantly improves collateral formation and microcirculation in hypertensive patients with chronic limb ischemia corresponding to overall clinical effect.

**PP.7.182 RHEOLOGICAL DISTURBANCES IN PATIENTS WITH STROKE**

M. Kruchinina, A. Gromov, V. Generalov, A. Rabko, M. Shakirov. Institute of Internal Medicine SB Rasi, Novosibirsk-Russia

Objective: To investigate the electrical and viscoelastic characteristics of erythrocytes (Er) in comparison with the structural changes of their membranes, the level of macroergic compounds to patients with stroke to identify different pathogenetic types of rheological disorders.

Design and Method: We used the methods of dielectrophoresis, chromatography, 31P NMR spectroscopy. We observed 190 men with stroke (42 of them in the dynamics of the therapy) mainly in sub-acute and residual periods and 35 healthy men (36-62 years).

Results: Electrical conductivity, indexes of aggregation, destruction, viscosity, rigidity of Er, the level of 2,3-DPG is higher and the velocity of Er motion to electrodes, the capacity of the membranes, plasticity, level of triphosphates is lower in patients with stroke compared with controls (p < 0.001-0.05). Two groups of patients with differences in Er parameters were revealed. Patients with the elements of the metabolic syndrome had Er with low plasticity, high electric conductivity, as expressed by intracellular energy shortage, high cholesterol fraction, an index of cholesterol/phospholipids (PHL) in the membranes of Er against decrease in total lipids, PHL (p < 0.0001 - 0.02). Which determined the severity of microcirculatory disorders and tissue hypoxia. Patients without
Introduction: Retinal image analysis can lead to early detection of target organ damage in several vascular diseases, such as hypertension or diabetes or atherosclerosis.

Objective: For these purposes it is required the evaluation of a high amount of images and the collaboration between different experts and healthcare centers. These routines demand new fast and automatic solutions. This work introduces Sirius a web-based system providing a framework for medical staff to collaboratively work using retinal image-based applications in a distributed, fast and reliable environment.

Results: Sirius consists of three main components: the web client that users interact with, the web application server that processes all client requests and the service module that performs the image processing tasks. In this work, we focus on a service for the analysis of retinal microcirculation using a semi-automatic methodology for the computation of the arteriolar-to-venular ratio (AVR), that is the initial expression of narrowing arteriolar, considered as an initial damage in retinal microcirculation in vascular diseases, especially in hypertension. Sirius has been evaluated in different real environments, involving health care systems, to test its performance. First, the AVR service was validated in terms of precision and efficiency and then, the framework was evaluated in different real scenarios of medical centers. Sirius is a web-based application providing a fast and reliable work environment for retinal experts.

Conclusion: The system Sirius allows the sharing of images and processed results between remote computers and provides automated methods to diminish inter-expert variability in the analysis of the images.
POINTER SESSION

POINTER SESSION 08
RENAZL ASPECTS

PP.8.184 α2A-ADRENERGIC RECEPTOR DEFICIENCY AMELIORATES PROGRESSION OF CHRONIC KIDNEY DISEASE

H. Hochi1, J. Stegbaru1, S. A. Pothoff1, E. Koenigshausen1, L. Hein2, L. C. Rump1, O. Vonend1.1 Department of Nephrology, Medical Faculty, Heinrich Heine University, Duesseldorf-GERMANY; 2Institute of Experimental and Clinical Pharmacology and Toxicology, University of Freiburg, Freiburg-Germany

Objective: Chronic kidney disease (CKD) is a major health issue. Investigations were carried out to analyse the function of α2A-adrenergic receptor (AR) for progression of CKD. The α2A-AR is known as main regulator of presynaptic noradrenaline release.

Design and Methods: A murine knockout model (KO) with deletion of α2A-AR was used and compared to its wild-type (WT). Experimental renal failure was induced by subtotal nephrectomy (SNX). Kidneys of WT and KO mice were isolated perfused for evaluation of presynaptic noradrenaline release and angiotensin II pressor response.

Results: In kidneys of KO mice presynaptic noradrenaline release after renal nerve stimulation was significantly higher than in WT mice. After SNX WT and KO mice developed albuminuria which was surprisingly significant higher in WT mice. Kaplan-Meier survival analysis revealed a diminished mortality in KO mice. In isolated perfused kidneys the α2-agonist UK14.304 showed a facilitatory effect on angiotensin II-induced vasoconstriction. In addition, UK14.304 induced a concentration- and time-dependent phosphorylation of extracellular signal-regulated-kinases ERK1/2 in α2A-AR transfected HEK 293T-cells.

Conclusions: The presented data confirms the noradrenaline release regulating effect of presynaptic α2A-adrenergic receptors. Moreover, our data reveal a major role of postsynaptic α2A-adrenergic receptors regulating vascular tone for progression of CKD. The cell culture experiments might hint to an ERK1/2 dependent pathway which could explain the effect of catecholamines modulating fibrotic processes in CKD.

PP.8.185 RENAL FUNCTIONAL DETERIORATION DECREASES INTRARENAL EXPRESSION OF HUMAN ANGIOTENSIN RECEPTOR BINDING AND INHIBITORY MOLECULE


The intrarenal renin-angiotensin system plays a crucial role in the regulation of renal circulation and sodium reabsorption through the activation of vascular, glomerular, and tubular angiotensin II type 1 (AT1) receptor signaling. The AT1 receptor is a member of the G protein-coupled receptor superfamily, having a seven-transmembrane spanning structure which activates G proteins through the third intracellular loop and the intracellular carboxyl-terminal (C-terminal) tail of the receptor. The C-terminal cytoplasmic domain of the AT1 receptor is involved in the control of AT1 receptor internalization and plays an important role in linking receptor-mediated signal transduction to the specific biological responses to angiotensin II, such as hypertension, cardiovascular remodeling, and renal injury. We previously identified the molecule AT1 receptor-associate protein (ATRAP), which specifically interacts with the C-terminal cytoplasmic domain of the AT1 receptor and selectively inhibits AT1 receptor signalling. In the present study we investigated expression and distribution of human ATRAP in normal kidney and renal biopsy specimens from patients with IgA nephropathy (N = 22). In the normal human kidney, both the ATRAP mRNA and protein were widely and abundantly distributed along the renal tubules from Bowman’s capsule to the medullary collecting ducts. In all renal tubular epithelial cells, the ATRAP protein co-localized with the AT1 receptor. In renal biopsy specimens with IgA nephropathy, a significant positive correlation between ATRAP and AT1 receptor gene expression was observed in the tubulointerstitial region (R = 0.92, P < 0.01). There was also a positive relationship between tubulointerstitial ATRAP expression and the estimated glomerular filtration rate (eGFR) in patients with IgA nephropathy (R = 0.44, P = 0.046). Furthermore, we examined a role of tubular ATRAP in the functional regulation of the tubular AT1 receptor using an immortalized cell line of mouse distal convoluted tubule (mDCT) cells and found that overexpression of ATRAP by adenoviral gene transfer suppressed the angiotensin II-mediated increases in TGFB production in mDCT cells. These findings suggest that in addition to the AT1 receptor, ATRAP, a newly emerging component of the renin-angiotensin system, is likely to play a role in balancing the renal renin-angiotensin system by counter-regulatory effects, which in turn may be confounded by the presence of chronic kidney disease.

PP.8.186 VENTRICULAR REPOLARISATION IN PATIENTS WITH RENOVASCULAR HYPERTENSION

V. Maluccio, C. Di Stefano, A. Fabbris, D. Leonc, M. Corella, A. Vairo, F. Vegglio. Scuola Medica 4 - Aou S. Giovanni Battista, Moncalieri-Italy

A prolonged QT interval represents a risk factor for ischemic heart disease in hypertensive subjects. In essential hypertension with left ventricular hypertrophy, QT interval duration is independently associated with an increased risk of cardiovascular and all-cause mortality, even after effective antihypertensive treatment.

Patients with renal-artery stenosis are at increased risk for cardiovascular events. The objective: of the present study was to evaluate the QT interval in patients with renovascular hypertension (RV) by comparison with controls with essential hypertension (EH) and primary aldosteronism (PA). The patients were divided into 3 groups: patients with RV, PA and EH.

Design and Methods: 24 patients with RV were studied. 27 sex- and age-matched patients with primary aldosteronism (PA) and 89 with essential hypertension (EH) served as control groups. Corrected QT intervals (QTc) were measured manually from 12-lead ECGs.

Results: The prevalence of QTc was longer in RV (439 ± 23ms) and PA (434 ± 23ms) compared to EH controls (418 ± 20ms) (p < 0.001). The prevalence of QTc > 440ms was higher in RV (37%) and PA patients (48%), as compared to EH controls (9%) (p < 0.001). After renal-artery angioplasty, blood pressure was significantly reduced (minus 15% systolic and 11% diastolic), QTc interval was shorter (426 ± 20ms) (p = 0.03), and the prevalence of QTc > 440ms was lower (10%) (p < 0.05).

Conclusions: In patients with RV, QT interval was significantly longer than controls with EH, and similar to high cardiovascular risk PA patients. The mechanisms behind QT prolongation of RV patients are not known. Factors such as hyperactivity of the sympathetic nervous system, and abnormality of intracellular ion currents and couplings may play a role. After treatment of renal-artery stenosis, the cardiovascular risk of RV patients may be reduced by concomitant blood pressure lowering and QTc duration shortening.

PP.8.187 ANGIOPROTECTIN: AN ANG-II LIKE PEPTIDE CAUSING VASODILATORY EFFECTS

V. Jankowski1, M. Toelle2, M. Van Der Giet3, M. Bader1, W. Ziek1, J. Jankowski1. 1Charite, Med. Klinik IV, Berlin-Germany; 2MDC, Berlin-Germany

The family of angiotensin peptides has been steadily growing in recent years. Most are fragments of angiotensin II (Ang-II) with different affinities to the known angiotensin receptors. Here we describe the novel endogenous octapeptide Pro-Glu-Val-Tyr-Ile-His-Pro-Phe (Angioprotectin), which acts as a strong agonist at MAS receptors. Angioprotectin provides physiological antagonism of vasoconstrictor actions of Ang-II via the AT1 and MAS receptor. Plasma concentrations in healthy human volunteers were about 15% and in renal failure patients up to 50%, of plasma Ang-II concentrations. A commercially available Ang-II antibody did not discriminate between Angioprotectin and Ang-II and thus Angioprotectin can contribute to Ang-II concentrations measured by antibody-based assays. This novel peptide is likely to be a relevant component of the human renin-angiotensin-system.
**PP.8.188 MICROALBUMINURIA IN THE GENERAL POPULATION: ITS PREVALENCE AND CLINICAL SIGNIFICANCE**

S. Tanaka, H. Takase, Y. Doi, G. Kimura. 'Nagoya City University Graduate School of Medical Sciences, Nagoya-Japan, 'Enshu Hospital, Hamamatsu-Japan

**Purpose:** Microalbuminuria is a well established marker of cardiovascular risk. Recent studies have shown that even small increases in urine excretion of albumin within 'normal level' (below the threshold level adopted to define microalbuminuria) correlate with future cardiovascular events. The present study was designed to investigate the prevalence of microalbuminuria and factors that associate with urine excretion of albumin in the general population.

**Methods:** Participants in a health checkup program in our hospital were enrolled in this study (n = 7,124, 56.4 ± 11.8 years old). Besides the routine checkup program (an interview regarding health status, physical examination, chest X-ray, electrocardiography, and laboratory assessment of cardiovascular risk factors), urine samples were collected for the measurement of albumin concentrations, which were expressed as the ratio of urine albumin to creatinine concentrations (UACR [mg/g Cr]). Cross-sectional analyses were performed to investigate relationships between UACR and other variables. The analytical range of UACR was ≥ 5 mg/g Cr and individual salt intake was assessed by estimating 24 hours urinary salt excretion, which was calculated by a previously reported formula.

**Results:** The blood pressure of participants was 126 ± 17.7 ± 10 mmHg and 30.4% and 9.1% of participants were with hypertension and diabetes mellitus, respectively. Urine albumin was detected in 2,856 subjects (40.1%) (30 > UACR ≥ 5 mg/g Cr, 35.0%; UACR ≥ 50 mg/g Cr, 5.1%). Multivariate regression analysis revealed that abnormal albuminuria (UACR ≥ 50 mg/g Cr) was correlated with systolic blood pressure, estimated 24 hours urinary salt excretion, and fasting plasma glucose after adjustment for possible factors (p < 0.0001). In participants with detectable albuminuria (UACR ≥ 5 mg/g Cr, n = 2,856), UACR was independently correlated with systolic blood pressure, estimated 24 hours urinary salt excretion, uric acid, and fasting plasma glucose (p < 0.01). Similar results were obtained in analyses performed in a subgroup of participants without any medication (n = 4,563).

**Conclusions:** The prevalence of microalbuminuria was about 5% in the general population. The urinary excretion of albumin was closely associated with blood pressure and salt intake, suggesting the importance of salt restriction for the prevention of end-stage renal disease and cardiovascular disease.

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**PP.8.189 RELATIONSHIP BETWEEN OXIDATIVE STRESS AND AORTIC STIFFNESS IN HYPERTENSIVE PATIENTS WITH CHRONIC KIDNEY DISEASE**

G. Mule', P. Cusimano, T. Viola, M. Costanzo, A.C. Foraci, A. Palermo, A. Castiglia, E. Nardi, G. Cerasola, S. Cottone. 'Department Di Medicina Interna E Specialististica Università Di Palermo, Palermo-Italy

**Background:** It is well known that arterial stiffness and oxidative stress are features of chronic kidney disease (CKD). Several studies have consistently demonstrated that arterial stiffness becomes progressively worse as CKD progresses and a negative correlation of oxidative stress with renal function has been described. There is also sound experimental evidence indicating that oxidative stress is involved in atherogenesis. The contribution of oxidative stress to aortic stiffness is less clear.

**Objective:** The aim of our study was to analyse the relationship between plasma levels of 8-ISO-prostaglandin F2alpha (8-ISO-PGF2alpha), an index of lipid peroxidation, considered a reliable biomarker of oxidative stress, and aortic stiffness in a group of hypertensive patients with chronic kidney disease.

**Methods:** We enrolled 90 pharmacologically treated hypertensive patients (mean age 59 ± 12 years, males 53%) with chronic kidney disease [estimated glomerular filtration rate (eGFR) < 60 ml/min/1.73m²]. In all the subjects routine biochemical parameters and 8-ISO-PGF2alpha plasma levels, measured by a solid-phase specific sandwich enzyme-linked immunosorbent assay (Assay Design Inc), were obtained. Moreover, ambulatory blood pressure monitoring and measurements of c-PWV, by a computerized automatic method (Complin), were performed. The GFR was estimated by the four-variable MDRD study equation.

**Results:** The study population comprised 90 hypertensive subjects with eGFR ranging from 60 to 15 ml/min/1.73m² (mean value: 37 ml/min/1.73m²). Thirty-one patients (34%) had type 2 diabetes. The patients (n = 41) with elevated values of c-PWV (> 12 m/sec) showed significantly higher 8-ISO-PGF2alpha plasma levels than those of subjects with PWV < 12 m/sec [423.3 ± 117.8 vs 359.8 ± 105.9 pg/ml; p = 0.009 and p = 0.02, before and after adjustment for age, gender and mean arterial pressure]. A statistical significant correlation was found between 8-ISO-PGF2alpha and c-PWV in the whole study population (r = 0.33; p = 0.001). This association held even after adjustment for age, gender, mean arterial pressure, smoking habit, presence of diabetes (or glycaemia, as continuous variable), total cholesterol, calcium x phosphate product and eGFR (beta = 0.23; p = 0.006) in a stepwise multiple regression model.

**Conclusions:** Our results seem to suggest that in hypertensive subjects with CKD there is an independent relationship between oxidative stress and aortic stiffness and that the unfavourable influence of a reduced renal function on large artery elastic properties may be partly mediated by an increased oxidative stress.

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**PP.8.190 ARTERIAL STIFFNESS AND COGNITIVE FUNCTION IN CHRONIC KIDNEY DISEASE**

D. Karasavvidou1, R. Kalaitzidis1, S-E. Pelidou2, S. Kountouris1, O. Balafa1, K. Siromopoulos1. 'Department of Nephrology, University Hospital of Ioannina, Ioannina-Greece, 'Department of Neurology, University of Ioannina, Ioannina-Greece

**Objective:** Increased arterial stiffness (AS) is an independent prognostic factor for cardiovascular risk, both in the general population and patients with chronic kidney disease (CKD). On the other hand AS appears to be negatively related to cognitive function (CF) in the general population, while in patients with CKD data is few and contradictory. The prevalence of AS and CF as well as their relationship in CKD (stage 3-4), hemodialysis (HD) and peritoneal dialysis (PD) patients was investigated. Design: The AS was estimated by measuring pulse wave velocity (PWV) in the carotid-radial and carotid-femoral level. The CF was assessed in all patients using 5 different questionnaires, tailored to the characteristics of the country general population.

**Methods:** Ninety-three patients studied stable patients with CKD (44 in stage 3-4, 26 in HD and 23 in PD). The average age was 61 ± 15 years and 68% were males. AS measurements were performed before the regular session in the middle of the week for HD patients and at regular visits to others. At the same time, CFs were also recorded.

**Results:** The groups were comparable with similar demographic characteristics. The mean systolic, diastolic and pulse pressure were 133 ± 21, 78 ± 11 and 55 ± 20 mmHg, respectively. There was no statistically significant difference in measurements of PWV between the groups. Age showed a positive correlation with the PWV (p = 0.05). Negative correlation was found between the PWV and the parameters of URR (r = -0.5, p < 0.05) and Kt/V (r = -0.46, p < 0.05) in dialysis patients. CF was negatively affected even in CKD stages 3-4 patients. Patients undergoing HD showed cognitive impairment in 81%, as opposed to 22% of patients undergoing PD. The anti-hypertensive treatment had a positive effect on the CF. The cognitive impairment showed a positive correlation with age (p = 0.001), while all diabetic patients had cognitive impairment (p < 0.05). PWV divided in quartiles showed that the lowest PWV the better CF.

**Conclusions:** The AS, which was not particularly abnormal in our study (only 2 patients had PWV > 13 m/s) was negatively correlated with CF. The diabetic patients compared with non-diabetics had the worst CF. PD patients showed better CF than patients undergoing in HD.

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**PP.8.191 COMPARISON OF THE MDRD AND THE CKD-EPI EQUATIONS TO ESTIMATE THE GLOMERULAR FILTRATION RATE IN UNTREATED HYPERTENSIVE PATIENTS**

A. Troshina1, Y. Kотовская2, N. Bagmanova2, J. Koblava2. 'Russian People Friendship University, Dolgoprudni-Russia, 'Russian People Friendship University, Moscow-Russia

**Objective:** The Chronic Kidney Disease Epidemiology Collaboration (CDK-EPI) equation has been proposed as a replacement for the Modification of Diet in Renal Disease (MDRD) equation to estimate the glomerular filtration rate (eGFR). The aim of the study was to compare the results of GFR calculations by two equations in patients with untreated arterial hypertension with normal serum creatinine.

**Methods:** Cross-sectional evaluation of a sample of 101 (49 men) untreated hypertensive normoalbuminuric patients (age 53.5 ± 12.3 years) without known kidney disease was done. The prevalence of eGFR 60-90 mL/min/1.73m² (arterial hypertension with decreased GFR according NKF KDOQI 2002) was assessed with the MDRD and the CKD-EPI equations in men and women separately.

**Results:** With the MDRD equation the median eGFRs in men/women were 92.4 ± 20.088.9 ± 16.3 mL/min/1.73m², and with the CKD-EPI equation 91 ± 16,090.2 ± 14.9 mL/min/1.73m². Among men the prevalence eGFR 60-90
Conclusion: Compared with the MDRD, the CKD-EPI equation generates a reduction in the prevalence of decreased eGFR in untreated normoalbuminuric hypertensive patients in similar range in men and women.

**PP.8.192 AMONG SUBJECTS AFFECTED BY CHRONIC KIDNEY DISEASE ABDOMINAL OBESITY IS A MARKER OF SUBCLINICAL CARDIAC DAMAGE**

C. Aliferi, S. Vettoretto, C. Caforino, C. Bonanomi, R. Floreani, G. Danzi, P. Messa. Fondazione I.R.C.C.S. Cà Grande Ospedale Maggiore Policlinico, Milan-Italy

Introduction: Chronic kidney disease (CKD) and metabolic syndrome (MS) are associated with a relevant increase of cardiovascular (CV) risk. We evaluated whether the coexistence of CKD and MS may influence the presence of subclinical cardiac damage.

Methods: We evaluated 200 patients affected by CKD and free from previous CV events. Blood and urinary samples were collected after an overnight fast. Albuminuria (A/C) was determined both on fast morning voidings of three different days and on a single 24-hour urine collection (album/24h). Cardiac damage was evaluated by means of echocardiography. We determined left ventricular mass indexed at the height elevated at 2.7 (LVMI) and we measured midwall fractional shortening (mFS) as a precocious index of systolic dysfunction. Left ventricular hypertrophy (LVH) was defined as LVMI > 51 g/m².7. MS was defined according to ATPIII criteria.

Results: Our cohort had the following characteristics: age 62 ± 15 years; males 65%; MS + 56%; type II diabetes 51%; SBP 140 ± 22 mmHg; DBP 80 ± 13 mmHg; MDRD: 99 ± 14 mmHg; MDRD: 58 ± 17 mmHg; waist circumference 100 ± 13 cm; eGFR 60 ± 32 ml/min; logA/C 1.25 ± 0.86. Patients were homogeneously distributed between CKD stages I to IV. MS + presented a higher prevalence of type II diabetes (DM + 56%; DM + 54%; p < 0.0001) as well as higher SBP (MS + 143 ± 18 vs MS- 136 ± 24 mmHg; p = 0.0002) while renal function and A/C were not significantly different among MS + and MS- subjects. MS + had higher LVMI (MS + 57.4 ± 14.5 vs MS- 42.5 ± 12.5 g/m²;7; p < 0.0001) while they had a significantly lower mFS (MS + 12.2 ± 4% vs MS- 16.7 ± 5.3%; p < 0.0001). LVMI and mFS correlated with: age, eGFR, LogA/C and with all the variables included in the defining criteria of MS. However, once those variables were analyzed in a logistic regression only waist circumference (WC), SBP and HDL were significantly correlated to LVH (OR 1.86 p < 0.0001; OR 1.14 p = 0.038 and OR 0.15 p = 0.002 for 5 cm increase of WC, 5 mmHg increase of SBP and 5 mg/dl increase of HDL) independently of eGFR and LogA/C that were not significant.

Conclusion: Our data suggest that although patients affected by CKD are generally considered to have a high CV risk, the coexistence of MS may increase the risk of subclinical cardiac damage over an the severity of renal impairment and other relevant risk factors. Moreover in this population WC resulted to be the most important and often neglected modifiable risk factor correlated with subclinical cardiac damage.

**PP.8.193 GENETIC VARIANT OF THE RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM (RAAS) AND RENAL SURVIVAL IN JAPANESE PATIENTS WITH CHRONIC KIDNEY DISEASE (CKD)**

Yasukazu Makino, Tadashi Konoßita, Tomoko Kimura, Miki Fujii, Shigeyuki Wakahara. Kentishou Arakawa, Iasso Inokits. Isamu Miyamoto. Fuku University School Medicine, Eitetsi-Japan

Background: Chronic kidney disease (CKD) is a public health problem, and inhibiting progression of CKD patients is a major task for the nephrology. The renin-angiotensin-aldosterone system (RAAS) may play pivotal role in the progression of CKD. And genetic polymorphism of RAAS has been reported to be associated with the development of some type of renal disease. However there has been few investigation of RAAS genetic variation and CKD progression in a large population-based study.

Methods: We enrolled 1008 CKD patients who consulted nephrologist in our hospital between January, 1995, and December, 2010. All patients were Japanese. 486 (48.2%) reached end stage renal disease (ESRD) at an average age of 62.7 years. We estimated the association between cumulative renal survival and five polymorphism of RAAS. The investigated genetic polymorphism are renin enhancer region (REN) C-5312T, angiotension (AGT) M235T, angiotension converting enzyme ACE insertion/deletion, angiotension type/receptor (AT2R) A1606C, and aldosterone synthase CYP 11B2 C-344T.For statistical analysis of the time course to ESRD a cumulative survival analysis using the Kaplan-Meier method with log-rank test.

Results: Cumulative renal survival in CKD was significantly less in those with TT genotype in (REN C-5312T) (log-rank, P = 0.0066 X² = 7.379). There was no association between cumulative survival and M235T, ACEI/ID, A1606C, and C-344T polymorphism.

Conclusion: REN C-5312T polymorphism may play a role CKD progression. And this polymorphism affect prognosis in CKD patient.
Comparison of the averaged blood pressure determinations and the biomarker parameters in the 3 groups, we found a significant difference (p = 0.004) between the average resistance in pre-dialysis patients (450.6 mmHg) and in APD (483.2). When the systolic BP peak is compared with resistance (R) and extracellular water (EW), we find a significant difference (p: 0.008, p: 0.023, respectively). The relationship between diastolic BP and maximum strength / extracellular water, was not statistically significant (p: 0.99, p: 0.52, respectively).

Conclusion: We conclude therefore that there is a positive relationship between the systolic blood pressure peak and overhydration in our peritoneal dialysis patients, respectively. The relationship between diastolic BP and maximum strength / extracellular water, was not statistically significant (p: 0.99, p: 0.52, respectively).

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Introduction: Cognitive impairment is well-recognized complication of end stage renal failure (ESRF). Atherosclerosis is believed to be involved in development of cognitive impairment and an early sign of atherosclerosis is hyper trophy of the arterial wall. Increased intima-media thickness (IMT) is a non-invasive marker of arterial wall alteration and it is a measure of subclinical vascular disease.

Design and Methods: To evaluate whether carotid IMT is associated with cognitive-motor functions, we measured carotid IMT in 40 HD patients (24 men, 16 women, mean age 47.67 ± 11.07 years) and compared it with the rest of the participants in a prospective research model. Should continue to examine which variables were reported as frequencies and percentages.

Conclusion: A key finding of this study was a prevalence of renal insufficiency much higher than expected. This is probably linked to the patient's age and the association of cardiovascular risk factors. It is shocking the omission of renal failure in hospital discharge reports, as patients with renal insufficiency need special attention: intensive treatment of cardiovascular risk factors, avoiding the use of nephrotoxic drugs, individualized dose adjustment, etc. Assessment of renal function using MDRD equation enables to diagnose cases of renal insufficiency with normal serum creatinine levels that otherwise would remain unnoticed.

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Objective: The blood pressure (BP) lowering effects of the renin inhibitor aliskiren (ALI) are sustained well beyond its plasma-half life. It is not known whether the hemodynamic effects of ALI are also sustained in the kidney, which could be a concern in circumstances where renal actions need to be reversed. We therefore studied reversibility of the systemic versus renal actions of ALI.

Design and Methods: In this open-label study, renal perfusion was measured by 3T MRI-arterial spin labelling (ASL) technique in 34 subjects with arterial hypertension before aliskiren (pre-ALI), after 4 weeks of treatment with aliskiren 300mg (ALI) and 4.5 days after discontinuation (post-ALI). In addition, plasma rennin activity (PRA) and oxidative stress were determined (reduced to oxidized glutathione in red blood cells).

Results: ALI reduced BP from 152 ± 14 to 139 ± 16 mmHg systolic (< 0.001) and 91 ± 11 to 85 ± 11 mmHg diastolic (p < 0.004). This was sustained post-ALI (136 ± 13 and 83 ± 10 mmHg, n.s. versus ALI). ALI increased renal perfusion from 272 ± 25 to 287 ± 29 U (p = 0.008), but these renal effects were reversed post-ALI (272 ± 26 U, p = 0.005 versus ALI, n.s. versus pre-ALI). PRA and oxidative stress were reduced by ALI, which was sustained post-ALI. Ang II levels were reduced by ALI but recovered post-ALI to pre-ALI levels.

Conclusions: After discontinuation of ALI, the BP effects were sustained while renal vasodilation was reversed, which was associated with sustained suppression of PRA and oxidative stress, while Ang II levels recovered to baseline levels. Renal hemodynamic effects are therefore more readily reversible than the systemic effects of ALI.

PP.P.200 SPECTRAL ANALYSIS OF CAROTID DISTENSION RATE IS USEFUL TO EVALUATE THE BAROREFLEX SENSITIVITY IN PATIENTS WITH MODERATE RENAL DYSFUNCTION


Short-term variation of blood pressure is largely controlled by autonomic function through the baroreflex arc. The most important non-invasive test to evaluate the autonomic function is the spectral analysis of blood pressure and R-R interval. However, it has long been recognized that carotid baroreceptors respond to deformation and not to pressure per se. Therefore, the carotid distension rate was recently used instead of blood pressure to evaluate the autonomic functioning in small populations. Autonomic dysfunction occurs in patients with severe renal dysfunction but little is known in moderate renal dysfunction. The aims of this study are to test in a large cohort of patients this new non-invasive method to evaluate the baroreflex, looking at the determinants of R-R interval, and to investigate the influence of moderate renal dysfunction on the baroreflex arc activity.

Methods: From EPP3 cohort, 2085 patients with available carotid echotracking measurements were included in this analysis (age 58.5 ± 6.0 years). Pulsatile distension was estimated as the difference between systolic and diastolic carotid diameter. The fast Fourier transformation was used to estimate the baroreflex sensitivity (BRS), defined as the ratio between variations in the carotid distension rate and R-R interval in the low-frequency (LF) range between 0.06–0.12 Hz for a period of at least 205 seconds. The slow autonomic activity was estimated by the LF distension rate.

Results: We studied 1961 patients with GFR > 60 and 124 patients 30-60 ml/min/1.73m². The R-R interval and BRS were comparable between the two groups. Carotid pulsatile distension was significantly lower in patients with moderate renal dysfunction than normal function (315 ± 99 and 351 ± 109 µm, respectively). Slow autonomic activity and respiratory rate were detected as independent determinants of the R-R interval variability in patients with normal renal function (R² = 0.37) and moderate renal dysfunction (R² = 0.33). The explained BRS variability was higher in patients with moderate renal dysfunction (R² = 0.22) than normal function (R² = 0.08). In patients with moderate renal dysfunction, BRS was higher when PP and pulsatile distension are reduced and in the absence of known cardiovascular diseases.

Conclusions: For the first time, a new non-invasive technique to study the baroreflex arc was tested in a large cohort and in patients with moderate renal dysfunction. Compared to patients with normal renal function, the BRS was not modified in patients with moderate renal dysfunction. However, BRS appeared very sensitive to mechanical factors in patients with moderate renal dysfunction since PP and carotid pulsatile distension were stronger determinants of BRS in these patients than when renal function is normal.
Objective: Previously, we reported that the impact of serum uric acid (SUA) on CVE in the presence of CKD from our analysis of the J-HEALTH study. This study examines the association among SUA level, CVE, and eGFR within specific groups of CKD patients defined as eGFR < 45 and 45-60 ml/min/1.73m². We investigated the following: if the impact of SUA on CVE differs among three categories of eGFR < 45, 45-60, > 60 ml/min/1.73m²; if early changes in SUA during hypertension treatment predict later GFR; and if shifts in GFR are associated with CVE.

Design and Method: J-HEALTH is a prospective, multicenter observational study of Japanese hypertensive subjects treated with losartan (n = 7,629). Mean follow-up period was 3.1 years. The primary endpoints were a composite of CVEs (stroke, myocardial infarction and sudden cardiac death) and the change in estimated glomerular filtration rate (eGFR). CKD was defined as eGFR < 60 ml/min/1.73m². Estimated GFR (eGFR) calculated using the equation for Japanese: eGFR (ml/min/1.73m²) = 194 x Cr-1.094 x age-0.287 (x 0.739 for women).

Results: eGFR increased from 38.1 to 57.6, from 52.8 to 67.5, from 74.7 to 80.7 ml/min/1.73m² in patients with eGFR < 45, 45-60, > 60 ml/min/1.73m² at baseline, respectively. Relative risk (RR) for CVE was 1.68 (95% confidence interval [CI] 1.19–2.37) times higher in patients with CKD versus non-CKD. In further analysis of patients with CKD, relative risk (RR) for CVE in patients with eGFR < 45 ml/min/1.73m² and 45-60 ml/min/1.73m² was 2.81 (95% confidence interval [CI] 0.94–2.00) times higher than those with eGFR > 60 ml/min/1.73m². The early change in SUA from baseline to 1 year was an independent predictor of the later change in eGFR from baseline to the end of follow-up.

Conclusions: The impact of SUA on CVE was shown to be greater in the presence of CKD. The impact of SUA on the later change in eGFR was greatest in more severe CKD patients. Losartan-based anti-hypertensive treatment can improve eGFR, which may be attributable, at least in part, to reduction in SUA.

Objective: To evaluate blood pressure control depends on renal function progression.

Material and Methods: Study included all patients older than 65 who attended a revision to our previous follow-up of at least 6 months, from February to November 2010. Demographic data were collected, the blood pressure as the average of the last two shots (it was considered controlled when the figures were lower than 140/90mmHg). Also collected baseline serum creatinine values and at time of review, we calculated evolution of renal function as the difference between the estimated glomerular filtration rate by MDRD-IDMS equation in the review from baseline divided by the years of monitoring and 4 groups were established: A) annual loss over 2ml/min; B) annual loss less than 2ml/min; C) annual improvement to 5 ml/min, and D) annual improvement over 5 ml/min.

Result: In the period under study collected data from 487 patients with a mean age of 75.2 ± 5.9 years, 52.8% were women. Mean follow-up in our clinic was 35 ± 13 months (range 9-60). The distribution of patients according to renal function groups were as follows: A) 24.7%, B) 19.8%, C) 37.2%, and D) 18.3%. Mean blood pressure was 143 ± 19/87.1 ± 11mmHg. The percentage of patients with systolic blood pressure control, diastolic, and both were 45.5%, 95.2% and 44.3%. The percentage of patients with controlled BP in each group was: A) 36.1%, B) 47.4%, C) 44.4%, and D) 55.8% (p = 0.044).

Conclusions: In patients over 65 years attending on nephrology clinic, blood pressure control achieved is lower in those with a poorer outcome of renal function. Improving blood pressure control is essential to prevent the progression of renal disease.
glucose intolerance progression. Patients with IFG, isolated IGT, newly diag-
nosed and known diabetes mellitus characterized by the highest number of MS 
criteria, which was observed in 8%, 16%, 17% ?? 22% patients respectively.

**Conclusion**: Frequency of CKD in patients with arterial hypertension increased with the glucose intolerance progression. Patients with glucose intolerance char-
acterized by the highest number of MS criteria irrespectively of stage of the 
disease. The importance of CKD as additional diagnostic criteria is much high in 
patients with arterial hypertension and normal glucose tolerance.

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**PP.8.207**

**RELATION BETWEEN CIRCADIAN BLOOD PRESSURE VARIABILITY AND ESTIMATED VALUE OF GLOMERULAR FILTRATION RATE IN UNKNOWN HYPERTENSION**

F. Cipollini, E. Arcangeli, E. Greco, G. Seghieri. Hypertension Unit, Dpt of Internal Medicine, Spedali Riuniti, Pistoia-Italy

**Objective**: In spite of the fact that the kidney is a known target organ in hyper-
tension there are scarce data about the relationship between blood pressure (BP), as well as its circadian variability, and glomerular filtration rate (GFR) in 
patients affected by newly diagnosed arterial hypertension. Consequently 
aim of this study was to explore this issue in a group of subjects who had never 
used antihypertensive drugs and who were enrolled to a standardised protocol 
aimed at diagnosing unknown arterial hypertension.

**Design and Methods**: We studied 106 subjects (66M/40F), who consecutively came to Hospital’s Hypertension Unit and who were confirmed as affected by 
arterial hypertension by the evidence of a 24hr-mean-ABPM > 125/80mmHg. 
Males and females were matched for mean(± SD) age (45 ± 9yr in males and 
45 ± 12yr in females), BMI (26 ± 4Kg/m² in males and 25 ± 5Kg/m² in females) 
and 24hr-ABPM-mean BP (157.7 ± 7.4mmHg in males and 151 ± 6 ± 7.7mmHg 
in females). GFR was calculated by the Cockcroft-Gault equation and expressed 
as ml/min/1.73m².

**Results**: The importance of CKD as additional diagnostic criteria is much high in 
patients with arterial hypertension and normal glucose tolerance.

- **Conclusion**: In hypertensive patients subclinical kidney damage was associ-
ated with the presence of pro-atherogenic abnormalities (older age, higher 
levels of BP, obesity, dyslipidaemia). There higher prevalence of cardiac 
and vascular damage in pts with subclinical kidney damage was revealed. 
Association of urinary albumin excretion and GFR with cardiac and vascular 
abnormalities suggested the pathophysiological rationale for the excess of card-
iovascular risk in patients with kidney dysfunction.

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**PP.8.209**

**DISCREPANCIES IN HYPERTENSION CONTROL RATES EVALUATED BY MEANS OF OFFICE BP AND AMBULATORY BP MONITORING IN HYPERTENSIVE PATIENTS WITH AND WITHOUT CHRONIC KIDNEY DISEASE**

M. Gorostidi, J. Segura, A. De La Sierra, J.J. De La Cruz, P. Aranda, J.R. Banegas, m. Ruizope, ‘Hospital Universitario Central de Asturias, Oviedo-Spain, 2Hospital 12 De Octubre, Madrid-Spain, 3Hospital Mutua Terrassa, Barcelona-Spain, 4Universidad Autonoma, Madrid-Spain, 5Hospital Universitario Carlos Haya, Malaga-Spain

**Objective**: Our purpose was to evaluate control rates of hypertension by means of office BP and ambulatory BP monitoring (ABPM) in hypertensive patients with or without chronic kidney disease (CKD).

**Design and Methods**: We evaluated 5,321 hypertensive patients from the 
Spanish Society of Hypertension ABPM Registry. CKD was defined according 
K/DOQI 2002 guidelines. Glomerular filtration rate was estimated by MDRD 
formula and urinary albumin excretion was assessed by albumin/creatinine ratio. 
BP control was defined by an office BP (mean of 2 measurements) < 140/90 
mmHg and by a daytime BP on ABPM < 135/85 mmHg or a nighttime BP on 
ABPM < 120/70 mmHg.

**Results**: A total of 1,506 patients (28.3%, 95% CI 27.1-29.5) had CKD. Office 
BP control was observed in 18.1% of patients with CKD and in 20.8% of patients 
without CKD (p = 0.029) despite CKD patients were receiving more antihyper-
tensive drugs (mean number per day 2.53 versus 2.20, p < 0.001). Control of 
daytime BP was more than double in patients with or without CKD but similar 
in both groups (51.9% and 51.6%, p < 0.0001) vs office control in both groups, 
p = 0.837 (between groups). Control of nighttime BP was lower in CKD patients 
(35.1% versus 43.6% in CKD-free patients, p < 0.0001).

**Conclusion**: In hypertensive patients, CKD conferred a worse office BP control 
control despite of a more intense antihypertensive treatment. Control rate of 
hypertension was more than double when evaluated by means of ABPM 
daytime BP and similar in patients with or without CKD. Nevertheless, control 
control was more powerful and lower in CKD patients. Evaluation of hyper-
tension control in CKD should be implemented with ABPM.

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**PP.8.210**

**A NEW EQUATION TO ESTIMATE GLOMERULAR FILTRATION RATE VERSUS OLD ONES FOR CLASSIFICATION OF CHRONIC KIDNEY DISEASE IN PATIENTS WITH ARTERIAL HYPERTENSION AND GLUCOSE INTOLERANCE**

V. Tolchacheva, S. Villevalde, E. Tyukhmenev, Z. Kobalava . Russian Peoples Friendship University, Moscow-Russia

**Abstract**: Spearman and χ² analyses were performed. P < 0.05 was considered statistically 
significant.

**Results**: Pts with subclinical kidney damage (n = 216) in comparison with pts 
without subclinical kidney damage (n = 360) were older (60.4 ± 9 vs 51.9 ± 7.3 yr, 
p = 0.01), had higher BMI (31.8 ± 4.3 vs 28.9 ± 4.1 kg/m², p < 0.05), total cholesterol (6.2 ± 1.2 vs 5.6 ± 0.8 mmol/l, p < 0.05), LDL (3.9 ± 0.8 vs 3.4 ± 0.9 mmol/l, p < 0.05), systolic BP (158 ± 18 vs 147 ± 11 mmHg, p < 0.05). Pts with subclinical kidney damage compared with pts with-
out subclinical kidney damage showed higher LVMI (153 ± 22 vs 118 ± 18 
g/m², p < 0.05), end-diastolic relative wall thickness (RWT) (0.46 ± 0.09 vs 
0.41 ± 0.10, p < 0.05), CIMT (0.79 ± 0.22 vs 0.67 ± 0.18 mm, p < 0.05), 
PWV (11.3 ± 1.6 vs 9.2 ± 1.4 m/s, p < 0.05). Prevalence of LV hypertrophy, 
CIMT > 0.9 mm and PWV > 12 m/s, were significantly higher in pts with sub-
clinical kidney damage compared with pts without subclinical kidney damage 
(χ² = 22.5, p < 0.01; χ² = 17.4, p = 0.01; χ² = 14.8, p = 0.02, respectively).

There was a negative correlation between GFR and LVMI (r = -0.28, p < 0.001), 
RWT (r = -0.22, p = 0.02), CIMT (r = -0.19, p = 0.04) and PWV (r = -0.07, 
p > 0.05). There was a positive correlation between MAU and LVMI (r = 0.46, 
p = 0.001), RWT (r = 0.31, p = 0.01), CIMT (r = 0.38, p < 0.001), 
PWV (r = 0.34, p < 0.001).

**Conclusions**: In hypertensive patients subclinical kidney damage was associ-
ated with the presence of pro-atherogenic abnormalities (older age, higher 
levels of BP, obesity, dyslipidaemia). There higher prevalence of cardiac 
and vascular damage in pts with subclinical kidney damage was revealed. 
Association of urinary albumin excretion and GFR with cardiac and vascular 
abnormalities suggested the pathophysiological rationale for the excess of card-
iovascular risk in patients with kidney dysfunction.
**Objective:** To compare new equation versus 2 widely available in clinical practice formulae for estimating glomerular filtration rate (GFR) in patients with arterial hypertension and glucose intolerance.

**Design and Method:** 547 patients 35-83 years old with arterial hypertension were enrolled into the study. BMI, BP, lipid profile and GFR using Cockcroft-Gault (C-G), Modification of Diet in Renal Disease Equations (MDRD) and CKD-EPI equations were assessed in all patients. Glycemia status was defined by standard oral glucose tolerance test in all non-diabetic patients. Patients were divided into groups with normal glucose tolerance (NGT) (n = 88), impaired fasting glucose (IFG) (n = 132), isolated impaired glucose tolerance (IGT) (n = 18), impaired glucose tolerance (IFG/IGT) (n = 72), newly diagnosed diabetes mellitus (n = 123), known diabetes mellitus (n = 114) (IDF 2005).

**Results:** Mild decrease in GFR using CKD-EPI equation were observed in 45% of patients with NGT, 61% - with IFG, 56% -with IGT, 50% of newly diagnosed diabetes mellitus, 50% in known diabetes mellitus versus 45%, 50%, 50%, 50%, 60%, 51% respectively using C-G formula and 50%, 64%, 56%, 68%, 54%, 47% respectively using MDRD equation (K/DOQI, 2002). Moderate decrease in GFR using CKD-EPI equation were observed in 28% of patients with NGT, 18% - with IFG, 28% - with IGT, 9% -with IFG/IGT, 23% of newly diagnosed diabetes mellitus, 30% in known diabetes mellitus versus 23%, 14%, 24%, 8%, 12%, 20% respectively using C-G formula and 38%, 24%, 15%, 32%, 37% respectively using MDRD equation. Severe decrease in GFR using CKD-EPI equation were observed in 2% of patients with NGT, 0% - with IFG, 5% - with IGT, 0% -with IFG/IGT, 3% of newly diagnosed diabetes mellitus, 0% in known diabetes mellitus versus 2%, 0%, 5%, 0%, 2%, 0% respectively using C-G formula and 2%, 0%, 5%, 0%, 2%, 0% respectively using MDRD equation (K/DOQI, 2002).

**Conclusion:** The frequency of moderate and mild decrease in GFR in patients with arterial hypertension was high using the MDRD formula versus CKD-EPI and C-G equation irrespective of the stage of glucose intolerance. No difference was observed in frequency of severe GFR irrespective of method of equation in patients with arterial hypertension and glucose intolerance.

**PP.8.211 INVESTIGATION OF RESISTANT HYPERTENSION IN PATIENTS WITH CHRONIC RENAL FAILURE**

A. Tsipis, G. Chatzivasileiou, G. Kastamas, C. Giannopoulos, I. Papadakis. Nephrology Department, Hippokration Athens General Hospital, Athens-Greece

**Introduction:** The high prevalence of chronic renal disease (CRD) in general population and the even highest in cardiovascular patients, the correlation of CRD with increased cardiovascular risk, as a major finding of many clinical studies, had as a consequence the publication of guidelines for diagnosis and treatment of CRD. Cardiovascular risk increases in parallel with severity of kidney disease, and it is of great importance the early treatment intervention and patient protection, from cardiovascular events and renal deterioration.

**Case report:** A 71-year-old man presented with chronic renal disease (serum creatinine: 4.3 mg/dL, serum urea: 95 mg/dL, creatinine clearance: 18 ml/min) and with a severe and resistant hypertension (>200/110mmHg) that was poorly controlled despite treatment with several antihypertensive agents. Laboratory evaluation revealed a serum potassium of 2.8 meq/L and a condition of metabolic alkalosis (ph: 7.45, HCO3: 32 meq/L), data that do not accordance with the normally evolution of chronic renal disease. Serum aldosterone was 149 ng/dL and the 24-hour urinary aldosterone excretion was 27.2 µg/24h. A CT scan of the abdomen and pelvis showed a mass in the left adrenal gland and after laparoscopic adrenal gland removal the biopsy revealed adrenal adenoma. The diagnosis was Conn’s syndrome (primary aldosteronism). Two months afterwards the patient presented physiologic concentration of serum potassium, serum aldosterone and 24-hour urinary aldosterone excretion, respectively. Arterial pressure is regulated with antihypertensive agents and renal function is stable.

**Conclusion:** Coexistence of CRD and Conn’s syndrome constitutes infrequent entity, but shows that more factors are responsible for resistant hypertension at several antihypertensive agents. The accurate investigation of arterial hypertension in patients with CRD can slow down the development of renal deterioration and decrease the cardiovascular risk.

**PP.8.212 RELATIONSHIP BETWEEN RENAL HEMODYNAMICS AND FUNCTIONAL OPTIONS IN PATIENTS WITH RESISTANT ARTERIAL HYPERTENSION**

A. Zherebcheva, N. Savelieva, N. Antipina, L. Gapon. Tyumen Cardiology Center, Tyumen-Russia

**Objective:** We’ve investigated the interaction of renal hemodynamics (RH) and renal function (RF) in patients with arterial hypertension (AH) resistant to anti-hypertensive treatment with 4 drug groups (ACE inhibitors, β-blockers, calcium antagonists and diuretics).

**Design and methods:** We’ve examined 43 patients with III grade AH (42.2% - m; 55.8% - f). 15 of patients had significant renal artery stenosis. The patients were divided into 2 groups: the main group with microalbuminuria (MA) (n = 14), and another group – 29 patients without MA. The prevalence of coronary artery disease was 13% (n = 10) in the first group, and 37.9% (n = 11) in the second group. The basic group (and second group respectively) aged 48.1 ± 2.4 (46.6 ± 1.8) yrs; the duration of AH was 15.9 ± 2.2 (17.3 ± 1.4) yrs; office blood pressure 182.5 ± 7.1/110.7 ± 4.7 (180.9 ± 5.3/155.5 ± 2.7) mmHg; plasma cholesterol (PH) level was 201.4 ± 0.3 (205.2 ± 0.2) mg/dl; plasma uric acid (UA) level -303.2 ± 4.5 (297.0 ± 25.5) mmol/l; potassium level –4.1 ± 0.1 (4.3 ± 0.1) mmol/l; serum creatinine (SC) level -99.3 ± 4.2 (87.3 ± 3.7) mmol/l. Glomerular filtration rate (GFR) was calculated with Cockcroft-Gault, Gault equation, and was 87.03 ± 8.3 mL/min (100.6 ± 4.9 mL/min respectively). Parameters of RH (measured by ultrasonic dopplerography) was evaluated as systolic and diastolic blood flow velocity (S/D BFV), pulsation and resistant renal artery indexes in the trunk, segmented and interlobar renal arteries (RA). The relationship between RH and RF parameters was calculated with Pearson correlation.

**Results:** SBFV in interlobar RA was negatively correlated with the level of plasma UA (r = -0.656, p = 0.029) in the main group, as well as the level of plasma creatinine (r = -0.608, p = 0.036). The value of DBFV in segmental RA was positively linked with GFR (r = 0.629, p = 0.038). In contrast, the value of SBFV in the segmented RA was positively correlated with the level of plasma UA (r = 0.422, p = 0.032) and PH (r = 0.452, p = 0.02) in the comparison group without MA.

**Conclusions:** The level of plasma UA and PH is positively associated with RH parameters on the stage of resistant AH without MA. The negative association with the level of UA and creatinine is presented as the stage of nephropathy with MA in patients with resistant AH. The existence of positive relationship with GFR is also identifying it.

**PP.8.213 POTENTIAL UTILITY OF RENAL FRACTIONAL FLOW RESERVE IN RENAL ARTERY STENTING**


**Objective:** The utility of hemodynamic measurements as diagnostic tools in renal artery stenosis assessment was demonstrated in several trials. However, its potential prognostic value in hypertension response after renal revascularization is still under debate. The aim of our study was to determine potential relationship between resting translesional pressures ratio (Pd/Pa ratio), renal fractional flow reserve (rFFR) and hypertension response after renal artery stenting.

**Methods:** 35 hypertensive patients (56% of males, mean age 65 years) with at least 60% stenosis in angiography, underwent renal artery stenting. Translesional systolic pressure gradient (TSPG), Pd/Pa ratio (the ratio of mean distal to lesion and mean proximal pressures) and hyperemic rFFR - after intra-renal administration of papaverine- were measured before stent implantation. Ambulatory BP measurements (ABPM) were recorded before the procedure and after 6 months. The ABPM results were presented as the blood pressure changes in subgroups of patients with normal (≥0.9) vs abnormal (<0.9) Pa/Pa ratio and normal (≥0.8) vs abnormal (<0.8) rFFR. The mean deltas were assessed in Signed-Rank test and compared between subgroups using non-parametric Wilcoxon test.

**Results:** Mean Pd/Pa ratio was 0.83 ± 0.12 and strongly correlated with TSPG (r = -0.89, p < 0.001), minimal lumen diameter (MLD; r = 0.53, p = 0.005) and diameter stenosis (DS; r = -0.51, p < 0.005). Similarly, mean rFFR recorded was 0.75 ± 0.11 with significant correlation with TSPG (r = -0.86, p < 0.0001) as well as with MLD (r = 0.50, p < 0.005) and DS (r = -0.51, p < 0.005) observed. Procedural success was obtained in all patients. Neither Pd/Pa ratio nor rFFR predicted hypertension response after renal stenting- mean change of blood pressure in patients with normal vs abnormal Pd/Pa ratio were -2.6 ± 1.2 vs 5.3 ± 1.7 mmHg (p = ns) and with abnormal vs normal rFFR 0.3/0.7 vs 0/-1.4mmHg, respectively (p = ns).

**Conclusions:** Physiological assessment of renal artery stenosis using Pd/Pa ratio and papaverine- induced renal fractional flow reserve does not predict hypertension response after renal artery stenting.
PP.8.214 PREVALENCE OF CHRONIC KIDNEY DISEASE IN THE GENERAL CZECH POPULATION. CZECH POST-MONICA STUDY
R. Cifkova, V. Teplan, J. Bruthans, A. Jabor, M. Jozifova, P. Volfhaf, A. Krajcovc vodka, V. Adamkova, M. Galovcova, V. Lanska. Institute for Clinical and Experimental Medicine, Prague-Czech Republic

Objectives: To determine the prevalence of chronic kidney disease (CKD, defined as eGFR < 60 ml/min/1.73 m²) in a representative Czech population sample.

Design and Methods: In 2006-09, a cross-sectional survey for CV risk factors was performed in 9 districts of the Czech Republic (1% population sample. Serum creatinine was analyzed in 3,612 individuals. Serum creatinine was analyzed in 3,612 individuals. Glomerular filtration rate (GFR) was estimated using an equation developed by the CKD Epidemiology Collaboration.

Results: A slight increase in plasma creatinine was found in 14 (0.8%) males (115–133 μmol/l) and 8 (0.4%) females (107–124 μmol/l). Renal impairment (a further increase in serum creatinine) was found in 18 (1%) and 6 (0.3%) females. A total of 950 (55.3%) males and 778 (42.5%) females had an eGFR ≥ 90 ml/min/1.73 m². A moderate decrease in eGFR (30–59 ml/min/1.73 m²) was documented in 30 of 950 (55.3%) males and 778 (42.5%) females had an eGFR

Conclusions: The majority of examined individuals from the general population present high prevalence of CKD, however, the association with any clinical importance.

PP.8.215 PREVALENCE AND CONTROL OF HYPERTENSION IN CHRONIC HEMODIALYSIS PATIENTS: RESULTS OF A SINGLE-CENTRE CLINICAL AUDIT
A. Del Giudice1, C. Di Giorgio2, A. Cicchella1, M. Piemontese1, G. Pompa1, M. Prencipe1, F. Accula1. 1IRCCS Casa Sollievo Della Sofferenza, Nephrology and Dialysis Unit, 2San Giovanni Rotondo- Italy, University of Bari, Department of Nephrology, Bari-Italy

Objective: Hypertension (HTN) is very common in hemodialysis patients. Its prevalence is as high as 72% and it is associated with an annual mortality of 23%. In more than 2/3 of cases HTN is uncontrolled. We report the results of a clinical audit on prevalence and control of HTN in our chronic hemodialysis patients.

Design and Methods: The following parameters in a cohort of 89 patients were assessed in one-month observational study conducted in October 2010: blood pressure (BP) before the beginning (preHD BP) and after the end of the treatment (postHD BP), age, sex, comorbidity, interdialytic weight gain (WG), plasma and dialysate sodium levels, hemoglobin (Hb) and levels of parathyroid hormone (PTH), prescription of erythropoiesis stimulating agents (ESA) and of antihypertensive drugs. In agreement with the current guidelines, patients with preHD BP = 140/90 mmHg and postHD BP = 130/80 mmHg were considered normotensive.

Results: As much as 49 patients (55%, 27 males/22 females, mean age 67.5 years) were found to be hypertensive; 16 of them (32.6%) were also suffering from a cardiopathy, 12 (24.5%) from a dyslipidemia, and 6 from a peripheral arteriopathy; 4 patients were diabetec. As much as 16 patients (32.6%) achieved the preHD BP target and 11 (22.4%) reached the postHD BP target; only 7 patients (14.3%) achieved both preHD and post HD BP targets. Compared to patients whose BP was not controlled, those achieving BP targets showed lower Hb levels (10.8 g/dl versus 11.8 g/dl) and a greater interdialytic WG (2.95 kg versus 2.27 kg); they were also taking more antihypertensive drugs (2.42 versus 1.97). There was no difference in plasma and dialysate sodium levels, PTH levels, and prescription of ESA.

Conclusions: Our data confirm the high prevalence of HTN and the unsatisfactory BP control in chronic hemodialysis patients. Together with a greater attention to non pharmacological treatment (dry weight and reduced dietary sodium intake), the antihypertensive medications may make the difference.

PP.8.216 INSULIN RESISTANCE AND RENAL FUNCTION IN HYPERTENSIVE NEPHROPATHY PATIENTS
V. Bezrodyns, Y. Syvshchenko, Moshchenko, Bezdovna, M.D. Strachekso Institute of Cardiology, Kiev-Ukraine

Background: It has been reported that patients with chronic kidney disease (CKD) present high prevalence of insulin resistance (IR), however, the association between IR and renal function in hypertensive nephropathy patients has not been clearly established.

Objective: To investigate the relationship between renal function and insulin resistance in hypertensive nephropathy patients.

Design and methods: We examined 104 untreated non-diabetic essential hypertensive patients with CKD II and III stage. Glomerular filtration rate (GFR) assessment based on 24-hour endogenous creatinine clearance. Microalbuminuria was detected in 24-h urinary samples. 2-h oral glucose tolerance test (OGTT) with estimation of immunoreactive insulin (IRI) was performed. Insulin resistance was evaluated using HOMA index.

Results: The patients were divided into 2 groups: gr.1 – with GFR 60–89 ml/min (n = 55), gr.2 – with GFR 30–59 ml/min (n = 49). Gr.2 pts had significantly higher 24-h systolic and diastolic blood pressure (p < 0.001 in both cases), IRI (fasting, at 60 and at 120 min of OGTT, p < 0.001 for all cases). Areas under insulin and glucose curves were significantly greater (p < 0.001 and p < 0.04 accordingly) in gr.1 pts comparing with gr.1 pts data. In univariate analysis GFR was related to fasting IRI (r = -0.397, p < 0.001), 60 min OGTT IRI (r = -0.308, p < 0.001) and HOMA index (r = -0.417, p < 0.001). A multiple linear regression analysis revealed that HOMA index in hypertensive nephropathy pts independently and inversely correlated with GFR (r = -0.238, p < 0.01).

Conclusion: In hypertensive nephropathy patients decline in renal function is associated with insulin resistance. The inverse correlation between GFR and HOMA index and plasma IRI levels suggests the deterioration of renal function due to insulin resistance. We can also suppose that renal dysfunction may contribute to plasma insulin elevation because of important kidney role in insulin clearance from systemic circulation.

PP.8.217 USEFULNESS OF LOW DOSE THIRTEEN WEEKLY ADMINISTRATION OF SPIRONOLACTONE IN PATIENTS WITH OR WITHOUT CHRONIC KIDNEY DISEASE AND RESISTANT HYPERTENSION
M. Mazioti, A. Raptis, A. Drakou, D. Bacharaki, D. Vlahakos. Attikon University Hospital, Athens-Greece

Introduction and aims: In order to control resistant hypertensive patients we prescribe two or more categories of antihypertensive regimens and even then in some of the patients we cannot have blood pressure within the guidelines limits. The inclusion of spironolactone as an effective hypertensive drug has been proved in patients with not known kidney insufficiency. The aim of this study was to detect the effectiveness and safety of low dose spironolactone induction in alternative days (25mg) in patients with chronic kidney disease (CKD) already receiving multi antihypertensive therapy (including a diuretic, calcium channel blocker or an angiotensin-converting enzyme inhibitor).

Methods: A total of 35 patients with resistant hypertension were divided in two groups, one with chronic kidney disease (group CKD, n = 17) with mean GFR 44.6 ± 2.8 ml/min and one without (group C, n = 18). There were no differences between the two groups concerning the gender, the weight, the Hb, Na or K.

Results: Observation of the patients for one year, at intervals of 6 and 12 months, revealed effective systolic and diastolic blood pressure (SBP) control statistically significant already from the first 6 months (table). None of the patients needed to interrupt spironolactone neither of the known side effects of the drug neither from deterioration of renal function. Hyperkalemia was biochemically detected in the CKD group (4.7 ± 0.1mg/ml), which was not associated with any clinical importance.

<table>
<thead>
<tr>
<th>GROUP C</th>
<th>GROUP CKD</th>
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<tbody>
<tr>
<td>SBP (mmHg)</td>
<td>12months</td>
</tr>
<tr>
<td>0</td>
<td>165 ± 4,7</td>
</tr>
<tr>
<td>135,4 ± 4,1</td>
<td>136 + /3,8</td>
</tr>
</tbody>
</table>
PP.8.218 CONTRAST NEPHROPATHY IN PATIENTS WITH HYPERTENSION: A DIFFERENT REALITY?


Purpose: Contrast nephropathy (CN) is the third most common cause of acute renal failure in hospitalized patients (P). Although reversible in most cases, it is associated with poor prognosis in acute coronary syndromes (ACS). Hypertension (HT) is not a constant risk factor in risk scores for CN. The purpose of this study was to evaluate in P with CN the prevalence of HT and compare P according to a previous history of HT.

Methods: Retrospective study of 473 P (68.7% male, age 66.43 ± 15.33) admitted for ACS in a Coronary Unit, between June 2009 and October 2010. We evaluated 122 P (70.5% male, age 71.04 ± 12.22 years) who developed CN (defined as an increase in serum creatinine ≥ 4.4 umol/L or ≥ 25%, till 72 hours after coronary angiography - CATH). P were divided into two groups, according to the presence of previous history of HT (HT+; n = 102 vs HT-, n = 20). P in regular hemodialysis were excluded. A follow-up (FU) for MACCE was performed (6.5 ± 5.30 months).

Results: HT was a risk factor for CN (p = 0.003). In our population, the prevalence of HT in P with CN was 83.6%. At admission, P with HT had higher incidence of diabetes (20.0% vs 9.0%; p = 0.037), were more often on ACEI/ARB (10.0% vs 6.5%; p < 0.001) and had higher levels of systolic blood pressure (117.05 ± 29.77 vs 136.72 ± 29.32mmHg; p = 0.012), BUN (7.39 ± 3.35 vs 10.81 ± 6.58mmol/L; p = 0.025) and uric acid (326.50 ± 88.55 vs 391.52 ± 122.90 mmol/L; p = 0.027). No differences were found among groups regarding age, sex, chronic renal disease, acute heart failure, type of ACS, creatinine, glomerular filtration rate, troponin or time between admission and CATH. HTA + group had a tendency for a greater number of coronary lesions (1.80 ± 1.06 vs 2.32 ± 1.67; p = 0.077), but the rate of angioplasty was similar. Regarding prognosis, there were no differences in hospitalization duration, neither on intra-hospital mortality (M). During FU, there were no differences in MACCE events.

Conclusion: CN is a prevalent disease in hypertensive patients, possibly in association with a higher incidence of diabetes. HT by itself does not worsen the prognosis of P with CN, although it might be a surrogate marker of this intra-hospital complication, enhancing the importance of prophylaxis in these patients.

PP.8.219 ANTI-HYPERTENSIVE, ANTI-ATHEROMATOUS MEDICATION AND SURVIVAL IN VASCULAR ACCESS FOR HEMODIALYSIS

M. Benitez Sánchez1, J. Gonzalez Carmelo1, T. Moreno Sanchez1, F. Moreno Rodriguez1, O. Elgueta1, S. Cruz Muñoz1, E. Rodriguez Gomez1, F. Fernandez Mora1, J. Mermo Perez1, F. Fernandez Giron1, J. Gonzalez Martinez1, J.M. Onaindia1. Hospital Universitario de Salamanca, Salamanca-Spain

Introduction: It is known that drugs such as HMG CoA inhibitors (statins) Inhibitors of angiotensin converting enzyme (ACEI) angiotensin II receptor blockers AT (ARB) inhibitors calcium channel, and acetylsalicylic acid (ASA), reduced in vitro neo-intimal proliferation. The most common cause of Arteriovenous fistula (AVF) dysfunction native and prostheses (Polietetrafluoroetileno) PTFE stenosis is located at the venous anastomosis, where inflammatory cytokines and oxidative stress lead to the proliferation and hyperplasia and subsequent neo-intimal stenosis and vascular access thrombosis.

Purpose: To analyze multivariate regression the effect of medication cardio-protective survival has on primary and secondary (AVF).

Patients and Methods: We designed a retrospective cohort study of 96 hemodialysis patients with clinical evidence of dysfunction of the AVF studied by Doppler ultrasound and Fistulography 1 dependent variable was considered as primary and secondary survival of the AVF. The independent variables were: sex, hyperlipidemia, diabetes, anti-hypertensive medication, ischemic heart disease, etiology of ESRD, antplatelet drug, age. Cox regression was used to analyze the Primary and Secondary Survival, adjusted for covariates. The survival rate of vascular access in relation to drugs was modeled by Kaplan-Meier test. The statistical significance was considered if p < 0.05.

Results: 96 patients, 61 were men, 35 women, mean age 59 years. 24% had diabetes, 40% were taking statins, 60 patients taking ACEI + ARB, 13 patients anti-beta-blockers, 4 Calcium -antagonists, 19 were not taking antihypertensive, antiplatelet drug 91 of 96, 78 patients were native AVF and 18 PTFE prostheses. The 51% had increased venous pressure, low blood flow 17.7%, 9.4% lack of maturation, 6.3% increase 5.2% recirculation steal syndrome. In 93 of 96 fistulography the stenosis / thrombosis who required 108 ATP, 4 stent and 10 fibrinolysis. At the end of the study 50% of AVF were functioning, 32% required vascular surgery, 13.5% required placement of central venous catheter. In primary survival the treatment with ACEI is a protective factor that decreases the relative risk of losing AVF in 42% (HR: 0.55; p = 0.038 HR 95% CI. (0.354 0.970) present Dyslipidemia is a risk factor that increases the probability of losing twice AVF HR: 2.192; p = 0.002. HR 95% CI: (1.328 3.618). The secondary survival is greater after making ATP: HR: 0.244; p = 0.0001, HR 95% CI (0.111 0.533) and lower in patients with dyslipidemia HR: 3.547; p = 0.04, HR 95% CI: (1.499 8.393).

Conclusions: The ATP and treatment with an ACEI are protective and decrease the relative risk of losing the AVF by 76% and 42% respectively, while presenting dyslipidemia increases the relative risk of losing access vascular more than threefold.

Table 1 Comparison of CRE and eGFR among four groups pretherapy and after 24 month treatment (x = s)

<table>
<thead>
<tr>
<th>Group</th>
<th>CRE (umol/l)</th>
<th>eGFR (ml/min)</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>75.0 ± 2.8</td>
<td>157.6 ± 5.5</td>
</tr>
<tr>
<td>B</td>
<td>76.5 ± 3.0</td>
<td>110.2 ± 2.4</td>
</tr>
<tr>
<td>C</td>
<td>75.8 ± 2.8</td>
<td>106.8 ± 5.7</td>
</tr>
<tr>
<td>D</td>
<td>71.5 ± 2.7</td>
<td>139.6 ± 3.6</td>
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</tbody>
</table>

Table 2 Comparison of CRE and eGFR among four groups pretherapy and after 24 month treatment (x = s)

<table>
<thead>
<tr>
<th>Group</th>
<th>CRE (umol/l)</th>
<th>eGFR (ml/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>7.56 ± 0.2</td>
<td>107.6 ± 5.5</td>
</tr>
<tr>
<td>B</td>
<td>7.02 ± 0.6</td>
<td>136.7 ± 6.0</td>
</tr>
<tr>
<td>C</td>
<td>7.98 ± 0.4</td>
<td>146.7 ± 6.0</td>
</tr>
<tr>
<td>D</td>
<td>7.56 ± 2.8</td>
<td>146.7 ± 6.0</td>
</tr>
</tbody>
</table>

A. Amlodipine combined with Telmisartan, B: Amlodipine combined with Amiloride, C: Amlodipine combined with Telmisartan and Simvastatin, D: Amlodipine combined with Amiloride and Simvastatin.

References:

1. Telmisartan and Simvastatin, D: AMLodipine combined with Amiloride and Simvastatin.
**POSTER SESSION 09**

**OBESITY**

**PP.9.221**

**COPEPTIN, A PREDICTOR OF CARDIOMETABOLIC RISK FACTORS AND ORGAN DAMAGE**

S. Enhörning1, L. Bankir2, N. Bouby2, J. Struck3, B. Hedblad1, P. Nilsson1, N. Morgenthaler2, O. Melander1. 1Clinical Sciences, Malmö University Hospital, Lund University, Malmö-Sweden, 2Inserm UMR 872-E2, Centre De Recherche Des Cordeliers, Paris- France, 3Research Department, B.R.A.H.M.S AG, Thermo Fisher Scientific, Hennigsdorf- Germany

**Objective:** Recently, high copeptin, the stable C-terminal fragment of arginine vasopressin (AVP) pro-hormone, has been associated with several components of the metabolic syndrome (MetS), diabetes mellitus (DM) development and nephropathy. Here we tested whether elevated plasma copeptin (copeptin) level is associated with later development of the MetS, its individual components or microalbuminuria (MA).

**Design and Method:** We analysed copeptin at baseline (1991-1994) in the population based Malmö Diet and Cancer Study-Cardiovascular cohort (n = 4742), and re-examined 2064 subjects 15.8 years later (mean age 72.8 y, 59% women) with an oral glucose tolerance test and measurement of MetS (according to ATP III) and its components.

**Results:** After age and sex adjustment, increasing quartiles of copeptin at baseline (lowest quartile as reference) was associated with incident abdominal obesity (P trend = 0.002), DM (P trend = 0.001), MetS (P trend = 0.003) and MA (P trend = 0.003). After adjustment for all MetS components at baseline, increasing copeptin quartiles predicted re-examination abdominal obesity (odds ratios 1.59, 1.33, 1.62; P trend = 0.03), DM (odds ratios 1.25, 1.29, 1.53; P trend = 0.04) and MA (odds ratios 1.08, 1.15, 1.71; P trend = 0.01) but not MetS (P trend = 0.14). Furthermore, the relationship between copeptin and MA was independent of DM, hypertension and CRP.

**Conclusions:** Copeptin independently predicts DM and abdominal obesity but not the cluster of MetS components. In addition, elevated copeptin signals increased risk of typically diabetes-related micro- and macrovascular complications; however, the association between copeptin and later MA was independent of both prevalent and incident DM. Our findings suggest a causal association between a dysregulated vasopressin system and cardiometabolic risk, which could have implications for risk assessment and novel treatments.

**PP.9.222**

**OBESITY CONCURRENTLY INFLUENCES EFFECTS OF BIRTH WEIGHT ON BLOOD PRESSURE VALUES IN YOUNG MEN**

V. Premuzic1, M. Laganovic1, D. Kuzmanic1, I. Vukovic-Lela1, Lj. Banfic1, M. Vrkic-Kirhmajer1, S. Karanovic1, T. Zeljkovic-Vrkic1, M. Milosevic2, M. Vrkic-Kirhmajer1. 1Clinical Sciences, Malmö University, Malmö-Sweden, 2Inserm Umrs 872-E2, Centre De Recherche Des Cordeliers, Paris, France

**Abstract PP.9.222**

Age and obesity as body mass index (BMI) 25 kg/m2. Subjects were divided to Normotensive non-treated, healthy adult men (n = 159; age 21.27 ± 0.9 years) were enrolled. Birth parameters were obtained from medical records. SGA was defined as BW under 10th percentile for gestational age and obesity as body mass index (BMI) > 25 kg/m2. Subjects were divided into the four groups: non-obese with normal BW (N = 55), obese with normal BW (N = 43), non-obese SGA (N = 40), obese SGA (N = 21). Blood pressure (BP) was measured with oscilometric device following ESH guidelines while aortic BP (SBPAO) and AS markers (pulse wave velocity (PWV), brachial and aortic augmentation index (AIXBR, AIXAO)) were determined using Arteriograph.

**Results:** Overall, SGA subjects had higher brachial systolic BP (SBP) (p = 0.021) and HR (p = 0.003) values than those born with normal BW. However, there were no differences in PWV, AIXBR, AIXAO and SBPAO between subjects with SGA and normal BW(p > 0.05). When subjects were further divided according to the BMI, we found that SBP was the highest in obese SGA subjects (p = 0.035). Obese SGA had higher SBPAO and PP values than non-obese SGA (p = 0.017; p = 0.036, respectively) and non-obese subjects with normal BW (p = 0.027; p = 0.001, respectively). There were no significant correlations between BMI and AS markers in all subgroups.

**Conclusion:** In young men, birth weight influences brachial SBP and HR, but according to our results it does not increase arterial stiffness determined with this technique. It might be concluded that higher values of SBP and HR observed in this group could be rather markers of hyperkinetic circulation than consequences of early vascular ageing. Obesity additionally affects BP values increasing even central SBP. SGA subjects should be informed about importance of life-style changes and monitored very closely.

**PP.9.223**

**NEUTRAL ENDOPEPTIDASE INHIBITION FOR THE TREATMENT OF THE METABOLIC SYNDROME**

Y. Eizenberg, E. Grossman, E. Peleg, Z. Shabat, Y. Sharabi. Sheba Medical Center, Tel Hashomer- Israel

Increasing arterial natriuretic peptide (ANP) level is potentially a therapeutic target in the metabolic syndrome due to its favorable effects on hypertension and lipid metabolism. Neutral endopeptidase (NEP) is the enzyme which degrades ANP. The Aim: of this study was to determine the effect of NEP inhibition compared to ACE inhibitor in an animal model of metabolic syndrome.

**Methods:** Forty Sprague Dawley (SD) rats were divided into four groups. Three groups were given high fructose diet and one was given standard chow diet. After 3 weeks, one group which was on high fructose diet was given the NEP inhibitor candoxatril (25 mg/kg/d) and another group which was on high fructose diet and on ACE inhibitor in an animal model of metabolic syndrome. The Aim: of this study was to determine the effect of NEP inhibition compared to ACE inhibitor in an animal model of metabolic syndrome.
fructose diet was given the ACE inhibitor enalapril (30 mg/kg/d). Weight, systolic blood pressure (SBP), triglycerides, insulin and adiponectin levels were measured at baseline, before treatment and at the end of the study.

**Results:** Both diets induced similar gain weight after 3 weeks but the fructose-fed groups induced metabolic syndrome with a significant increase of SBP, insulin, triglycerides and adiponectin levels. Treatment with enalapril decreased weight, SBP and adiponectin, insulin and triglycerides levels. In the group which was treated with candesartan SBP and adiponectin levels decreased.

**Conclusions:** In SD rats, high fructose diet results in the development of the metabolic syndrome with all its primary manifestations. Treatment with enalapril reversed almost completely the effect of diet on the development of the metabolic syndrome with a decrease in weight, SBP and insulin, adiponectin and triglycerides levels. Treatment with candesartan caused a decrease in SBP and adiponectin level without significant effect on the other constituents of the metabolic syndrome.

**PP.9.224 THE INFLUENCE OF ZOFENOPRIL ON BLOOD PRESSURE, ADIPOKINES ACTIVITY AND ENDOTHELIN-1 IN OBSESE HYPTERTENSIVE PATIENTS**

T. Morozova, T. Romantsova, S. Oshorova, T. andruschishina. I.M. Sechenov First Moscow State Medical University, Moscow-Russia

**Purpose:** to evaluate the influence of zofenopril on blood pressure (BP), adipokines activity and the marker of the endothelial dysfunction endothelin-1 in hypertensives with obesity.

**Methods:** 32 obese patients (f – 14, m – 18, body mass index (BMI) 34.5 ± 4.3 kg/m², mean age 54.2 ± 8.4 years) with essential hypertension I-II degree were treated by zofenopril in doses 30-45 mg/day during 12 weeks. Office blood pressure (BP), ambulatory blood pressure monitoring (ABPM) parameters, biochemical tests, safety and tolerability were assessed during the study. Serum leptin, adiponectin and endothelin-1 were measured at the beginning and the end of active treatment period. No additional dietary advice was prescribed.

**Results:** mean office BP was 149.8 ± 125.8/89.4 ± 8.8 mmHg before treatment. According ABPM there was abnormal circadian profile of BP in 69.7% of pts. Office BP was decreased 15.0/5.0 mmHg (p = 0.05) after 12 weeks of zofenopril treatment (37.5 mg/d). ABPM parameters have significantly improved: mean daytime systolic BP (SBP) was decreased on 8.00 mmHg, mean daytime diastolic BP (DBP) on 4.33 mmHg, mean nighttime SBP on 12.3 mmHg, mean nighttime DBP on 7.2 mmHg, mean daily SBP on 9.00 mmHg, mean daily DBP on 4.5 mmHg (p < 0.05 in all cases) with improvement of circadian BP profile. There was no significant change in heart rate throughout the treatment (72.5 ± 10.9 before and 69.0 ± 7.3 bpm at the end of the study, p > 0.05). The serum leptin was decreased from 18.7 (12.8; 34.0) to 17.5 (12.5; 36.1) mg/l (p = 0.001), the serum endothelin-1 was decreased from 0.38 (0.25; 1.03) to 0.34 (0.14; 0.88) fmol/ml (p = 0.05). There was a tendency to increase in serum adiponectin from 10.4 (7.5; 14.1) to 13.6 (6.5; 17.7) mg/l (p = 0.12), the parameters of carbohydrate, lipid metabolism and the level of serum creatinine were not significantly changed. There was no significant change in BMI at the end of the treatment period. No patient was withdrawn from the study due to adverse effects.

**Conclusions:** the angiotensin-converting enzyme inhibitor zofenopril demonstrated the possibilities to improve obesity-related metabolic disorders and endothelial function in addition to blood pressure lowering effect in obese hypertensive patients.

**PP.9.225 WHAT DOES METABOLIC SYNDROME ADD IN PREDICTION ABOUT FUTURE CARDIOVASCULAR EVENTS IN HYPTERTENSIVE NON-DIABETIC PATIENTS IN PRIMARY PREVENTION?**


**Introduction and Objectives:** The aim of this study was to assess the impact of metabolic syndrome as a predictor of cardiovascular events (CVE).

**Methods:** This retrospective study involved 2481 non-diabetic hypertensive patients (52% women, 43% with metabolic syndrome), without previous CVE. The total follow-up was 13096 patient/year with a medium of 4,5 years.

**Results:** 183 (7.5%) patients had a CVE (14/1000 patient/year). In 95 (52%) cases was a cardiac event, in 53 (29%) cerebrovascular, in 15 (8.2%) a peripheral arterial disease and in 20 (10,9%) death was the first CVE. Patients with metabolic syndrome did not have more CVE (HR 1.19; CI - 95%:0.89-1.58; p = 0.292). In a multivariate analysis correcting for other factors, only age (HR 1.08; CI 95%: 1.07-1.10; p = 0.001), male gender (HR 1.77; CI 95%: 1.27-2.45; p = 0.001), smoking (HR 2.95; CI 95%: 2.01-4.34; p = 0.001), and values of systolic arterial pressure (SAP) ≥ 160 mm Hg (HR 1.83; CI 95%: 1.17-2.89; p = 0.009) and cholesterol-low density lipoproteins (C-LDL) ≥ 160 mg/dl (HR 1.58; CI 95%: 1.05-2.38; p = 0.029) were associated with new CVE.

**Conclusions:** In hypertensive non-diabetic patients in primary prevention the diagnosis of metabolic syndrome did not add any significant prediction about future CVE over the traditional risk factors. SAP ≥ 160 mm Hg and C-LDL ≥ 160 mg/dl during the follow up were factors related to new CVE.

**PP.9.226 THE PECULIARITIES OF LEFT VENTRICULAR REMODELING IN ESSENTIAL HYPTERTENSIVE PATIENTS WITH METABOLIC SYNDROME AND WITHOUT IT**

S. Gurgemyan, S. Valimyan, K. Nikoghosyan. Institute of Cardiology, Yerevan-Armenia

**Objective:** Metabolic syndrome (MetS), is a cause of cardiovascular events development. In this study we estimate as MetS impacts on the LV remodelind in essential hypertensive (EH) patients (pts). Design and Method: The pts were divided into two groups (gr): 1 – 34 AH pts (mean age 58 ± 10 years, 52.9% male) with MetS according to IDF criterias, II - 36 AH pts (mean age 59 ± 9 years, 52.8% male) without MetS. The systolic blood pressure (SBP) and diastolic (DBP) one in both grs pts is the same (I gr - 162 ±6.296 ± 3.3 mmHg and II gr - 160 ± 6.294 ± 2.8 mmHg). Duration of AH in I gr pts is 13.2 ± 6.0, in II gr is 11.4 ± 0.8 years. The 2D echocardiography and Doppler-echocardiography were performed. Arterial stiffness (AS) was assessed on the basis of carotid-femoral pulse wave velocity (PWV) by means of a computerized method (Complor SPF). All pts were treated by combined therapy with anglo- dipine (5 mg/5d) and ramlipril (10 mg/d), and in addition to them, if necessary or also hydrochlorothiazide (12.5-25 mg/0.d). BP was checked regularly. Echocardiography and PWV were recorded at baseline and after 12 months of treatment.

**Results:** The meaning of LV mass index (LVMI) is significantly greater in I gr pts in comparison with II gr (209.05 ± 5.39 mg/ml vs 156.1 ± 7.6 mg/ml, p < 0.05). In I gr pts prevalent geometric type is LV eccentric hypertrophy (LVEH; 24 pts, 70.6%); in II gr pts general type is LVCH (n = 27 pts 75.0%). In I gr pts left atrial (LA) diameter is considerably greater in comparison with II gr (p < 0.001). The enddiastolic diameter (EDD) is greater in I gr pts than in II gr, posterior wall thickness (PWT) and interventricular septum thickness (IVST) were bigger in I gr pts in comparison with II. The PWV is higher in I gr pts than in II (14.43 ± 1.21 m/s vs 11.34 ± 0.82 m/s). In multivariate analysis in I gr pts PWV is close connection with LVMII and EDD and negative relation is found with RWT irrespective of age and sex. In II gr the same relationships were absent or low. After 12 months of treatment the positive changes are seen in the regression of LV and large arteries remodeling.

**Conclusions:** In EH pts the MetS has negative impact on the cardiovascular system. Arterial stiffness plays an important role in formation of LV remodeling. The combined therapy is benefit for regression of LV and large arteries remodeling.

**PP.9.227 METABOLIC EFFECTS OF ALISKIREN, FOSINOPRIL, TELMISARTAN IN PATIENTS WITH METABOLIC SYNDROME**


**Objective:** To evaluate the changes of glucose, insulin, lipid levels in patients with AH and MS during 6-month course of antihypertensive treatment with different agents.

**Patients:** We observed 105 patients with mild to moderate AH and clinical signs of MS (according ATP III criterias) and 10 healthy subjects. Patients with diabetes mellitus were excluded.

**Methods:** All patients were divided in 3 groups according to therapy. In 38 patients (1st group) treated with fosinopril, 36 patients (2nd group) – by telmisartan, 31 patients (3rd group) – by aliskiren. If target blood pressure was not reached HCTZ was added. In all patients before and after 6 month of therapy we performed ABMP and 2-hour oral glucose tolerance test (OGTT) estimation of serum glucose, insulin, lipid level.
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Groups before treatment

<table>
<thead>
<tr>
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<th>Glucose, mmol/l</th>
<th>Insulin, mU/ml</th>
<th>HOMA</th>
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<td>fosinopril</td>
<td>5.42 ± 0.18</td>
<td>8.8 ± 0.83</td>
<td>2.35 ± 0.25</td>
</tr>
<tr>
<td>telmisartan</td>
<td>5.5 ± 0.14</td>
<td>9.4 ± 0.92</td>
<td>2.37 ± 0.25</td>
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<tr>
<td>aliskiren</td>
<td>6.50 ± 0.38</td>
<td>10.36 ± 2.51</td>
<td>3.39 ± 1.04</td>
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Groups after treatment

<table>
<thead>
<tr>
<th>Groups</th>
<th>Glucose, mmol/l</th>
<th>Insulin, mU/ml</th>
<th>HOMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>fosinopril</td>
<td>5.35 ± 0.18</td>
<td>8.01 ± 0.69</td>
<td>2.08 ± 0.2</td>
</tr>
<tr>
<td>telmisartan</td>
<td>5.34 ± 0.14</td>
<td>6.53 ± 2.98*</td>
<td>1.62 ± 0.18*</td>
</tr>
<tr>
<td>aliskiren</td>
<td>6.09 ± 0.5</td>
<td>8.09 ± 2.33*</td>
<td>2.99 ± 0.4*</td>
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</table>

Results: The blood pressure control was absolutely equivalent in all groups. Main results of changes of metabolic parameters are presented in the table. At the beginning of investigation the levels of serum glucose, insulin, HOMA index before and during OGTT in all groups were comparable. At the end of the study we observed the tendency to improvement of OGTT data and lipid level in patients treated by fosinopril (HOMA changed from 2.35 ± 0.25 to 2.08 ± 0.2, p < 0.05, TG and HDL cholesterol did not change) and significantly improvement in patients treated by telmisartan (HOMA changed from 2.37 ± 0.25 to 1.62 ± 0.18, p < 0.05, TG changed from 1.75 ± 0.15 to 1.34 ± 0.15 mmol/l, HDL cholesterol changed from 1.15 ± 0.03 to 1.75 ± 0.03 mmol/l, p < 0.05). Significantly improvement in patients treated by aliskiren (HOMA changed from 3.39 ± 1.04 to 2.39 ± 0.94, p < 0.05, TG and HDL cholesterol did not change). In comparison between aliskiren, telmisartan and fosinopril groups at the end of study aliskiren and telmisartan more decreased HOMA, fasting insulin level than fosinopril.

Conclusion: The 6-month therapy in patients with AH and MS by fosinopril did not change HOMA, glucose, insulin, triglycerides levels. Therapy by telmisartan significantly improved HOMA, fasting insulin, TG, HDL level. Therapy by aliskiren significantly improved HOMA, fasting insulin and did not change TG, HDL level.

PP.9.228 INCREASED INFLAMMATORY MARKERS IN HYPERTENSIVE PATIENTS IN THE CONTEXT OF THE METABOLIC SYNDROME


Objective: Studying laboratory parameters of hypertensive patients in the context of the metabolic syndrome (MS) could provide significant insights into the etiology of the condition, known to be complex and multifactorial. The purpose of this study was to evaluate the values of fibrinogen and hsCRP in hypertensive patients with metabolic syndrome compared to hypertensive patients without atherosclerotic dyslipidemia.

Material and Method: Forty-eight hypertensive patients with metabolic syndrome (mean age 57 ± 3.67 years) and forty-four hypertensive patients without atherosclerotic dyslipidemia (mean age 54 ± 4.80 years) were included in the study. MS was defined by the National Cholesterol Education Program Adult Treatment Panel III guidelines. In all patients, the plasma total cholesterol, triglycerides, HDL-cholesterol, LDL-cholesterol, hsCRP and fibrinogen levels were evaluated. Anthropometric characteristics and blood pressure were also recorded. The statistically analysis was done using Pearson’s test and Student’s t-test. p < 0.05 was considered statistically significant.

Results: Significant differences between groups were found for the following: BMI, waist, abdominal circumference, waist/hip ratio, total cholesterol, triglycerides, LDL-cholesterol (all p < 0.001) and HDL-cholesterol (p = 0.008). We found significant higher levels of fibrinogen (3.30 ± 0.34 vs 3.15 ± 0.29 g/L, p = 0.24 ± 0.25 vs 0.35 ± 0.16 mg/L, p = 0.008) in hypertensive patients with metabolic syndrome compared to hypertensive patients without atherosclerotic dyslipidemia.

Conclusions: Our study reveals that inflammatory markers (hsCRP, fibrinogen) that are not routinely measured are elevated in hypertensive patients with metabolic syndrome and emphasize the value of these laboratory parameters in these patients.

PP.9.229 CLINICAL EFFICACY OF THE FIRST RENIN INHIBITOR - ALISKIREN IN PATIENTS WITH HYPERTENSION AND METABOLIC SYNDROME

Y. Zhermakova, V. Myychka, I. Chazova, M. Kirillova, Y. Ponomarev, K. Ivanov. Russian Research Cardiology Complex, Moscow-Russia

Aim: To estimate antihypertensive efficacy, cardiometabolic effects, influence on level of microalbuminuria (MAU) and vascular stiffness of the first renin inhibitor aliskiren in patients with hypertension, 1-2 stages and metabolic syndrome.

Materials and Methods: The study included 33 patients with hypertension, stages 1-2: average age was 41.2 ± 0.9 years, 16 men and 17 women, weight was 95.18 ± 4.84 kg, body mass index was 33.13 ± 1.31 kg/m², waist circumference was 106.38 ± 3.51 cm. All patients had arterial hypertension II-III degrees, duration of arterial hypertension was on average 4.8 ± 3.2 years. Previous therapy was changed to aliskiren in a starting dose 150 mg. If doses of the previous preparations had been maximum, the starting dose of aliskiren was 300 mg a day. The study lasted 24 weeks. All patients underwent clinical examination, including the anthropometrical measurement, 24-hour blood pressure monitoring (BPM), fasting glucose, glycemia during oral glucose tolerance test, total cholesterol (TC), low density lipoproteins (LDL), high density lipoproteins (HDL), triglycerides (TG), level of MAU and rates of vascular stiffness (right/left pulse wave velocity - R/L-PWV, carotid ankle vascular index - CAVI/L-CAVII, right- augmentation index - R-AI).

Results: At the moment of the research termination there were 70% of patients on the monotherapy of aliskiren, 60% of which received aliskiren in a dose of 150 mg, 300 mg of aliskiren received 40% of patients. On the combined therapy there were 30% of patients, the majority of them received a combination of aliskiren and hydrochlorothiazide. Target levels of BP both systolic, and diastolic were achieved in 80% of patients. As a result the systolic BP significantly decreased from 137.38 ± 2.23 to 126.75 ± 1.9 mm Hg (p < 0.01), diastolic BP decreased from 84.90 ± 1.99 to 78.14 ± 1.25 mmHg (p < 0.05). Postprandial glucose level decreased from 7.22 ± 0.36 to 6.20 ± 0.22 mmol/l (p < 0.05). Levels of lipids significantly have not changed (TC decreased from 7.22 ± 0.36 to 6.20 ± 0.22 mmol/L, p < 0.05). That refers to the improvement of structural and functional abilities of a vascular wall.

Conclusions: The results of aliskiren therapy in patients with hypertension and metabolic syndrome showed antihypertensive effect with significantly decreased of postprandial glucose level, decreased the level of MAU and improvement of structurally and functional abilities of a vascular wall.

PP.9.230 LEVELS OF LEPTIN, ADIPONECTIN, INFLAMMATORY FACTORS AND ANTHROPOMETRIC PARAMETERS IN PATIENTS WITH ABDOMINAL OBESITY AND ARTERIAL HYPERTENSION

A. Berezina1, O. Belyaeva1, O. Berkovich1, E. Shlyakhov2, E. Baranova1, On behalf of E. Baranova. 'Saint-Petersburg State Medical University N.A. I.P. Pavlov, Saint-Petersburg-Russia, 1Federal Center of Heart, Blood and Endocrinology N.A. VA.Altman, Saint-Petersburg-Russia

Objective: to compare metabolic status and anthropometric parameters in normotensive and hypertensive patients with abdominal obesity (AO).

Methods: 120 patients with AO (IDF, 2005) age 43 ± 2.0 years, body mass index (BMI) 32.1 ± 1.9 kg/m² were examined. 50 patients were hypertensive (BP ≥ 140/and, or ≥ 90 mm Hg). Body mass (BM), waist circumference (WC), BMI, body fat (BF,% and lean body mass (LBM, kg) were measured. Lipid profile (total cholesterol, HDL-cholesterol, LDL-cholesterol, TG) was obtained. Fasting glucose and insulin, HOMA-IR were defined. The levels of leptin, adiponectin, TNF-A and CRP were measured.

Results: BMI, WC, BM, were significantly higher in hypertensive patients with AO (105.0 ± 1.4 cm and 100.2 ± 1.3 cm, p = 0.01, 96.4 ± 2.1 kg and 90.3 ± 1.7 kg, p = 0.03, 33.9 ± 0.6 kg/m² and 31.1 ± 0.5 kg/m², p = 0.001, respectively). There were no differences in lipid profile, levels of fasting glucose, insulin and HOMA IR between normotensive and hypertensive patients. The levels of leptin, CRP and TNF-A were higher (66.1 ± 4.7 mg/ml and 60.1 ± 5.1 mg/ml, p = 0.002, 9.1 ± 1.7 mg/l and 6.1 ± 0.9 mg/l, p = 0.04, 52.6 ± 9.3 mg/ml and 33.0 ± 3.5 mg/ml, p = 0.04, respectively) as well as adiponectin was lower (17.2 ± 2.0 µg/ml and 21.9 ± 1.2 µg/ml, p = 0.01).
and 20.7 ± 1.5 μg/ml, p = 0.02) in hypertensive patients. Positive correlation between DBP and TG (r = 0.2, p = 0.02), DBP and WC (r = 0.3, p = 0.004), SBP and WC (r = 0.3, p = 0.003), SBP and BMI (r = 0.2, p = 0.02), SBP and BW (r = 0.2, p = 0.02) was found.

Conclusion: Levels of leptin, CRP, TNF-α, BMI, waist circumference in hypertensive patients with abdominal obesity were higher level of adiponectin was lower than these parameters in normotensive with AO.

**PP.9.231 THE EFFECTIVENESS OF THERAPY PERINDOPRIL ARGinine TREATMENT OF PATIENTS WITH HYPERTENSION AND METABOLIC SYNDROME IN NATIONAL PROGRAM “PREMIA”**

I. Prekhorova1, V. Mychka1, K. Ivanov1, S. Olimpieva2, V. Kulikovsky3, V. Masenko1, I. Chazova1. 1. Russian Cardiology Research and Production Center, Moscow-Russia, 2. The Russian State Medical University, Moscow-Russia

Aim: To study the effect of 16 weeks treatment with the new form of perindopril arginine on blood pressure, carbohydrate metabolism (fasting glucose, postprandial glucose), lipid metabolism in patients with arterial hypertension stages 1-2 and metabolic syndrome against effect in patients with only arterial hypertension stages 1-2.

Materials and Methods: The randomized study included 2200 patients from 73 towns with hypertension, stages 1–2. Among them patients with metabolic syndrome were 44.3%. Patients were prescribed 5 mg of perindopril. In patients previously treated by another ACE inhibitor the last was changed to perindopril 5 or 10 mg. If the effect was not enough the therapy included indapamide retard 1,5 mg. The study lasted 16 weeks. All patients with metabolic syndrome and without it underwent clinical examination, including the anthropometric measurement, fasting glucose, postprandial glucose, total cholesterol (TC), low density lipoproteins (LDL), high density lipoproteins (HDL), triglycerides (TG).

Results: After the 16-week course of perindopril arginine treatment of patients with arterial hypertension stages 1-2 and metabolic syndrome we achieved a decrease in body weight from 86.04 ± 13.21 to 84.43 ± 12.88 kg and body weight of patients with only arterial hypertension stages 1-2 decreased from 78.69 ± 12.79 to 77.64 ± 12.26 kg (p < 0.001); waist circumference from 99.48 ± 10.19 to 97.56 ± 9.98 cm against from 88.96 ± 11.86 to 87.80 ± 11.76 cm (p = 0.001). As a result the systolic BP significantly decreased from 160.10 ± 11.43 to 127.45 ± 8.66 mm Hg and from 157.39 ± 11.73 to 125.56 ± 8.70 mm Hg (p = 0.0164), diastolic BP decreased from 95.49 ± 7.22 to 79.53 ± 6.13 mmHg against from 94.23 ± 7.36 to 78.73 ± 6.09 mmHg (p = 0.1558). Also there was a decrease in postprandial glucose in both groups of patients from 6.59 ± 1.22 to 6.34 ± 1.17 mmol/l, lipid from 0.62 ± 0.77 to 0.59 ± 0.77 mmol/l (p < 0.0001), fasting glucose from 5.29 ± 1.58 to 5.05 ± 0.70 mmol/l from 4.84 ± 0.68 to 4.74 ± 0.62 mmol/l (p < 0.001); TC level from 6.17 ± 0.96 to 5.43 ± 0.83 mmol/l against from 5.24 ± 1.04 to 4.89 ± 0.82 mmol/l (p < 0.0001); TG level from 1.96 ± 0.93 to 1.73 ± 0.75 mmol/l and from 1.55 ± 0.74 to 1.51 ± 0.91 mmol/l (p < 0.001). LDL from 3.70 ± 1.11 to 3.16 ± 0.98 mmol/l against from 3.07 ± 1.09 to 2.84 ± 1.01 mmol/l (p < 0.0001) and the level of HDL increase 1.23 ± 0.44 to 1.28 ± 0.43 mmol/l in patients with arterial hypertension stages 1-2 and metabolic syndrome, but in patients with only arterial hypertension stages 1-2 there were no significantly changes(from 1.36 ± 0.53 to 1.35 ± 0.46 mmol/l). (p = 0.001).

Conclusion: Results of perindopril arginine therapy of patients with hypertension stages 1-2 in combination with metabolic syndrome and patients with only arterial hypertension stages 1-2 showed significant antihypertensive effect and improved rates of lipid and carbohydrate metabolism, decreasing of body weight and waist circumference data in both groups, but the patients with hypertension stages 1-2 in combination with metabolic syndrome had significant higher decreasing of all indicators.

**PP.9.232 ASSOCIATION OF ERECTILE DYSFUNCTION AND ANDROGEN DEFICIENCY WITH METABOLIC SYNDROME IN MEN CHARACTERIZED BY HIGH CARDIOVASCULAR RISK**

M. Mamedov, G. Sharvadze, E. Podoubekaya. National State Research Center for Preventive Medicine, Moscow-Russia

Objective: To evaluate the frequency of androgen deficiency and erectile dysfunction (ED) in men with metabolic syndrome and high cardiovascular risk on SCORE.

Methods: The study included 300 men aged 30-59 with metabolic syndrome (IDF, 2005) and high cardiovascular risk on SCORE (> 5%). All participants were measured HDL cholesterol, LDL cholesterol, triglycerides and fasting glucose as well as waist circumference and BP. Androgen deficiency was diagnosed if level of total testosterone was decreased (< 12 nmol/l) and/or level of free testosterone was decreased (< 0.25 nmol/l) and if symptoms of hypogonadism were present. ED was evaluated by IIEF (< 21 points).

Results: Androgen deficiency was diagnosed in 17% (n = 52) of men with metabolic syndrome and high cardiovascular risk, but ED – in 60.7% (n = 182). In all cases androgen deficiency was combined with ED of different degrees (in 18% - mild, in 33.7% mild to moderate and in 9% - moderate). Hypogonadism was diagnosed in 28.6% of patients with ED and high cardiovascular risk. Among men with ED (including the subgroup with hypogonadism) the patients with ED in 22.6% had 3 component, 29.4% - 4 component and 8.7% of men had all 5 components of metabolic syndrome.

Conclusion: Every second man with metabolic syndrome and high cardiovascular risk has ED, one third - hypogonadism. Most men with ED had mild-to-moderate ED, which demand medication correction.

**PP.9.233 IS THERE AN INFLUENCE ON ADIPOSE TISSUE RAAS BY DIRECT RENIN INHIBITION? A POST-MARKETING SURVEY OF ALISKIREN ON Efficacy IN OBese PATIENTS AND IN PATIENTs WITH MEtABOLIC SYNDROME**

H.M.H. Schäfer1, I. Sudano2, D. Häberer3, G. Noll2. 1. 13 Cape Heart Centre, Cape Town-South Africa, 2. Cardiovascular Center Cardiology, University Hospital Zurich, Zurich-Switzerland, 3. Healthworld Swiss, Zug-Switzerland

Objective: The renin-angiotensin-aldosteron-system (RAAS) is active at systemic as well as on cellular level. Since Angiotensinogen and Renn-mRNA in adip-tissue are evident the efficacy of antihypertensive drugs within the RAAS may be dependent on the amount of fat-tissue. Although there are currently no comparative studies that examine features of different RAAS-inhibitors (ACEI, ARB or direct renin inhibitor-[DRI]) various trials show that DRI aliskiren particularly is effective in obese patients with less than metabolic syndrome which are recommended by ESC-guidelines.

Design and Method: This post-marketing survey was undertaken to assess blood pressure reduction of 1283 patients receiving Aliskiren-Monotherapy (AMT) and Aliskiren/Hydrochlorothiazide Single-Pill combination therapy (AHCT-SPC) in patients with and without metabolic syndrome (MS) and different body-mass-indices (BMI) in the primary care setting. For the subsequent analysis, parametric method (ANOVA and Bonferroni post-hoc-test) and non-parametric methods (Chi2-Test and Mann-Whitney-U-Test) were used. Correlation analysis was performed, using a two-sided Pearson coefficient and a significance level of p < 0.05.

Results: SBP/DBP was reduced equally in patients with and without MS (over all: -22.0/–10.8 ± 15.5/9.4 mmHg), however fewer patients with MS achieved target blood pressure (BP) levels according to ESC/Echo-guidelines regardless of additional medications (30%, p < 0.001) compared to 47% of patients without MS. Moreover, BMI alone correlated with BP reduction (–0.069/–0.071, p = 0.040/0.03) and showed a significant influence on BP attainment in patients with AMT/AHCT-SPC only. In patients with BMI > 30 kg/m² MSSBP/MSDBP decreased (<23.6/–12.1 ± 16.4/9.6 mmHg) more than in subjects with BMI < 30 kg/m² (-21.2/–10.5 mmHg).

Conclusions: In hypertensive patients with MS and patients with hypertension only SBP and DBP can be lowered equally with AMT/AHCT-SPC. However subjects with MS accomplished BP-control in just under one third. BP was significantly reduced in obese patient (BMI > 30) receiving AMT/A- HCT-SPC (–10.2%) and provided higher BP-control rates than patients with MS in which probably more than two antihypertensive agents are needed to control BP adequately. Further randomized controlled trials are needed to assess the effect of different drugs acting on RAAS on blood pressure and outcome in patients with obesity and MS.

**PP.9.234 RAPID INCREASE IN BLOOD PRESSURE AND SYMPATHETIC ACTIVITY DURING A HIGH FAT DIET IN RABBITS**

G. Head1, S. Burke1, L. Prior1, B. Barzel1, J. Armitage2. 1. Baker Ed Heart and Diabetes Institute, Melbourne Australia, 2. Monash University, Melbourne-Australia

Objective: To evaluate the frequency of androgen deficiency and erectile dysfunction (ED) in men with metabolic syndrome and high cardiovascular risk on SCORE.
Short term consumption of a high fat diet (HFD) induces elevated blood pressure (BP), heart rate and renal sympathetic nerve activity (RSNA) which may be the basis for the development of long term obesity related hypertension. In the present study we determined the rapidity of such changes and whether this involved disturbance to other stimuli including airjet stress, hypoxia and baroreflexes. New Zealand White rabbits implanted with telemetry devices for BP and RSNA were placed on a normal or 13.5% HFD. Reflexes and stress responses were examined weekly during the 3-week diet. After 1 week on the HFD, rabbits demonstrated 4%, 8% and 30% greater BP, heart rate and RSNA respectively (P < 0.05). By the end of 3 weeks of HFD, BP, heart rate and RSNA were elevated by 10%, 5% and 82% (n = 9). Baroreflex curve analysis showed that the increase was independent of baroreceptor inputs and similar to the effects of acute stress. Indeed acute airjet stress induced lesser sympathetic responses suggesting that the pathway was already activated. The sympatho-excitatory responses to hypoxia were similar in the HFD and normal diet groups over the 3-week period of diet. Together these results suggest that sympathetic activation occurs within several days of a high fat diet and may be associated with a chronic activation of forebrain pathways mediating the sympathetic responses to acute emotional stress.

**PP.9.235** ESTIMATION OF SKELETAL MUSCLE MASS FROM APPENDICULAR LEAN SOFT MASS MEASURED BY DUAL-ENERGY X-RAY ABSORPTIOMETRY IN CHINESE

W.F. Zeng, Y. Zhang, He Chen, Y. Li, Jg Wang. Shanghai Institute of Hypertension, Ruijin Hospital, Shanghai-China

**Objective:** We studied whether total body skeletal muscle (SM) mass could be accurately estimated from appendicular lean soft tissue (ALST) mass measured by dual-energy X-ray absorptiometry (DXA), and investigated the validity of equations of prediction reported previously and derived from the data of the present study.

**Methods:** We measured body composition by magnetic resonance imaging (MRI) and DXA in 194 Chinese stratified for sex, age and body mass index. The equation of prediction was generated by linear regression. The agreement between measured and predicted SM mass was assessed by the use of intra-class correlation analysis, paired t test and Bland-Altman plot.

**Results:** The studied subject included 97 women (50.0%). Age averaged 48.2 years (range 22 to 78 years). Mean body mass index (± SD) was 24.9 ± 3.5 kg/m². The total body SM mass measured by MRI (18.1 ± 4.8 kg) was closely correlated with ALST mass (19.4 ± 4.7 kg), with a correlation coefficient of 0.95, 0.84 and 0.89 in all subjects, men and women, respectively. If the previously published equations were used, the difference of SM mass measured by MRI and estimated from ALST was 3.37 ± 1.75 Kg and 3.25 ± 1.70 Kg in the absence and presence of age in the equation, respectively. On the basis of our own data, we generated 2 equations without or with age: SM = 0.98*ALST-0.09 (R = 0.91, P < 0.0001) and SM = 0.97*ALST-0.03*Age + 0.66 (R = 0.92, P < 0.0001). By the application of these equations, the difference between measured and estimated SM mass decreased to –0.03 ± 1.46 Kg and –0.03 ± 1.39 Kg, respectively.

**Conclusions:** Estimation of SM mass by ALST is plausible, but requires population-specific equations of prediction. Our equations should be validated in other studies in Chinese.

**PP.9.236** AMBULATORY BLOOD PRESSURE AND NOCTURNAL DIPPING WITH REDUCED CARBOHYDRATE AND REDUCED FAT HYPOCALORIC DIETS

S. Engeli1, S. Haufe1, P. Kastl1, S. Wiesen1, F.C. Lütfi1, M. Boschmann2, J. Tank1, J. Jordan1. 1Hannover Medical School, Hannover-Germany. 2University Medicine Charité, Berlin-Germany

**Objective:** Weight reduction is often recommended to improve blood pressure in obese subjects. Different hypocaloric diets have been tested for their influences on body weight and metabolism, but data on ambulatory blood pressure changes, especially the phenomenon of nocturnal dipping, are rare.

**Design and Method:** We randomly assigned 102 obese women and men to either a carbohydrate reduced (< 90 g/d) or a fat reduced diet (< 30% calorie intake from fat) over 6 months. Participants were not on antihypertensive medications. We assessed 24-h ambulatory blood pressure monitoring (ABPM) at baseline and month 6. Blood pressure was measured every 20 min between 6:00 and 22:00, and every 30 min during the night. All data are given as mean ± SD. Results: 36 participants in the reduced carbohydrate and 42 participants in the reduced fat diet group completed the 6 months weight loss phase with successful ABPM measurements.

Body mass index decreased 2.6 ± 1.4 kg/m² in both diet groups (p < 0.01 for each). Systolic ABPM decreased 3 ± 7 mm Hg with reduced carbohydrate and 3 ± 10 mm Hg with reduced fat diet (p < 0.05 compared with baseline for both, ns between groups). Diastolic ABPM changed 1 ± 5 mm Hg with reduced carbohydrate and 2 ± 9 mm Hg with reduced fat diet (ns). At baseline, 43 of the completers showed a nocturnal blood pressure reduction < 10% (non-dippers, 7 ± 4% reduction), whereas 35 of the completers showed a normal nocturnal blood pressure reductions (dippers, 17 ± 8% reduction). The number of non-dippers decreased from 43 to 20 with weight loss. Remarkable, with weight loss, non-dippers only reduced nocturnal blood pressure (systolic 115 ± 10 to 110 ± 14 mm Hg, p < 0.01; diastolic 68 ± 9 to 64 ± 8 mm Hg, p < 0.001), whereas daytime blood pressure hardly changed. In contrast, dippers showed reductions in daytime blood pressure (systolic 124 ± 9 to 120 ± 10 mm Hg, p < 0.05; diastolic 78 ± 7 to 76 ± 6 mm Hg, p = 0.047) with no changes in nocturnal blood pressure.

**Conclusion:** Carbohydrate and fat reduced hypocaloric diets elicited similar reductions in ambulatory blood pressure in obese subjects. With weight loss, dippers primarily show reductions in daytime blood pressure, whereas nocturnal blood pressure decreases in non-dippers. Thus, office blood pressure measurements may be misleading in weight loss studies.

**PP.9.237** ADIPONECIN, INSULIN RESISTANCE AND BLOOD PRESSURE IN A PAEDIATRIC POPULATION

F Pieruzzi1, Me Street1, P Brambilla1, M Giussani1, S Galtabii2, A Smerieri2, Ma Ziveti1, S Bernasconi2, Gv Zuccotti2, A Stella1, S Genovesi3. 1Università Degli Studi Di Milano Bicocca, Milano-Italy, 2Department of Pediatrics, University of Milan, 3Asl Milano 2, Milano-Italy.

**Objective:** Circulating levels of adiponectin are decreased in obesity-induced insulin resistance, and correlate negatively with visceral fat amount. In adults hypo-adiponectinemia is a predictor of the development of arterial hypertension. Few data are available on the relationship between adiponectin and blood pressure in children. Aim of this study was to evaluate in normal weight (NW) and obese (OB) children with (HT) and without hypertension (NT) the relationships among adiponectin, blood pressure and HOMA-index (as estimate of insulin resistance).

**Design and Methods:** In 100 children (age 6.2 to 16.5 yr, 39 females) systolic (SBP) and diastolic blood pressure (DBP), body mass index (BMI), waist circumference (WC, as estimate of visceral fat), adiponectin and HOMA-index were measured. Hypertension was ascertained according to the National High Blood Pressure Education Program Working Group on High Blood Pressure in Children and Adolescents, weight class according to the International Obesity Task Force classification and BMI percentile according to CDC charts. The study population was split into 4 groups: Group A (NW and NT, n = 27), Group B (NW and HT, n = 18), Group C (OB and NT, n = 27), Group D (OB and HT; n = 28). Differences among groups were calculated by ANOVA + Fisher’s PLSD. Correlations between continuous variables were analysed by simple and multiple regression.

**Results:** Among OB subjects adiponectin was significantly lower (5652 ± 2558 vs. 8359 ± 3426 ng/ml, p = 0.04), and HOMA-index higher (3.8 ± 3.8 vs. 2.4 ± 1.7, p = 0.03) in HT compared with NT subjects. In obese HT children, WC values (85.3 ± 10.7 vs. 79.5 ± 7.9 cm, p = 0.01), but not BMI percentile (98.4 ± 1.0 vs. 97.9 ± 1.0, NS) were higher compared with NT. Among NW children, BMI percentile (59.1 ± 23.9 vs. 46.7 ± 28.7, p = 0.03), but not WC (64.7 ± 8.5 vs. 62.2 ± 6.1 cm, NS), was higher in HT compared with NT. In the entire study population, SBP percentiles were inversely correlated with adipo-nectin, and positively correlated with HOMA-index values (p = 0.015 and 0.001, respectively). Adiponectin and HOMA-index values correlated also with BMI percentiles (p = 0.001 and 0.003, respectively) and with WC values (p = 0.001 for both). In a multiple regression model, only BMI percentiles (p = 0.035) and WC (p = 0.011) were independently associated with SBP values.

**Conclusions:** In OB children adiponectin levels and insulin resistance may play a role in determining systolic blood pressure values, presumably because of the greater accumulation of visceral fat in HT as compared to NT subjects. In NW children SBP seems to be mostly determined by BMI.
It is known that MS is the important reason of insulin resistance. The most of the patients with MS have the fatty liver disease (NAFLD).

**Aim:** To assess the risk factors for MS and non-alcoholic fatty liver disease (NAFLD) in Russian Federation in the national population-based D|ERGE study.

**Methods:** In total of 30 787 primary care patients (56% females, mean age 47.8 ± 16 years) were enrolled into open multicenter national-wide prospective study. Careful clinical examination, serum biochemistry (including ALT, AST, yGT, lipid spectrum, glucose and hepatitis screening) and abdominal ultrasound diagnostics with precise liver assessment were performed in 30 754 patients.

**Results:** NAFLD was found in 8215 (27%) of included patients. Within group with confirmed NAFLD liver steatosis was diagnosed in 80.3%, steatohepatitis in 16.8%, and cirrhosis in 2.9% of patients. Of notice, only in 3.6% of NAFLD patients (1.0% in all population) the diagnosis has been established before D|ERGE-L-01903 program initiation, despite regular observations of participants in primary care centers. AST was increased ≥ 2.5 N in 2816 (9.2%), ALT was increased ≥ 1.5 N in 3144 (10.2%) of patients. In total patients population most frequent associated clinical conditions were arterial hypertension (42%), dyslipidemia (38%), and abdominal obesity (36%). In total NAFLD patients population following conditions has been found significantly more frequent: arterial hypertension (70%), dyslipidemia (76%) and hypercholesterolemia (69%), p < 0.001 compared with total population. In patients aged from 18 to 29 years abdominal obesity was identified as risk factor, because it was found in 45% NAFLD patients in comparison with 14% of patients without NAFLD, p < 0.001. The significance of abdominal obesity as NAFLD risk factor is decreased with advanced age due to relatively higher prevalence of obesity in patients without NAFLD aged from 40 to 80 years. NAFLD was diagnosed in 64.3% of patients with type 1 diabetes, 69.8% patients with type II diabetes, 45.2% of patients with arterial hypertension, 61.5% of patients with obesity and in 66.9% in those with metabolic syndrome.

**Conclusion:** Taking into account high prevalence (27%) of NAFLD in Russian Federation the attention should be given for NAFLD risk factors such as arterial hypertension, dyslipidemia and hypercholesterolemia in all age groups as well as abdominal obesity in patients younger than 39 years. Metabolic factors clustering might explore an important link between metabolic syndrome and NAFLD.

**S. Bychkova, O. Krasuyk. Ukrainian Military Medical Academy, Kyiv–Ukraine**

**Objective:** The objective of this work was to define the levels of proinflammatory cytokines, C-reactive protein and the level of CD54 + lymphocytes in the blood of patients with arterial hypertension in combination with metabolic syndrome.

**Design and Methods:** Eighty-nine patients aged 35 to 56 years were examined. All the patients had II stage of arterial hypertension (AH) with the II level of blood pressure elevation. Metabolic syndrome was diagnosed according to the recommendations IDF (2005). There were examined the level of tumor necrosis factor (TNF-α), interleukine-1 (IL-1), interleukine-6 (IL-6), C-reactive protein (C-RP) in the serum of patients and the level of CD54 + lymphocytes in peripheral blood before the treatment and after 4 weeks. The treatment includes the intensive diet, antihypertensive drugs (ACE inhibitors, calcium antagonists) and atorvastatin (10 mg) daily.

**Results:** The first examination established, that patients with MS had the high level of proinflammatory cytokines before the treatment, the serum level of TNF-α was higher in 2.8 times to the level of healthy people, the serum level of IL-1 – in 1.9 times, the serum level of IL-6 – in 11.5 times, the level of C-RP in 2.16 times, quantity of CD54 + lymphocytes – in 1.7 times (p < 0.01). This fact shows that atherosclerosis, which accompanied the MS, has inflammatory etiology. The high level of inflammatory factors and lymphocytes, which expressed the ICAM-1, promotes the development of other components of the blood and aggravation of atherosclerosis. The high level of inflammatory reaction is associated with the increased risk of cardiovascular events, however the influence of 25(OH)D insufficiency on development and pathogenesis of hypertension is a disputable subject and requires further investigations. The purpose of the current research is to study the relationship between 25(OH)D serum concentration with anthropometric data (height, weight, hip circumferences, BMI, BP) and biochemical markers (glucose, lipids, insulin, HOMA-IR, aldosterone (A), plasma renin activity (PRA)). Fasting blood was obtained and plasma glucose was determined by glucose oxidase, lipids by standard methods, insulin – ELISA, A and PRA – radio-immune method. BP was measured by 24-hour monitoring. We examined 158 women 40 to 52 (mean age 46.9 ± 5.5) with abdominal obesity, the control group included 35 women of the same age but with no obesity. Among study group 41.7% had hypertension, 55.5% – prediabetes and DT2, 46.1% - dyslipidemia. Vitamin D deficiency was revealed in 86.3% cases, obese women had significantly lower 25(OH)D concentration (48.1 ± 1.1 nmol/l) and higher HOMA-IR level (3.44 ± 0.09) compared to the control group. Aldosterone level and PRA were comparable in both groups, but PRA correlated with insulin level (r = 0.32, p = 0.0001). We revealed inverse correlations between 25(OH)D concentration and systolic (r = -0.31, p = 0.007), diastolic (r = -0.25, p = 0.03) BP. Our results showed high frequency of metabolic syndrome components in abdominal obese women and correlation between insulin resistance and PRA. Vitamin D insufficiency, more prevalent in obese women, is most probably a hypertension risk factor. Hence, further studies are necessary to support these findings.
Conclusions: Patients with AH with MS have reliable growth of concentration of proinflammatory cytokines, C-RR, quantity of CD54+ lymphocytes. The presence of non-specific LAS to collagen normalized the lipid levels in serum and have the antinflammatory effects.

The present study compared the effects of WL achievement on WL-induced BP reduction over 24 weeks between D alone, EX alone and a combination with D + EX, especially focusing on the relationship of the sympathetic nervous activity (observed with plasma norepinephrine (NE) levels) and insulin resistance (homeostasis model of insulin resistance, HOMA-IR).

The 3 groups were each composed of 30 obese hypertensive men. BMI, fat-mass, waist-to-hip ratio, BP, plasma NE, and HOMA-IR were measured at every 4 week period over 24 weeks.

All basal parameters were similar among the 3 groups. At 24 weeks, the combination group with D + EX had significantly higher prevalence of normo-tensive subjects (n = 24) than the D alone (n = 14) or EX alone group (n = 9) (χ2 = 10.81, P < 0.05). In the D alone group, plasma NE decreased significantly at 2 weeks, BMI, fat-mass and BP levels reductions were observed at 8 weeks, and waist-to-hip ratios and HOMA-IR decreased at 12 weeks. In comparison, in the EX alone group, significant reductions of fat-mass and HOMA-IR were observed at 4 weeks, BMI, waist-to-hip ratios, plasma NE and HOMA-IR significant reductions were observed at 8 weeks, and significant decreases in BP levels were detected at 12 weeks. In the D + EX group, plasma NE decreased significantly at 2 weeks, and BMI, fat-mass, waist-to-hip ratio, BP levels and HOMA-IR decreased significantly at 4 weeks. Plasma leptin decreased significantly at the same time-points with reductions of total body fat-mass. The magnitude of reductions of all parameters were greatest in the D + EX group among the 3 groups throughout the study. These results demonstrate that D + EX has stronger ameliorative effects on WL, WL-induced BP reduction, normalization of hypertensive, sympathetic activation and insulin resistance compared to D or EX alone. Suppression of plasma NE was followed by reductions of weight loss, BP reduction and HOMA-IR in the groups with WL.

The suppression of sympathetic activation accompanying the improvement of insulin resistance might play a major role on caloric restriction induced weight loss and weight loss-induced BP reduction, while exercise might improve insulin sensitivity followed by suppression of sympathetic activation. A caloric restricted diet and aerobic exercise might, perhaps, have different mechanisms on weight loss and weight loss-induced BP reduction, however a combination of caloric restriction and exercise is preferred to control BP levels in obese hypertensive patients.

EFFECT OF MENOPAUSE ON THE PREVALENCE OF METABOLIC SYNDROME IN A HELLENIC COHORT

C. Thomopoulos1, M. Daskalaki1, O. Papazachou1, N. Rodolakis2, D. Papadopoulos1, A. Kounou1, M. Papavassiliou1, T. Makris1, 1Cardiology Dept., Helenes Venizelos Hospital, Athens-Greece, 2Cardiology Dept, Laiko Hospital, Athens-Greece, 3Cardiology Dept, Sismanoglio Hospital, Athens-Greece

Objectives: To investigate whether menopause enhances the prevalence of metabolic syndrome (MS) in a Hellenic cohort. We hypothesized that there would be difference in the prevalence of MS in tandem with an adverse clustering of its components in postmenopausal (PMW) with respect to premenopausal (PRMW) women.

Methods: 604 consecutive white women were studied in an outpatient cardiological unit. 356 subjects were PMW (i.e. absence of menses for at least 12 consecutive months). In the entire population systolic and diastolic office BP, waist circumference, plasma fasting glucose, triglycerides and HDL-cholesterol were measured. Diagnosis of MS was made according to the ATP-III criteria. Pharmacological treatment for hypertension, hyperlipidaemia and diabetes type 2 was also registered.

Results: PMW demonstrated higher prevalence of MS compared with PRMW (n = 184, 52% vs. n = 82, 33%, p < 0.001). In the PMW group, the diagnosis of MS was guided by the clustering of (n = 60, 33%), (n = 80, 43%) and 5 (n = 44, 24%) from its components. Among the components of MS in the PMW group, hypertension-oriented criterion was the more prevalent (n = 156, 85%) followed by waist circumference-oriented criterion (n = 148, 80%), plasma glucose-oriented criterion (n = 144, 78%) and lipid-oriented criteria (decreased HDL and increased triglycerides, n = 144, 78% and n = 104, 56%, respectively). In the entire population by using a logistic multivariable model, the presence of menopause determines MS with odds ratio of 2.3 (1.7 - 4.6), p < 0.001 after adjustment for confounders including pharmacological treatment.

PP9.244 DOES THE ASSOCIATION BETWEEN LIPID PROFILE AND OBESITY INDICES VARY THROUGH DECADES IN ESSENTIAL HYPERTENSIVE PATIENTS?

S. M. Kyvelou1, G. Vysoulis1, E. Karpouli, V. Tzanou2, T. Gialerimos2, C. Stefanadis1, 11St Cardiology Clinic University of Athens Hippokration Hospital, Athens-Greece, 13St Cardiology Clinic Onassis Cardio-surgery Center, Athens-Greece

Objective: There is a known interaction between obesity, lipid profile and arte- rial hypertension. The aim of the present study was to assess the association between different patterns of obesity to lipid profile in essential hypertensive patients. Further, these possible associations were explored taking into consider- ation different periods of time from 1987 to 2010.

Design and Methods: The study cohort comprised 22900 consecutive, essential hypertensive patients who referred to our outpatient clinics from 1987 to 2010. Patients were subjected to full clinical and laboratory evaluation. Further, previous anthropometric and hypolipidemic treatment was assessed through medical history. Study population was further divided in six groups according to the time of referral to our clinics [group I (from 1987-1990), group II (from 1991-1994), group III (from 1995-1998), group IV (from 1999-2002), group V (from 2003-2006) and group VI (2007-2010)].

Results: Overall, a strong positive association was observed between total cholesterol (TC), triglycerides (TGL), low-density lipoprotein (LDL), apolipopro-tein B (ApoB) with all obesity markers (p < 0.0001) both in univariate and multivariate analysis. High density lipoprotein (HDL) and apolipoprotein A (ApoA) were negatively associated with obesity indices (p < 0.0001). The associations remained strongly significant (p < 0.0001) when comparing the six time period groups, while LDL, gradually decreased from past to recent years (p < 0.0001) and obesity markers tend to worse nowadays (p < 0.0001).

Conclusions: In essential hypertensive patients there is a strong correlation between lipid profile and obesity markers independently of several co-factors. Assessing the differences among six periods of referral time in our clinics, it appears that when approaching recent years, patients even though more obese present with a better lipid profile.
One-way ANOVA corrected with Bonferroni test was used to assess differences between groups (p < 0.05).

**Results:** 76% of this population is overweight or obese. Both obese and overweight groups had significantly higher diastolic BP values (89 ± 3 mmHg vs. 80 ± 2 mmHg) than normoweight group (71 ± 2 mmHg; p < 0.001 comparing with both groups). Obese individuals showed higher systolic BP compared with the group of normal weight (142 ± 4 mmHg vs. 125 ± 4 mmHg; p = 0.016). When compared to overweight, obese subjects presented significantly higher plasmatic PCR levels (p = 0.023). There were no differences between groups established by BMI regarding neither the metabolic parameters nor the phenotypic characteristics of the subpopulation of proinflammatory monocytes (CD16+).

**Conclusion:** In this population of healthy blood donors there is a high prevalence of overweight/obesity. Obese individuals showed higher BP and plasmatic PCR levels, but similar proinflammatory monocyte subpopulations comparing to normoweight individuals.

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**PP.9.246 CREATIVE KINASE IS ASSOCIATED WITH OBESITY IN THE GENERAL POPULATION**

I. Oudama, Z. Jegemathi, P. Kawalbanshing, J. Clark, G. Van Montfrans, L. Breetower. 1Academic Medical Center, Amsterdam; The Netherlands, 2University of Suriname, Paramaribo-Suriname, 3University of Cincinnati, Cincinnati-USA

**Background:** Several studies have suggested that skeletal muscle metabolism plays a role in the etiology of obesity. In skeletal muscle, creatine kinase (CK) is the key enzyme in the rapid resynthesis of adenosine triphosphate (ATP). High CK type IIa muscle fiber proportions are associated with a greater increase in percentage body fat after overfeeding. Skeletal muscle CK activity increases after overfeeding and correlates negatively with metabolic rate. However, it was not previously assessed on a population level whether serum CK at rest, a measure of skeletal muscle CK, is associated with body mass index (BMI).

**Methods:** We analyzed a stratified random sample of the population of Amsterdam, the Netherlands, consisting of 1444 citizens (503 whites, 292 Indian-Asians, 580 blacks, and 69 of other ethnicity), aged 34-60y. After correlation analysis, we used linear regression analysis to assess the association between CK and BMI.

**Results:** CK was the main predictor of BMI in the population, 2.4 units BMI increase for age, ethnicity (black vs other), sex, and creatinine as a measure of muscle mass (Figure for BMI increase per log CK tertiles, and Table). Discussion We analyzed a stratified random sample of the population of Amsterdam, the Netherlands, consisting of 1444 citizens (503 whites, 292 Indian-Asians, 580 blacks, and 69 of other ethnicity), aged 34-60y. After correlation analysis, we used linear regression analysis to assess the association between CK and BMI.

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**PP.9.248 FACTORS AFFECTING SERUM LEPTIN LEVELS IN PATIENT WITH ABDOMINAL OBESITY**

E. Chubenko, O. Belyaev, O. Boshkalo, O. Berkovich, E. Bazhenova, E. Chernetcova, K. Monosova, E. Baranova, E. Shlyakhto. 1Saint-Petersburg State Medical University N.A.I. Pavlov, Saint-Petersburg-Russia, 2Saint-Petersburg Federal Heart, Blood and Endocrinology Centre, Saint-Petersburg-Russia, 3Russian Federation, St.-Petersburg-Russia

**Introduction:** Abdominal obesity (AO) and arterial hypertension (HTN) are atherosclerosis risk factors. One of the early signs of atherosclerosis is increase of intima-media thickness of the common carotid arteries (CCA IMT).

**Study Objective:** To reveal subclinical damage of the CCA in hypertensive and normotensive subjects with AO.

**Material and Methods:** We examined 216 patients with AO and 23 subjects with normal waist circumference without clinical signs of atherosclerosis. All of them underwent ultrasound duplex scan of CCA (ALOKA SSD-3500, Japan). CCA IMT above 0.9 mm was considered to be abnormal. Local CCA wall thickening exceeding by 50% and more thickness of the adjacent intima-media complex or CCA IMT above 1.3 mm were the criteria of atherosclerotic plaque.

**Results:** 60.9% of patients with AO were diagnosed with HTN. In obese patients with CCA IMT below and equal to 0.9 mm systolic blood pressure (BP) was lower than in patients with CCA IMT above 0.9 mm (132.2 ± 1.5 mm Hg vs 138.6 ± 2.4 mm Hg, p < 0.01). CCA IMT in obese normotensives was significantly higher than in control group (0.72 ± 0.03 mm vs 0.55 ± 0.02 mm, p < 0.01). The rate of CCA IMT above 0.9 mm in obese hypertensives and normotensives did not vary (49.4% vs 69.8%, p > 0.05). CCA IMT in patients with AO and HTN was higher than in obese normotensives (0.90 ± 0.02 mm vs 0.82 ± 0.02 mm, p < 0.01). Atherosclerotic plaques of CCA were found in 39.8% of patients with AO.

**Conclusion:** In patients with AO and normal BP early signs of atherosclerosis were found in 49.4%. In obese hypertensive patients CCA IMT is higher than in normotensive obese patients.

**PP.9.247 CAROTID ARTERIES SUBCLINICAL DAMAGE IN HYPERTENSIVE AND NORMOTENSIVE PATIENTS WITH ABDOMINAL OBESITY**

E. Baranova, O. Belyaev, O. Boshkalo, E. Chubenko, A. Berezina, O. Bolshakova, O. Berkovich, T. Karonova, S. Kozlova, E. Bazhenova, E. Shlyakhto. 1Saint-Petersburg State Medical University N.A.I.Pavlov, Saint-Petersburg-Russia, 2Saint-Petersburg Federal Heart, Blood and Endocrinology Centre, Saint-Petersburg-Russia, 3Russian Federation, St.-Petersburg-Russia

**Study Objective:** To estimate the influence of various factors on serum leptin concentration in men and women with abdominal obesity.

**Material and Methods:** 525 patients with abdominal obesity (AO) were examined: 388 women (73.9%) and 137 men (26.1%), age 45.8 ± 0.3 years. AO was diagnosed according to IGR criteria (2005). Serum leptin concentration was determined by ELISA. To investigate the independent effect of various parameters on serum leptin levels in women and men additionally multivariate stepwise linear regression analysis was performed. Statistical analyses were performed using SPSS 17.0 for Windows (SPSS, Inc., Chicago, IL, USA).

**Results:** The following 23 independent variables were entered into the model stepwise multivariate regression: age, body weight, height, BMI, menopausal status for women, waist circumference (WC), WC/hip circumference, duration of obesity, systolic blood pressure, diastolic blood pressure, plasma glucose, serum total cholesterol, high density lipoproteins, triglycerides, insulin, index HOMA-IR, C-reactive protein, left ventricle mass index, diameter and volume of the left atrium, IVRT, the ratio of peak E/A, intima-media of the common carotid arteries thickness. However, only body weight and BMI were statistically significant independent factors affecting serum leptin levels in females and males with AO (R² = 0.345; Model: F = 127.12, p < 0.001 for women and R² = 0.312; Model: F = 132.03 p < 0.001 for men). According to the results of multivariate stepwise linear regression analysis the following model was constructed: Leptin = -98.9 + 0.9 x body weight + 2.7 x BMI + 0 (for women and -34.5 for men).

**Conclusions:** Multivariate linear regression analysis demonstrated that only body weight and body mass index are statistically significant independent factors affecting the increase in serum leptin in females and males with abdominal obesity.

**PP.9.249 METABOLIC SYNDROME AND AMBULATORY ARTERIAL STIFFNESS INDEX IN ADOLESCENTS**

A. Gonzalez, J. Ferrer, E. Silva, C. Esis, M. Bracho, J.J Villasmil, S. Bricelho, G. Bermudez. Instituto De Investigacion Y Estudios De Enfermedades Cardiovasculares, Maracaibo-Venezuela
Objective: To investigate the relationships between metabolic syndrome and arterial stiffness index derived from ambulatory blood pressure monitoring in adolescents.

Design and Method: This was a cross-sectional study conducted with 132 high school students (58 boys and 74 girls), aged between 12 to 18 years (14.68 ± 1.8). A 24 hours ambulatory blood pressure monitoring was carried out to all patients using a Spacelabs monitor. Ambulatory arterial stiffness index (AASI) was defined as 1 minus the regression slope of diastolic over systolic blood pressure reading obtained from 24-h recordings. Metabolic syndrome (MS) was defined according to modified criteria of age specific adolescents that are linked to the adult treatment panel III criteria. Pearson correlation was used to evaluate the association between metabolic and, anthropometric variables and AASI. The forward stepwise logistic analysis regression was used to investigate the probability of increased AASI.

Results: The prevalence of MS was 9.8% (n = 13). Patients with MS had higher value of AASI than those without MS (0.66 ± 0.1 vs. 0.48 ± 0.1, P = 0.001). AASI was significantly correlated with weight (r = 0.182; P = 0.03), high-density lipoprotein cholesterol level (r = −0.22; P = 0.01), waist circumference abnormality (r = 0.65; P = 0.002) and MS (r = 0.288; P = 0.001). Moreover, the prevalence of increased AASI (upper tertile) was greater in patients with MS (P < 0.01). After adjusting for weight, height, high-density lipoprotein cholesterol level and waist circumference abnormality, the presence of MS entailed a more than fourfold greater risk for increased AASI (P = 0.037).

Conclusions: MS is associated with increased AASI in adolescents. These data support the role of this new index of arterial stiffness as a marker of risk and help to explain the high cardiovascular morbidity that is observed in patients with MS.

**PP9.250** RELATIONSHIP BETWEEN AMBULATORY ARTERY STIFFNESS INDEX AND METABOLIC SYNDROME COMPONENTS IN PATIENTS WITH CORONARY ARTERY DISEASE

W. Sobieczwski, M. Wirtwein, M. Nedozytko, M. Gruchala, A. Rynkiewicz. Medical University of Gdańsk, Gdańsk-Poland

Objective: Individuals with metabolic syndrome (MS) are at increased risk for cardiovascular events. The ambulatory arterial stiffness index (AASI), derived from ambulatory blood pressure (BP) monitoring recordings, is an indirect marker of arterial stiffness and a potential predictor of cardiovascular risk. We evaluated relationship between AASI and MS diagnosed on the basis of classical ATP III criteria.

Design and Method: We have studied group of 1345 patients (909 male and 436 female, mean age 63.2 ± 9.2 years) with coronary artery disease (CAD). MS was defined according to classical ATP III criteria. 24-hour ambulatory BP monitoring (ABPM) was performed through an oscillometric device (Spacelabs 90210, Spacelabs Inc., Redmond, Washington, USA) with the BP readings set at 20-minute intervals (6:00 AM – 0:00 PM) and at 30-minute intervals (0:00 PM – 6:00 AM). Office blood pressure and office heart rate were measured before 24 hour ABPM. Blood samples for fasting glucose, HDL and triglycerides were collected. AASI was defined as 1 minus the regression slope of DBP on SBP, and was calculated by standard symmetric regression. Stepwise multiple linear regression was used to test the independent relation between AASI and office SBP, glucose level, waist circumference, triglycerides and HDL level.

Results: Study population was divided into two groups (ATP III criteria): with MS (n = 360, mean age 62.9 ± 11.5 y) and without MS (n = 985, mean age 63.4 ± 11.5 y). The prevalence of the MS was 26.7% (22.9% male and 32.7% female, P < 0.001). Mean value of AASI in the study group was 0.31 ± 0.05. Higher value of AASI was found in MS group than without MS (0.32 ± 0.05 vs. 0.30 ± 0.05, p < 0.001). There was significant relationship between AASI and waist circumference (r = 0.11, p < 0.001), mean office systolic BP (r = 0.35, p < 0.001) and fasting glucose level (r = 0.18, p < 0.001) but there was no relationship between AASI and fasting triglycerides and HDL level. Waist circumference, office systolic BP, mean diastolic BP and fasting glucose level were independently related to AASI (table).

<table>
<thead>
<tr>
<th>Variable</th>
<th>β</th>
<th>B</th>
<th>Multiple R</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waist circumference, cm</td>
<td>0.09</td>
<td>0.0003</td>
<td>0.13</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Mean systolic BP, mmHg</td>
<td>0.87</td>
<td>0.002</td>
<td>0.43</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Glucose level, mg/dl</td>
<td>0.04</td>
<td>0.0005</td>
<td>0.08</td>
<td>0.04</td>
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<tr>
<td>Triglycerides level, mg/dl</td>
<td>0.01</td>
<td>0.0001</td>
<td>0.06</td>
<td>0.65</td>
</tr>
<tr>
<td>HDL level, mg/dl</td>
<td>0.03</td>
<td>0.0002</td>
<td>0.11</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Conclusions: AASI is significantly related to waist circumference, systolic and diastolic BP but no to triglycerides or HDL level.
BACKGROUND: It is marked, that presence abdominal obesity at hypertensive perimenopausal women is not always accompanied by signs of a metabolic syndrome.

AIM: studying of protective function of estrogen on development of a metabolic syndrome at hypertensive perimenopausal women with abdominal obesity.

METHODS: 31 at hypertensive perimenopausal women with an abdominal obesity of 1-2 degree which made 2 clinical groups is surveyed: 1 group – 16 patients (middle age = 45,1 ± 1,3 years) with diabetes or broken tolerance to glucose, 2 group – 15 patients (middle age = 43,7 ± 0,6 years) without disorders of a carbohydrate metabolism. All group have been comparable on a body mass index (BMI > 30) and waist circumference (WC > 88). All surveyed carried out to measure glucose, insulin, estrogen in blood and definition of lipid profile. A condition insulin-resistance (IR) determined with the help of calculate HOMA-index (index through which IR can be estimated, IR = 2 * OMA – 3).

RESULTS: is marked, that in 1-st group authentic female's BMI (BMI = 34,14 ± 0,75 & WC = 100,3 ± 1,2 cm) are combined with signs of dyslipidemia (increase values of a cholesterol and triglycerides (6,68 ± 0,46 and 4,37 ± 1,03 mmol/l) and smaller contents of lipoproteins of high density (0,43 ± 0,10 mmol/l) and disturbances of a carbohydrate metabolism, including insulin-resistance (HOMA-index was 5,94 ± 0,75) alongside with authentically revealed estrogen deficiency. In 2-nd group attributes of abdominal obesity (BMI = 34,14 ± 1,75 & WC = 100,3 ± 2,4 cm) are marked, insulin-resistance (HOMA-index was 2,34 ± 0,24). In 2-nd group it is marked essential changes in the levels of estrogen.

CONCLUSION: it is established that hormonal status in particular deficiency of estrogens instead presence of abdominal obesity plays predominating role in development of metabolic syndrome at hypertensive perimenopausal women.
N. Martell-Claro1, 1Hypertension Unit. Hospital Clinico San Carlos, Madrid-Spain, 2Vascular Biology Research Laboratory. H Clinico San Carlos, Madrid-Spain, 3Epidemiology and Preventive Medicine Department. H. Clinico San Carlos., Madrid-Spain

Introduction: Circulating endothelial progenitor cell (EPC) number and function is a valuable surrogate biomarker for cardiovascular risk and a strong predictor of the risk of cardiovascular events. It is well known that the metabolic syndrome (MetS), a constellation of various metabolic abnormalities, is associated with an increased risk of both diabetes and cardiovascular disease. Reduction of EPCs has been proposed as a novel mechanism of cardiovascular disease in type 2 diabetes. This study was designed to identify a graded association between increasing number of components of the MetS and the number of EPCs.

Methods: Peripheral blood samples were collected from hypertensive patients. The MetS (High blood pressure, waist circumference, glucose, triglycerides, and low HDL-cholesterol levels) was estimated using the update Adult Treatment Panel III (ATP III) of the National Cholesterol Education Program (NCEP). EPCs were identified as CD34+/KDR+ (early circulating EPCs) and CD34+/CD144+ (more mature circulating EPCs) with specific antibodies by flow cytometry. We also measured CD34+/CD105+ (endoglin) EPCs which have been associated with coronary artery disease.

Results: A total of 190 subjects, 120 patients (59% males, age 63 ± 4 y) and 70 control subjects without any of the MetS components (69% males, age: 41 ± 9 y) were studied. 70.8% of the patients showed MetS and 29.2% showed only 2 components of MetS. EPC subtypes levels were increased in patients compared with control group [CD34+/KDR+: 0.27% (IQR: 0.13–0.54) vs. 0.10% (IQR 0.03–0.4), P < 0.001; CD34+/CD144+: 1.04% (IQR: 0.44–1.82) vs. 0.08% (IQR 0.04–0.28), P < 0.001; CD14+/CD105+: 11.06% (IQR: 6.93–17.55) vs. 10.17% (IQR: 3.51–26.08), NS]. However, when we have analyzed for number of component of MetS, there was a significant reduction in CD34+/CD144+ EPC levels in patients with 4 components of the MetS with respect to those with 3 components [0.44% (IQR: 0.17–0.85) vs. 1.13% (IQR: 0.63–2.04), P < 0.001].

Conclusions: Circulating EPCs number (early and more mature circulating EPCs) is affected by the presence of any component of MetS when compared with control group. More mature circulating EPCs number decrease significantly in patients who have 4 components of the MetS compared with patients having 3 components. These data suggest that impaired EPC recruitment might be involved in the pathophysiology of cardiovascular disease.
POSTER SESSION

PP.10.258 THE COMPARISON ARTERIAL STIFFNESS AND CEREBROVASCULAR REACTIVITY IN HYPERTENSIVE PATIENTS WITH AND WITHOUT OBSTRUCTIVE SLEEP APNEA

T. Ripp¹, S. Zapodovnikov², V. Mordovin¹. ¹Institute of Cardiology, Tomsk, Russia; ²Siberian Medical University, Tomsk, Russia

Objectives: The aim of this study was the comparison arterial stiffness and cerebrovascular (CV) reactivity in condition of hypercapnia in patients with hypertension(H) with and without obstructive sleep apnea (OSA).

Methods: All participants of research have given the informed agreement. We used cardio-ankle vascular index (CAVI) for estimation of arterial stiffness and ultrasonography of transcranial Doppler’s method in the study of middle cerebral arteries (MCA) from temporal window. We studied the changes of flow velocity mean (FV) starting and at the time of hypercapnia (inhalation 2-3min 4% mixture of carbonic gas (MCG) with air) and FV in period of recovery (rec) (air-inhalation 3min) of 1group - 18 patients (H of grade II-III + OSA (apnea-hypopnea index > 5 events/h)) and 2group - 16 patients with H and without OSA. All patients had not cerebral stroke during of the life history (age 38.4 ± 12.5 years). Secondary hypertension were excluded by clinical and biochemical tests. At the time of vascular evaluation, none of the patients had a history or clinical evidence of peripheral vascular disease, coagulopathy, or any disease predisposing them to vasculitis. All participants of research have given the informed agreement. We used index of FV - IFV = (V0-V2)/V0*100, coefficient modification of flow velocity CFV = V2/V0 and new coefficient - normalized to BP autoregulation answer NBPA = (V2-V0)/(V0*(BP2–BP0)). V0 and BP0 are starting parameters. V2 and BP2 are parameters during inhalation.

Results: Patients and healthy volunteers had not distinctions of anthropometrical parameters. Significant difference was found between 1 and 2 groups: BP = 126 ± 10/82 ± 12 and 156.5 ± 18/91 ± 10mmHg p = 0.06; IFV = 33,7 ± 2.8% and 15.5 ± 2.5% p = 0.02; CFV = 1.34 ± 0.28 and 1.15 ± 0.25% p = 0.03; NBPA = 4.9 ± 2.7 and 10.2 ± 3.8 p = 0.00 respectively.

Conclusion: Patients with H and OSA and without cerebral stroke during of the life history have inhibited cerebrovascular reactivity and decrease in adequacy of the answer of arterial blood circulation of a brain in condition of hypercapnia. New coefficient normalized to BP autoregulation answer NBPA was very perceptible for these patients.

PP.10.259 HYPERCAPNIA-INDUCED CEREBROVASCULAR RESERVE OF PATIENTS WITH HYPERTENSION AND OBSTRUCTIVE SLEEP APNEA

T. Ripp¹, S. Zapodovnikov², E. Ripp¹, V. Mordovin¹. ¹Institute of Cardiology, Tomsk, Russia; ²Siberian Medical University, Tomsk, Russia

Objectives: The aim of this study was evaluate state cerebrovascular (CV) reactivity in condition of hypercapnia-induced CO2 cerebrovascular reserve in patients with hypertension(H) and obstructive sleep apnea(OSA).

Methods: We used ultrasonography of transcranial Doppler’s method in the study of middle cerebral arteries (MCA) from temporal window. We studied the changes of flow velocity mean (FV) starting and at the time of hypercapnia (inhalation 2-3min 4% mixture of carbonic gas (MCG) with air) and FV in period of recovery (rec) (air-inhalation 3min) of 1group - 28 healthy volunteers and 2group - 16 patients with essential H of grade II-III and OSA (apnea-hypopnea index > 5 events/h) without cerebral stroke during of the life history (age 38.4 ± 12.5 years). Secondary hypertension were excluded by clinical and biochemical tests. At the time of vascular evaluation, none of the patients had a history or clinical evidence of peripheral vascular disease, coagulopathy, or any disease predisposing them to vasculitis. All participants of research have given the informed agreement. We used index of FV - IFV = (V0-V2)/V0*100, coefficient modification of flow velocity CFV = V2/V0 and new coefficient - normalized to BP autoregulation answer NBPA = (V2-V0)/(V0*(BP2–BP0)). V0 and BP0 are starting parameters. V2 and BP2 are parameters during inhalation.

Results: Patients and healthy volunteers had not distinctions of anthropometrical parameters. Significant difference was found between 1 and 2 groups: BP = 126 ± 10/82 ± 12 and 156.5 ± 18/91 ± 10mmHg p = 0.06; IFV = 33,7 ± 2.8% and 15.5 ± 2.5% p = 0.02; CFV = 1.34 ± 0.28 and 1.15 ± 0.25% p = 0.03; NBPA = 4.9 ± 2.7 and 10.2 ± 3.8 p = 0.00 respectively.

Conclusion: Patients with H and OSA and without cerebral stroke during of the life history have inhibited cerebrovascular reactivity and decrease in adequacy of the answer of arterial blood circulation of a brain in condition of hypercapnia. New coefficient normalized to BP autoregulation answer NBPA was very perceptible for these patients.
systolic blood pressure 151 (139.3-163.1) mmHg, diastolic blood pressure 92 (88.7; 96.6). All patients took antihypertensive and antiarrhythmic treatment, and 50% had 2 and more antihypertensive drugs. All subjects underwent cardiorespiratory monitoring using “Cardiotecnika 04” device (INKART, Russia) that includes 24-hour ECG monitoring and night registration of pulse oximetry and nasopharyngeal flow. Sleep onset and duration was assessed based on the patients’ diaries.

Results: Based on cardiorespiratory study results, all patients had obstructive sleep apnea syndrome (OSAS) of different severity with median apnea-hypopnea index 18 (88.9; 97) episodes per hour: 37% have mild OSAS, 29% – moderate, and 33.3% – severe sleep breathing disorders. Saturation was 93.4% (88.9; 97), minimal saturation was 83.95% (74.2; 90.7). Based on the cardiorespiratory study with the simultaneous registration of ECG, pulse oximetry and nasopharyngeal flow (Cardiotecnika, INKART) 86.2% of subjects experienced heart rhythm disturbances: 45.5% - supraventricular arrhythmies (supraventricular tachycardia and premature heart beats), 9.1% - ventricular tachycardia, 18.2% - ventricular premature beats, 9.1% had combination of supraventricular and ventricular arrhythmias, and 18.2% had pauses more than 2000 msec. All the heart rhythm disturbances were registered during sleep. 14.8% demonstrated no arrhythmias.

Conclusion: Sleep breathing disorders (from mild to severe forms) seem to be associated with the heart rhythm disturbances that are prevalent during night-time.

PP.10.262 REPRODUCIBILITY OF BERLIN QUESTIONNAIRE TO EVALUATE RISK OF SLEEP APNEA IN PATIENTS WITH RESISTANT HYPERTENSION


Objective: Obstructive sleep apnea (OSA) increases the risk of hypertension and other cardiovascular diseases. This association seems to be stronger in resistant hypertension (RH) with a reported prevalence as high as 83%. RH is defined as uncontrolled office blood pressure (BP) despite the use of at least 3 antihypertensive drugs. As the diagnosis of OSA is too expensive, there are many screening tools to identify patients at high risk, and the Berlin Questionnaire (BQ) is the most widely used. The objective of our study is to verify the reproducibility of Berlin questionnaire among resistant hypertensives.

Design and Method: The first BQ was applied by 3 trained assistant physicians during the routine clinical evaluation in a total of 473 RH patients. The second one was repeated 10 months later in 39 randomized patients by a different physician. The BQ is composed of 9 questions divided in 3 categories (snoring, daytime sleepiness and diagnosis of hypertension) and patients are considered of high risk for OSA when 2 of them are positive.

Results: The BQ was retested in 39 RH patients (69% female, mean age 64 ± 11 years) and 59% was found at high risk for OSA (against 57% of the first BQ). High reproducibility scores (Kappa coefficient = 0.68) was found in the final result of BQ, nevertheless in the first category (snoring) the Kappa coefficient was 0.57, a moderate agreement, while in category 2 the agreement was very low (Kappa = 0.30). As we are studying a hypertensive population the category 3 was positive for all patients. Evaluating each question, the first one (“do you snore?”) has a high agreement (kappa = 0.62) and the worst one is question 7 (“how often do you feel tired or fatigued after your sleep?”) (kappa = 0.11).

Conclusions: BQ is a reproducible method for assessing the risk for OSA in patients with resistant hypertension.

PP.10.263 IS ARTERIAL STIFFNESS RELATED TO SLEEP APNEA?

L. Korostovtseva1, Yu. Sviryaev2, V. Ivanenko1, N. Zvartau1, A. Kozlenok1, A. Kalikin1, A. Konradi1. Almazov Federal Heart, Blood and Endocrinology Centre, St. Petersburg-Russia, 1No.83 FMBA Clinical Hospital, Moscow-Russia

Objective: To study the parameters of central blood pressure (BP) and pulse wave velocity (PWV) in hypertensive patients with obstructive sleep apnea syndrome (OSAS).

Methods: 64 hypertensive patients under 65 years old without any severe concomitant cardiovascular diseases were included in the study (mean age 52.3 ± 8.1, 76% males). Based on the sleep study (Embla, USA) they were divided into 2 sex- and age-matching groups: subjects with moderate-to-severe OSAS [n = 41], apnea-hypopnea index (AHI) ≥ 15h, mean AHI 45.2 ± 22.3h), and those with AHI < 15h formed the control group (n = 23, mean AHI 6.2 ± 5.3h). OSAS patients appeared to be slightly more obese (p = 0.035) and to have bigger neck circumference (p = 0.028). Central BP and carotid-femoral PWV (cPWV) were measured (SphygmoCor) in all subjects at standard conditions.

Results: Patients with moderate-to-severe OSAS had higher cPWV (9.3 ± 2.5 vs 8.06 ± 2.5 m/sec, p = 0.018), while there was no any difference in central BP parameters and augmentation index in the groups. Non-adjusted correlation analysis showed a positive correlation between cPWV and AHI (r = 0.30, p = 0.023) and negative with the minimal saturation level (r = –0.40, p = 0.035) during sleep. However, when adjusted for age and office BP only correlation with saturation level was significant (r = –0.66, p = 0.019).

Conclusion: AHI is not related to the increase of arterial stiffness, but moderate-to-severe OSAS can affect arterial vessels indirectly through profound hypoxemia during sleep.

PP.10.264 SNORE SEVERITY: POLYSOMNOGRAPHY FINDING AND MASKED HYPERTENSION IN PATIENTS WITH RECENT DIAGNOSIS OF HYPERTENSION

G. Caruso1, D. Fernández1, M. Perez1, M. Smurra1. Hospital Ramos Mejía, Caba-Argentina, 1Hospital Torcu, Caba-Argentina

Background: It’s well known that Obstructive Sleep Apnea (OSA) is independently associated with Hypertension (HTA). Although snoring is the principal manifestation of OSA, this symptom is poorly recognized. On the other hand, recent studies have assessed the prognostic value of nocturnal blood pressure (BP).

Objective: to determine in recent hypertension patients (HP) the relationship between snoring severity, polysomnography (PSG) findings and nocturnal BP profile in Ambulatory Blood Pressure Monitoring (ABPM).

Methods: We prospectively evaluated 129 HP (94 males, aged 52 ± 9) stratified by European Society of Hypertension criteria. Office measurement of BP (OBP), ABPM and PSG was performed in all HP. All patients (P) were evaluated by Berlin questionnaires. P with antihypertensive or anxiolytic therapy, smoke, alcohol abuse or respiratory pathology were excluded. Statistics analysis was performed by Kruskal-Wallis test, Chi quadradaro and Spearman correlation. p < 0.05 was considered statistically significant.

Results: The average of BP were OBP 156 ± 28/94 ± 12, 24hs BP 147 ± 20/92 ± 12; Diurnal 152 ± 21/93 ± 13 and Nocturnal 139 ± 19/91 ± 11. Nocturnal Sistolic BP (NSBP) as well as 24 Sistolic BP (24SBP) correlated with snoring severity (p < 0.01). Adjusted by age, sex and BMI, the Apnea Hypopnea Index (AHI) correlated with NSBP and 24 SBP (p < 0.01), but not with office BP. Independently of AHI level, snore severity showed correlation with NSBP (p < 0.05). Nocturnal circadian rythm was absent in 66%, 28% showed inverse dipper pattern and 19% had borderline office HTA with normal diurnal ABPM and high nocturnal BP (masked HTA).

Conclusion: In our HP with recent diagnosis, snoring and ambulatory BP levels were significantly associated with nocturnal predominance. AHI correlated with NSBP and 24 SBP. ABPM analysis showed a high incidence of non dipper and inverse dipper pattern. Interestingly, most of these patients had normal office BP with masked HTA. Ours findings showed the importance of evaluating the snoring in the initial evaluation and its relationship with nocturnal BP profile in the hypertensive patients.

PP.10.265 FEATURES OF AUTONOMIC CONTROL IN HYPERTENSIVE PATIENTS WITH SLEEP APNEA SYNDROME

O. Mamonov, J. Sviryaev, A. Konradi, E. Shlyakhto. Almazov Federal Heart, Blood and Endocrinology Centre, Saint-Petersburg-Russia

In hypertensive patients with the of Sleep Apnea-Hypopnea syndrome (SAH), the disease often has a more malignant character. One of the reasons for poor control of hemodynamic in patients with SAH may be more significant violations of autonomic regulation of circulation.

Objective: To assess autonomic regulation in hypertensive patients depending on the severity of SAH.

Patients and Methods: 2 groups of patients with essential hypertension without associated clinical conditions: 37 patients with SAH and 40 patients without SAH, the mean age of patients in these groups, 52.1 ± 9.7 and 54.3 ± 7.8 years. Patients in both groups received combination antihypertensive therapy. All patients underwent ambulatory BP monitoring, evaluation of spontaneous arterial baroreflex (ABD), the Valsalva index (VI), the...
vasomotor component of the cardiopulmonary baroreflex (VC CPBR) and cold vasomotor reactivity (CVR). Patients with clinical signs of SAH were performed polysomnography.

**Result:** The study revealed that, despite a comparable antihypertensive therapy in patients with SAH, we had higher levels of daily diastolic blood pressure: 87.3 ± 9.6 and 76.7 ± 10.8, p < 0.01 and reveal a tendency to increase systolic BP: 136.4 ± 21.4 and 128.4 ± 11.8, p = 0.08. The value of ABR did not reach statistical difference: 6.1 ± 3.1 and 6.7 ± 3.1 mmHg, p > 0.05, however, in SAH group, the value of the ABR was inversely associated with the apnea-hypopnea index: r = -0.45, p < 0.01. At the same time, in patients with SAH, a decrease of VI: 1.45 ± 0.22 and 1.72 ± 0.25, p < 0.01, that indicating a decrease in the chronotropic control of heart rate in this group. Significant differences in VC CPBR also were not found: 11.6 ± 12.1 and 17.3 ± 9.6%, p > 0.05, however, in patients with SAH forearm blood flow was lower: 3.7 ± 1.7 and 6.5 ± 2.6 ml/min 100 cm², p < 0.01, whereas CVR was higher: 42.1 ± 12.1 and 28.6 ± 10.4%, p < 0.01, indicating the increase in vascular tone and nonspecific reactivity in patients of this group.

**Conclusion:** In patients with SAH blood pressure augmentation combined with increase of the muscularocutaneous vessels resistance and nonspecific vasomotor reactivity, whereas nonspecific chronotropic reactivity is decreased. The decrease in the same baroreflex regulation of heart rate is associated with the severity of sleep apnea.

**PP.10.266 OBSTRUCTIVE SLEEP APNEA SYNDROME (OSAS) AND OBESITY AS THE CAUSE OF PRIMARY HYPERALDOSTERONISM (PA) IN A POPULATION WITH RESISTANT HYPERTENSION**


**Background:** The prevalence of Primary Hyperaldosteronism (PA) in patients with resistant hypertension is approximately 20%. Hyperaldosteronism may be present in obesity, Diabetes and OSAS. We assessed the prevalence of PA in our population with hypertension resistant (IRA) inflows in 2009 in our center and evaluated the clinical features.

**Material and Methods:** In a year were visited for the first one 341 patients (190m and 151 F) with a mean age of 57.8. Fifty-six patients appeared to be affected by IRA by pharmacology history and blood pressure measurement. All 56 patients were studied for secondary hypertension with hormone assays, ultrasound of the kidneys and adrenal glands, echocardiodoppler renal artery, renal and adrenal CT. polysomnography. The Primary Hyperaldosteronism (idiopathic IHA and adrenal adenoma APA) was studied by PAC/PRA > 40, and subsequent spiral CT kidneys and adrenal glands.

**Results:** In 21 patients there was a PAC/PRA > 40. Average age was 54 years. BMI 32 ± 4. All patients were under treatment at least three drugs with PAS average 156 ± 10mmHg and diastolic 98 ± 6mmHg In 5 patients were subsequently diagnosed with APA treated with endoscopic surgery. In 16 patients with IHA: 8 patients had bilateral adrenal hyperplasia. 10 patients were affected by OSAS and 5 patients were diabetics. The 16 patients with IHA were treated with spironolactone 50mg resulting in a reduction in blood pressure SBP = 140 ± 6mmHg PAD = 85 ± 4mmHg.

**Conclusion:** In PA there is a small percentage of APA in patients with IHA other pathology (OSAS, obesity, diabetes) may be the cause.

**PP.10.267 EFFECT OF CPAP ON BLOOD PRESSURE CONTROL IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA SYNDROME**

A. Panoutsopoulos1, A. Pappas2, E. Koroboki1, A. Kallianos1, K. Kostopoulos2, E. Manios1, E. Lagoudianakis2, F. Rosi2, C.H. Kostopoulos1, N. Zokopoulou1, 3Department of Therapeutics - Alexandra Hospital, Nafplio-Greece, 2General Hospital of Argo, Argos-Greece

**Introduction:** The relationship between obstructive sleep apnea syndrome (OSAS) and hypertension has well been established by many researchers. Nevertheless published data regarding the effect of CPAP on blood pressure reduction remain inconclusive.

**Aim:** To assess the effect of CPAP therapy on 24-hr blood pressure (BP) measurements in patients with OSAS.

**Methods:** Our study included 18 patients without known cardiovascular disease, diagnosed with OSAS on overnight polysomnography. In all patients ambulatory blood pressure was recorded for 24hr at baseline and 3 months after CPAP treatment.

**Results:** Ten male and eight female patients with a mean age of 57 ± 11 years old and an average body mass index of 32 ± 5 participated in our study. The patients’ 24hr systolic BP (123 ± 11 vs. 129 ± 16 mmHg) and PP (47 ± 9 vs. 52 ± 10 mmHg) and nighttime systolic BP (118 ± 12 vs. 125 ± 16 mmHg) and PP (47 ± 10 vs. 52 ± 11 mmHg) showed a minor improvement (p = 0.06). No changes were detected during day-time measurements.

**Conclusion:** Our results suggest that CPAP therapy is associated with a mild decrease in blood pressure. This beneficial effect is mainly attributed to the reduction of the nocturnal blood pressure. Current data suggest that patients with refractory hypertension appear to benefit more from CPAP treatment in terms of blood pressure reduction. The small number of enrolled patients along with the fact that our study sample consisted of patients with no prior history of hypertension might account for our failure to provide with statistically significant results.
We enrolled 30 patients (55.1% short-term continuous positive airway pressure (CPAP) therapy. Deteriorates left ventricular systolic longitudinal function at early, subclinical newly-developed ECHO-based techniques (strains imaging) suggested that OSA tricles dysfunction has been well documented. Furthermore, studies utilizing PATIENTS WITH OBSTRUCTIVE SLEEP APNEA K. Kunicz, E. Swierbelska, J. Wolf, W. Kucharska, R. Nowak, A. Korzen-Burakowska, L. Bieniaszewski, K. Narkiewicz. Department of Hypertension and Diabetology, Medical University of Gdansk, Gdansk-Poland Objective: The link between obstructive sleep apnea (OSA) and cardiac ventricles dysfunction has been well documented. Furthermore, studies utilizing newly-developed ECHO-based techniques (strains imaging) suggested that OSA deteriorates left ventricular systolic longitudinal function at early, subclinical stage. We tested the hypothesis whether these abnormalities may be reversed by short-term continuous positive airway pressure (CPAP) therapy.

Design and Methods: We enrolled 30 patients (55.1 ± 6.5 years old, BMI 32.9 ± 4.9 kg/m², mean ± SD) with newly diagnosed moderate- to severe OSA (AHI = 37.9 ± 19, SpO2 ≥ 93% of patients) who were subsequently titrated to effective short-term CPAP (7 ± 2 nights). CPAP treatment efficacy was based upon device’s inbuilt computer logs (treatment time, apnea-hypopnea indices, leakage, AutoSet, ResMed™). All patients underwent echocardiography (Vivid 7 Pro™ with 2.0-3.6 MHz transducer) before, and after one week of effective (AHI < 5) CPAP. Two-dimensional (2D) longitudinal strains were measured using 2D strain analysis system (GE Echopack™). Conventional 2D and Doppler mitral/tricuspid inflow parameters, and tissue Doppler velocities were also acquired. Four patients were excluded from further analysis due to poor CPAP compliance.

Results: Systolic and diastolic office blood pressures were not influenced by CPAP treatment (P = 0.56 and P = 0.20, respectively). CPAP therapy had differential effects on echocardiographic measurements: (1) intraventricular septal (IVS) strains decreased from -15.9 ± 4.5 % to -17.2 ± 3.8 %, P = 0.03 (95% CI for differences from 0.1% to 2.5%), whereas (2) no significant changes in inferior wall (IW) strains were observed (-18.3 ± 4.6% to -18.4 ± 5%, P = NS; 95% CI for differences from -1.6% to 1.8%). No correlation between AHI and IVS in response to CPAP was found (R = 0.22, P = NS). However, significant correlations were found between IVS strains and diastolic performance indices of both ventricles (table). While the strength of the relationship for LV-derived indices remained intact after CPAP, apnea elimination attenuated these correlations for right ventricle (table).

Conclusions: Short-term CPAP therapy for sleep apnea improves IVS strains independently of blood pressure changes. Since we found differential effects of CPAP treatment on particular strains, the role of segmental strains as an early ECHO-derived marker of heart muscle dysfunction in OSA patients needs to be further tested.

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<th>IVS strain before CPAP</th>
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E. A early and diastolic mitral inflow velocity; E’E’-early diastolic mitral annulus velocity septum site; E’RV early diastolic tricuspid annulus velocity.

Objective: To evaluate the frequency of common secondary hypertension causes – renal artery stenosis (RAS) and primary hyperaldosteronism (PHA), depression and sleep disorders – insomnia and obstructive sleep apnea (OSA) - in patients with true resistant hypertension and preserved renal function participating in the ongoing study.

Design and Methods: From the group of 114 patients with true resistant hypertension (defined as clinic BP > 140/90 and ambulatory daytime mean BP > 135/85 mmHg staying on 3 antihypertensive drugs including diuretic), without diabetes and impaired renal function (eGFR > 60ml/min/1.73m²) referred to our Clinic in years 2009-2010 we included 100 patients (55 M, 45 F, mean age 48.6 ± 9.3 years) without primary aldosteronism or Cushing disease. All patients underwent full night polysomnography. In all patients metabolic syndrome (MS) components as well as albuminuria were assessed. The subcutaneous fat volume (SFV) and intra- abdominal visceral fat volume (VFV) were measured at the level of the umbilicus using a standardized method with a computed tomography scan.

Results: There were no differences in men and women in the frequency of abdominal obesity and SFV between men and women. Men were characterized by higher VFV (23.5 ± 5.8 cm³ vs. 14.2 ± 7.8 cm³; p < 0.001), higher BMI and a tendency towards higher frequency of MS (65.4% vs. 50%; p = 0.09) and impaired fasting glucose level (54.5% vs. 40%; p = 0.1). Moderate-severe OSA (apnea/hypopnea index [AHI] > 15) occurred more frequently in men than women (65.5% vs. 20%; p < 0.001). VFV but not SFV correlated with AHI (r = 0.42; p < 0.001), plasma fasting glucose and glucose in glucose tolerance test levels, with uric acid level and GFR as well as with triglyceride plasma level. Both VFV and SFV correlated with HDL plasma level. VFV was characterized by the strongest correlation with neck circumference (r = 0.81; p < 0.001).

Conclusions: In our studied group of patients with true resistant hypertension more pronounced visceral obesity was related to more frequent metabolic abnormalities and OSA severity in men as compared with women.

Objective: Function assessment of endothelium by endothelial-dependent response of the brachial artery in hypertensive patients (pts) with obstructive sleep apnea (OSA).

Design and methods: The study sample consisted of 60 hypertensive patients. They were divided into two groups consisted of 40 pts (1gr) with previously diagnosed moderate/severe hypertension (SBP24 = 163 ± 7; DBP24 = 112 ± 12) and of 20 pts (2gr) controls. 20 pts from 1gr had moderate/severe obstructive sleep apnoea (AHI = 46.3 ± 3.7). Continuous positive airway pressure therapy (CPAP) was administered to 20 patients for 6 months. The participants were matched for age, weight and had no any lipid or carbohydrate metabolism disorders. The brachial artery diameter was measured in all pts during the rest and on 60, 90, 120 min after CPAP therapy in 2D-scan mode. The standard polycromaticographic procedure via EMBLA Flaga (Australia) and 24-hour blood pressure measurements via SpaceLabs 90207 (USA) were performed for 40 subjects.

Results: Flow-dependent vasodilatation (FV), measured in brachial artery in 1gr (m = 6.65 ± 3.0%) was significantly lower than in healthy controls (m = 11.6 ± 3.1%) (p < 0.001). In 20 pts from 1gr with moderate/severe OSA FV (m = 4.93 ± 2.42%) was also significantly lower than in corresponding controls (p < 0.001) and was lower than in hypertensive patients (m = 20 with-
INCIDENCE OF OBSTRUCTIVE SLEEP APNEA AND COMMON SECONDARY HYPERTENSION CAUSES IN PATIENTS WITH TRUE RESISTANT HYPERTENSION

E. Florczak, E. Warchol1, A. Prejblisz3, P. Bielen2, P. Sliwinski2, A. Klosiwicz1, I. Michalowska1, H. Janaszek-Sitkowska1, M. Januszewicz1, L. Cendrowska-Demkow1, E. Szwench1, P. Hoffmann1, A. Januszewicz1, A. Wiecek1, K. Narkiewicz3, 1Institute of Cardiology, Warsaw-Poland, 2Institute of Tuberculosis and Pulmonary Diseases, Warsaw-Poland, 3Medical University of Silesia, Katowice-Poland, 1Medical University of Gdansk, Gdansk-Poland

Objective: To evaluate the frequency of obstructive sleep apnea (OSA) and secondary hypertension causes, including renal artery stenosis (RAS) and primary hyperaldosteronism (PHA), in patients with true resistant hypertension and preserved renal function participating in the ongoing study.

Design and Methods: In our ongoing study we investigated 114 patients (67 M, 47 F, mean age 48.6 ± 9.7, range 19 – 65 yrs) with true resistant hypertension (defined as clinical BP > 140/90 and ambulatory daytime mean BP > 135/85 mmHg staying on 3 antihypertensive drugs including diuretic), without known diabetes and impaired renal function (eGFR > 60ml/min/1.73m²) referred to our Clinic in years 2009-2010. All patients underwent thorough examination including: full night polysomnography, renal artery CT scan, adrenal and renal CT scan and standard hormonal evaluations for PHA, pheochromocytoma and Cushing syndrome (CS). Left ventricular mass index (LVMI) and echocardiography tissue Doppler indices (including E' and E/E') were calculated.

Results: OSA (apnea/hypopnea index [AHI] > 5) was diagnosed in 83 patients (73%). Moderate-severe OSA (AHI > 15) occurred in 54 patients (47%), more frequently in men than women (67% vs.19%; p < 0.001). Patients with OSA were characterized by older age, higher BMI, relative wall thickness (RWT), E' index and more frequent metabolic syndrome. RAS occurred in 4 patients (3.5%), PHA was diagnosed in 12 patients (11%) and CS was found in 2 patients (2%). In none of the patients pheochromocytoma was diagnosed. RAS, PHA and CS were diagnosed in 18 patients (16%). Those patients were characterized by non-significantly more frequent left ventricular hypertrophy and higher RWT. There were no differences in other clinical features studied. Adrenal incidentalomas were found in 6 patients (6%).

Conclusions: Our study demonstrated a very high frequency of OSA in patients with truly resistant hypertension. This warrants OSA screening in this group of patients.

INCIDENCE OF OBSTRUCTIVE SLEEP APNEA ON AMBULATORY BLOOD PRESSURE MEASUREMENTS REPEATABILITY IN NEVER TREATED HYPERTENSIVE PATIENTS

A. Prejblisz, G. Kowalewski, M. Makowiecka-Ciesla, E. Florczak, P. Slivinski, P. Bielen, B. Pucilowska-Jankowska, K. Paschalis-Purtak, M. Kluk, M. Kabat, A. Januszewicz, 1Institute of Cardiology, Warsaw-Poland

Objectives: To evaluate the relationship between obstructive sleep apnea (OSA) and repeatability of ambulatory blood pressure measurement (ABPM) in patients with untreated hypertension.

Design and methods: From the group of 121 patients with never treated hypertension we included 94 patients (72M, 22F; mean age 37 ± 10; range 18-58 yrs) with valid two ABPMs taken 7 days apart on the same week day. All patients underwent polysomnography - apnea/hypopnea index (AHI) was calculated. According to AHI patients were divided into 2 groups: 1 - without OSA (AHI ≤ 5 n = 46), 2 - with OSA (AHI ≥ 5 n = 48). We evaluated the agreement between paired ABPMs by Bland and Altman’s method. The repeatability coefficient (RC) for the evaluation of the repeatability was employed. The repeatability coefficient as a percentage of the mean of the repeat measurements (%M) and the percentage of close to maximal variation (%MV) were also calculated.

Results: There were no significant differences in mean BP daytime and nighttime levels and nighttime decline between the groups. There was no difference between both measurements in first and in the second group. There were no differences in nighttime SBP and DBP declines between 1 and 2 recordings in both groups. Group 2 was characterized by worse repeatability indices (Table). 37% of patients had changed their dipping status – 40% in the group with OSA, 35% in the group without OSA.

Conclusions: In our studied group of never-treated hypertensive patients, patients with OSA were characterized by lower ABPM reproducibility, what should be taken into consideration when performing ABPM in this group of patients.

EFFECT ON CEREBRAL BLOOD FLOW OF THE THERAPY OF CONTINUOUS POSITIVE AIRWAY PRESSURE IN PATIENTS WITH MODERATE HYPERTENSION AND OBESITY

A. Aksenova, A. Litvin, P. Galitsin, M. Bugriy, E. Elfimova, M. Bolotova, V. Sergienko, I. Chazova. Russian Cardiology Research Center Department of Hypertension, Moscow-Russia

Objective: To explore opportunities to improve perfusion of the brain in hypertensive and obesity patients (pts) after 6 months therapy.

Design and methods: The study sample consisted of 49 pts. They all had moderate hypertension (SBP = 153 ± 11 mm Hg; DBP = 93 ± 9 mm Hg) and obesity (body mass index 35 ± 5). All patients underwent overnight polysomnography (EMBLA Flaga [Iceland]). They were divided into three groups (gr). Gr.I and gr.II had severe OSAHS, apnea-hypopnea index (AHI ≥ 5), (p = 0.001). According to AHI patients were divided into 2 groups: 1 - without OSA (AHI ≤ 15); 2 - with OSA (AHI ≥ 15). We evaluated the agreement between paired ABPMs by Bland and Altman’s method. The repeatability coefficient (RC) for the evaluation of the repeatability was employed. The repeatability coefficient as a percentage of the mean of the repeat measurements (%M) and the percentage of close to maximal variation (%MV) were also calculated.

Results: There were no significant differences in mean BP daytime and nighttime levels and nighttime decline between the groups. There was no difference between both measurements in first and in the second group. There were no differences in nighttime SBP and DBP declines between 1 and 2 recordings in both groups. Group 2 was characterized by worse repeatability indices (Table). 37% of patients had changed their dipping status – 40% in the group with OSA, 35% in the group without OSA.

Conclusions: In our studied group of never-treated hypertensive patients, patients with OSA were characterized by lower ABPM reproducibility, what should be taken into consideration when performing ABPM in this group of patients.
patients who had undergone for invasive treatment; (2) description of clinical characteristics of ACS patients at high risk of OSA; (3) evaluation the relationship between high risk of OSA and hypertension.

**Design and Methods:** We prospectively studied consecutive patients satisfying entry criteria (mean age 57.1 ± 8.7 SD). 68% males admitted to the tertiary university hospital. A total of 158 acute myocardial infarction patients evaluated for potential OSA were given a sleep questionnaire (BQ and ESS). High risk was defined as cumulative high risk based on BQ and ESS scores > 10.

**Results:** Fifty four (34.2%) patients were at high risk and 104 (65.8%) at low risk of OSA. On admission, patients at high risk of OSA had significantly higher mean body mass index (32.3 ± 4.6 vs. 27.5 ± 3.8 kg/m²; p < 0.0001), mean body surface area (2.1 ± 0.2 vs. 1.9 ± 0.2; p < 0.0001), and were more often obese (64% vs. 22.7%; p < 0.0001). High risk of OSA patients had often history of hypertension (92.6% vs. 55.8%; p < 0.0001) and diabetes mellitus (37% vs. 15.4%; p = 0.0049) compared to the patients at low risk. Patients at high risk of OSA had significantly higher resting heart rate (83 ± 14 vs. 80 ± 22 beats per minute; p = 0.036), systolic blood pressure (149.9 ± 34.2 vs. 128.4 ± 23.6 mmHg; p < 0.0001), diastolic blood pressure (87.7 ± 17.4 vs. 76.2 ± 12.1 mmHg; p < 0.0001). Their left ventricular diastolic diameter (52.2 ± 7.3 mm vs. 48.2 ± 5.1 mm; p = 0.01), left ventricular mass index (13.6 ± 4.7 g/m² vs. 9.1 ± 2.4 g/m²; p = 0.0001), interventricular septal thickness (12.6 ± 2.4 vs. 11.5 ± 1.7 mm; p = 0.0028) were increased compared with low-risk subjects. The left ventricular mass (300.7 ± 105.7 g vs. 237.5 ± 59.6 g; p = 0.0022) and left ventricular mass index (140.3 ± 47.4 vs. 122.8 ± 28.2 g/m²; p = 0.023) were significantly higher in high-risk patients. In multiple logistic regression analysis, hypertension, history of body mass index, diastolic blood pressure, left ventricular diastolic diameter, left ventricular mass index, interventricular septal thickness were independent risk factors for high risk of OSA.

**Conclusions:** (1) In the study population of ACS patients every third patient was at high risk of OSA; (2) On admission, patients at high risk of OSA had significantly higher systolic and diastolic blood pressure; (3) Hypertension was highly prevalent in patients with suspected OSA.

**PP.10.270** **RELATIONSHIP BETWEEN ARTERIAL STIFFNESS AND OBSTRUCTIVE SLEEP APNEA SYNDROME WITH METABOLIC SYNDROME**

H. Mitsuibayashi, M. Ootou, A. Komori, T. Ishii, M. Nakauma, A. Suzuki, Y. Nakahara, H. Mitsuibayashi, The Nippon Dental University Hospital, Tokyo-Japan

**Purpose:** The aim of this study was to evaluate the relationship between the effect of continuous positive airway pressure (CPAP) and the change of arterial stiffness in obstructive sleep apnea hypopnea syndrome (OSAHS) with metabolic syndrome (MS).

**Methods:** Thirty five OSAHS males with MS as experimental groups and twenty five OSAHS males without MS as controls were enrolled and were evaluated by polysomnography (PSG) during sleep. AH1 subjects were 30-70 years old in hospital from April 2005 to September 2010. Cardio-ankle vascular index (CAVI) is superior to estimate the extent of atherosclerosis in large arteries. Therefore, We measured CAVI as arterial stiffness in all subjects before and after CPAP treatment.

**Result:** Apnea-hypopnea index (AHI) in OSAHS males with MS group higher than that in control group (39.7 ± 32.5 p < 0.05). CAVI in OSAHS males with MS group were similar to that in control group (8.58 ± 8.33). After CPAP treatment, AHI decreased in both groups (5.1 vs 4.8 n.s.). CAVI in OSAHS males with MS group strongly decreased compared to control group (6.16 vs 7.15 p < 0.01).

**Conclusion:** To conclude, these findings suggest the improvements of CAVI in OSAHS males with MS by CPAP that may contribute to improvements of insulin resistance.
Methods: The study included 99 patients with heavy form OSAS (mean index apnea/hypopnea in the group was 42.4 ± 1.8). All patients had general clinical examination, office blood pressure (BP) measurements taken, twenty-four-hour ambulatory blood pressure monitoring (ABPM), glucose level measurements, lipidogram. The average subjects’ age was 49.3 ± 1.2 years old, body mass index - 34.76 ± 0.8 kg/m².

Results: Initial level of mean office SBP and DBP in the whole group was 164.28 ± 1.42 mm Hg and 92.28 ± 0.94 mm Hg. According to the ambulatory twenty-four-hour blood pressure monitoring in 91 (92%) subjects had increased blood pressure in both the active and the passive period of the day. The level of the SBP and DBP in the whole group was 143.06 ± 1.4 mm Hg and 86.01 ± 1.2 mm Hg. It is now considered proven that people with insufficient (less than 10%) BP decrease at night and night hypertension have a higher risk of developing cardiovascular complications. Patients in the study group had SI BP lower than the normal, which suggests the lack of blood pressure decrease with these subjects during the night. Possible mechanisms underlying the development of hypertension in these subjects are intermittent hypoxia during the night, the stimulation of peripheral chemoreceptors, sympathetic activation and renin-aldosterone system activation. The average level of glucose in the group was 5.85 ± 0.2 mmol/liter. First identified diabetes was diagnosed in 10.0% patients, carbohydrate tolerance disorder was detected in 23.2% subjects. Total cholesterol level in the group was 6.25 ± 0.1 mmol/L, the increase of cholesterol level was detected in 77.8% patients. Triglyceride level in the group was 2.4 ± 0.3 mmol/l and in 56.6% patients it exceeded the norm.

Conclusion: We can make a conclusion about the influence of the respiratory disorders during the sleep on the development of hypertension, disorders of carbohydrate and lipid metabolism in subjects with OSAS. Taking into account this data, general practitioner must pay attention to symptoms of disordered breathing during the sleep in patients, especially the ones with cardiovascular disease, to assess their condition and choose the adequate therapy for such patients.
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PP.11.281 RENAL RESISTIVE INDEX AS A NEW INDEPENDENT RISK FACTOR FOR NEW-ONSET DIABETES MELLITUS AFTER KIDNEY TRANSPLANTATION


Introduction: Pulse pressure (PP), a marker of aortic stiffness, was shown to be an independent risk factor for new-onset diabetes after transplantation (NODAT). The exact link between PP and NODAT is unknown.

Patients and Methods: Intra-renal resistive index (RI), used as a marker of widespread microvascular damage, was assessed early after transplantation in 65 renal transplant recipients, and the incidence of NODAT was analyzed during follow-up (median: 5.7 years [extremes: 0.3-21.4], total observation period: 4908 patient-years).

Results: The incidence of NODAT was 7.7%, 11.2%, and 14.6% at 1, 5, and 10 years after transplantation, respectively. RI at the 3-month visit was a predictor of NODAT (hazard ratio (HR) per 0.1: 1.35 [1.15-1.59], p = 0.0001), even after multiple adjustments. RI measured at 1 year of disease (HR per 0.1: 1.43 [1.15-1.76], p < 0.0001) and at 10 years of disease (HR per 0.1: 1.22 [1.06-1.41], p = 0.0069) were predictors of NODAT. Patients with RI >0.73 (p < 0.0001), and was associated with NODAT using univariate analysis (HR per 0.1: 1.09 [1.04-1.14], p = 0.0025) but not after adjustment on RI (HR: 1.00 [0.96-1.14], P = 0.1328).

Conclusions: RI is an independent predictor of NODAT. The relationship between PP and NODAT seems mediated by increased RI, suggesting that aortic stiffness may lead to pancreas microvascular damage.

PP.11.282 BLOOD PRESSURE AND KIDNEY FUNCTION IN PATIENTS WITH TYPE 2 DIABETES MELLITUS: RESULTS OF THE PROSPECTIVE STUDY SKIF-2

B. Mankovsky, D. Ivanov. National Medical Academy for Postgraduate Education, Kiev-Ukraine

Objective: Our previous epidemiologic study SKIF in 1692 patients with type 2 diabetes mellitus showed a 94% prevalence of hypertension and that 24% of patients had a glomerular filtration rate (eGFR) below 60 mL/min. In SKIF-2 we assessed the effect of perindopril/indapamide combination on blood pressure (BP) and renal function in patients with type 2 diabetes mellitus in the setting of routine clinical practice.

Design and Method: In 637 patients with type 2 diabetes mellitus aged above 40 years, baseline systolic and diastolic BPs were 161.9 ± 0.5 mm Hg and 95.2 ± 0.3 mm Hg (mean ± SEM). All patients were given perindopril 5 mg/indapamide 1.25 mg once daily, which after 4 weeks was increased to perindopril 10 mg/indapamide 2.5 mg if necessary to reduce BP to below 130/80 mm Hg. The eGFR was monitored before and after the follow-up period.

Results: Perindopril/indapamide significantly reduced systolic and diastolic BPs in 12 weeks to 127.2 ± 0.3 and 78.7 ± 0.2 mm Hg, respectively. Target BP (below 130/80 mm Hg) was achieved in 489 (73.3%) patients. Compared with baseline, systolic and diastolic BPs, respectively, were reduced by 34.7 mm Hg and 16.5 mm Hg (P < 0.001) in patients on perindopril 5 mg/indapamide 1.25 mg and 38.4 mm Hg and 15.8 mm Hg in those on perindopril 10 mg/indapamide 2.5 mg. eGFR increased significantly from 84.3 ± 1.1 to 94.7 ± 1.1 mL/min (P < 0.001).

Conclusion: Perindopril/indapamide significantly reduced BP and increased eGFR in 637 type 2 diabetes mellitus patients in the setting of routine clinical practice. These results confirm the efficacy of the combination perindopril/indapamide already demonstrated in the 11,140 type 2 diabetic patients of the ADVANCE trial.

PP.11.283 PULSE WAVE ANALYSES IN TYPE 2 DIABETIC SUBJECTS WITH HYPERTENSION


Background: Cardiovascular risk is more severe in hypercholesterolemic hypertensive subjects with than without diabetes mellitus type 2 and is expected to differ in terms of pulsatile arterial hemodynamics including pulse wave velocity (PWV), wave reflections (WR), pulse pressure amplification (PPA).

Material and Methods: Hypertensive subjects were divided into 2 groups for the same age, sex, heart rate, and mean blood pressure (MBP >105mmHg) including 216 non diabetic and 122 diabetic subjects with 51 under and 71 without insulin treatment. Pulse wave analysis was performed in all patients.

Results: PWV was markedly higher (p <0.001) in diabetic than in non-diabetic subjects with, in the former group, a significantly higher ß index value relating PWV to pulse pressure. WR was significantly lower in diabetic than in non-diabetic subjects. Under insulin treatment, PWV, but not WR and PPA, was increased significantly.

Conclusion: Diabetic subjects have more severe pulsatile arterial hemodynamics than non-diabetic subjects for the same MAP, i.e. with higher PWV, lower WR and unchanged PPA, resulting in a more severely disturbed cardiac function. Insulin treatment and PWV, but not WR and PPA, are positively associated. (n = 186)

PP.11.284 EFFECTS OF TIME OF DAY OF HYPERTENSION TREATMENT ON THE AMBULATORY BLOOD PRESSURE PATTERN OF PATIENTS WITH DIABETES: THE HYGIA PROJECT


Objectives: Hypertensive patients with diabetes are at a greater risk for cardiovascular events than non-diabetic subjects. It has been reported that > 89% of hypertensives ingest all their blood pressure (BP)-lowering medication in the morning. Moreover, non-dipping is associated, among other factors, with the absence of homogeneous 24h therapeutic coverage when subjects are treated with single morning doses. Accordingly, we investigated the impact of the time of day of hypertension treatment on the BP pattern of hypertensive patients with diabetes participating in the Hygia Project, designed to evaluate prospectively cardiovascular risk by ambulatory BP monitoring (ABPM) in primary care centers of Northwest Spain.

Methods: We studied 1766 hypertensive patients with type 2 diabetes (1084 men/682 women), 66.5 ± 10.6 years of age. Among the subjects, 398 were untreated at the time of ABPM, 432 were treated with all BP-lowering medication ingested upon awakening, and the remaining subjects were ingesting ≥1 medication at bedtime. Hypertension was defined as an awake BP mean ≥ 125/75 mmHg for systolic/diastolic BP, or an asleep BP mean ≥ 110/60 mmHg, or BP-lowering treatment. BP was measured at 20-min intervals from 07:00 to 23:00h and at 30-min intervals at night for 48h. During monitoring, subjects maintained a diary listing the times of going to bed at night and awakening in the morning.

Results: Among untreated patients, 62.8% were non-dipper (including 12.3% with a riper pattern). Among subjects ingesting all BP-lowering medication upon awakening, the prevalence of extreme-dipper, dipper, non-dipper and riser BP patterns were 4.2, 29.2, 49.3 and 17.4%, respectively (P = 0.246 for

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prevalence of non-dipper/riser pattern compared to untreated subjects). The prevalence of patients with sleep-time relative systolic BP decline < 10% (non-dipping, including rising) was lowest among subjects ingesting all their prescribed medication at bedtime (53%; P = 0.016 compared to untreated subjects; P = 0.001 compared to patients treated upon awakening).

Conclusions: In hypertensive patients with diabetes, treatment at bedtime is characterized by increased sleep-time BP control and a significantly lower prevalence of a non-dipper BP pattern. These two novel therapeutic targets have already been shown to significantly reduce cardiovascular morbidity and mortality.

**PP.11.285** THE PROGNOSTIC VALUE OF ULTRASOUND ASSESSMENT OF EXTRACRANIAL CEREBRAL CIRCULATION IN HYPERTENSIVE PATIENTS WITH OR WITHOUT DIABETES MELLITUS

A. Gavrilia, C. Searpe, A. Rosu, M. Ciobanu, M. Chirion, C. Morgosanu, S. Marinescu, I. Isoc, V. Sarcea. *University Hospital C.F., Craiova-Romania*

The aim: of the study was to estimate how the ultrasound parameters of the carotid arteries correlate with prognostic of hypertensive patients with or without diabetes mellitus (DM).

Material and Methods: 40 hypertensive patients(pts), mean age = 58.2 ± 7.8 years, 52.5% males - group 1 and 40 hypertensive pts with DM, matched for age and sex, mean age = 59.8 ± 7.3 years, 55% males - group 2. Vascular ultrasound parameters performed were: thickness of intima-media layer (IMT) in common carotid arteries (CCA), peak systolic velocity (PSV) in internal carotid arteries (ICA), end diastolic velocity (EDV) in ICA, resistance index (RI) in ICA, peak systolic velocity ratio (PSVR) in ICA and CCA and two Doppler pts were evaluated during one year in order to detect the following complications: unstable angina (UA), non-ST-segment-elevation myocardial infarction (NSTEMI), transient ischemic stroke (TIS) ischemic stroke (IS).

Results: In group 1, UA was significantly associate with higher EDV in ICA (28.2 ± 2.7 cm/s vs 16.1 ± 1.7 cm/s, p = 0.02). In the same group, TIS was found in a significantly higher proportion at pts with greater IMT in CCA (0.3 ± 0.3mm vs 0.4 ± 0.2mm, p = 0.01). In group 2, UA was significantly associated with a greater RI in ICA (0.74 ± 0.09 vs 0.59 ± 0.11, p = 0.04). NSTEMI was significantly more frequent at pts with greater RI in ICA (0.75 ± 0.11 vs 0.58 ± 0.12, p = 0.03) and with higher PSVR in ICA and CCA (2.53 ± 0.13 vs 1.21 ± 0.2, p = 0.008). In the same group, TIS was found in a significantly greater proportion at pts with higher EDV in ICA (27.3 ± 2.8 cm/s vs 18.2 ± 2.1 cm/s, p = 0.03). IS was significantly associated with greater PSVR in ICA and CCA at hypertensive pts with DM (2.51 ± 0.18 vs 1.12 ± 0.22, p = 0.001).

Conclusions: Greater IMT in CCA and higher level of EDV in ICA and of PSVR in ICA and CCA seem to predict a worse mid term outcome (one year) concerning cardiovascular events at hypertensive pts, especially with DM. Moreover, higher RI in ICA appears to have more powerful mid term prognostic value (one year) for incidence of acute coronary syndromes without ST-segment elevation at hypertensive pts with DM.

**PP.11.286** TREATMENT MANAGEMENT AND COMPLIANCE WITH INTERNATIONAL GUIDELINES FOR PRIMARY AND SECONDARY PREVENTION OF CARDIOVASCULAR DISEASES IN PATIENTS WITH TYPE II DIABETES MELLITUS IN OUTPATIENT CARE INSTITUTION IN MOSCOW (PHARMACOEPIDEMIOLOGICAL STUDY)

Y. Tsiruleva. *Outpatient Clinic, Moscow-Russia*

Objective: To evaluate the treatment management in patients with hypertension, coronary artery disease (CAD), dyslipidemia and diabetes mellitus in routine general practice and assess compliance with international guidelines for primary and secondary prevention of cardiovascular diseases.

Design and Methods: The retrospective single-step review of 1146 medical records of patients with type II diabetes mellitus was carried out in outpatient care institutions of Moscow city during the period from 2004 till 2006. The quality of primary and secondary preventive measures and recommended pharmacotherapy of CAD in patients with type II diabetes was estimated according to the delivery rate of up-to-date international and domestic guidelines for management of such patients.

Results: There were females 849 (74.1%) and 297 (25.9%) males. Obesity was registered in 527 (46%) patients diabetes mellitus type II, high weight in 357 (31.2%) and only 121 (10.6%) patients had normal weight. Arterial hypertension was detected in 1015 (88.6%) patients with diabetes mellitus type II. Average of the systolic blood pressure was 147.4 mm Hg, diastolic blood pressure was 85.0 mm Hg. Most of patients had II or III degree of arterial hypertension based on WHO classification, 710 (62%) patients and 218 (19%) accordingly. CAD was found in 862 (75.2%) patients with diabetes mellitus type II, angina pectoris in 736 (85.4%) patients accordingly. Basic pharmacological groups for prevention and treatment of cardiovascular diseases were: ACE-inhibitors – 53.8%, beta-blockers – 30.8%, antplatelet drugs – 21%, lipid-lowering drugs – 2.4%. Targeted blood pressure value for group < 130/80 mm Hg was registered only in 4.4% patients. Only 9.7% patients have normal cholesterol rate (< 4.5 mmol/l), triglycerides – 53% (< 1.7 mmol/l), LDL cholesterol – 18.4% (< 2.5 mmol/l) accordingly.

Conclusion: The study had revealed that in spite of the administration of cardiovascular treatment, the percentage of target blood, lipids levels are not sufficient. The improvement of the risk factors management should be implemented in the routine practice.
levels of plasma MMP-2 (23% of patients with HbA1c > 7% and 6% of patients with HbA1c ≤ 7%, ns).

Conclusions: In type 2 diabetic patients a poor glycemic control is associated with a greater impairment of LV diastolic function and a higher prevalence of plasma MMP-9 expression. The latter finding indicates a potential role of plasma MMP-9 as marker of preclinical cardiac dysfunction in diabetic cardiomyopathy.

**PP.11.289**

**THE DIFFERENCES IN THE 24-H BLOOD PRESSURE PROFILE IN HYPERTENSIVES AND DIABETIC HYPERTENSIVES**

Farzad Adl, Ali Shahvaran, Samaneh Ahsant, Ali Asghar Tavassoli. Faculty of Medicine Kazeroun University, Shiraz-Iran

Hypertension is a common problem in both normal population and diabetic patients. The purpose of this study was to examine possible differences in the 24-h blood pressure (BP) profile between hypertensives (HT) and diabetic hypertensives (DHT). This study has been done in Shiraz Beheshti Hospital during Jan-July 2010 on 63 HT and 63 DHT patients. (average age: 60-29 vs 60-22 years). There were no significant differences between mean systolic and diastolic BP during day, night and 24 hrs. (respectively 135.9/90.1, 130.6/76.8, 134.9/90.1 mmHg in HT vs 132.7/77.3, 129.4/73.1, 127.6/77.3 mmHg in DHT) (PV > 0.05). Also there were no significant differences in BP load during day, night 24-hrs (respectively 52.9%, 60.5%, 54.7% in HT vs 43.5%, 60.6%, 47.5% in DHT) (PV > 0.05). After the comparison of BP variability only night-time diastolic BP variability was significantly lower in DHT (9.5 vs 10.6 mmHg) (PV = 0.028) and there were not any other differences. Further more there was direct and significant relation ship between The amount of fasting blood glucose and night-time diastolic BP variability IN DHT (PV = 0.012, r = 0.314). So we concluded that night-time diastolic variability is lower in diabetic hypertensives. Also it is possible that an elevation of fasting blood glucose may enhanced night diastolic variability in this group.

**PP.11.290**

**EVALUATION OF EFFECTS OF GENDER ON ANTHROPOMETRIC PARAMETERS AND GLYCEMIC CONTROL IN TYPE 2 DIABETES MELLITUS**

M. Picca. P.O. Macedonio Melloni - A.O. Fatebenefratelli E. Ohtalmico, Milan-Italy

Background: Obesity, specially if abdominal, represents an important risk factor for the development of type 2 diabetes mellitus (DM). DM increases the risk of cardiovascular disease more in women than in men with a mechanism which is still unclear.

Aim: We investigated the eventual association between anthropometric parameters indicative of global or abdominal obesity and glycemic control in men and women with type 2 DM.

Materials and Methods: We evaluated 425 consecutive patients (205 men and 220 women aged 68 ± 11 years) with type 2 DM attending the Diabetes Ambulatory Care Centre of our hospital. Data about body mass index (BMI), waist circumference, waist-to-hip and waist-to-height ratio were collected and linear regression analysis was performed to evaluate their association with the levels of glycated haemoglobin (HbA1c).

Results: Among male patients, BMI resulted 28.6 ± 3.9 Kg/m², waist circumference 99.6 ± 12, waist-to-hip ratio 0.96 ± 0.05 and waist-to-height ratio 0.60 ± 0.06, with HbA1c of 5.9 ± 1.6 %; Both for men and for women no significant association was observed between HbA1c levels and BMI (r = 0.12, p = 0.10 for men; r = 0.14, p = 0.07 for women), waist circumference (r = 0.11, r = 0.19 for men; r = 0.14, r = 0.07 for women), waist-to-hip ratio (r = 0.09, p = 0.26 for men; r = 0.07, p = 0.37 for women), and waist-to-height ratio (r = 0.10, p = 0.23 for men; r = 0.12, p = 0.13 for women).

Conclusion: According to our data anthropometric parameters do not predict glycemic control in type 2 DM, similarly for men and women.

**PP.11.291**

**DIFFERENTIAL EXPRESSION PROFILES OF MICORRNA IN THE HEART OF DIABETIC RATS**


Objectives: MicroRNA are small, non-coding single strand RNA molecules, which negatively regulate gene expression at the post-transcriptional level. Each miRNA regulates many genes, playing a role in many physiopathological processes. Aim of the study was to evaluate microRNA expression profiles in diabetic cardiomyopathy in streptozotocin-induced diabetic rats.

Methods: Diabetes was induced in 8 Sprague Dawley rats by streptozotocin injection. Control rats (n = 6) underwent only buffer injection. Blood glucose was measured twice after streptozotocin injection and only rats with blood glucose levels above 250 mg/dl were considered diabetic. Three months after the onset of diabetes, rats were sacrificed and the heart was excised. Micro RNAs were extracted (Mirvana) and TaqMan Low-Density Array system was used to investigate miRNA expression in the heart. Expression differences between control and diabetic rats were confirmed with real time PCR.

Target genes were predicted by using two different algorithms (TargetScan and Miranda) and classified in intracellular pathways (KEGG). Myocardial interstitial and perivascular fibrosis was evaluated by morphometric analysis (Meta Morph 6.2) of left ventricle coronal sections previously stained with Sirius Red.

Results and Conclusion: At the end of the experimental period, diabetic rats showed a significant increase in blood glucose level (p < 0.01) and myocardial interstitial and perivascular fibrosis (p < 0.01) as compared with control rats. Three miRNAs, miR-384-5p, miR-875-5p and miR-706 were significantly down-regulated (p < 0.05) in the heart of diabetic rats, while miR-296-5p was significantly up-regulated (p < 0.05). Real time PCR confirmed the down-regulation of miR-296-5p, miR-875-5p and miR-706. Gene ontology analysis of the putative target genes of miR-296-5p identified this specific mi in TGF-β signal pathway, MAPK signaling, and extracellular matrix receptor interaction networks. These data suggest that miR-296-5p could play a role in different pathways involved in tissue fibrosis in diabetic cardiomyopathy.

**PP.11.292**

**DYNAMICS OF INTRARENAL VASCULAR RESISTANCE UNDER LONG-TERM ANTHYPERTENSIVE MONOTHERAPY WITH ACE INHIBITORS AND CALCIUM ANTAGONISTS IN HYPERTENSIVE DIABETIC PATIENTS**

O. Koshelkaya, R. Karpov. Institute of Cardiology, Tomsk-Russia

Purpose: This open randomized study was aimed to compare dynamics of intrarenal vascular resistance (IRVR) during long-term antihypertensive monotherapy with ACE inhibitors (Gr.1) and calcium antagonists (Gr.2) in hypertensive diabetic patients.

Methods: We randomized hypertensive pts with type 2 diabetes to a daily dose of 4-8 mg perindopril or 240-320 mg verapamil SR for 30-32 weeks followed by a parallel method. There were 22 pts (51.8 ± 6.6 yrs, HbA1c 8.8 ± 1.3%) in Gr.1 and 19 pts (52.7 ± 6.5 yrs, HbA1c 8.7 ± 2.8%) in Gr.2. Office BP values in 24-h ambulatory BP parameters and duplex scanning for measurements of intrarenal blood flow velocity profiles were employed. Maximum systolic, end-diastolic velocities, their ratio and resistive index (RI) in the main renal arteries and in segmental renal arteries under long-term verapamil SR treatment was used to investigate microRNA expression in the heart. Expression differences between control and diabetic rats were confirmed with real time PCR.

Results: The mean 24-h BP values were significantly decreased from 138.9 ± 16.9/82 ± 10 to 128.6 ± 14.6/77.7 ± 6.1 mmHg in Gr.1 (at least, p≤0.02) and from 140.8 ± 16.9/85.2 ± 8.1 to 131.1 ± 14.9/78.3 ± 9.8 mmHg in Gr.2 (at least, p≤0.05). However, positive dynamics of IRVR levels was achieved only in Gr.1 in contrast to Gr.2. There was a significant fall of abnormal high values of IRVR in both men and segmental intrarenal arteries after ACE inhibitors treatment from 0.70 ± 0.05 to 0.66 ± 0.05 (p≤0.01) and from 0.68 ± 0.06 to 0.64 ± 0.06 (p≤0.02), respectively. There were no significant changes of IRVR in total Gr.2, whereas the decrease in high values of IRVR in men and segmental intrarenal arteries under long-term verapamil SR treatment was achieved only in pts with sufficient glycemic control in whom average 24-h BP was less than 130/78 mmHg after the treatment.

Conclusion: ACE inhibitors exert more pronounced positive effect on intrarenal vascular resistance compared with calcium antagonists and have advantages over the latter in hypertensive diabetic patients with disturbed renal haemodynamics as well as with insufficient glycemic and BP control.
Introduction: Arterial hypertension is a major risk factor for micro- and macrovascular complications in type 2 diabetes. Several factors are known to influence blood pressure profile in diabetic patients, such as age, sex, body weight, diabetes duration, insulin dosage, metabolic control, and microalbuminuria. Ambulatory blood pressure monitoring (ABPM) permits the observation of blood pressure throughout the day and night. ABPM is better related to end organ damage and cardiovascular morbidity from hypertension than office blood pressure readings. We used our database to study risk factors for abnormal 24-h blood pressure regulation and microalbuminuria in type 2 diabetic patients.

Methods: ABPM was performed in 102 diabetics. Individual least median squares (LMS)-SD scores were calculated for diurnal and nocturnal systolic (SBP), diastolic (DBP), and mean arterial (MAP) blood pressure according to normalized values. The nocturnal blood pressure reduction (dipping) was calculated for SBP as well as DBP.

Results: In diabetics, NBP in particular was significantly elevated (SBP + 0.51, DBP + 0.58, MAP + 0.80 LMS-SD) and dipping of SBP, DBP, and MAP was significantly reduced (p < 0.0001). Age, diabetes duration, sex, BMI, AIC, and insulin dose were related to altered blood pressure profiles; dipping, however, was only affected by age, female sex, and AIC. The presence of microalbuminuria was associated with nocturnal DBP (p < 0.0001) and diastolic dipping (p < 0.01).

Conclusions: Our observations revealed a clear link between the quality of metabolic control and altered blood pressure regulation even in patients with short diabetes duration. Nocturnal blood pressure in particular seems to mainly contribute to diabetes complications such as microalbuminuria.

PP.11.294 THE EFFECTIVENESS OF THERAPY PERINDOPRIL ARGININE IN TREATMENT OF PATIENTS WITH HYPERTENSION AND DIABETES TYPE 2 IN NATIONAL PROGRAM "PREMIA"

K. Ivanov, V. Mychka, J. Prokhoreva, S. Olimpieva, V. Kilikovsky, V. Masenko, I. Chazova. Russian Cardiology Research and Production Center, Moscow-Russia

Aim: To study the effect of 16 weeks treatment with the new form of perindopril on blood pressure, carbohydrate metabolism (fasting glucose, postprandial glucose), lipid metabolism in patients with arterial hypertension stages 1-2 and Diabetes type 2 against effect in patients with only arterial hypertension stages 1-2.

Materials and Methods: The randomized study included 2200 patients from 73 towns with hypertension stages 1-2. Among them patients with Diabetes type 2 were 13,200%. Patients were prescribed 5 mg of perindopril. In patients previously treated by another ACE inhibitor the last was changed to perindopril 5 or 10 mg. If the effect was not enough the therapy included indapamide.

Results: After the course of perindopril arginine treatment of patients with arterial hypertension stages 1-2 and Diabetes type 2 we achieved a decrease in body weight from 86.71 ± 15.85 to 85.07 ± 15.32 kg and body weight of patients with only arterial hypertension stages 1-2 decreased from 78.69 ± 12.79 to 77.64 ± 12.26 kg (p < 0.05); waist circumference from 98.98 ± 14.22 to 97.40 ± 13.95 cm against from 85.96 ± 11.86 to 87.80 ± 11.76 cm (p < 0.05). As a result the systolic BP significantly decreased from 161.86 ± 14.05 to 128.55 ± 9.50 mm Hg and from 157.39 ± 11.73 to 125.56 ± 8.70 mm Hg (p < 0.05), diastolic BP decreased from 94.99 ± 8.41 to 80.28 ± 6.31 mmHg against from 94.23 ± 7.36 to 78.73 ± 6.09 mmHg (p = 0.1238). Also there was a decrease in postprandial glucose in both groups of patients, from 10.33 ± 2.86 to 8.91 ± 2.39 mmol/l and from 6.02 ± 1.07 to 5.99 ± 1.02 mmol/l (p = 0.1341), fasting glucose from 7.26 ± 1.97 to 6.42 ± 1.30 mmol/l against from 4.84 ± 0.68 to 4.74 ± 0.62 mmol/l (p = 0.1269); TC level from 5.85 ± 1.17 to 5.22 ± 0.87 mmol/l and from 5.24 ± 1.04 to 4.89 ± 0.82 mmol/l (p < 0.05), TG level from 2.00 ± 1.13 to 1.76 ± 0.81 mmol/l against from 1.55 ± 0.74 to 1.51 ± 0.91 mmol/l (p = 0.1269), LDL from 3.60 ± 2.23 to 3.10 ± 0.10 mmol/l and from 3.07 ± 1.09 to 2.84 ± 0.10 mmol/l (p = 0.05), HDL level of LDL increase from 1.30 ± 0.52 to 1.38 ± 0.66 mmol/l against from 1.36 ± 0.53 to 1.35 ± 0.46 mmol/l (p < 0.005).

Conclusion: Results of perindopril arginine therapy of patients with hypertension stages 1-2 in combination with Diabetes type 2 and patients with only arterial hypertension stages 1-2 showed significant antihypertensive effect and improved rates of lipid and carbohydrate metabolism, decreasing of body weight and waist circumference data in both groups, but the patients with hypertension stages 1-2 in combination with Diabetes type 2 had significant higher decreasing of all indicators.

PP.11.295 COMBINED EFFECTS OF CALCIUM CHANNEL BLOCKER AND ANGIOTENSIN II RECEPTOR ANTAGONIST IN HYPERTENSIVE PATIENTS WITH TYPE 2 DIABETES

T. Yokoi, S. Nakade, H. Masaki, H. Takahashi. Kansai Medical University, Mortyachi-Japan

Objective: We comparatively studied the combined effects of 2 types of calcium channel blocker (CCB) (Azelnidipine tablet: AZL, Nifedipine CR tablet: NCR) in hypertensive patients with diabetes who have failed to achieve target blood pressure levels by usual dose of angiotensin II receptor antagonist (ARB).

Methods: AZL 8-16 mg/day or NCR 10-40 mg/day was randomly allocated to 58 hypertensive patients with type 2 diabetes combined with valsartan 80 mg once after breakfast, and the dose was increased until they achieved their target blood pressure < 130/80 mmHg (JISH2009). During the study, measurement of blood pressure/heart rate and hematology/urinalysis were performed for 6 months.

Results: The doses of CCB were 17.1 ± 9.4 mg/day in the AZL group and 13.2 ± 3.9 mg/day in the NCR group (mean ± SD). No significant difference was observed in the patients characteristics between the two groups. Twenty-two patients were with eGFR < 60, and 46 patients with normal albuminuria. Although 65% or higher patients achieved target blood pressure level in month 6 in both groups, the blood pressure was significantly lower in the NCR group than the AZL group after month 2, and the rate of target attainment was significantly higher in the NCR group in month 4. In AZL group, almost 50% of patients achieved the target blood pressure level after month 5. No changes were observed in the blood glucose, HbA1c, and urinary Alb/Cr in both groups, and eGFR was maintained favorably. No significant difference was observed in the changes in blood pressure and renal function in 22 patients with eGFR < 60 at the study initiation in both groups.

Conclusions: In type 2 diabetes patients with the stage 1-2 nephropathy, both high dose AZL and low dose NCR combined with ARB achieved target blood pressure levels, and could maintain the renal function favorably. It was confirmed that NCR has superior early antihypertensive effect and cost-effectiveness than AZL.

PP.11.296 RENAL IMPAIRMENT AND ALL-CAUSE MORTALITY IN HIGH RISK VASCULAR PATIENTS: EFFECT MODIFICATION BY DIABETES

S. Selvarajah1, J. Haniffi1, Y. Graaff2, F. Visseren2, C. Uiterwaal2, M. Bot3.1Clinical Research Centre, Kuala Lumpur Hospital, Kuala Lumpur-Malaysia, 2University Medical Center Utrecht, Utrecht-The Netherlands

Objective: Renal impairment and type 2 diabetes (DM) are well known independent risk factors for mortality. The evidence on the combined effects of these risk factors on mortality is unclear, but of importance since it may determine the aggressiveness of treatment. This study sought to assess and quantify the effect modification of diabetes on renal impairment in its association with mortality.

Design and Methods: Patients with clinically manifest vascular disease or at high risk recruited in the Second Manifestations of ARterial disease cohort study were selected. Between 1996 and 2008 7,135 patients were enrolled. They were followed up amounting to 33,198 person-years. Renal impairment was defined by albuminuria status and estimated glomerular filtration rate (eGFR). Outcome was all-cause mortality.

Results: Mortality increased progressively with each stage of renal impairment, for both albuminuria status and eGFR, for diabetics and non-diabetics. There was no additive effect modification by diabetes on mortality risks due to renal impairment. The relative excess risk due to interaction (RERI) for DM with eGFR of less than 30 ml/min/1.73m² was 0.38 (-0.85, 1.61). The RERI for DM with eGFR of 60-89 ml/min/1.73m² was -0.31 (-0.92, 0.3 -(0.85, 1.61). The RERI for DM with eGFR of 60-89 ml/min/1.73m² was -0.31 (-0.92, 0.39).

Conclusions: Diabetes mellitus does not modify the relation between all-cause mortality and renal impairment. These findings suggest that the hallmark for...
survival is the prevention and delay in progression of renal impairment in all patients at high risk of cardiovascular disease.

**PP.11.297** ACCURACY OF A NOVEL IONTOPHORESIS TECHNOLOGY BASED DEVICE FOR THE DIAGNOSIS OF DIABETES MELLITUS IN CHINESE

C. Sheng¹, Y. Li¹, W. Zeng¹, Q. Huang², J. Deslypere³, J. Wang¹. ¹Shanghai Institute of Hypertension, Shanghai-China, ²Impeto Medical, Paris-France

**Objective:** The prevalence of diabetes is increasing in most countries, including China. However, the current screening methods are either not sensitive enough, too cumbersome, or not standardized. A new simple and fast screening technique based on iontophoresis technology (EZSCAN, Impeto Medical, Paris, France) has recently been developed, and clinical trials performed in South Asia and Europe. In the present study, we studied the diagnostic accuracy of this device in Chinese.

**Methods:** We performed the EZSCAN test in 195 subjects. EZSCAN measures electrochemical conductance at forehead, hands and feet, and derives a diabetic index with a value ranging from 0 to 100. Diabetes mellitus was defined as a plasma glucose concentration of at least 7 mmol/l at fasting or at least 11.1 mmol/l at 2 hours after glucose load, or as the use of antidiabetic drugs.

**Results:** The study population included 120 non-diabetic subjects (54% men; mean age 47 years) and 75 diabetic patients (45% men; mean age 60 years; use of antidiabetic drugs 81%). The electrochemical conductance (μS) was significantly (P < 0.001) lower in diabetic patients for the hands (44 vs. 61 μS) and feet (51 vs. 69 μS) locations, but not for the forehead (15 vs. 17 μS, P = 0.39). When a diabetic index of 40 was used as the threshold, the sensitivity and specificity for the diagnosis of diabetes mellitus was 85% and 64%, respectively.

**Conclusion:** EZSCAN is accurate in the diagnosis of diabetes mellitus, with reasonable specificity and sensitivity as a screening tool.

**PP.11.298** GLYCAVED HAEMOGLOBIN, FASTING GLUCOSE AND CARDIOVASCULAR RISK FACTORS IN A HYPERTENSIVE POPULATION

L. Vigil, M. Lopez, M. Varela, R. Garcia-Carretero, D. Ferrero, J. Ruiz. Hospital Universitario De Motostoles, Madrid-Spain

**Background:** Compared to fasting glucose levels, glycated haemoglobin has a similar association with the risk of diabetes, but a stronger correlation with the risk of cardiovascular events and of death from any cause. Our aim was to analyze the association of both glycated haemoglobin and fasting glucose with other cardiovascular risk factors (CVRF) in a hypertensive population.

**Methods:** Cross-sectional, observational study including 207 patients (55.1% males), aged 58 ± 14 years, diagnosed of essential hypertension and attended in our Hypertension Unit during a six months period. We performed in all of them a clinical history, a physical examination and routine analysis, including glycated haemoglobin (HbA1c, calibration IFCC, Menarini).

**Results:** Body mass index (BMI) was 31.6 ± 6, systolic blood pressure (SBP) 137 ± 16 mm Hg and diastolic pressure (DBP) 77 ± 12 mm Hg. 16.4% had a previous cardiovascular event. Average anti-hypertensive drug number was 4.5 ± 2.1. BMI and class of anti-hypertensive drug was significantly (P < 0.001) higher in patients with diabetes mellitus (DM) than in non-diabetic patients (NDP).

**Conclusions:** In hypertensive patients, glycated haemoglobin had a stronger association with others CVRF than fasting plasma glucose. Systolic blood pressure and age were the only independent determinants for the glycated haemoglobin. This parameter can be a useful tool in the cardiovascular risk evaluation of these patients.

**PP.11.299** THE INFLUENCE OF RILMENIDINE ON PLASMA LIPID PROFILE AND HYPERTENSION IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

A. Ordyan, E. Ter-Stepanyants, L. Aleksanyan, A. Naghdalyan. Yerevan State Medical University, Yerevan-Armenia

**Objectives:** Rilmenidine is centrally acting imidazoline type-1 receptor agonist that significantly lowers blood pressure and has some insulin-sensitising actions. The aim of study was to assess the effect of Rilmenidine on plasma lipid profile and hyperension in patients with type 2 diabetes mellitus.

**Methods:** We examined 38 patients, 18 women and 20 men (mean age 53.9 years) with type 2 diabetes mellitus and hypertension, under treatment with glibenclamide. By level of cholesterol, HDL, LDL, triglycerides all patients were divided into 3 groups. In 1 group (n = 12) were included patients with normal plasma lipid profile/cholesterol level below 5.2 mmol/l, HDL - above 1.68 mmol/l, LDL - below 2.6 mmol/l, triglycerides below 1.7 mmol/l - in group 2 (n = 15) - patients with moderate risk (cholesterol level 5.6-6.2 mmol/l, HDL – below 1.68 mmol/l, LDL - above 3.5 mmol/l, triglycerides above 1.7 mmol/l), and in 3 group (n = 11) - patients with high risk (cholesterol level above 6.2 mmol/l, HDL – below 1.0 mmol/l, LDL - above 4.1 mmol/l, triglycerides above 1.7 mmol/l). Rilmenidine was prescribed during 8 weeks in the dose of 1 to 2 mg/d, depending on hyperension. Results were analyzed using variation statistic method (Student’s t-test, with p < 0.05 significance level).

**Results:** By the end of the study in all groups systolic blood pressure (SBP) and diastolic blood pressure (DBP) remarkably change (SBP - from 179.8 ± 27.3 to 130.1 ± 9.8, p = 0.05; DBP - from 109 ± 11.6 to 79.4 mmHg p < 0.05). In group 1 patients plasma lipid profile remained normal. In group 2 patients - significant reduction in total cholesterol and LDL of 16% (p = 0.03) and 19% (p = 0.03). Triglycerides were reduced non-significantly by 14%, and HDL was increased by 18%. No significant shifts were seen in group 3 patients - total cholesterol and LDL of 9% (p = 0.03) and 11% (p = 0.03). Triglycerides were reduced non-significantly by 13%, and HDL was increased by 14%.

**Conclusions:** Therapy with Rilmenidine was associated with favorable changes of lipid profile. In patients with type 2 diabetes mellitus and hyperension Rilmenidine is recommended to use in case of normal plasma lipid profile or moderate risk. In patients with high risk Rilmenidine is recommended, but it also is necessary to prescribe another antiatherosclerotic medi- cal preparations.

**PP.11.300** PREDICTORS OF NON-FATAL MYOCARDIAL INFARCTION EVENTS OF PATIENTS WITH TYPE 2 DIABETES

K. Samedova, V. Mirzaraza. Vm Center of Endocrinology Diabetes and Metabolism, Baku-Azerbaijan

**Objective:** To determine predictors of non-fatal myocardial infarction on studied sample of patients with type 2 diabetes.

**Design and Method:** Research is spent in group of 190 men aged 52 ± 5 years of patients (pts) with type 2 diabetes. Mean duration of diabetes was 4 years. At all pts following parameters were analyzed: level of fasting glycaemia, glycosylated haemoglobin (HbA1c), levels of total cholesterol, LDL-cholesterol, HDL-cholesterol, CRP, urate, creatinine, cystatin C and DBP) were non-significant. Fasting plasma glucose, adjusted for the same parameters, showed a positive correlation with urate (r = 0.221, p = 0.046) and with SBP (r = 0.384, p < 0.001). In multivariate analysis, including in the model all the variables with significant correlations and adjusting again for age, gender, BMI, and class of anti-hypertensive drug, only systolic blood pressure (B = 0.015, 95% CI: 0.008-0.022, p < 0.0001) and age (B = 0.012, 95% CI: 0.003-0.020, p = 0.005) were independent determinants for the glycated haemoglobin (R² = 0.45).

**Conclusions:** In hypertensive patients, glycated haemoglobin had a stronger association with others CVRF than fasting plasma glucose. Systolic blood pressure and age were the only independent determinants for the glycated haemoglobin. This parameter can be a useful tool in the cardiovascular risk evaluation of these patients.
Conclusions: Age, level of fasting glycaemia, level of systolic BP, levels of total cholesterol, LDL cholesterol, HDL cholesterol, triglyceride are potent predictors of non-fatal myocardial infarction in diabetic men.

Objective: We aimed to assess the impact of high blood pressure associated with type 2 diabetes mellitus over the cardiac structure and function.

Design and Method: We performed a transversal study, lasting 18 months, in which 84 patients with essential hypertension, and type 2 diabetes, with medium age 57 ± 12 years were evaluated echocardiographic in comparison with 50 healthy subjects.

Results: Patients with hypertension and diabetes had a significant greater left ventricular wall thickness (IVS 14.2 ± 5.2 vs. 8.5 ± 1.5 mm, p < 0.0001); LVPW 13.5 ± 2.9 vs. 7.3 ± 0.7 mm, p < 0.0001) and mass (LVM 181 ± 55 g/m² vs. 87.3 ± 21 g/m², p < 0.0001). Only 2.4% of the patients had a normal left ventricle. Concomitant hypertension affected 80.9%. Eccentric hypertrophy was observed in 1.2%. 15.5% of the diabetic hypertensives presented remodeling. Cardiomyopathy aspect was detected in 3.6% of the hypertensives. E/A ratio was reduced: 0.91 ± 0.3 vs. 1.37 ± 0.3 in healthy subjects, suggesting the presence of diastolic dysfunction. 81% presented abnormal relaxation. Restrictive pattern was found in 2.4% 16.6% of the patients had normal/pseudo-normal pattern. Global systolic function was preserved, but longitudinal fiber contraction was impaired (MAPSE 9.05 ± 0.03 mm vs. 12 ± 0.02 mm in normal subjects).

Conclusions: Both hypertension and diabetes have a profound impact on the heart, the combination of the two entities generating a major remodeling with marked left ventricular hypertrophy and impaired functional properties, especially the diastolic.

**Echocardiographic Data in Patients with Essential Hypertension and Type 2 Diabetes Mellitus**

L. Popescu. University of Medicine and Pharmacy Carol Davila - Bucharest, Bucharest-Romania

**Cardiac Geometry and Function in Normotensive Diabetic Patients**

M. Picca, F. Agozzino, P.O. Macedoßen Melloni, O. Fatebenefratelli E. Ofalunico, Milan-Italy

Background and Aim: Diabetes mellitus (DM) increases the incidence of myocardial infarction, claudicatio and stroke more in women than in men. Left ventricular hypertrophy (LVH) is a powerful independent risk factor for cardiovascular morbidity and mortality among hypertensive patients (pts). We assessed the presence of gender differences in LV geometry and function in normotensive pts with type 2 DM.

Methods: Forty-eight consecutive pts (26 males, 22 females, mean age 60.3 ± 11.9 years) with type 2 DM and normal blood pressure (BP). All pts underwent to clinical examination, laboratory investigations and echocardiographic Doppler study.

Results:

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<th></th>
<th>Males (n = 26)</th>
<th>Females (n = 22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>59.1 ± 10.0*</td>
<td>61.6 ± 12.0</td>
</tr>
<tr>
<td>Body mass index (Kg/m²)</td>
<td>26.6 ± 2.3*</td>
<td>27.2 ± 2.3</td>
</tr>
<tr>
<td>Systolic BP (mmHg)</td>
<td>123 ± 8*</td>
<td>125 ± 13</td>
</tr>
<tr>
<td>Diastolic BP (mmHg)</td>
<td>78 ± 5*</td>
<td>80 ± 6</td>
</tr>
<tr>
<td>Pts with microalbuminuria</td>
<td>7/26*</td>
<td>9/22</td>
</tr>
<tr>
<td>Plasma creatinine (mg/dl)</td>
<td>1.00 ± 0.13*</td>
<td>0.93 ± 0.26</td>
</tr>
<tr>
<td>Plasma glucose (mg/dl)</td>
<td>125 ± 9*</td>
<td>126 ± 10</td>
</tr>
<tr>
<td>Glycosylated haemoglobin (%)</td>
<td>6.3 ± 0.9*</td>
<td>6.4 ± 1.1</td>
</tr>
<tr>
<td>LVM (g/m²)</td>
<td>99.2 ± 8.5*</td>
<td>38.8 ± 8.8</td>
</tr>
<tr>
<td>Predicted mFS (%)</td>
<td>104 ± 8*</td>
<td>106 ± 10</td>
</tr>
<tr>
<td>E/A</td>
<td>0.84 ± 0.21*</td>
<td>0.66 ± 0.20</td>
</tr>
</tbody>
</table>

*not significant compared with Females; *p < 0.02 compared with Females

Conclusions: According to our data, gender is not associated with significant differences in LV geometry and systolic function in normotensive type 2 diabetic patients; the greater prognostic impact of DM observed in women could be independent from these features. The specific role of LV diastolic dysfunction remains to be assessed.

**Impaired Glucose Metabolism in Normotensives is Associated with Exaggerated Inotropic Response in Stress Test**

M. Daskalaki, O. Papazachou, C. Thomopoulou, N. Rodolakis, D. Papadopoulos, A. Komnou, C. Grassos, T. Makris, Cardiology Dept., Helena Venizelou Hospital, Athens-Greece, Cardiology Dept, Lasko Hospital, Athens-Greece, Cardiology Dept, D Aikis Hospital, Athens-Greece
Abstracts e239

**Objective**: We aimed to investigate the association between glucose metabolism measures and the exaggerated blood pressure response (EXBPR) to exercise testing in normotensive non-diabetic subjects. We hypothesized that subjects with impaired glucose metabolism would demonstrate more frequently exaggerated BP response to exercise treadmill testing, further contributing to the development of new-onset hypertension.

**Methods**: 142 consecutive subjects underwent office blood pressure (BP) measurements, 24-hour BP monitoring, echocardiography and treadmill exercise test according to the Bruce protocol. EXBPR at a sub-maximal workload level divided the population into two groups. Furthermore, blood samples were obtained for fasting glucose (FG), fasting insulin (FI) and lipid profile assessment. Measures of insulin resistance (HOMA-IR, QUICKI and McAuley) were also estimated and a standardized oral glucose tolerance test was performed to evaluate glucose levels at 120 minutes (G120).

**Results**: Subjects with EXBPR (n = 40, 27 males) compared to those without EXBPR (n = 102, 66 males) resulted older by ≥4 ± 6 years, p < 0.001. Body mass index, waist circumference and 24-hour systolic BP were higher in the former group with respect to the latter (28 ± 3 vs. 26 ± 1 Kg/m², 98 ± 3 vs. 95 ± 4 cm and 122 ± 6 vs. 118 ± 6 mmHg, p < 0.001 for all), while lipidogram profile did not differ between the groups (p = NS). FG, FI, G120, HOMA-IR, QUICKI and McAuley index were increased in subjects with EXBPR compared to those without EXBPR (p < 0.001 for all). FG, FI, G120, HOMA-IR, QUICKI and McAuley index differed in subjects with EXBPR compared to those without EXBPR (p < 0.001 for all). Logistic multivariable regression models revealed that the studied glucose metabolism measures, duration of exercise and 24-hour systolic BP remained determinants of EXBPR (p < 0.05 for all) after adjustment.

**Conclusions**: Impaired glucose measures are significant determinants of EXBPR to exercise testing in normotensive non-diabetic subjects suggesting that impaired glucose metabolism may contribute to adverse cardiovascular prognosis including new-onset hypertension.

**PP.11.305**

**CIRCADIAN BLOOD PRESSURE PROFILE IN TYPE 2 DIABETIC PATIENTS: INFLUENCE OF CARDIAC AUTONOMIC NEUROPATHY AND METABOLIC SYNDROME**

E. Lunina, I. Petrukhin. Tver State Medical Academy, Tver-Russia

**Objective**: Although diabetic cardiac autonomic neuropathy (CAN) is established to be associated with circadian blood pressure (BP) non-dipping pattern, some controversy still exists about factors involved in the impaired diurnal BP profile in diabetes. Type 2 diabetes is frequently accompanied by other features of metabolic syndrome (MS), which is shown to play a role in reduced nocturnal fall in BP. We aimed to study a relative influence of CAN and MS on circadian BP profile in type 2 diabetes.

**Design and Methods**: A total of 152 type 2 diabetic patients (age: 57.9 ± 9.3 years, 28 men) were examined by non-invasive 24-h ambulatory BP monitoring. According to WHO criteria for MS and on the basis of standard Ewing’s test the patients were divided into 4 groups: 1) CAN-MS-; n = 14; 2) CAN-,MS+; n = 14; 3) CAN+,MS-; n = 18; 4) CAN+,MS+; n = 106.

**Results**: After adjustment for age and hypertension, systolic BP non-dipping pattern was significantly associated with MS (OR 4.4 [95% CI 1.9-10.2]) and CAN (OR 6.9 [95% CI 2.7-17.6]). CAN was an independent predictor of abnormal systolic BP profile in patients with MS (OR 5.9 [95% CI 1.8-19.1]), but not in those without MS. Nor MS, neither CAN were independently associated with reduced nocturnal fall in diastolic BP.

**Conclusion**: Both CAN and MS are associated with non-dipping pattern of circadian systolic BP in type 2 diabetes. Combination of CAN with MS results in the most severe abnormalities of circadian systolic BP profile in type 2 diabetic patients.

**PP.11.306**

**ENDOTHELIN 1-21 LEVEL IN PATIENTS WITH TYPE 2 DIABETES AND ARTERIAL HYPERTENSION LIVING IN THE EXTREME NORTH**

D. Isakova, E. Salalova, A. Efano, E. Dorodneva, I. Medvedeva. Tyumen State Medical Academy, Tyumen-Russia

**Objective**: To estimate the level of endothelin dysfunction marker, endothelin 1-21 (ET 1-21), and its correlation with some metabolic and clinical characteristics in group of patients with type 2 diabetes and arterial hypertension, living in the extreme North.

**Design and Methods**: 80 patients with type 2 diabetes were included into research (21 men and 59 women). Mean age of patients in investigated group was 56.4 ± 6.2 years. All patients had decapmentation of carbohydrate metabolism level (of glycated hemoglobin (HBA1C) ≥ 7 %). Mean HBA1C value - 8.9 %. The disease duration in the general group was 12.6 ± 8.4 years. All patients had arterial hypertension in anamnesis. 71.25 % of patients (1-st group) had not achieved optimal blood pressure (systolic blood pressure higher than 130 mm Hg and diastolic blood pressure higher than 80 mm Hg) in various reasons, and only 28.75 % of patients (2nd group) had achieved optimal blood pressure. All patients were investigated: ET 1-21 level, also anthropometric data, indices of a carbohydrate metabolism, lipids (cholesterol, VLDL, LDL, HDL). Data were statistically processed with nonparametric STATISTICA-6 software. Spearman and the Mann- Whitney test correlation analysis.

**Results**: Result of the research showed that ET 1-21 level was equal to 6.01 ± 2.6 fmol/ml, median - 0.47 fmol/ml. 1-st group of patients who did not achieve BP target had average ET 1-21 level equal to 7.23 ± 2.5 fmol/ml. That is statistically higher, compared to those patients, who achieved BP target (p < 0.05). Our data analysis also showed that ET 1-21 level has positive correlation with disease duration (r = 0.44, p < 0.05), body build index (r = 0.32, p < 0.05), systolic blood pressures (r = 0.22, p < 0.05), postprandial glucose level (r = 0.31, p < 0.05), LDL (r = 0.23, p < 0.05).

**Conclusions**: In type 2 diabetes mellitus patients with decapmentation of a carbohydrate metabolism and arterial hypertension ET 1-21 level is significantly increased. ET 1-21 positively correlates with some cardiovascular risk factors. This allows to speak about ET 1-21 as a marker of endothelial dysfunction, that shows the endothelium injury extent and risk of CVD in type 2 diabetes mellitus patients with decapmentation of a carbohydrate metabolism and arterial hypertension.

**PP.11.307**

**TRANSFORMING GROWTH FACTOR-BETA 1 AND HEART REMODELING IN TYPE 2 DIABETES MELLITUS PATIENTS ASSOCIATED WITH LEFT VENTRICULAR DIASTOLIC DYSFUNCTION**

A. Berezin, A. Glavatsky. State Medical University, Zaporozhye-Ukraine

**Aim**: To investigate the serum concentration of transforming growth factor beta 1 (TGF-beta 1) and its role in development of left ventricular hypertrophy (LVH) of patients with arterial hypertension and documented left ventricular diastolic dysfunction in combination with 2nd type diabetes mellitus (DM) and also of patients without DM.

**Methods**: The study population consisted of 50 patients with arterial hypertension (left ventricular ejection fraction 48.4 ± 14.5%) including 30 patients with DM (first group) and 20 patients without DM (second group). 30 healthy subjects were part of control group. The serum concentration of TGF-beta1 was determined from each subject with the use of a solid-phase TGF-beta 1–specific sandwich ELISA. The cardiac remodeling was examined by the instrumentality of conventional Echo and Doppler methods. Types of left ventricular geometry were described as normal geometry of left ventricle (NGLV), concentric LVH (CLVH), eccentric type of LVH (ELVH) and concentric type of left ventricular remodeling (CLVR).

**Results**: We determined that LVH diagnosed from patients with arterial hypertension in combination with DM in 88.5% cases and from patients with EH without DM - in 60% cases (p < 0.05). The serum concentration of TGF-beta1 was compounded 35.17 ± 2.76 ng/ml in first group, 32.13 ± 0.95 mg/ml in second group that are differed significantly from the serum concentration of TGF-beta1 in control group – (19.9 ± 0.85 ng/ml, p < 0.001 for all cases). Analysis of the serum concentration of TGF-beta 1 against geometric type of left ventricle allowed to determine that from patients with arterial hypertension important differences the level of TGF-beta 1 were revealed from patient with CLVH and ELVH as compared to NGLV and CLVR as well as control group. Even dynamism of studied characteristic were preserved in principal group but changes of the level of TGF-beta 1 in case of CLVH and ELVH were more manifest and were differed statistically significantly between groups in case of development of CLVH.

**Conclusions**: Increase of the blood level of TGF-beta1 is observed from patients with arterial hypertension and this change more expressed in combination with 2nd type diabetes mellitus (DM). Increase of the blood level of TGF-beta1 is observed from patients with arterial hypertension and this change more expressed in combination with 2nd type diabetes mellitus (DM).
Objective: To identify predictors of regression of diabetic nephropathy in adolescents with type 1 diabetes.

Design and Method: We analyzed data from a prospective cohort study of type 1 diabetic adolescents with diabetic nephropathy. The study included 41 type 1 diabetic adolescents with diabetic nephropathy aged (mean ± SD) 16.0 ± 1.5 years, with duration of diabetes 14.4 ± 3.1 years, HbA1c 10.3 ± 1.7%. 22 out of 41 had microalbuminuria [urinary albumin excretion (UAE) – 30–300 mg/day] and 19 matched on age, duration of diabetes, sex patients had macroalbuminuria (UAE > 300 mg/day). Subjects were monitored for a mean of 6 years (following parameters: age, age at onset of diabetes, duration of diabetes, initial HbA1c, systolic and diastolic blood pressure. All patients were treated with angiotensin converting enzyme inhibitors during the study.

Results: After 6 years, of the 22 with initial microalbuminuria, 5 (22%) regressed to normoalbuminuria, whereas microalbuminuria was persistent in 17 (78%). Of the 19 who had initial macroalbuminuria, macroalbuminuria developed in 4 (19%), macroalbuminuria was persistent in 15 (79%). Multiply regression analysis showed that only baseline diastolic blood pressure (beta = 0.45, p < 0.05) was significantly and independently associated with regression macroalbuminuria, whereas initial HbA1c (beta = 0.54, p < 0.01) was independent factor of regression microalbuminuria. The use of angiotensin-converting-enzyme inhibitors was not associated with the regression of diabetic nephropathy.

Conclusion: The regression of diabetic nephropathy is influenced both by good metabolic control and lower diastolic blood pressure in adolescents.

**PP.11.309 SERUM SFAS AND SFASL LEVELS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS AND ARTERIAL HYPERTENSION**

N. Stoynev, G. Kirilov, T. Tankova. Clinical Center of Endocrinology, Sofia-Bulgaria

Aim: Aim of this study is to evaluate serum sFas and sFasL levels in subjects with type 2 diabetes mellitus and hypertension in comparison with normotensive subjects with type 2 diabetes.

Material and Methods: Ninety four patients (54 men and 40 women), divided in 3 groups, are included in the study – 26 subjects with type 2 diabetes and treated hypertension, of mean age 51.27 ± 8.45 years (Group 1), 38 subjects with type 2 diabetes and non-treated hypertension, of mean age 51.11 ± 12.89 years (Group 2) and a control group of 34 patients with type 2 diabetes without hypertension, of mean age 47.57 ± 8.62 years. Twenty four-hour ambulatory blood pressure monitoring (Oscar, SunTech Medical Instruments, USA) is used to measure arterial blood pressure in the process of recruitment of the subjects included in Group 2 and in the control group. Standart anthropometric measurements of weight, height and waist circumference were performed. Serum sFas and sFasL levels were evaluated with ELISA (Quantikine, R&D Systems, Minneapolis, USA).

Results: Subjects from Group 1 have higher body mass index (BMI) compared to control group (p = 0.005) but with no difference compared to Group 2. Waist circumference in Group 1 is higher than both Group 2 (p = 0.029) and control group (p = 0.002). No differences in anthropometric parameters are found between Group 2 and the control group. No differences in serum sFas levels are found. Serum sFasL levels are decreased both in Group 1 (p = 0.001) and Group 2 (p = 0.026) as compared to control group. No difference in sFasL, in found between the two hypertensive groups. Correlation analysis showed no correlation of sFas and sFasL levels with age, BMI and waist circumference.

Conclusion: Subjects with type 2 diabetes and hypertension have lower serum levels of expression of sFasL than normotensive subjects with type 2 diabetes mellitus. The decrease of serum sFasL does not depend on the existence of anti-hypertensive treatment. The existence of hypertension does not change significantly serum sFas levels in patients with type 2 diabetes mellitus.

**Materials and Methods:** The study included 302 patients, 28.8% of them were female and 71.2% were male. The age of the patients varies from 42-86 years old. All patients with type 2 diabetes mellitus and acute coronary syndrome were evaluated for presence of dyslipidemia considering the values of total cholesterol greater than 220mg/dl, triglyceride greater than 150mg/dl; HDL-cholesterol less than 40mg/dl and LDL-cholesterol greater than 130mg/dl.

Results: We analyzed 302 patients’ men and women. 35.8% of patients had high level of total cholesterol, 57.6% of patients had high level of triglyceride, 21.8% of patients had high level of LDL cholesterol, 56.9% had low level of HDL cholesterol. 67.5% of all patients had poor control of diabetes (HbA1C > 6, 5) and 32.4% of patients had good control of diabetes (HbA1C < 6, 5). There was a positive correlation between dyslipidemia and control of diabetes (r = 0.265, p < 0.01).

Conclusions: Dyslipidemia and poor control of diabetes are frequent in patients with type 2 diabetes presented with acute coronary syndrome in Emergency Room. Most of the patients had high level of triglyceride and low level of HDL-cholesterol, and for this disorder a right treatment is needed.

**PP.11.311 ABOUT THE PREVENTION OF DIABETES IN THE WOMEN: WHAT IS THE OPINION OF THE SPANISH DOCTORS?**


Objective: To determine the opinion of Spanish physicians about the prevention of diabetes in women.

Methods: Cross sectional study. There has been a telephone survey of 400 doctors working in primary care in Spain, stratified by province, with a statistical error of ± 4.9%.

Results: The median age of 48.8 years. 50.4% were men. Carry an average 21.5 years working as doctors. 57% work in urban areas and the rest rural. 63.9% have a computer protocol that reminds you of preventive activities.

<table>
<thead>
<tr>
<th>How often do you screen for diabetes type II?</th>
<th>Several times a year</th>
<th>Every 2 years</th>
<th>When requested never</th>
</tr>
</thead>
<tbody>
<tr>
<td>After 45 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From 20 to 45 years</td>
<td>5.2%</td>
<td>42.7%</td>
<td>47%</td>
</tr>
<tr>
<td>Before age 14</td>
<td>29.9%</td>
<td>63.1%</td>
<td>1.7%</td>
</tr>
<tr>
<td>At what age makes mass screening of type II diabetes?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>46.4%</td>
<td>23.5%</td>
<td>14.1%</td>
</tr>
<tr>
<td>Often</td>
<td></td>
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<td></td>
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<tr>
<td>Sometimes</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Rarely</td>
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</table>

Conclusions: The majority of Spanish doctors usually recommend the determination of women with diabetes risk factors once a year. Although screening is not much we can adapt the guidelines, we must improve and be screened to the female population adapted to the guidelines.

**PP.11.312 HYPERGLYCEMIA AND DIABETES MELLITUS PRESENTED ON ADMISSION – WHO IS JUDGE AND SENTENCED?**

L. Paiva, R. Providencia, S. Barra, P. Gomes, C. Faustino, A. Botelho, A. Leitao-Marques. Centro Hospitalar De Coimbra, Coimbra-Portugal

Objective: Stress Hyperglycemia (SH) is a transient blood glucose elevation due to stress of illness and in acute myocardial infarction (MI) set, predicts short/long term mortality. DM is a known mortality predictor in MI. These are often related with hypertensive patients (HTN), as part of the endothelial dysfunction continuum. Relation between SH and DM is still controverse, namely the role of SH in patients with or without DM. This study aims to determine the impact of HS and DM on prognosis of HTN patients with MI.
**Design and Method:** Retrospective study of 568 consecutive HTN patients (70.7 ± 12 years, 61.4% men, 41.5% DM) admitted for MI. They were divided in 4 groups accordingly to the presence of HS (admission glycemia ≥ 7.7mmol/L) (HS-/HS +) and DM (DM-/DM +). Comparison of clinical, laboratorial, echocardiographical and angiographical parameters was made. 2-year follow up mortality predictors were also investigated.

**Results:** In this sample, SH/DM interaction was seen in 59% of the cases. 2-year follow up mortality (23.8%). Univariate analysis showed SH as a more potent mortality predictor (OR 3.05, p < 0.001) than DM (OR 1.55, p = 0.036). Multivariate analysis, using a mortality predictor model for 24 months included Grace score ≥ 140 and HS +. DM didn’t add predictive value to Grace, which was the most potent predictor.

**Conclusions:** In HTN patients with MI, glucidic metabolism alterations (SH/DM) were very frequent. SH is a major adverse prognostic marker, especially for non-DM patients, with the risk persisting in the 2-year follow up. SH doesn’t seem to have the same prognostic value on DM patients. This data suggests that patients with SH are at higher risk than those with clinical DM, which agrees with some recent published studies.
Introduction: Arterial hypertension (AH) is a frequent comorbidity in patients with atrial fibrillation (AF). The occurrence of thromboembolic events (TE) is the most severe complication of this arrhythmic disease. CHADS2 and CHADSVasc scores are two of the mostly used classifications in clinical practice to estimate this risk. The presence of thrombi (T) in the left atrial appendage (LAA), spontaneous echo contrast (SEC) and reduced maximum emptying and filling velocities (MEV and MFV) of the LAA are risk markers for TE. To best of our knowledge, comparative studies of CHADS2 and CHADSVasc for TE prediction in the hypertensive population are lacking. Purpose: To evaluate and compare the accuracy of CHADS2 and CHADSVasc for the prediction of TE in hypertensive patients with AF. To test a new score for TE prediction in this population.

Methods: 410 consecutive patients (age 68.6 ± 10.0 years; 37.1% women) underwent assessment during AF through standard transthoracic (TTE) and transesophageal echocardiography, with search for SEC and LAA T, CHADS2, CHADSVasc and a third score (composed by data from CHADS2, excluding heart failure, alongside with data derived from TTE) were computed.

Results: In this population of patients with AF, those with AH were older (69.89 ± 8.68 vs 61.97 ± 13.39; p < 0.001), had a higher BMI (29.04 ± 5.26 vs 25.34 ± 7.39; p < 0.001) and higher TR according to CHADS2 (2.45 ± 1.04 vs 0.91 ± 0.91; p < 0.001) and CHADSVasc (4.21 ± 1.49 vs 2.12 ± 1.49; p < 0.001). In what echocardiographic evaluation is concerned, only LAA systolic SV was superior acuity in the prediction of LAA T (AUC 0.715 vs 0.571; p < 0.01) and LAA MEV (AUC 0.715 vs 0.578; p n.s.). When compared with the remaining scores, CHADSEcho had better prediction of dense SEC (AUC 0.605 vs 0.01) and LAA MEV (AUC 0.639 vs 0.09), better prediction of dense SEC (AUC 0.605 p 0.01) and no differences were found regarding the prediction of MEV < 20 cm/s (AUC 0.568 p 0.131). Conclusion: CHADSEcho was more sensitive in the prediction of LAA T, dense SEC and reduced LAA MEV when compared with two of mostly used scores in clinical practice: CHADS2 and CHADSVasc. These differences were observed also in the subgroup of patients with AH, a relevant proportion of the study population. No relevant differences were found between CHADS2 and CHADSVasc for the study’s endpoints.

Conclusions: Despite the fact that patients with AH had a higher TR according to clinical risk stratification scores (CHADS2 and CHADSVasc), that didn’t translate into clear differences in what echocardiographic parameters are concerned. The extent and severity of atherosclerotic disease, age and BMI seem to have a role in the materialization of this risk. This may lead us into thinking that in this hypertensive population, the higher TR is due not only to AF in itself, but also to endothelial dysfunction and comorbid atherosclerotic disease.

Introduction: Atrial fibrillation (AF) is highly prevalent in patients with arterial hypertension (AH). The presence of AH is part of the most used classifications for thromboembolic risk (TR) stratification in AF. The mechanisms behind this association are not completely elucidated. Purpose: To evaluate the possible existence of anatomic or functional changes in patients with AH and AF, when compared with patients with AF without AH, that place them in a higher TR category.

Methods: 370 patients with AF (age 68.8 ± 10.1 years, 37.0% women; 82.7% with AH) were assessed using conventional transthoracic and transesophageal echocardiogram. In 75 of them left atrium (LA) and left atrial appendage (LAA) deformation was studied with speckle tracking and measurement of strain (S), strain rate (SR), segmental velocities and displacement (SV and SD). Comparisons were performed according to the presence or absence of AH.

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Introduction: Atrial fibrillation (AF) is highly prevalent in patients with arterial hypertension (AH). The presence of AH is part of the most used classifications for thromboembolic risk (TR) stratification in AF. The mechanisms behind
was: 1(46%), 2 (58%), 3 (61%), 4 (62%), 5 (56%) and 6 (52%). The annual visit frequency was: anticoagulants 21.7 and anti platelet 11.9 (p < 0.05).

Conclusions: An important proportion of hypertensive patients with AF have high stroke risk, specially females. The level of anticoagulation has room for improvement. There are gender differences, males consume more anticoagulants although females have higher risk. There is a very high frequency of visits by patients taking anticoagulants.

THE CONTROL OF ARTERIAL HYPERTENSION AND THE PREVALENCE OF ATRIAL FIBRILLATION IN PATIENTS AT 80 AND OLDER

P. Mikus. Slovak Medical University, University Hospital Bratislava, Bratislava-Slovak Republic

The aim of our study was to estimate the control and the therapy of arterial hypertension in the view of the latest guidelines in patients at 80 and older, especially in those with diabetes and chronic kidney diseases before admission to our Geriatric department of the Slovak Medical University and at the time of the discharge. We estimated the occurrence of atrial fibrillation as well.

We evaluated 233 patients at 80 and older who had been hospitalised from January to July 2009. 25 patients died, from the survived patients 186 patients had arterial hypertension (anamnesis of hypertension or currently made a diagnosis of hypertension). The average age of hypertensive patients was 86.0 years.

The average systolic blood pressure at the admission was 149.2 mmHg, the average diastolic blood pressure was 81.4 mmHg. A blood pressure below 140/90 mmHg had 56 patients (30.1%). There was no difference in the prevalence of atrial fibrillation between the well controlled hypertensive patients and the patients with not well controlled arterial hypertension (32.3% vs 35.7%).

There was no difference between the treatment of arterial hypertension in patients with and without atrial fibrillation.

We found out that two third of our hypertonic patients had been not treated equally before admission. But there was no difference in the prevalence of atrial fibrillation between the well controlled hypertensive patients and the patients with not well controlled arterial hypertension. The myofibrosis of the atrium due by other cardiovascular diseases has in the old people probably greater influence to the occurrence of atrial fibrillation as the arterial hypertension alone.

LARGE AND SMALL PREDICTORS OF THE RELAPSE OF ATRIAL FIBRILLATION AMONG PATIENTS WITH ARTERIAL HYPERTENSION

M. Arakelyan, P. Mogutowa, N. Poteshkina. Russian State Medical University, Moscow-Russia

Atrial fibrillation (AF) is one of the most wide-spread forms of the sinus rhythm (SR) disturbance.

Objective: To determine the most unfavorable factors of the risk of the relapse of the AF among the patients with arterial hypertension (AH). 60 patients with 1-3 degree of AH and high risk of cardiovascular complications were investigated. 45% of them (n = 27) were women, 55% (n = 33) were men. Mean age was 58.5 ± 8.4 years. SR was restored medicamentously (amiodarone, propafenone, n = 45) or by cardioversion (n = 15). The anamnesis, antihypertensive and antiarhythmic therapies (AHT and AAT) were estimated initially and after 6 month period. Echocardiography was made. In order to maintain the SR all the patients got AAT (amiodaron and metoprolol) as well as antihypertensive therapy (inhibitors a-converting enzyme) to reach the desired level of arterial pressure of less than 140/90 mmHg. Main findings: during 6 month period, 34 patients (57%) were reported to have the relapse of the AF. Correlation analysis showed the existence of significant positive medium power dependence between the relapse of the AF and the following mono-factors: 3 degree of AH, AF in anamnesis, CHD, dilatation of the left atrium (LA), hypertrophy and diastolic dysfunction of the left ventricle (LV). According to the results of the multifactor discriminant analysis of the above mentioned mono-factors, large and small predictors of the relapse of the AF were determined. The most unfavorable risk factors, large predictors, contributing to the emergence and relapse of the AF are 3 degree of AH (Wilks’ Λ = 0.91; p = 0.021), AF in anamnesis, (Wilks’ Λ = 0.88; p = 0.009), dilatation of the LA (Wilks’ Λ = 0.85; p = 0.014). CHD, hypertrophy and diastolic dysfunction of the LV due to their lower significance and probability of emergence of the AF belong to small predictors.

Conclusions: Large predictors of the emergence and relapse of the AF are 3 degree of AH, AF in anamnesis, dilatation of the LA; small predictors are CHD, hypertrophy and diastolic dysfunction of the LV.

PREDICTION OF SPONTANEOUS RHYTHM CONVERSION IN CASE OF ATRIAL FIBRILLATION OF LESS THAN 48 HOURS DURATION

Y. Vidergol1, I. Osipova1, T. Tavravskaya1, Y. Galkina2, A. Timofeev2. Altay State Medical University, Barnaul-Russia, 1Municipal Public health care institution “Municipal hospital No. 1”, Barnaul-Russia

Objective: to determine the likelihood of spontaneous conversion to sinus rhythm (SCSR) of atrial fibrillation (AF) of less than 48 hours.

Material and Methods: Data of a patients group has been investigated. The group consisted of 160 patients of 20 to 79 years age (M ± SD: 55.1 ± 9.1 years; 55% - male), admitted to hospital cardiovascular department in 2005-2008 with AF of less than 48-h from onset of arrhythmia symptoms. SCSR means conversion to sinus rhythm (SR) without first and/or third grade antiarhythmic drugs usage in hospital and before hospitalization. 65 per cent of patients had cardiovascular diseases at the moment of the research (90% of those suffered from arterial hypertension); 23% had AF associated with acute reasons; in 14% of cases attempts to determine any cardiovascular system pathology failed (i.e. 14% had idiopathic form of AF).

Results and Conclusion: 66% (n = 105) of patients showed SCSR. Frequency of SCSR in the group of AF associated with acute reasons (secondary) made up 92%, averse in the group not associated with acute reasons it was 58% (p = 0.001). By means of discriminant analysis method 12 independent predictors were determined which enable to predict SCSR with the help of linear classification function formula with 94% probability: AF duration before hospitalization comprised = 5.5 hours (OR = 4.8; p = 0.0001); AF occurred for the first time (OR = 2.4; p = 0.02); previous paroxysm duration = 16-h (OR = 13.9; p = 0.00001); any drug therapy before hospitalization (OR = 3.2; p = 0.003); absence of any accompanying noncardiac pathology (OR = 2.8; p = 0.01); arterial hypertension 1st stage (OR = 4.3; p = 0.03); chronic cardiac insufficiency higher than 3 functional class NYHA (OR = 37.3; p = 0.0001); absence of ropelarization phase disorder according to ECG (OR = 4.1; p = 0.03); average heart rate when arriving in hospital > 116 beats per minute (OR = 3.9; p = 0.0004); left atrium diameter = 41.5 mm (OR = 12.1; p = 0.00001); right atrium normal size (OR = 2.9; p = 0.03); left ventricle posterior wall thickness = 11.3mm (OR = 3.0; p = 0.008). On the basis of the received formulas computer software has been developed. The “Probability of spontaneous conversion to sinus rhythm in case of atrial fibrillation (SCSR)” software is designed for IBM computers Pentium 1 and higher compatible; program language: Microsoft Visual FoxPro 6.0; ??: Windows 2000 ?7 and higher; software volume: 560 Kbytes). State registration certificate of PC software No. 201061308. The software has been tested on 27 patients admitted in 2009. Probability of the predicted prognosis compliance with the actual result made up 93%.

Conclusion: SCSR is a base for determining the policy of treatment of patients with recently developed AF as it enables to define a patients group for whom urgent cardioversion can be delayed due to high probability of atrial fibrillation conversion to sinus rhythm.

ATRIAL FIBRILLATION, EPIDEMIOLOGY AND ASSOCIATED FACTORS IN EMERGENCY DEPARTMENTS

J. Martínez1, L. Lapuerta2, S. Rousell3, C. Flaño1, J. Ochoa1. 1Hospital San Pedro, Logroño, 2Hospital Santa bárbara, Soria-Spain, 3Hospital Viamed-Los Manzanos, Logroño-Spain

Besides age, other risk factors are related to the development of atrial fibrillation. Hypertension, diabetes, heart failure, ischemic heart disease and valvular heart disease are some of them and the increase in prevalence may explain the increased incidence of atrial fibrillation.

Methods: We studied the reports of 3432 attendances at the Emergency Unit of Hospital San Pedro (Logroño) in 2009. We collected data on birth date, gender, diagnosis of admission diagnoses and coexisting side. The aim of this study is to analyze the atrial fibrillation, gender distribution and its association with factors that may facilitate the presentation of atrial fibrillation.

Results: Of the total of 3432 emergency department assisted 250 patients (7.28%) attended by symptoms or signs associated with the presence of atrial fibrillation (mean age: 74.084 years, SD 11.93) and secondary diagnoses most commonly associated were hypertension (53.2%), valvular heart disease (13.6%)
and ischemic heart disease (7.6%). The mean ages for these groups were 76.03, 78.61 and 77.94 years respectively and there were no significant differences between them. The gender distribution showed no differences between the two (male 135, 54%, female 115, 46%). The average age shown by the male group (70.77 years) was lower than for the female group (77.96 a.) and so did the value obtained in the Middle Ages subgroups of atrial fibrillation and attendant factors. Among patients with atrial fibrillation and hypertension male patients (59, 43.7%) had a mean age of 72.406 years and female (74, 64.34%) age of 78.93 years. Among patients with valvular heart arrhythmia and male patients had a mean age of 76.71 years while the female age was 79.75 years. And patients with ischemic heart arrhythmia and men had a mean age of 75.54 years while for females age was 81.25 years.

Conclusions: Emergency assistance to atrial fibrillation in Logroño in 2009 is more frequent than expected. A 7.28% of all emergencies were due to atrial fibrillation. The average age of the population was 74,084 years and showed a difference of seven years among men (70.77 years) and females (77.96 years). The diagnoses most commonly associated with the presence of atrial fibrillation in both sexes were hypertension (53.2%), valvular (13.6%) and ischemic heart disease (7.6%).

**PP.12.320** THE INFLUENCE OF RAMIPRIL ON ECHOCARDIOGRAPHIC PARAMETERS AND ATRIAL FIBRILLATION RECURRENCE IN HYPERTENSIVE PATIENTS WITH RECURRENT ATRIAL FIBRILLATION

L. Aleksanyan, E. Ter-Stepanyanc, A. Ordyan, A. Nagdalyan. Yerevan State Medical University, Yerevan-Armenia

Objective: To observe the cardiovascular effect of 2 years of treatment with the angiotensin converting enzyme inhibitor ramipril (ramipril) on blood pressure, echocardiographic findings and on atrial fibrillation recurrence.

**Design and Methods:** 50 outpatients (30 men and 20 women) were enrolled in this study with essential hypertension, in sinus rhythm, but at least with 2-3 episodes of atrial fibrillation in previous 12 month. They were treated with ramipril (10mg) for 2 years. Patients with known heart failure or left ventricular dysfunction and with evidence of prior myocardial infarction were excluded from this study. Clinic blood pressure (BP) and a 24-h electrocardiogram (ECG) were evaluated monthly. We also carried out 2-dimensional guided M-mode echocardiography: intraventricular wall thickness (IVWT), posterior wall (PW) thickness every six month. The age range was 45-60 years.

**Results:** After 2 years of treatment, systolic blood pressure was reduced significantly from 170 mmHg to 145 mmHg. Diastolic blood pressure was also decreased significantly from 95 mmHg to 75 mmHg. Echocardiographic findings (parameters) were reduced also: IVWT (from 13.89 ± 3.70 mm to 11.65 ± 3.41 mm), PW (from 11.6. ± 1.88 mm to 9.67 ± 1.28 mm). Two years follow-up showed a significant reduction of AF new episodes (22% - 11/50).

**Conclusion:** Treatment of hypertension with ramipril significantly reduces echocardiographic criteria for LVH and effectively prevents new episodes of AF in hypertensive patients.

**PP.12.321** HOW RELEVANT IS ATRIAL FIBRILLATION IN A LARGE COHORT OF HYPERTENSIVE PATIENTS?

V. Moltivas, J. Segura, J.A. Garcia-Donaire, C. Cerezo, L. Guerrero, L. Fernandez, L.M. Ruizope. Hypertension Unit, Department of Nephrology, Hospital 12 De Octubre, Madrid-Spain

Hypertension is the most frequent cause of atrial fibrillation (AF) and the combination of hypertension and AF is associated with a particularly high stroke risk. The prevalence in the general population is 1%, increasing up to 9% in elderly. Our study was intended to describe the prevalence of AF in a cohort of hypertensive patients followed at least one year in our hypertension unit from January-1975 to March-2010, and those factors related to the presence of AF from the beginning or their development during the follow-up. We included 7924 hypertensive patients (mean age 60.7 ± 14.7 years, 53.7% female) with a mean follow-up period of 8.1 ± 6.5 years. A total of 308 (3.9%) patients presented with AF: in 111 (1.4%) AF was present from the beginning and in 199 (2.5%) AF was developed during the follow-up. Among patients aged below 40 years, 40-49, 50-59, 60-69 or older than 69 years, the prevalence of AF was 0.6%, 0.8%, 2.5%, 3.1% and 8.4% respectively (p < 0.001). Among male these percentages were 0.7%, 1.2%, 2.8%, 6.9% and 6.3%, respectively, and 0.0%, 0.4%, 2.2%, 5.8% and 9.6% among female (p < 0.001 in both subgroups). Patients with AF showed older age, more obesity and diabetes, higher systolic blood pressure values and higher number of blood pressure lowering-drugs than those without AF. They showed more left ventricular hypertrophy, increased urinary albumin excretion, reduced estimated glomerular filtration rate, and higher rate of previous cardiovascular disease. Factors related with the presence of AF from the beginning were age (odds ratio [OR] 1.058, 95% confidence interval [95%CI] 1.034-1.082, p < 0.001), presence of left ventricular hypertrophy (OR 2.315, 95%CI 1.416-3.785, p < 0.001) and previous cardiovascular disease (OR 3.921, 95%CI 2.395-6.427, p < 0.001). Factors related with the development of AF during the follow-up were age (OR 1.074, 95%CI 1.054-1.094, p < 0.001), body mass index (OD 1.047, 95%CI 1.010-1.086, p = 0.013), presence of left ventricular hypertrophy (OR 2.117, 95%CI 1.392-3.099, p = 0.001) and previous cardiovascular disease (OR 2.574, 95%CI 1.752-3.784, p < 0.001). We conclude that pre-existing and new-onset AF is a frequent finding in hypertensive patients, closely related with age and the presence of left ventricular hypertrophy and previous cardiovascular disease.

**K. Rewink, T. Grodzicki. Jagiellonian University of Cracow, Krakow-Poland**

**Background:** Atrial fibrillation (AF) is common complication of hypertension. Both of them are potentially connected with endothelial dysfunction. There are a few data in literature concerning their additive influence on endothelium. The study probed whether the episode of AF and its persistence influence the endothelial function among hypertensive patients.

**Materials and Methods:** We included 35 hypertensive patients (mean age 68 ± 8 years, 46% male) with episode of AF lasting < 48 hours, without acute coronary episode, hemodynamic instability or acute inflammation, who were candidates for pharmacological cardioversion. We measured flow mediated dilatation (FMD) of brachial artery and intima media complex thickness (IMT) of carotid arteries at the inclusion and 14 days later.

**Results:** In 14 day of observation 16 patients had sinus rhythm while in other 19 subjects AF persisted. There were no difference in initial FMD (5.9% vs 5.6%). IMT, age, body mass index, systolic and diastolic blood pressure between both groups. After 2 weeks, the FMD of patient with sinus rhythm did not differ from the initial value, but the FMD of patients with AF persistence importantly decreased (5.1% vs 2.0%, p = 0.01).

**Conclusions:** The onset of AF worsen the endothelial function in hypertensive patients. This influence is connected with AF persistence and appears between 48 hours and 14 days of AF duration.

**PP.12.323** EPIDEMIOLOGICAL GENDER DIFFERENCES IN HYPERTENSIVE PATIENTS OVER 65 YEARS. ASSOCIATED FACTORS OF ATRIAL FIBRILLATION. FAPRES REGISTRY.

V. Pallares1, L. Facial2, P. Morillas3, J.L Llisti4, C. Sanchis5, V. Gif6, A. Corde6, J. Redon7, B. Bertomeu1. 1Unión De Mutuas, Burriana-Spain, 2Hospital Provincial, Castellon-Spain, 3Hospital Universitario San Alcántar-Spain, 4Cs Ingeniero Joaquín Benlloch, Valencia-Spain, 5Cs Algemesi, Algemesi-Spain, 6Universidad Miguel Hernandez, San Juan-Spain, 7Hospital Clinico Universitario, Valencia-Spain

Background and Objectives: FAPRES registry is a cross-sectional, multicenter study conducted in primary care and hypertension units of Valencia community. The aim is to determine the prevalence of atrial fibrillation (AF) in hypertensive patients (HTp). We included the first three HTp = 65 years who attended on the first day of visit of the week for 5 weeks. We recorded cardiovascular risk factors, target organ damage and associated cardiovascular disease caused differentiating between gender. The objective of this sub-analysis is to determine whether gender differences in factors associated with the onset of AF.

**Results:** We analyze 1,028 hypertensive patients with a mean age of 72.8 ± 5.8 (47.3% male). 9% were smokers, 27.6% diabetics, 48.3% dyslipidemia, 10.9% had a history of angina, 8.5% myocardial infarction, 7.3% heart failure, stroke 7.5% and 6.1% had renal failure. Regarding gender differences, men had a waist circumference greater, less BMI and obesity, and more prevalence of diabetes, smoking, ischemic heart disease, kidney failure, peripheral arterial disease and carotid disease. There were no differences in the presence of AF between 25% men and women (11.5% vs 9.2%, p = NS). Women had higher levels HDL-c and lower uric acid than men. Women had a rate of BP control by ABPM than men (55.7% vs 45.7%, p = 0.001). Whereas the inverse proportion in terms of BP clinical control 31.2% vs 39.9 %, p = 0.004). With regard to treatment were few differences, women were taken less antiplatelet agents
and diuretics that men. Other treatments (beta blockers, ACE inhibitors, ARB, calcium channel blockers and anticoagulants, there were no differences). In the multivariate logistic regression model, women with a history of heart disease, lower GFR, and the number of antihypertensive drugs. In men with age, smoking and a history of heart disease.

Conclusions: In hypertensive patients over 65 years, there are epidemiological differences between men and women in previous heart disease, antihypertensive treatment and factors associated with the presence of AF. Knowing these differences can help us in the management of these patients.

**Abstract PP.12.325**

**PREDICTIVE MODEL OF DIFFERENT ATRIAL FIBRILLATION TYPES APPLIED IN THE CLINICAL SETTING**


**Objective:** To predict the progression of paroxysmal Atrial Fibrillation (AF) to permanent AF, by demographic characteristics, ultrasound indices, biochemical indices and medical history.

**Design and Method:** Prospective observational study conducted at Asklepieion General Hospital. Participants (N = 118, 77 males and 41 females) had a mean age of 71.27 ± 11.49-years at diagnosis. Subsequently they were followed up at a dedicated outpatient clinic for arrhythmias. The outcome variable was dichotomized to patients with paroxysmal and permanent AF. Backward Wald stepwise multiple logistic regression analysis was applied to our data. Regression diagnostics were used to check for collinearity and ROC analysis evaluated our prediction model.

**Results:** Age > 75 (OR: 3.597, p = 0.021), Left atrium (LA) diameter > 45mm (OR: 4.811, p = 0.003), HDL < 35 (OR: 2.759, p = 0.049) were identified as significant independent predictors of progression to permanent AF. History of Ischemic Heart Disease was significant in the univariate analysis (OR: 3.514, p = 0.01) but was backward eliminated when entered in the multivariable model. Our regression model was quite satisfactory [Nagelkerke R² = 0.329, Area Under the Curve = 0.789 (0.689 – 0.889), p < 0.001], achieving 70.6% sensitivity and 76.1% specificity for a cut off value for predicted probabilities set at 0.5.

**Conclusion:** The development of permanent AF can be predicted, and the follow up of the patients can be scheduled according age, LA diameter and HDL plasma levels to achieve optimal prognosis. The hypothesis that lone paroxysmal AF has distinct pathophysiological mechanism related purely to electrophysiological phenomena whereas permanent AF has multifactorial background, can be supported from our data.

**Abstract PP.12.326**

**THE ROLE OF MULTIPLE RISK FACTORS FOR ATRIAL FIBRILLATION IN HYPERTENSIVE PATIENTS**


**Objective:** To assess and compare demographic data, biochemical indices, biological parameters and the presence of multiple risk factors and/or Metabolic Syndrome (MS) in patients with atrial fibrillation (AF) with or without HTN and in hypertensive patients (H) with no AF.

**Design and Method:** Cross sectional observational study. 118 patients with AF (77 males and 41 females) with a mean age of 71.27 ± 11.49-years and 49 patients with hypertension and no AF (30 males and 19 females) with a mean age of 58.45 ± 14.27 were analyzed. Comparisons were carried out by non-parametric Man Whitney and chi square test for independence. The crite-rria for the metabolic syndrome that we used were from the guidelines of the National Cholesterol Education Program Third Adult Treatment Panel (NCEP-ATP III)

**Results:** Examined parameters are depicted in Table. AF patients were significantly older (p < 0.001), had higher left atrium diameter (P < 0.001), lower ejection fraction (P < 0.001) and LDL values (p < 0.001).

**Conclusion:** The proportion of MS found in the AF group, in agreement with recently published data. The association between hypertension and MS was significantly more prominent and coexistence of AF and hypertension should be taken into account when investigating the relation between MS and AF. The interconnection of MS and AF should be investigated further.

**Abstract PP.12.327**

**ATRIUM SIZE IS PREDICTOR OF ATRIAL FIBRILLATION RISK DEVELOPMENT**

O. Drapkina, V. Ivashkin. Moscow Medical University, Moscow-Russia

The aim is study patients with atrial fibrillation specific gravity depend upon atrial dilatation. Evidences and methods are 119 patients with atrial dilatation (atrial size > 4.0 cm) and 70 patients without atrial dilatation (atrial size < 4.0 cm) according to data of transthoracic echocardiography.

**Results:** The sinus rhythm was registered at 81.69% (n = 62) of patients with normal atrial size and at 52.54% (n = 58) of patients with atrial dilatation (p = 0.001). The atrial fibrillation was registered at 18.31% (n = 13) of patients with atrial dilatation.
with normal atrial size and at 47.46% (n = 56) of patients with atrial dilatation (p < 0.05). The atrial fibrillation was indicated at 22.22% (n = 4) of patients with left atrium prevalent dilatation. The atrial fibrillation was not indicated among patients with right atrium prevalent dilatation (p > 0.05). 62.65% of patients with both atriums dilatation had atrial fibrillation (p < 0.05). The conducting of correlation between atrial size and frequency of atrial fibrillation showed the following established data indicated in the table N1.

Table N1. The dependence between atrial size and frequency of atrial fibrillation

<table>
<thead>
<tr>
<th>Left atrial size, cm</th>
<th>n</th>
<th>The frequency of atrial fibrillation, %</th>
<th>p</th>
<th>Right atrial size, cm</th>
<th>n</th>
<th>The frequency of atrial fibrillation, %</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 4</td>
<td>13</td>
<td>14.94</td>
<td>0.9436</td>
<td>&lt; 4</td>
<td>17</td>
<td>18.89</td>
<td>0.5411</td>
</tr>
<tr>
<td>4.1-4.5</td>
<td>12</td>
<td>24.49</td>
<td>0.5346</td>
<td>4.1-4.5</td>
<td>11</td>
<td>28.95</td>
<td>0.3150</td>
</tr>
<tr>
<td>4.6-5.0</td>
<td>6</td>
<td>60.0</td>
<td>0.0611</td>
<td>4.6-5.0</td>
<td>8</td>
<td>38.19</td>
<td>0.0021</td>
</tr>
<tr>
<td>5.1-5.5</td>
<td>14</td>
<td>87.5</td>
<td>0.0009</td>
<td>5.1-5.5</td>
<td>13</td>
<td>81.25</td>
<td>0.0021</td>
</tr>
<tr>
<td>5.6-6.0</td>
<td>6</td>
<td>85.71</td>
<td>0.0087</td>
<td>5.6-6.0</td>
<td>4</td>
<td>66.67</td>
<td>0.0715</td>
</tr>
<tr>
<td>6.1-6.5</td>
<td>9</td>
<td>81.82</td>
<td>0.0005</td>
<td>6.1-6.5</td>
<td>10</td>
<td>83.33</td>
<td>0.0032</td>
</tr>
<tr>
<td>&gt; 6.6</td>
<td>9</td>
<td>100</td>
<td>0.0008</td>
<td>&gt; 6.6</td>
<td>6</td>
<td>100</td>
<td>0.0022</td>
</tr>
</tbody>
</table>

Conclusions: The atrium size is predictor of atrial fibrillation risk development. The normal atrial size is associated with sinus rhythm presence. The atrium dilatation increases the atrial fibrillation risk development. The timely echocardiography atrial size determination can help to forecast of atrial fibrillation risk development and therapeutic approach.
POSTER SESSION

POSTER SESSION 13
CLINICAL ASPECTS

**PP.13.328**

EFFECT OF ANTHYPERTENSIVE MEDICINES (TAKEN FOR CONTROL OF BLOOD PRESSURE), ON QUALITY OF LIFE IN ASYMPTOMATIC HYPERTENSIVE INDIVIDUALS

S.C. Mishra, S. Prakash, A. Banerji, R. Kaira, S. Garg  
**Indian Armed Forces, Kamla-Narain Institute of Cardiovascular Diseases, New Delhi, India**

**Objective:** We studied asymptomatic hypertensive individuals (from armed forces of India) to find out if their quality of life (QOL) changed after 6 months of medication.

**Design and Methods:** 262 asymptomatic hypertensive individuals were enrolled and screened for any co-morbidity. They were placed on one, two or more anti-hypertensive medications as required besides lifestyle modifications. In this questionnaire based study, two previously well validated QOL tools (WHQOL-BREF and SF-36) were used that covered most aspects of QOL. Participants were required to address these questionnaires at baseline and at 6 months after being on medication.

**Results & Conclusion:** Of 232 individuals aged 30 to 60 years, only 40.5% individuals achieved adequate blood pressure control. There was significant improvement in the QOL scores evaluated after medication for 6 months. Change in QOL before & after 6 months in WHO QOL-BREF: in domain D1 [Baseline score (Mean ± SD) 59.18 ± 17.64 vs 6th month score (Mean ± SD) 60.02 ± 18.77; 95% Confidence interval -7.81 to -5.86, (p-value < 0.001)], in D2 [Baseline score (Mean ± SD) 59.22 ± 17.95 vs 6th month score(Mean±SD) 60.02 ± 19.27; 95% Confidence interval -7.90 to -5.70,(p-value < 0.001)], in D3 [Baseline score (Mean ± SD) 62.80 ± 21.10 vs 6th month score(Mean±SD) 65.15 ± 21.47; 95% Confidence interval-3.03 to -1.67, (p-value < 0.001)], in D4 [Baseline score (Mean ± SD) 60.98 ± 19.22 vs 6th month score(Mean±SD) 64.09 ± 18.98; 95% confidence interval -3.80 to -2.43, (p-value < 0.001)]. In physical capacity score of SF-36 [Baseline score (Mean ± SD) 40.25 ± 11.12 vs 6th month score (Mean ± SD) 4278 ± 11.7; 95% confidence interval -2.98 to -2.06, (p-value < 0.001)] and in mental capacity score of SF-36 [Baseline score (Mean ± SD) 43.22 ± 8.85 vs 6th month score [Mean ± SD) 46.10 ± 9.30; 95% confidence interval -3.46 to -2.8 (p-value < 0.001)]. The better education, the male gender, those with better controlled blood pressure and those in stage-1 of hypertension at presentation showed better improvement in the QOL. Age had no influence on QOL (between 30-60 years) and female gender had significantly lower QOL scores than males. Those requiring single antihypertensive medicine had significantly better QOL scores. Thus, medication used to treat hypertension leads to an improvement in quality of life, even in the individuals who are symptom free at the time of initiating medication.

**PP.13.329**

INCREASED CARDIOVASCULAR RISK IN PATIENTS SUBJECTED TO LUNG TRANSPLANTATION

S. Perlini1, S. Surbone1, I. Giovi1, G. Savio1, F. Salinaro1, P. Preti1, T. Oggionni1,  
1Medical University Graz, Division of Cardiology, Graz, Austria, 2Joanneum Research, Graz, Austria

**Objective:** Cardiovascular disease (CVD) is a common cause of morbidity and mortality after solid-organ transplantation, due to a combination of pre-existing cardiovascular risk factors in recipients and immunosuppressive drug toxicity. Aim of the present study was to describe the prevalence of new-onset hypertension, hypercholesterolemia and diabetes in lung transplant recipients.

**Design and Methods:** Sixty-seven patients (mean age: 47.9 ± 14.5 years) were followed for at least 3 years after lung transplantation in the Pavia center. Cumulative prevalence of new-onset hypertension, dyslipidemia, and diabetes were calculated. To this aim, either the values of the relevant parameters (i.e. blood pressure, plasma lipids, and glucose) or a new prescription of any antihypertensive, lipid lowering, or anti diabetic drug therapy, were assessed at each follow-up visit.

**Results:** When compared to the time of lung transplantation, the prevalence of hypertension increased from 11.9% to 70.1% (from 8 patients before transplantation to 47/67 patients at the 3-year follow-up visit; p < 0.01). The concomitant prevalence of diabetes and dyslipidemia raised from 13.4% to 29.9%, and from 47.8 to 85.1 %, respectively (from 9 to 20/67, and from 32 to 57/67 patients; p < 0.01 for both). During the 3-year follow-up body weight and body mass index increased from 65.4 ± 10.8 to 74.5 ± 12.1 kg, and from 22.4 ± 3.7 to 26.1 ± 3.9 kg/m², respectively (p < 0.01 for both), further contributing to the increased cardiovascular risk already over this relatively short follow-up after lung transplantation.

**Conclusions:** A large number of lung transplant recipients develop new-onset hypertension, diabetes or dyslipidemia after transplantation. The increased cardiovascular risk of these patients should be taken into account during follow-up, to better define a proper and timely cardiovascular prevention.

**PP.13.330**

CORRELATION OF HIGH-SENSITIVE CRP PLASMA LEVELS AND ANKLE BRACHIAL INDEX IN HYPERTENSIVE PATIENTS

V. Riegelnik1, S. Perli1, T. Augustin2, C. Colantonio3, C. Kos1, B.M. Pieske1, R. Zweiker1,  
1Medical University Graz, Division of Cardiology, Graz, Austria, 2University of Pavia, Pavia Italy, 3Pneumologia, Fondazione IRCCS San Matteo, Pavia, Italy

**Objective:** Hypertension is widespread in both developed and undeveloped countries. It is a risk factor for coronary heart disease, stroke, heart failure, arterial aneurysm and chronic kidney disease. Both blood pressure and hsCRP levels might be associated as markers of cardiovascular disease. The aim of this analysis was to examine the correlation of high-sensitive CRP plasma levels (hsCRP) and ankle brachial-index (ABI).

**Design and Methods:** For analysis a database of hypertensive patients enrolled in the educational program “herz.leben” was used. Details of the program have been published earlier. In a retrospective design we compared plasma levels of hsCRP and the ankle-brachial ratio in patients of the program. Before transplantation. ABI serves as additional novel risk factor for cardiovascular morbidity and mortality. It was the aim of this analysis to evaluate the correlation of hsCRP and ABI in a cohort of hypertensive patients with increased cardiovascular risk.

**Results:** 93 consecutive patients (51% male, mean age of 63 ± 11 years) were included. 30 patients showed hsCRP levels of > 3 mg/dl (elevated risk for arteriosclerosis), 40 patients hsCRP plasma levels between 1-3, (intermediate risk) and 23 patients showed hsCRP < 1 (low risk). In 76 patients the ABI was between 0.9 and 1.2 (standard value), 10 patients showed ABI < 0.9, which serves as indicator of subclinical or clinical peripheral vascular disease and 7 patients had an ABI > 1.2, which serves as an indicator for arterial medialclerosis. We found a significant correlation of ABI on left and the right side. Correlations of hsCRP and ABI are shown in table 1. There was no significant relation of hsCRP plasma levels and ABI measurements.

<table>
<thead>
<tr>
<th>hsCRP (mg/dl)</th>
<th>ABI left</th>
<th>ABI right</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.9</td>
<td>0.9-1.2</td>
<td>&gt; 1.2</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1-3</td>
<td>8</td>
<td>23</td>
</tr>
<tr>
<td>&gt; 3</td>
<td>0</td>
<td>25</td>
</tr>
</tbody>
</table>

Cor (hsCRP; ABI_left side) = -0.05 Cor (hsCRP; ABI_right side) = -0.02

**Conclusion:** In our dataset there is no significant interaction between the high-sensitive CRP plasma levels and the ankle-brachial index in hypertensive patients. Therefore, both parameters be used for optimal risk prediction.
PP.13.331 PREVALENCE AND RISK FACTORS OF HYPERTENSION IN RHEUMATOID ARTHRITIS

V. Duraj, M. Gjata, L. Collaku, A. Tafaj. UHC Mother Teresa, Tirana-Albania

Introduction and Aims: The rheumatoid arthritis is accompanied with diseases, such as the myocardial infarct and cardiac insufficiency. Their increased prevalence is often accompanied with increased mortality. The age and obesity are well-known predictors for the hypertension in the general population. In addition, smoking and inflammation might contribute to the development of hypertension. In the rheumatoid arthritis, the chronic inflammation may contribute to the increased arterial stiffness, as one of the physical causes for the increase of systolic arterial pressure by proving a relation that exists between the inflammation and the hypertension in the rheumatoid arthritis. The purpose of the study is the assessment of the prevalence of hypertension in the rheumatoid arthritis compared to the hypertensive population without rheumatoid arthritis. In addition, we also studied the correlation that exists between the rheumatoid arthritis and the other risk factors, such as the systolic arterial pressure, age, lipid anomalies, obesity.

Methods: This study is cross-sectional. In the study were involved 45 patients (20 men and 25 women). The age of patients varied from 30-68 years old. All patients were under hypertension treatment. The 25 patients suffering from rheumatoid arthritis and hypertension were compared to the 20 other patients who did not suffer from rheumatoid arthritis, but who had the presence of HTA. At the moment of the presentation, the patients were subjected to all laboratory examinations.

RESULTS: The prevalence of hypertension was the same for both groups. The patients who showed signs of rheumatoid arthritis, had higher of the systolic blood pressure 155 ± 12 mmHg versus 143 ± 8 mmHg (< 0.05), and, diastolic blood pressure 105 ± 5 mmHg versus 100 ± 1 mmHg (p = 0.05), as compared to the hypertensive population without the presence of AR. The patients with rheumatoid arthritis indicated higher levels of cholesterol 220 ± 55 mg/dL versus 200 ± 0.02) and triglycerides 65 ± 11 mg/dL versus 124 ± 5 mg/dL (p < 0.03), in comparison to the hypertensive population without signs of AR. The patients with rheumatoid arthritis had a younger age compared to the other hypertensive population without the presence of the disease. With regard to obesity, the diabetes, the dyslipidemia, the stress, the smoking and the inflammation might contribute to the development of hypertension in these patients. In our work, we wonder whether if there are differences between the two study groups in the presentation of the disease.

Conclusions: The patients with rheumatoid arthritis indicated higher figures of the systolic and diastolic, a younger age, higher levels of cholesterol and triglycerides when compared to the hypertensive population that had no presence of the disease.

PP.13.332 PRIMARY CARE PHYSICIANS’ BEHAVIOUR IN INADEQUATE BLOOD PRESSURE CONTROL (THE PRESCAP STUDY 2010)

F.J. Alonso Moreno1, J.I. Llisterri Caro2, G.C. Rodríguez Roca2, M. Ferreiro Madueño3, S. Lou Arnal4, E. Carrasco Carrasco5, P. Beato Fernández1, Ma. Prieto Díaz2, O. García Vallejo7, J. Ocaña López-Cepero10, on behalf of the Working Group of Arterial Hypertension of the Spanish Society of Primary Care Physicians (Groups Hua/Semergen) and the PreScap 2010 Investigators, 1Centro de Salud Ingeniero Joaquín Utebo, Zaragoza-Spain, 2Centro de Salud De Abarán, Murcia-Spain, 3Cap El Masnou, Alella, Teiá, Barcelona-Spain, 4Centro De Salud De Valdés, UHC Mother Teresa, Tirana-Albania, 5Centro de Salud La Puebla de MONTALBÁN, Toledo-Spain, 6Centro de Salud De Utrera, Zaragoza-Spain, 7Centro De Salud De Abarán, Murcia-Spain, 8Centro De Salud De Almirall, Barcelona-Spain, 9Centro de Salud Sillería, Toledo-Spain, 10Centro de Salud De Ingeniero Joaquín Utebo, Zaragoza-Spain, 11Cap Espanyol, Barcelona-Spain, 12Cap De Urgències, Barcelona-Spain, 13Departamento de Medicina. Almirall S.A., Barcelona-Spain

Objective: To identify the behaviour of the primary care (PC) physicians on inadequate blood pressure (BP) control in Spanish hypertensive population, and to know the main reasons determining the changes in strategy.

Design and Methods: Epidemiological, observational, cross-sectional and multicentric study carried out in Spanish PC settings. Patients aged ≥ 18 years, with an established clinical diagnosis of hypertension and with anti-hypertensive treatment, were included. BP was measured following European Guidelines (ESH/ESC 2007), and BP control was regarded as optimum when SBP/DBP was < 140/90 mmHg (Reappraisal ESH 2009). Data were recorded during three consecutive days in all centers: 8, 9 and 10 of June 2010. Descriptive statistics and measurement comparison (Chi-square test, Student’s t-test and ANOVA test) was performed using the SAS 9.2 package.

Results: A total of 12,961 hypertensive patients (52.0% women) were studied. The mean age was 66.3 ± 11.4 years, 16.8% of patients had a family history of premature CVD, 56.2% were dyslipemic, 29.9% were diabetic, 7.9% had left ventricular hypertrophy, 13.8% heart disease (10.1% ischemic heart disease and 5.1% heart failure) and 6.2% nephropathy. A total of 16.3% were smokers. Patients had been receiving antihypertensive treatment during a mean of 8.2 ± 6.2 years and 63.6% of them were treated with combination therapy: 44.1% combination of 2 drugs, 15.4% combination of 3 drugs and 4.1% more than 3 drugs. 38.4% of patients (95% CI: 37.6-39.2) presented poor SBP and DBP control (n = 4,978), and in 37.5% (95% CI: 36.1-38.9) of these patients (n = 1,722) the physician decided to modify the treatment. Treatment modification in patients with poor BP control (according to PRESCAP 2006 study criteria) was 28.8% (95% CI: 27.6-29.9), lower than the 30.4% (95% CI: 29.2-31.6) observed in PRESCAP 2006 study. Publication of 2009 Reappraisal of ESH guidelines may have had an influence on physicians’ behaviour due to the change of criteria of optimum control. In the patients that physician modified the treatment; modifications were drug addition (39.8%), change of drug (34.3%), dose increase (22.8%) and other actions (3.1%). The main reason for modifying the previous treatment was the lack of efficacy in 76.1%, followed by 4.2% due to the presence of adverse events and 1.2% due to patient request. In 6.6% the treatment was modified for other reasons.

Conclusion: Although the degree of BP control in Spain has improved in relation to previous studies, we have observed that in a broad sample of non-controlled hypertensive patients the PC physician’s behaviour continues being changeable due to the change of criteria of optimum control. In the patients that physician modified the treatment; modifications were drug addition (39.8%), change of drug (34.3%), dose increase (22.8%) and other actions (3.1%). The main reason for modifying the previous treatment was the lack of efficacy in 76.1%, followed by 4.2% due to the presence of adverse events and 1.2% due to patient request. In 6.6% the treatment was modified for other reasons.

PP.13.333 CELLULAR Ca++/Mg++ RATIO AS A MARKER FOR BORDERLINE HYPERTENSION

K. Kisters1, F. Tokmak2, M.Q. Nguyen2, B. Gremmler1, M. Cziborra1, M. Hausberg2, 3St Anna Hospital, Herne-Germany, 4Ruhr University, Bochum-Germany, 5Stadtklinikum, Karlsruhe-Germany

Background: A cellular calcium-magnesium antagonism seems to involve in the pathogenesis primary hypertension.

Patients and Methods: Total plasma and intracellular (lymphocytic) calcium (Ca++) and magnesium (Mg++) contents were determined in 25 untreated patients with essential hypertension (EH) and 25 normotensive healthy subjects (NT). Intracellular measurements were performed in lymphocytes. Ca++ and Mg++ contents were measured by atomic absorption spectroscopy and lymphocytic protein was determined according to Bradford’s method as a reference. There was no significant difference in Plasma Ca++ and Mg++ concentrations in the studied groups.

Results: Intracellular Mg++ and Ca++ contents were found significantly different between groups (p < 0.01). The Ca+/Mg++ ratio in lymphocytes was significantly increased in EH (0.75 ± 0.22) as compared to healthy subjects (0.28 ± 0.16) (p < 0.1) and correlated to mean arterial blood pressure values (r = 0.52, p < 0.01).

Conclusions: We measured an increased intracellular Ca++/Mg++ ratio in hypertensive subjects inducing inflammation and atherosclerosis.

PP.13.334 HYPERTENSION IN THE ELDERLY. DO DIFFERENCES REALLY EXIST?

M. Á. Barón Ramos, C. Luque Amado, M.I. Grana Costa, F.M. Godoy Guerrero, A. Muñoz Claros, A. Ruiz Cantero. Hospital De La Serranía De Ronda, Ronda-Spain

Purpose of the Study: Some studies (such as HYVET 2008) suggest that treatment of hypertension in the elderly is beneficial in reducing the blood pressure, cardiovascular events and its associated mortality. However, current guidelines do not address a specific way for the management and the target of control of hypertension in these patients. In our work, we wonder whether if there are differences between elderly and non elderly hypertensive patients.

Material and Methods: A descriptive study of 345 hypertensive patients admitted to the Internal Medicine Department of our hospital from May to October 2010. We divided the patients in to groups: elderly (≥ 80 years old) and non-elderly (< 80). We collected age, sex, cardiovascular risk factors, the treatment they were receiving and the blood pressure measured on arrival at hospital. Statistical analysis was performed using Chi2 for qualitative variables and T Student for quantitative ones.

Results: We analyzed a total of 345 hypertensive patients with a mean age of 75.162 ± 9.99 years old. 127 (36.8%) of them were classified on the elderly group. A total of 167 (48.4%) were female. There were no differences in the distribution of the following cardiovascular risk factors among non-elderly...
and elderly groups: DM (42.21% vs 40.15% p = 0.39), dyslipidaemia (46.54% vs 40.94% p = 0.18), chronic renal failure (14.96% vs 13.30% p = 0.39), congestive heart failure (15.13% vs 22.04% p = 0.07), peripheral arterial disease (5.50% vs 3.14% p = 0.23) and previous stroke (14.67% vs 21.25% p = 0.07). We found statistical significant differences regarding the presence of ischemic heart disease (14.67% vs 32.28% p < 0.001), tobacco use (14.22% vs 6.29% p = 0.01) and gender (57.70% were non elderly males and 59.05% were elderly females p = 0.002). We find no difference between the measure of Systolic Blood Pressure (137.12 ± 29.34 vs 136.50 ± 29.28 p = 0.85). Nevertheless, there was a significant statistical difference on Diastolic Blood Pressure (71.94 ± 16.99 vs 68.36 ± 14.79 p = 0.04). The mean number of medication they were on was 2.06 ± 1.31 vs. 2.18 ± 1.14 p = 0.37). Both groups were on the same type of hypertensive medication (beta blockers, alpha blockers, calcium channel blockers, ACE inhibitors, ARBs or direct renin blockers). The use of diuretics seemed to be more frequent among the elderly population (54.12% vs 65.35%, p = 0.02).

**Conclusions:** Elderly and non elderly hypertensive patients seem to be quite similar, although the elderly group has a higher prevalence of ischemic heart disease, they take diuretics more frequently and have lower diastolic blood pressure. The non elderly group has more prevalence of tobacco use. There were more women in the elderly group and more men in the non elderly group. It is remarkable that the use of beta blockers was similar in both groups.

**Results:**

- **BPMaxE:** the factors: height (r = 0.53, p < 0.0001), waist/hip ratio (r = 0.276, p < 0.001) and BMI (r = 0.137, p < 0.04). The diastolic BPMaxE correlated only with the weight (r = 0.141, p < 0.04). The regression analysis showed that height and waist/hip ratio were significant predictors for systolic BPMaxE and the estimated model was: Y = -94.291 + 2.121 [height] + 69.62 [waist/hip ratio], R2 = 0.314. For diastolic BPMaxE, the obtained model was: Y = 69.454 + 0.167 [weight], R2 = 0.020.

**Conclusions:** These results suggest that anthropometric parameters are useful to predict the BP response to exercise in normotensive and non-obese adolescents. Therefore, it is necessary to control these parameters during the adolescence to reduce the occurrence of the hypertension in adult life.

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### **PP.13.335**

**RELATIONSHIP BETWEEN BLOOD PRESSURE RESPONSE TO EXERCISE AND ANTHROPOMETRIC INDEXES IN HEALTHY ADOLESCENTS**

E. Silva, J. Villasmil, G. Bermudez, A. Gonzalez, M. Bracho, C. Esis, G. Calmon, E. Clavell. Instituto De Enfermedades Cardiovasculares. Universidad del Zulia, Maracaibo-Venezuela

**Objective:** The abnormal blood pressure (BP) response to exercise has a potential prognosis on future hypertension. The aim of this study was to determine the association between the BP response to exercise and anthropometric indexes in healthy adolescents.

**Methods:** It was evaluated 209 normotensive and non-obese adolescents -males (n = 96) and females (n = 113) - whose age-mean was 15 years. The following anthropometric data was registered: weight, height, body mass index (BMI), waist circumference (WC), hip circumference, waist/hip ratio and waist/height ratio, as well as BP during treadmill test (Bruce Protocol). Pearson correlation was used to detect associations between BP in maximal exercise (BPMaxE) and anthropometric parameters. Likewise, the stepwise linear regression was applied to estimate the best predictive factors for BPMaxE.

**Results:** There was a statistically significant correlation between systolic BPMaxE and the factors: height (r = 0.53, p < 0.0001), weight (r = 0.429, p < 0.00001), WC (r = 0.345, p < 0.0001), waist/hip ratio (r = 0.276, p < 0.001) and BMI (r = 0.137, p < 0.04). The diastolic BPMaxE correlated only with the weight (r = 0.141, p < 0.04). The regression analysis showed that height and waist/hip ratio were significant predictors for systolic BPMaxE and the estimated model was: Y = -94.291 + 2.121 [height] + 69.62 [waist/hip ratio], R2 = 0.314. For diastolic BPMaxE, the obtained model was: Y = 69.454 + 0.167 [weight], R2 = 0.020.

**Conclusions:** These results suggest that anthropometric parameters are useful to predict the BP response to exercise in normotensive and non-obese adolescents. Therefore, it is necessary to control these parameters during the adolescence to reduce the occurrence of the hypertension in adult life.

**PP.13.336**

**THE FREQUENCY AND THE LOCALIZATION OF HEADACHES IN AMBULATORY TREATED HYPERTENSIVE PATIENTS**

M. Klocek1, M. Deren2, K. Kawecka-Jaszcz1.

1 Department of Cardiology and Hypertension, Jagiellonian University Medical College, Krakow-Poland

**Objectives:** To assess the frequency and the location of headaches in ambulatory treated patients with essential hypertension (H). In spite of this, the level of blood pressure (BP) after this type of surgery has been studied very little.

**Methods and Results:** We conducted a study among the 311 patients who underwent surgery for type A aortic dissection (AD) or aortic haematoma (HA). In these cases, the level of blood pressure (BP) after this type of surgery has been very little.

**Conclusions:** Headache is frequently experienced by hypertensive patients. However, there is only a very weak association between the localization of headaches and the arm with permanently higher BP as well as with BP values and anti hypertensive treatment used.

**PP.13.337**

**QUALITY OF LIFE IN PATIENTS WITH ESSENTIAL HYPERTENSION - 6 YEAR FOLLOW-UP**

M. Klocek, K. Kawecka-Jaszcz. 1 Department of Cardiology and Hypertension, Jagiellonian University Medical College, Krakow-Poland

**Aim:** To examine changes in the quality of life (QoL) and its determinants in patients with essential hypertension (H) during six year of follow-up.

**Material and Methods:** At baseline 1005 consecutive patients of hypertension clinic, 490 men and 515 women, aged 49±14.5 years and duration of H 10.2±8.7 years were enrolled and followed up for 6 years. At entry and after every 2 years assessments of QoL. (by the Psychological Well-being Index – PGWB and the EuroQol, 5D – EQ questionnaires) and selected clinical (BP, BMI, concomitant diseases, changes in pharmacological treatment and CV morbidity and mortality) as well as socio-demographical factors (education, marital status) were performed. At the end of the study complete data from 878 patients (411 men and 467 women) were obtained.

**Results:** At baseline in all patients BP was 147±6 ± 10.5/91 ± 8.3 mmHg, QoL was 87.9 ± 17.1 points in PGWB and 68.5 ± 12.0 points in EQ, and patients used 2.7±1 antihypertensive drug/person. The QoL was higher in men than in women, higher in those with higher education level and subjects without concomitant diseases. During the study, the new onset of hypercholesterolemia appeared in 38.4% of patients, diabetes in 11.0%, coronary heart disease in 5.6%, other disease in 31.2%, and 32 subjects (3.2%) died. After 6 years QoL decreased both in PGWB and in EQ tests, 73.4 ± 21.3 points and 59.8 ± 18.5 points respectively, p < 0.001. Lowering the QoL was bigger in women than in men (p < 0.01). Compared to baseline, at 6 year BP was significantly lower (129.9 ± 8.0/80.9 ± 8.1 mmHg, p < 0.01) and the patients consumed more drugs 5.5 ± 3.3/person (p < 0.01). The determinants of the lowest QoL after 6 years in both sexes were: age, lowest level of education, unemployment and new diseases occurred during observation (p < 0.01). Patients taking < 3 drugs had the highest QoL.

**Conclusion:** The quality of life is having a tendency to lowering over time, even during the course of successful treatment of hypertension. This effect is more pronounced in women than in men. The direct mechanisms of lowering of QoL during life course in hypertensive patients need further investigations.

**PP.13.338**

**BLOOD PRESSURE MANAGEMENT IS INADEQUATE AFTER SURGERY FOR ACUTE TYPE A AORTIC SYNDROME**

J. Baguet1, L. Boggio-Graham, G. Barone-Roche1, H. Pierre1, O. Ormezzano2, E. Vautrin1, O. Chavannon1, 1 Cardiology Department, University Hospital, Grenoble-France, 2 Cardiac Surgery Department, University Hospital, Grenoble-France

**Objective:** Hypertension (HT) plays a major prognostic role in terms of morbidity/mortality after surgery for type A aortic dissection (AD) or aortic haematoma (HA). In spite of this, the level of blood pressure (BP) after this type of surgery has been studied very little.

**Methods and Results:** We conducted a study among the 311 patients who underwent surgery for type A AD or HA within our establishment, at least 6 months previously, between January 1990 and October 2009. The patients included in the study (mean follow-up period of 70.6±52.5 months) underwent clinical BP measurement and ambulatory BP monitoring (ABPM) over 24 hours (N = 99), together with respiratory polysomnography/polypathy
In the study, we observed hypertension in 132 patients (83.5%), of which 74 were diabetic vascular event in 81 (51.3%). There were constitutional syndrome in 37 (23.4%, including with two with gastric cancer), general malaise in 100%, type 2 diabetes in 82 (43%); thyroid dysfunction in 44 (27.8%). Of these 44 patients 42 were hypothyroid; vitiligo in 10 (6.3%), 22 (22%) patients were in treatment with metformin. A statistically significant correlation was detected between levels of VB12 and hemoglobin (r = 0.326, p = 0.001, p < 0.01), and between VB12 and MCV (r = 0.190, P = 0.017, p < 0.05) in the subgroup of VB12 < 100 pg/ml with normal ferritin (a total of 34 cases, two with B12 = zero) were constant low hemoglobin levels and high MCV. Low ferritin levels were found in 57 patients (36%) and are in positive correlation with the MCV (r = 0.291, p = 0.001, p < 0.01).

Conclusions: 1. The prevalence of HTN and the association of diabetes with HTN are very elevated, in the presence of B12 vitamin deficit. 2. Also it is elevated the prevalence of autoimmune chronic gastritis, hypothyroidism and type 2 diabetes. 3.– High MCV and the low hemoglobin increases the probability of B12 deficit, although any value of both parameters does not discard it. 4.- The coexistence of the commented organ specific autoimmune processes is correlated with the hypertension and the vascular events.

PP.13.341  IMPORTANCE OF THE NUMBER OF TABLETS IN THE CONTROL OF BLOOD PRESSURE IN VERY ELDERLY HYPERTENSIVES

P. J. Labrador, P. M. Gonzalez Castillo. Virgen Del Puerto Hospital, Plasencia-Spain

Aim of Study: To assess the degree of blood pressure control in patients older than 80 years in a row in our Nephrology unit in terms of two blood pressure (BP) targets (140/90 and 150/90), the type of drugs used and the number of tablets of antihypertensives prescribed.

Material and Methods: Study included all patients over 80 years with a follow-up prior consultation of at least 6 months, who came to review from February to November 2010. We collected demographic data, blood pressure, type of drugs used and number of pills prescribed.

Results: We included in the analysis 120 patients, mean age 83.3 ± 2.9 years, the percentage of women was 55.8%. The mean values of systolic and diastolic blood pressure were 144.3 ± 20.4/6.8 ± 10.2 mmHg. For the target of <140/90, the percentage of controlled patients was 42%. If we consider the second goal of BP < 150/90, the percentage would increase to 65.5% control blood pressure. Then the number of tablets prescribed according to their family were: ACE inhibitors 20.8%, 35.8% ARB2, duretics 76.7%, 54.2% calcium channel blockers, 20% beta-blockers, alpha-blockers 8.3% and 7.5% other. The distribution in function of the number of tablets of antihypertensives prescribed was, none 4.2%, a 30%, two 24.2%, 25.8% three, and four or more 15.8%. The degree of BP control to < 140/90 according to the number of pills prescribed were: no medication, 40%, with one 45.7%, 41.4% with two, 43.5% and 31.6% with four or more. Considering the goal <150/90 would be, with none 100%, with one 74.3%, with two 62.1%, 61.3% with three, four or more 52.6%.

Conclusions: In our Nephrology population above 80 years percentage of achieved BP control was 42% for 140/90, while to a goal <150/90 reached for two of every three patients. More antihypertensive therapy prescribed were duretics, followed by blockers of renin-angiotensin system and calcium antagonists. The percentage of controlled patients decreased with increasing the number of pills prescribed, which would imply a lower adherence to treatment. The use of combinations could lead eventually to imply BP control in this population.

PP.13.342  PRECEREBRAL ARTERIES STATUS IN PATIENTS WITH RESISTANT HYPERTENSION


Background: Cardiovascular events closely associates with uncontrolled blood pressure (BP) level and structural damages of heart and vessels in patients with resistant hypertension (HT). Objective. To assess the relationship between the structure of carotid arteries and the changes of BP in ambulatory patients with resistant HT.

Patients and Methods: We examined 336 ambulatory patients with uncontrolled HT (94 males and 242 females) 39 – 69 (the mean age 54 ± 3) years
old on a combined antihypertensive therapy The repeat “office” blood pressure (BP) measurements, ambulatory BP monitoring (ABPM) were performed in all patients. BP was screened for secondary HT exclusion. Ultrasound with Doppler analysis of carotid and vertebral arteries was performed for estimation of precerebral arteries structure.

**Results:** The secondary HT was diagnosed in 29 (8.6%) cases: 9 – primary aldosteronism (2.7%), 2 (0.6%) intracranial tumors, 2 (0.6%) pheochromocytoma and 16 – renovascular HT (5.5%). In 198 cases (59.1%) the main cause of resistant HT was suboptimal treatment regimen. In this group “office” BP decreased significantly from 167 ± 8/98 ± 5 mm Hg to 134 ± 446 ± 2 mm Hg (P < 0.001) during 3 months of follow-up. Thus, “true” resistant HT was found in 42 patients (12.6%). The intra-media thickness (IMT) was higher compared with age-matched patients with uncontrolled HT who achieved goal BP during treatment modification period: 1.4 ± 0.3 mm vs 0.9 ± 0.2 mm, P < 0.05. The IMT closely correlated with age (r = 0.49, P < 0.05), “office” systolic BP (r = 0.53, P < 0.01), average systolic BP during ABPM, (r = 0.61, P < 0.01). Also we found negative correlation between changes “office” systolic BP during therapy and IMT values (r = -0.46, P < 0.05) in “true” resistant group (n = 42). Plaques and significant blood flow decrease in carotid and/or vertebral arteries was found in 24 patients of the general group (18.9%) with no strict indications for surgical correction. Among patients with “true” resistant HT the atherosclerotic changes of precerebral arteries were found in 37 cases (87.5%) (P < 0.001).

**Conclusions:** The “true” resistance is not a frequent cause of its in patients with uncontrolled HT The “true” treatment resistance is closely associated with structural changes of precerebral vessels, higher IMT values. The structural disturbances of carotid arteries he can identify inadequate response to treatment in patients with “true” resistant HT.

**PP.13.342** ANXIETY-DEPRESSIVE DISORDERS IN HYPERTENSIVE PATIENTS. ASSOCIATION WITH COGNITIVE IMPAIRMENT AND 24-HOURS BLOOD PRESSURE PROFILE

N. Afanasyeva, V. Mordovin. Research Institute of Cardiology, Tomsk-Russia

Cardiovascular pathology, cognitive impairment and anxiety-depressive disorders are among most common diseases. The anxiety-depressive disorders have negative impact on the cardiovascular system and development of cardiovascular disease including arterial hypertension. Anxiety and depression are independent risk factor of development of an arterial hypertension.

The aim was to investigate relation of anxiety and depression to cognitive impair-ment and parameters of 24-h blood pressure profile in hypertensive patients.

**Methods:** We examined 50 non complicated essential hypertensives, aged between 26-57 years. All patients underwent clinical exam, 24-hours ambulatory blood pressure monitoring, neurocognitive assessment by Wechsler Memory Scale (WMS) and neuropsychological testing (Mendelevich V.D. test, Spilberger-Khanin test).

**Results:** In group of the patients with the anxiety significantly values of daily SBP (153.6 ± 12.7 vs 139.3 ± 12.8 mm Hg; p = 0.014), night SBP (145.5 ± 19.6 vs 122.6 ± 18.6 mm Hg; p = 0.036), variability night SBP (16.6 ± 4.7 vs 11.4 ± 4.7 mm Hg; p = 0.043) and DBP (11.5 ± 3.7 vs 7.7 ± 2.6 mm Hg; p = 0.036), load night SBP (87.3 ± 12.2% vs 61 ± 15.8%; p = 0.036) were decreased, increased a degree of night dipping BP (7.5 ± 4.3% vs 13 ± 7.5%; p = 0.044). In group of the patients with the depression significantly values of daily SBP (147.5 ± 16.6 vs 137.9 ± 13.2 mm Hg; p = 0.032), load night SBP (77.3 ± 20.56% vs 57.6 ± 31.3%; p = 0.019) were increased. In hypertensive patients with anxiety memory impairment were marked (5.7 ± 1.41 vs 6.4 ± 1.1 numbers; p = 0.002), the considerable quantity of repetitions for storing of words was required (6.4 ± 2.29 vs 4.7 ± 1.7; p = 0.044), patients remembered words less (62.1 ± 9.2 vs 69.6 ± 5.5 words; p = 0.003), supposed errors in proof test more (5.4 ± 5.6 vs 2.5 ± 2.4 errors, p = 0.032). In patients with anxiety indicators of psychomotor speed were worse (on test “Numbers–letters” 19.4 ± 8.6 vs 25.6 ± 7.7 signs, p = 0.036). In hypertensive patients with depression memory impairment were marked (3.5 ± 1.27 vs 4.8 ± 1.7 numbers; p = 0.020), patients remembered words less (63.8 ± 8.6 vs 70.1 ± 5.4 words; p = 0.012). In patients with depression indicators of long-term (7.4 ± 1.7 vs 8.6 ± 1.4 words; p = 0.043) and figurative memory (6.7 ± 1.8 vs 8.2 ± 1.5 pictures; p = 0.009) were worse, supposed errors in proof test more (10.2 ± 9.1 vs 5.7 ± 4.4 errors, p = 0.048).

**Conclusions:** Our study demonstrates, that in hypertensive patients with anxiety-depressive disorders above a level BP and loading BP during the night period, above variability night BP is lowered a night dipping BP. Comparison between anxiety-depressive disorders and cognitive impairment is found out.

**PP.13.344** EVALUATION OF BPVR AS AN INDEX TO SIMPLIFY DIAGNOSTIC CRITERIA OF HYPERTENSION IN CAUCASIAN ADOLESCENTS

F. Rabbia', I. Rabbia', S. Totital, E. Testa', M. Covella', E. Berza', C. Di Stefano', M. C. Bertello', E. Gioua', F. Cerutti', F. Vegliò'. 'Department of Medicine and Experimental Oncology, Hypertension Unit, Hosp. ‘San Giovanni Battista’, Turin-Italy, ‘Department of Paediatrics, University of Turin, Turin-Italy

Diagnosis of hypertension in adolescence is difficult because of the need of several percentile grids. Recently, LU and coworkers [1] found that blood pressure/height ratio (BPVR) was a simple and accurate index for screening hypertension in Han adolescents. However, they suggested that this index had to be validated in other ethnic groups.

**Objective:** The aim of our study is to test the applicability of this index on a population of Caucasian adolescents in order to considering his use also in this ethnic group.

**Methods:** We considered a population of 1413 Caucasian adolescents (705 females and 698 males, age range 12-15 years) evaluated in a cross sectional population-based study conducted among students of public, junior high schools of Turin, Italy. Hypertension was defined and blood pressure measurements were performed according 2004 Guidelines. Obesity was defined by BMI ≥ 95th percentiles. BPVR was calculated as follows: BPVR = SBP (mmHg)/height (cm) and DBPVR = DBP (mmHg)/height (cm). Specificity and sensitivity of the index applied in our population against the gold standard were calculated. Statistical analyses were performed using the SAS V9 software. Mean and standard deviation of descriptive data were calculated. Pearson correlation coefficient was used to test the association between various data, in order to confirm the Chinese data.

**Results:** Regarding blood pressure, we observed in mean 113 ± 11 (110 ± 11) and 54 ± 27 (57 ± 24) respectively for systolic and diastolic value in boys (girls). Boys have significantly higher height (159 ± 9), weight (51 ± 11) and SBP than girls (p<0.01) who had higher DBP values (p<0.04), 24% of males and 19% of females were obese. The prevalence of hypertension was 15.32% (0.96% stage 2) in boys and 14.95% (2.05% stage 2) in girls. BPVR (0.71 in both group) and DBPVR (0.34 and 0.37 in male and female respectively) were not correlated with age and height in both sexes but positively correlated with BP values. According to cut off points provided by LU and coworkers and considering stage 1 hypertension, sensitivity and specificity ≥ 90% was found in both sexes. For stage 2 specificity was about 1 in both sexes for SBP and sensitivity was 1 for SBP and invalidable for DBP.

**Conclusions:** Our analysis adds a confirmation about the validity of BPVR as simple and accurate index for hypertension diagnosis also in Caucasian adolescents. [1] Liu Q, Ma CM, Yin FZ, Liu BW, Lou DH, Liu XL. How to simplify the diagnostic criteria of hypertension in adolescents. J Hum Hypertens. 2010 Apr 29.

**PP.13.345** PLASMA INSULIN LEVELS ARE ASSOCIATED TO BODY WATER DISTRIBUTION IN HYPERTENSIVE PATIENTS: A BIOELECTRICAL IMPEDANCE ANALYSIS EVALUATION

G.L. Colussi, C. Catena, C. Petri, F. Pezzutto, L.A. Sechi. Hypertension Unit, Department of Internal Medicine, University of Udine, Udine-Italy

Objective: Hyperinsulinemia is associated to sodium and water retention and can therefore influence body water distribution. The bioelectrical impedance analysis (BIA) is a non-invasive and reproducible method that permits assessment of water distribution and has been validated in renal patients. The aim of this study was to investigate the relationships between glucose metabolism and total body water content and distribution by BIA in patients with hypertension.

**Design and methods:** In 72 untreated essential hypertensive patients (51 ± 14 yr., 37M/35F) we measured anthropometric indexes (BMI, waist circumference), plasma glucose, insulin and C-peptide levels after fast and in response to an oral glucose load, and the HOMA-index was calculated. Body fluid composition was measured by BIA after calculation of total body water that was normalized for the body surface area (TBW/m²) and extra- to intracellular ratio of water distribution was subsequently determined.

**Results:** There was no difference in TBW/m² between patients with (HOMA > 2.5) or without insulin- resistance (HOMA < 2.5). TBW/m² had no relationship with the other metabolic variables. Patients with insulin-resistance had an higher extra-to-intracellular body water ratio (0.98 ± 0.27 vs. 0.83 ± 0.16, P = 0.004). At univariate analysis extra-to-intracellular body water
ratio was directly related to age (r = 0.480, p < 0.001), insulin level (r = 0.345, p = 0.006), and HOMA index (r = 0.294, p = 0.020). In the multivariate analysis the included BMI as a potential confounder, age (β = 0.273, p = 0.020) and plasma insulin (β = 0.396, P = 0.002) were independently associated to extra-intracellular body water ratio. No relationships were found between body water distribution and blood pressure values, creatinine clearance, and blood glucose.

Conclusions: In untreated hypertensive patients fasting plasma insulin levels are an independent determinant of body water distribution. These results support a role for this hormone in the regulation of body fluid homeostasis.

PP.13.346 CHARACTERISTICS OF HYPERTENSION AMONG ELDERLY RESIDENTS OF LONG TERM CARE FACILITIES

B. Gryglewska, J. Wójkowska-Mach, T. Grodzicki, P. Heczko. Jagiellonian University, Medical College, Cracow-Poland

Objective: Estimation of co-morbidity, treatment and control of hypertension among elderly residents of different types of long-term care facilities.

Methods: We conducted a cross-sectional study in 2 nursing homes (NH) and 1 long term care hospital (LTCH) by collecting data from the medical documentation of residents aged 60 years and over. Blood pressure (BP) measurements, Mini Nutritional Assessment - MNA (0-12 scores), Abbreviated Mental Test Score - AMTS (0-10 scores), Activities of Daily Living – ADL (0-6 scores) were performed. Results obtained from NH and LTCH residents were compared using U Mann- Whitney or Chi square tests.

Results: The sample consisted of 189 residents, 76.3 ± 11.2 years old. 38.6% men. HT was diagnosed in 98 subjects and mean BP values were 133.7 ± 17.6/73.8 ± 10.2mmHg. The most frequent used drugs were ACEI (77.6%), BB (40.8%) and calcium blockers (25.6%), NH (n = 54) and LTCH (n = 44) hypertensives had similar age (77.7 ± 8.6 vs 80.2 ± 9.0 years), MNA (11.2 ± 3.1 vs 10.5 ± 2.8), AMTS (6.8 ± 2.6 vs 6.6 ± 3.5), diastolic BP (75.1 ± 9.9 vs 72.1 ± 10.4 mmHg), number of chronic diseases (4.7 ± 1.6 vs 5.1 ± 1.7) and number of medications (6.7 ± 3.6 vs 7.2 ± 3.4). However, systolic BP (135.5 ± 18.8 vs 126.4 ± 12.7, p < 0.001) values were higher and functional status (ADL - 4.0 ± 2.1 vs 1.3 ± 2.2, p < 0.001) was better among NH patients than LTCH hypertensives. Antihypertensive drugs were similar among LTCH and NH residents, but control of hypertension was worse among NH residents than LTCH hypertensives (45.3 vs 66.8%, p < 0.001).

Conclusions: Insufficient treatment of hypertension among elderly residents of nursing homes might be important reason for their higher cardiovascular risk.

PP.13.347 HYPERTENSION AND SYSTEMIC LUPUS ERYTHEMATOSUS

L. Balf, I. Rachchi, B. Ben Dhiaou, F. Boussem, S. Kretai, S. Kochbati, O. Cherif, L. Robkani. Habib Thameur Hospital, Tunis-Tunisia

Objective: Systemic lupus erythematosus (SLE) is an inflammatory multisystem disease with a variable course and prognosis. The most commonly involved systems are the skin, mucous membranes, joints, kidney, central nervous system and the lungs. Hypertension is less described than the other clinical signs. The most common pathophysiological explanation of the hypertension in SLE is glomerulonephritis. The aim of our study was to determine the prevalence and the etiologic profile of hypertension in SLE.

Design and Method: A retrospective analysis of 110 patients with SLE over a period of 12 years was performed from January 2000 to January 2011. Diagnosis of SLE was established according to the classification criteria of the American College of Rheumatology (ACR) in 1990.

Results: The prevalence of hypertension in patients with SLE was 27% (30/110) with average delay of apparition of 21 months. There were 28 women and 2 men with mean age of 47 years (21-69). Hypertension was associated with lupus nephritis (6 cases), renal impairment (6 cases) and corticosteroid treatment (16 cases). Hypertension was isolated in 2 cases. Cardiovascular factors associated with hypertension were: diabetes (10 cases), sedentary life (13 cases), obesity (12 cases) and dyslipidemia (8 cases). Main clinical manifestations associated with hypertension: were: cutaneous involvement (18 cases), arthritis/arthritis/arthralgia (23 cases), hematological manifestations (12 cases), pericarditis (5 cases) and pleuritis (8 cases). Antiphospholipid syndrome was found in 9 cases. Coronary artery disease, arteritis of lower limb and transient ischemic attack complicated the course of hypertension in 5 patients. Angiotensin-converting enzyme inhibitors and calcium channel blockers were the most common treatment in this group.

Conclusion: Hypertension was frequently caused by corticosteroid treatment in this study. This should be avoided as far as possible in all patients with SLE.

PP.13.348 THE IMPACT OF DIFFERENT TYPES OF CIRCADIAN RHYTHM OF BLOOD PRESSURE AND NOCTURRAL LEVEL OF THAT PRESSURE IN RELATION TO THE STAGE OF OPTIC NERVE NEUROPATHY AND ON THE CHARACTERISTICS OF BLOOD FLOW IN SELECTED ARTERIES OF THE EYEBALL AND ORBIT OF PATI

B. Krasinska1, M. Karolczak-Kulesza2, Z. Krasinski1, K. Pawlaczyk-Gabriel1, A. Nikl1, J. Gluszek1, A. Tykarski1. 1Department of Hypertension, University of Medical Sciences, Poznan-Poland, 2Department of Ophthalmology, University of Medical Sciences, Poznan-Poland, 3Department of General and Vascular Surgery University of Medical Sciences, Poznan-Poland

Introduction: The physiological decrease in systemic pressure during sleep and an excessive hypertensive effect of drugs used to treat the arterial hyperten-

sion (AH), can lead to a secondary reduction of perfusion in the vessels of the eyeball and orbit, chronic ischemia of the optic nerve (ON) and the develop-

ment of neuropathy of that nerve.

The aim of the study was to assess the impact of different types of circadian rhythm of blood pressure and nocturnal level of that pressure in relation to the stage of ON neuropathy and on the characteristics of blood flow in selected arteries of the eyeball and orbit of patients (P) with primary open-angle glaucoma (G) and AH.

Materials and Methods: The study was conducted on a group of 69 P with G and treated, controlled AH. All the P 24-h blood pressure records were taken. During the ophthalmoscopic examination the thickness of the nerve fibers and the degree of visual field defects (VFD) were assessed. Intraocular pressure (IOP) was mea-

sured many times during the day. The Ultrasound-Doppler was used to estimate peak systolic velocity (PSV), end-diastolic velocity (EDV) and the vascular

resistance index (RI) in the opthalmic (OA), central retinal (CRA) and short posterior ciliary arteries (SPCRA). The results obtained in the study were ana-

lyzed for the whole group and after dividing the P into three subgroups accord-

ing to the height of NBPF (NBPF < 10%–ND, 10.15%–D, > 15% – D + ED) and a further three according to mean arterial pressure by night (MAPn).

Results: In the group of D and D + ED the ocular perfusion pressure by night, visual evoked potentials showed significantly lower than in the ND group. The greatest decrease in the VFD was in the group D + ED. The PSV, EDV and RI in the OA and CRA differed significantly between the groups. PSV and EDV values were the lowest in the group D + ED and largest in the ND group. Inverse relations were observed for RI in the OA and CRA. The average IOP during the day and night was the highest and the ocular perfusion pressure was the most impaired in the group with the lowest MAPn. Analysis of the flow in the vessels of the eye and orbit in groups depending on the MAPn level showed that PSV and EDV in the CRA and PSV in the OA were significantly impaired in the group with the lowest MAPn compared with other groups.

Conclusions: In patients with G and well-controlled AH, a normal NBPF of more than 10% is associated with a greater VFD and greater degeneration of the ON fibers, which may be the result of reduced perfusion in the OA and CRA ex in this group of patients. Low minimum diastolic pressure and the level of NBPF, but not the absolute value of average arterial blood pressure at night, should be included in the group of specific risk factors for progression of open angle G in patients with AH. The dependencies listed by us show that in this group of patients there exists the need for carrying out ABPM together with determining the level of NBPF. These findings also suggest avoiding excessive lowering of blood pressure at night in patients with glaucoma and hypertension.

PP.13.349 ENHANCED PERSISTENCE IN HYPERTENSIVE PATIENTS TREATED WITH ANGIOTENSIN RECEPTOR BLOCKERS IN THE UK

L. Breitscheidel1, A. Sandberg2, K. Kostev2, B. Holz1, M. S. A. Oberdick3. 1IMS Health GmbH & Co. Ohg, Munich & Frankfurt-Germany, 2Daiichi Sankyo Europe Gmbh, Munich-Germany

Objective: To evaluate persistence with angiotensin receptor blockers (ARBs) in comparison to other antihypertensive therapies in patients with hypertension in the UK.

Design and Method: This retrospective study analyzed prescription data collected by general practitioners (n = 708) in the UK, using a longitudinal database, the IMS Disease Analyzer (DA). The DA database was searched for patients with hypertension.
hypertension (ICD-10 code I10) in the period 09/2008-08/2009 with a follow-up of at least 12 months. Persistence was defined as the proportion of patients who remained on their initially prescribed therapy for 1 year. The differences between mean persistences (days) were calculated by using multiple regression analyses, adjusted for age, gender, region, insurance status and co-morbidity.

Results: Out of 120,300 patients with hypertension in the DA database, 16,165 patients (mean age 66.1 years [SD: 13.8], women 52.9, 23.8% with diuretic prescriptions, 28.0%, 26.6%, 12.3% and 9% with fixed or unfixed ACE inhibitor, calcium antagonist, beta-blocker and ARB prescriptions, respectively) were eligible for analysis, according to inclusion and exclusion criteria. Of these, 1,542 patients were on fixed or unfixed treatment with ARBs. At 12 months, patients taking unfixed ARBs (80.2%) demonstrated significantly better persistence compared to patients treated with other unfixed antihypertensive therapies: diuretics (66.6%), beta-blockers (65.8%), calcium antagonists (67.1%), and ACE inhibitors (65.6%). Mean duration of persistence in patients receiving unfixed ARBs (319.0 days/patient) was significantly longer (p < 0.001) compared with other antihypertensive therapies (ranging between 278.8 and 284.6 days/patient).

Conclusions: These real-life data demonstrate that persistence with treatment regimen containing an unfixed ARB in UK patients with hypertension is significantly better compared to other unfixed treatment regimens. These differences should be addressed in hypertension management strategies of patients to ensure their adequate blood pressure control.

Material and methods: The study group included 46 individuals with pharmacologically treated arterial hypertension (mean age: 46.13 ± 7.36 years). According to criterion of occupational exposure to lead two subgroups were selected: group I consisted of subjects occupationally exposed to lead (n = 23), and group II – not exposed to lead (n = 23). In each of the examined subjects, basic anthropometric data were collected, as well as arterial blood pressure measurements with application of Korotkov method. The following parameters characterising occupational exposure were determined: blood lead concentration (Pb-B), and blood zinc protoporphyrin (ZnPP) concentration. Serum concentration of cystatin C was established by immunonephelometry with the use of human cystatin C-specific antibodies.

Results: The studied groups did not differ in mean values of systolic and diastolic blood pressure. It was shown that in group I concentrations of Pb-B and ZnPP were statistically significant higher than in group II. Serum concentration of cystatin C was statistically significant higher in group I than in group II. In the group I a positive linear correlations between Pb-B and cystatin C (r = 0.46; p < 0.05) as well as between ZnPP and cystatin C (r = 0.47; p < 0.05) were observed. A regression analysis demonstrated that higher blood lead level, and more advanced age represented independent risk factors of an increased cystatin C concentration in the group I.

Conclusions: In patients with arterial hypertension occupationally exposed to lead cystatin C concentration significantly increase compared to patient with arterial hypertension occupationally exposed to lead. Lead concentration may serve as a predictive marker forecasting the cystatic C concentration in patients with arterial hypertension occupationally exposed to lead.

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PP.13.350  EACH HYPERTENSIVE PATIENT IS UNIQUE, BUT NOT THAT MUCH: THE CLINICAL FORMS OF ESSENTIAL HYPERTENSION

X. Gireed1, D. Rosenbaum, D.P. Laroche2, V. Katsadze1. On behalf of the investigators of the Caravage Study. 1Pitié Salpêtrière Hospital, Paris-France, 2Stactis, Paris-Pariss, 3Rothinger Ingelheim, Paris-France

Objective: To group patients with essential hypertension in some distinct clinical forms, which might be useful for choosing appropriate antihypertensive treatment.

Methods: A cross-sectional survey was conducted in French cardiology offices and included patients with treated uncontrolled or untreated essential hypertension (office Blood Pressure (BP) ≥140/90 mmHg or ≥130/80 mmHg in patients with diabetes or renal failure). More than 30 clinical variables were collected, analysed using k-means clustering algorithm and described for profiling the clusters in clinical forms of hypertension.

Results: 356 cardiologists recruited 1706 hypertensive patients: 834 untreated and 872 treated but uncontrolled. Independently of treatment status, 4 clusters were detected: cluster 1 including elevated diastolic BP (DBP), grade 1 BP, elevated heart rate (HR), early antihypertensive treatment, current smoking, high BP (HBP) history in the family, young age, male gender, living in the north of France; cluster 2 combining abdominal obesity, recent weight gain, treated dyslipidaemia, treated diabetes, left ventricular hypertrophy (LVH), renal damage, coronary disease, heart failure, retinopathy, peripheral arterial disease (PAD), east of France; cluster 3 combining elevated systolic BP (SBP), elevated Pulse Pressure, elevated mean BP (MBP), isolated SBP, grade 3 BP, white-coat effect, LVH, established cardiovascular and/or renal diseases, old age; cluster 4 combining elevated DBP, grade 1 BP, south of France. Only three clusters were named: the cluster 1 was named familial hypertension, because antihypertensive treatment < 45 years of age was predominant; the cluster 2, “metabolic hypertensive”, because abdomi- nal obesity and/or diabetes were predominant; the cluster 3, vascular hyperten- sion”, because Pulse Pressure > 65 mmHg was predominant.

Conclusion: This study identifies different clusters of patients with essential hypertension. These clusters might help to define the appropriate first line antihypertensive treatment for patients belonging to the respective groups and might enhance earlier BP control.

PP.13.351  OCCUPATIONAL EXPOSURE TO LEAD AND SERUM CYSTATIN C CONCENTRATION IN PATIENTS WITH ARTERIAL HYPERTENSION

R. Poreba, P. Gac, M. Poreba, J. Antonowicz-Juchniewicz, R. Andrezejak. Wroclaw Medical University, Wroclaw-Poland

Introduction: Occupational exposure to lead affects the functioning of the cardiovascular system, especially regulation of arterial blood pressure. Cystatin C may be treated as the novel risk factor for cardiovascular diseases.

Aim: The aim of the study was to investigate the relationship between occupa- tional exposure to lead and serum cystatin C concentration in hypertensive patients.

PP.13.352  PULSE PRESSURE AND COGNITIVE IMPAIRMENT IN TREATED HYPERTENSIVE PATIENTS

T. Yaneva-Sirakova, R. Tarnovska-Kadreva, L. Trayanov. Medical University Sofia, Sofia-Bulgaria

Objective: A large proportion of hypertensive patients (Ps) are still far from the optimal blood pressure (BP) control, despite early diagnosis and the availability of a variety of antihypertensive drugs. They may remain with an elevated cardiovascular risk, incl. high risk for cognitive impairment (CI). Pulse pressure (PP) has been identified as an independent marker for cardiovascular death and advanced target organ damage. PP assessed ambulatory BP monitoring (ABPM) so far has been underestimated risk factor for target organ damage - CI. These are the preliminary results of an ongoing study on BP determinants for early CI in treated hypertensive Ps.

Design and methods: We examined 148 Ps - males 51 (34.5%), females 97 (65.5%), mean age 64.16 ± 11.18 years and mean hypertension history 13.1 ± 11.05 years. We gathered full medical history, esp. hypertension history, physical examination and laboratory screening. Ps with atrial fibrillation, major head trauma, bypass surgery and neurological disease leading to CI were excluded. Neuropsychological profile was assessed with a battery of neuropsychological tests (NPTs), validated for the Bulgarian population: Mini-Mental State Examination (MMSE, cut-off value 25) and the more sensitive and specific Montreal Cognitive assessment (MoCA, cut-off value 26). ABPM was conducted as recommended by ESH/ESC. PP during the day was 56.85 ± 12.02 mmHg and during the night - 55.15 ± 16.13 mmHg.

Results: Regression analysis found correlation between day and night PP and NPTs’ results. Mann-Whitney Test (t < 0.05) was used to find that there is significant difference (sig. 0.023 for MMSE) in the mean values of the NPTs’ results between the groups with PP > 50 and PP ≤ 50 mmHg. The result was not age dependent. Again with Mann-Whitney Test we assessed the significance of the difference between mean values of day-PP (sig. 0.01) and night-PP (sig. 0.02) between Pts with CI and those without (resp. > 55 mmHg and < 55 mmHg).

Conclusion: Elevated PP both during the day as well as in the night is correlated with CI. It is a marker of large artery stiffness and target organ damage not only in the very elderly (our study population mean age is 64.16 years). Thus CI may correspond to other target organ damage.

PP.13.353  VASCULAR INJURY IN HYPERTENSIVE PATIENTS: ARE MEN AND WOMEN EQUAL? PARITE STUDY

C. Moumi-Véheir1, T. Simone2, D. Guedj3, A. Achouba4, E. Ghamad5, S. Quercet6, M. Guennoun1, 1Hospital Cardiologique de Lille, Lille-France, 2Chu Saint-Antoine, Paris-France, 3Cardiologist, Cnf, Paris-France, 4Cardiologist;Novartis, Rueil-Malmaison-France, 5Cardiologist, Gif/Yvette-France, 6Novartis, Rueil-Malmaison-France, Cardiologist, Cnf, Marseille-France

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Aim: To describe complementary examinations undertaken to identify target organ injury in patients with essential hypertension as a function of gender and cardiovascular risk (CVR).

Method: Cross-sectional, multicentric study conducted in France with 654 cardiologists, each of whom included four consecutive, gender-paired patients with hypertension for whom details of complementary examinations carried out over the last 6 months were available.

Results: 3,440 patients included (53% M, 47% F). Examinations: echocardiography 66.2%; vascular Doppler 40.2%; coronary ischemia testing 34%; Holter EKG 14.1%. Significant differences between M and F were found in terms of the examinations undertaken. Myocardial ischemia testing was significantly more frequent in M than F, particularly when CVR was medium or high.

<table>
<thead>
<tr>
<th>Examination</th>
<th>Females (n = 1621)</th>
<th>Males (n = 1819)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise test ET %</td>
<td>18.8</td>
<td>40.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Ischemia test without ET</td>
<td>5.9</td>
<td>8.2</td>
<td>0.007</td>
</tr>
<tr>
<td>ET = noET %</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Vascular Doppler %</td>
<td>36.9</td>
<td>43.2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Ischemia test (ET and noET) in high CVR (n=%)</td>
<td>(1012) 26.9</td>
<td>(1358) 49.1</td>
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</table>

Conclusion: Tests to identify coronary insufficiency are performed more often in men with hypertension than in women with hypertension. Efforts to promote parity should probably be encouraged.

Conclusion: The impairment of renal function (GF) and microalbuminuria (MAL) are clinical expression of target organ damage (TOD) in hypertension and markers of cardiovascular (CV) risk. The aim of this study is to analyze the CV risk and prognosis of a cohort of hypertensive patients according to presence subclinical cardiac and renal injury in the variability of BP by ABPM.

Results: We included 405 patients (53.8% women) with a mean age of 55.5 years. Patients with LVH had lower EGF and higher UA (65.81 ± 3.34, 41.31 ± 3.87), compared with subjects without LVH (90.64 ± 3.78, 22.69 ± 1.3, p < 0.0001). Patients with concentric LVH have lower GF and higher UA (55.27 ± 2.41, 35.47 ± 2.55), compared with eccentric LVH (71.08 ± 2.05, 25.08 ± 1.48) and compared with patients without cardiac structural alterations (91.78 ± 1.97, 15.15 ± 0.45, p < 0.0001). In the multivariate analysis for LVIM, there was a significant relationship with the depth of the BP (p < 0.005), BMI (p < 0.0001), DM (p < 0.001), and EGF (p = 0.002). The prevalence of LVH is a risk factor for cardiovascular prognosis (RTI 95% 1.60 [0.99-2.76]), as well as the deterioration of renal function (1.01 [0.32 - 3.37]), but not microalbuminuria (0.86 [0.38 to 1.93]).

Conclusions: The impairment of renal function (GF below 60 ml/min and microalbuminuria) in patients with hypertension, is closely related to the presence of left ventricular hypertrophy. The existence of subclinical lesions in different target organs (heart and kidneys) showed a multiplicative interaction that worsens the cardiovascular prognosis of these patients.

PP.13.354 LACK OF EFFICACY OF THE ELECTROCARDIOGRAM TO DIAGNOSE NEW LEFT VENTRICULAR HYPERTROPHY

D. Pikorz, A. Tommasi. Sanatorio Británico Sa, Rosario-Argentina

International guidelines recommend routinely the electrocardiogram (ECG) for detecting left ventricular hypertrophy (LVH).

Objectives: To determine the ability of ECG to detect the development of new LVH in the follow up of non LVH treated (TT) hypertensive (HT) patients (p).

Material and Methods: 108 TT HT p without LVH measured by echocardiography according to Devereux’s method, LVH was considered as left ventricular mass index > 110 g/m² in women (W) or 125 g/m² in men (M). ECG criteria for LVH were: 1) Sokolow Lyon (SL) > 35 mm, 2) Cornell voltage criteria (CV) > 28 mm and 20 mm W, 3) product of the VC for the duration of QRS (LIFE) > 2440 mm.ms, 4) presence of one of the three criteria (1of3). We evaluated the sensitivity (S), specificity (Sp), positive predictive value (PPV), negative predictive value (NPV), positive likelihood ratio (LPR), likelihood of a negative ECG result (LNR) to discard new LVH.

Results: Follow-up 2140 ± 1395 days. 12% (12 p) developed concentric LVH, and likelihood of a negative ECG result (LNR) to discard new LVH.

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Conclusion: Tests to identify coronary insufficiency are performed more often in men with hypertension than in women with hypertension. Efforts to promote parity should probably be encouraged.
PP.13.357 DIASTOLIC DYSFUNCTION IN HYPERTENSIVE PATIENTS WITHOUT LEFT VENTRICULAR HYPERTROPHY

D. Piskorz, A. Tommasi. Sanatorio Británico Sa, Rosario-Argentina

Left ventricular hypertrophy (LVH) is a common complication of hypertension and may be associated with diastolic dysfunction (DD).

Objectives: To determine the prevalence of DD in hypertensive (HTN) patients (p) without LVH.

Material and Methods: 98 HTN p, 66 with and 32 without LVH measured by the method of Devereux, LVH was considered a left ventricular mass index > 110 g/m² in women and 126 g/m² in men. Mitral valve orifice Pulsed Doppler was performed and it was measured the peak instantaneous velocity ratio E/A (VE/VA) and isovolumic relaxation time (IVRT), both were corrected by age; and Tissue Doppler of the interventricular septum was also performed, and it was measured the peak instantaneous velocity ratio E'/A' (VE'/VA') and instantaneous velocity peak E'/E'(VE'/VE').

Results: Mean age 60.3 ± 36.7 years, male 47 p (48%), 8 p diabetics (8.2%). The table presents the results of the assessment of diastolic function:

<table>
<thead>
<tr>
<th>without LVH</th>
<th>with LVH</th>
<th>p value</th>
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<tbody>
<tr>
<td>Mean VE/VA</td>
<td>0.96 ± 0.29</td>
<td>0.88 ± 0.34</td>
</tr>
<tr>
<td>Abnormal VE/VA (%)</td>
<td>32 - 48.5</td>
<td>17 - 53.1</td>
</tr>
<tr>
<td>Mean IVRT (msec)</td>
<td>108.6 ± 28.4</td>
<td>120.7 ± 24.4</td>
</tr>
<tr>
<td>Abnormal IVRT (%)</td>
<td>51 - 77.3</td>
<td>26 - 81.3</td>
</tr>
<tr>
<td>Mean VE'/VA'</td>
<td>1.13 ± 1.45</td>
<td>0.83 ± 0.98</td>
</tr>
<tr>
<td>Abnormal VE'/VA' (%)</td>
<td>50 - 75.8</td>
<td>27 - 84.4</td>
</tr>
<tr>
<td>Mean VE/VE</td>
<td>10.6 ± 4.8</td>
<td>13.7 ± 13.4</td>
</tr>
<tr>
<td>VE'/VE &gt; 10</td>
<td>40 - 65.2</td>
<td>27 - 84.4</td>
</tr>
</tbody>
</table>

Conclusions: 1) high frequency of DD in HTN p without LVH, 2) the only one difference between p with and without LVH was the higher pulmonary capillary pressure in the first, showed by a higher VE'/VE'', 3) LVH is not the cause of DD in HTN p.

PP.13.358 INCREASED RENAL VASCULAR RESISTANCE IS ASSOCIATED WITH IMPAIRED CORONARY MICROCIRCULATION, ENDOTHELIAL DYSFUNCTION AND ALBUMINURIA LEVELS. AN INVASIVE APPROACH

C. Tsounis, D. Tsiachris, G. Latsios, K. Dimitriadis, A. Kasiakogias, C. Tsioufis, First Cardiology Clinic, University of Athens, Hippokration Hospital, Athens-Greece

Background: Measurement of renal resistive index (RRI) has been used to assess the severity of renal damage in hypertension. Coronary flow reserve (CFR) is often used to express coronary microvascular function and asymmetric dimethylarginine (ADMA), an endogenous inhibitor of nitric oxide synthase, is a marker of endothelial dysfunction. The aim of the present study was to evaluate the relationship between hematological with coronary microcirculation, endothelial function and albuminuria in untreated essential hypertensive subjects.

Design and Methods: For this purpose, we studied 24 hypertensive patients (aged 57.7 ± 10 years, 10 males) with indications of myocardial ischemia and normal coronary and renal arteries in the coronary and renal angiography. Renal blood flow velocity was measured by a 0.014 in. Doppler flow wire (Flowire, Volcano) in the renal artery. RRI was calculated as: (peak systolic velocity - end-diastolic velocity)/peak systolic velocity. CFR was calculated by using also Flowire in response to bolus intracoronary administration of adenosine (60μg). Serum creatinine levels (sCr), glomerular filtration rate (eGFR according to MDRD formula) and ADMA were assessed from a morning blood sample. Albumin excretion was determined as the ratio of albumin to creatinine (ACR) on two non-consecutive morning spot urine samples.

Results: In the entire study population RRI was negatively correlated with CFR (r = 0.530, p = 0.008) while no correlation was observed with age, sex, anthropometric characteristics as well as blood pressure levels measured during catheterization of the renal artery. Moreover, RRI was positively correlated with ADMA (r = 0.570, p = 0.006), logACR (r = 0.410, p = 0.046) and negatively correlated with eGFR (r = -0.423, p = 0.040).

Conclusions: Increased vascular resistance is associated with impaired coronary microcirculation, endothelial dysfunction and kidney 1 damage (as reflected by increased albumin excretion and reduced eGFR). RRI may be considered a useful hypertensive target organ damage surrogate.

PP.13.359 OXIDATIVE STRESS IN CHILDREN WITH PRIMARY HYPERTENSION BEFORE AND AFTER 1 YEAR OF STANDARD ANTIHYPERTENSIVE THERAPY

J. Sladowska-Kozlowska, M. Litwin, A. Niemirska, A. Wierzbicka. The Childrens Memorial Health Institute, Warsaw-Poland

The relation of target organ damage (TOD) and oxidative stress (SOX) and the effect of antihypertensive therapy on SOX in children has not been fully explored. We assessed SOX in 86 children (14.1 ± 2.4 years) with primary hypertension (PH) before and after 12 months of standard non-pharmacological and pharmacological therapy based on angiotensin converting enzyme inhibitor (ACEI) or angiotensin 2 receptor type 1 blocker (ARB1).

Results: Pts with concentric left ventricular hypertrophy had significantly higher thiobarbituric acid reactive substances (TBARS) concentration (0.54 ± 0.39 μmol/l) in comparison to pts with normal left ventricular geometry (0.33 ± 0.22 μmol/l), pts with left ventricular concentric remodeling (0.31 ± 0.12 μmol/l) and eccentric hypertrophy (0.36 ± 0.15 μmol/l). Pts with carotid IMT > 2SDS had greater TBARS concentration (0.15 ± 0.33 μmol/l) in comparison to pts without MS. TBARS correlated with: left ventricular mass (p < 0.01, r = 0.31), carotid IMT (p = 0.05, r = 0.29), albuminuria (p = 0.05, r = 0.21), systolic blood pressure - SBP/24h (p = 0.05, r = 0.25) and indexSBP/24h (p < 0.05, r = 0.24), ADMA and eGFR concentrations correlated with: CRP (p < 0.05, r = 0.38 and p < 0.05, r = 0.53 respectively) and TG/HDL ratio (p < 0.05, r = 0.48 and p < 0.05, r = 0.40, respectively). After 1 year of antihypertensive treatment there was significant decrease of blood pressure, TOD and prevalence of MS. TBARS concentrations decreased (0.36 ± 0.22 vs 0.30 ± 0.29 μmol/l, p = 0.001) and gluthathione increased (737.8 ± 88.9 vs 769.6 ± 34.0 μmol/l, p = 0.001).

Conclusion: SOX in children with PH is related to TOD and metabolic abnormalities. Standard antihypertensive treatment is effective in terms of blood pressure lowering, regression of TOD and metabolic abnormalities and decrease of SOX.

PP.13.360 MICROALBUMINURIA IS A POOR MARKER OF VASCULAR DAMAGE IN HYPERTENSIVE PATIENTS WITHOUT CARDIOVASCULAR DISEASE

A. Szyndler1, R. Nowak1, K. Czeczowice1, A. Dubie1, K. Poloni1, W. Kucharska1, M. Hofmann1, B. Poutouye1, S. Laurent1, K. Narkiewicz2, On Behalf of CareNorth research group. 1Hypertension Unit, Dept. of Hypertension and Diabetology, Medical University of Gdansk, Gdansk-Poland, 2Dept. of Pharmacology, HEGP, APHP, Universite Paris Descartes, Inserm U970, Paris-France

Objective: Microalbuminuria is an important predictor of renal and cardiovascular events, particularly in patients with type 2 diabetes. However, relationship between increased urinary protein excretion and vascular damage in hypertensive patients is unclear. Therefore, we assessed the significance of microalbuminuria as a marker of vascular damage in hypertensive patients without overt cardiovascular disease.

Design and Methods: We measured ambulatory blood pressure (Spacelabs 90207 device), carotid-femoral pulse wave velocity (Sphygmocor device), and carotid intima-media thickness, diameter, and distensibility in (ArtLab system) in 27 hypertensive patients (23 males, age 54 ± 4 years, BMI 32 ± 1 kg/m², mean ± SEM) with microalbuminuria. These measurements were compared with those obtained in 27 normoalbuminuric patients matched for gender, age and BMI.

Results: In comparison with normalalbuminuria, microalbuminuria was associated with smaller nocturnal fall of SBP (7.4 ± 1.4 vs. 11.8 ± 1.7 %; P < 0.05) and DBP (9.2 ± 2.1 vs. 14.6 ± 1.9 %; P < 0.05). Microalbuminuric and normoalbuminuric had similar pulse wave velocity (10.5 ± 0.5 vs. 9.8 ± 0.4 m/s, respectively; P = NS), carotid intima-media thickness (0.66 ± 0.03 vs. 0.68 ± 0.02 mm, respectively; P = NS), carotid diameter (7.9 ± 0.2 vs. 7.7 ± 0.2 mm, respectively; P = NS) and distensibility (0.48 ± 0.03 vs. 0.46 ± 0.04 mm, respectively; P = NS).
Conclusions: Microalbuminuria is associated with non-dipping profile of ambulatory blood pressure. However, it is a poor marker of vascular damage in hypertensive patients with cardiovascular disease. These findings support multiple organ damage assessment in hypertensive patients.

PP.13.361 THE NEW METHOD TO DIAGNOSE SUBCLINICAL CARDIAC INJURY IN PATIENTS WITH ARTERIAL HYPERTENSION WITHOUT LEFT VENTRICULAR HYPERTROPHY

N. Koziołowa, A. Bushmakina, E. Polyanskaia, N. Kovalevskaya. Perm State Medical Academy. Perm-Russia

Objective: to evaluate diagnostic value of markers of left ventricle collagen matrix damage in patients with arterial hypertension (AH) without left ventricle hypertrophy (LVH).

Materials and Methods: 60 patients with AH were examined. The patients were divided into 2 groups of 30 people each depending on LVH presence. The first group consisted of the patients without LVH. The second group consisted of the patients with LVH. Average age of the patients was 46.7 ± 5.9 years. Average AH duration was 3.9 ± 2.1 years. To evaluate LVH the patients underwent echocardiography and left ventricle myocardium mass index (LVMMI) was calculated. LVMMI was calculated as a relation of LVMV to body surface area (BSA). To calculate BSA D. Dubois formula (1975) was used. LVMMI > 125 g/m² for males and LVMMI > 110 g/m² for females considered to be a criterion for LVH. To evaluate left ventricle collagen matrix, serum level of 1st-type metalloproteinase (tTIMP-1) was determined.

Between the groups the patients didn’t differ significantly in terms of risk factors, comorbidities and antihypertensive therapy. To evaluate diagnostic value of the method, ROC curve analysis was performed using the method of deLong et al. (1988) obtaining exact Binomial Confidence Interval for AUC.

Results: Direct correlation of high dependence between LVMMI and tTIMP-1 level both in females (r = 0.97, p < 0.001) and males (r = 0.78, p < 0.001) was detected. Average tTIMP-1 level in females with AH without LVH was 173.9 ± 17.0 ng/ml and with LVH - 197.0 ± 16.1 ng/ml respectively (p = 0.018). tTIMP-1 level in a group of patients with AH without LVH and with LVH differed significantly both in females (p < 0.001) and in males (p < 0.001). Cut-off value was 179 ng/ml in females and 189 ng/ml in males. Test sensitivity in females was 83.3% (95% CI = 64.5-91.8), specificity – 71.8 % (95%CI = 55.4-89.0), in males test sensitivity was 84.0% (95%CI = 66.9-92.5), specificity - 75.7% (95%CI = 61.2-93.8). tTIMP-1 value between 138 ng/ml and 179 ng/ml in females and between 138 ng/ml and 189 ng/ml in males can demonstrate presence of early subclinical LV-myocardial injury in patients with AH without LVH. tTIMP-1 value > 179 ng/ml in females and > 189 ng/ml in males shows LVH presence.

Conclusions: tTIMP-1 level in patients with AH can show pathologic process in intercellular LV-myocardial matrix earlier than LVMMI, which is the gold standard in LVH diagnosis, and can be an early marker of subclinical cardiac injury in patients with AH.

PP.13.362 INITIAL ORTHOSTATIC REACTIONS AND CEREBROVASCULAR PATHOLOGY IN PATIENTS WITH ESSENTIAL HYPERTENSION

E. Oschepkova, N. Lazareva, Y. Kuzmina, T. Balakonova, S. Gorieva, A. Rogoza. Russian Cardiology Research And Production Complex, Moscow-Russia

Aim of the study: To investigate the initial orthostatic reactions (IOR) during active orthostatic test (AOT) and cerebrovascular pathology in patients (pts) with essential hypertension (EH).

Material and Methods: 99 pts (30M, 69F), 57.4 ± 1.1 years with EH grade 1 or 2. During AOT BP (beat to beat) and HR measured continuously and non-invasively using the “Task Force Monitor”. Carotid atherosclerosis was measured by ultrasound system ACUSON 128xP10 7,0 MHz linear array transducer (7.0 MHz). The statistical analysis was carried out by nonparametric methods of Mann-Whitney and Fisher exact test with Statistica 6.

Results: The average hemodynamics BP (BPah) drop of 40 mm Hg or more were registered in all pts in the first 15 sec after standing. At the analysis it is revealed 2 different types of the reaction BP. Type I (n = 62) observed short-term drop BPah more than 18 ± 6 mm Hg after standing with restoration by 15 sec on 75-100% from initial level baseline. Type II (n = 37) revealed pronounced decrease BP reaction 22 ± 9 mm Hg, but not restoration by 15 sec - initial orthostatic hypotension (IOH). In pts with II IOR was registered more frequent symptoms of cerebral hyperperfusion during test (13/62 vs 24/37, p < 0.001), and carotid atherosclerosis were more frequent in type II (97% vs 24% p < 0.001).

Conclusions: The prolonged initial orthostatic depressor reactions are associated with higher frequency symptoms of cerebral hyperperfusion during test and carotid atherosclerosis in patients with essential hypertension.

PP.13.363 ARE DISCREPANCIES BETWEEN ELECTROCARDIOGRAPHIC AND ECHOCARDIOGRAPHIC DIAGNOSIS OF LEFT VENTRICULAR HYPERTROPHY RELATED TO THE TYPE RATHER THAN THE EXTENT OF THE HYPERTENSION?

C. C. Beladan1, F. Matei2, A. Calin1, M. Rosca1, B.A. Popescu1, D. Muraru1, R. Enache1, F. Curcea2, C. Ginghina1. 1University of Medicine and Pharmacy Carol Davila, Bucharest- Romania, 2Institute of Cardiovascular Diseases Prof. Dr. C.C. Ilescu, Bucharest-Romania

Background: Left ventricular hypertrophy (LVH) is an independent cardiovascular risk factor. Electrocardiography (ECG) and echocardiography are recommended in clinical practice for LVH diagnosis. However, discrepancies were reported between echocardiographically estimated left ventricular mass (LVM) and ECG findings in the diagnosis of LVH. Purpose. We aimed to assess the ability of ECG to detect a similar increase in LVM, as estimated by echocardiography, in patients (pts) with hypertension (HTN), aortic stenosis (AS) and hypertrophic cardiomyopathy (HCM).

Methods: We prospectively enrolled pts with preserved LV ejection fraction (> 50%) and a similar extent of LVH as assessed by echocardiography: 20 pts with isolated HTN (60 ± 9 yr, 7 men), 20 pts with severe AS (65 ± 9 yr, 12 men) and 20 pts with symmetric HCM (57 ± 12 yr, 11 men). Standard 12-lead ECGs and a comprehensive 2D echocardiography were performed in all. We tested the following ECG criteria for LVH: Sokolow-Lyon index, Cornell voltage and product indexes, Romhilt-Estes and Perugia scores. Mitral annular longitudinal velocities (Skeletal and Sleral) and global longitudinal LV strain (GLS) were assessed from apical views by tissue Doppler and by speckle tracking echocardiography respectively.

Results: There were no significant differences between HTN, SA and HCM pts regarding age, gender, body surface area or LVM index (147 ± 56g/m², 157 ± 21g/cm², 176 ± 49g/m², p = 0.089). Presence of LVH criteria on ECG in HTN vs AS vs HCM pts was as follows: Sokolow-Lyon index (4 vs 12 vs 11), Cornell voltage (1 vs 4 vs 9) (p < 0.05 for all), Cornell product (2 vs 6 vs 8), Romhilt-Estes (1 vs 10 vs 11), Perugia score (4 vs 14 vs 14). Skeletal, Sleral and GLS were similar between AS and HCM pts (p > 0.05) and lower as compared to HTN pts (p < 0.01 for all).

Conclusion: In our study ECG findings of LVH were more prevalent in pts with AS and HCM than in hypertensives, for a similar increase in LVM. It confirms the hypothesis according to which ECG does not have the ability to measure LVM but rather provides specific information on the changes in electrical properties of myocardium in LVH. Moreover, as the prevalence of 4 ECG criteria for LVH and Sleral, GLS respectively were similar between AS and HCM pts, structural and functional similarities between these two types of LVH can be further discussed.

PP.13.364 RELATIONSHIP BETWEEN BLOOD PRESSURE AND SUBCLINICAL TARGET ORGAN DAMAGE IN HYPERTENSIVE PATIENTS


Background: Several studies have shown that in hypertensive patients (HP) there is a correlation between increased central and peripheral hemodynamic parameters (CPHP): aortic systolic pressure (AoS), aortic pulse pressure (Aopp), pulse pressure (PP), systolic blood pressure (SBP), PP, cardiac output (CO), heart rate (HR) and target organ damage (TOD) expressed as: decrease the elasticity index of large and small arteries (C1 and C2), increased left ventricular mass index (LVMI) and augmentation index adjusted for heart rate (AlxHR).

Objective: Determine whether in HP is correlation between increased CPHP previously mentioned and the decrease of C1 and C2, as well as increased AlxHR and LVMI.

Design and Methods: Experimental study, non explained prevalence. 100 treated hypertensive patients, 47% male with a mean age 58.3±11.60 years). The OD was evaluated by: echocardiography: LVMI, radial application tonometry using (HDU PW CR-2000 and SphygmoCor) being evaluated: C1, C2, AlxHR and LVMI.
C2, AoSP, AoPP and Alx.HR. The correlation of the variables were performed using r Pearson, finding significant correlations when p < 0.05.

Results: AoSP, AoPP, SBP, DBP, PP were negatively correlated with C1(r = -0.62/-0.62/-0.66/-0.30/-0.70 respectively) (all p < 0.05) and DBP were negatively correlated with C2(r = -0.47/-0.49 respectively) (all p < 0.05), while DBP was positively correlated with C2(r = 0.22, p < 0.05). AoSP, AoPP, PP, SBP, DBP, were positively correlated with Alx.HR (r = 0.59/0.54/0.46/0.52/0.36 respectively) (all p < 0.05). Alx.HR was negatively correlated with C2 (r = -0.59/0.21 respectively) (all p < 0.05). No correlation was found between: AoSP, AoPP, PP, SBP, DBP and LVM1 (all p > 0.05).

Conclusion: Our results show that in HP there is a strong correlation between increased CHPH and arterial stiffness evaluated by the following parameters: C1, C2, AoSP, AoPP and Alx.HR. In this study the evaluation tests of arterial stiffness were most helpful to diagnose the OD.

PP.13.365 PREDICTORS OF NORMALIZATION OF LEFT VENTRICULAR GEOMETRY AFTER 1 YEAR OF STANDARD ANTIHYPERTENSIVE TREATMENT IN CHILDREN WITH PRIMARY HYPERTENSION
J. Sladowska-Kozlowska, M. Litwin, A. Niemirska, A. Wierzbicka, R. Janas. The Childrens Memorial Health Institute, Warsaw-Poland

In 86 children (14 ± 2.4years) with newly diagnosed primary hypertension (PH) left ventricular (LV) geometry and biochemical parameters before and after 12 months of standard antihypertensive therapy were assessed.

Results: At baseline normal LV geometry (NG) was found in 43 (50%), concentric remodeling (CR) in 3 (3.5%), concentric hypertrophy (CH) in 9 (10.5%) and eccentric hypertrophy (EH) in 31 (36%) pts. There were no differences in prevalence of severe ambulatory hypertension or dipping status in relation to LV geometry. Pts with CH and EH were more viscerally obese than pts with NG. Pts with CH had higher diastolic blood pressure (DBP) in comparison to pts with EH and greater thio barbituric acid reactive substances (TBARS) concentration in comparison to other groups (p < 0.05). The main predictor of relative wall thickness (RWT) was TG/HDL ratio (RC = 0.319, β = 0.246, p = 0.004). All pts received life style and dietary advices. Drug therapy based on ACEi and/or ARB was started in 49 pts (57%), who had a significant target organ damage and/or severe ambulatory hypertension. After 12 months treatment left ventricular mass index (38.5 ± 10.7 vs 35.2 ± 7.5 g/m² height 2.7, p = 0.0001) and prevalence of the left ventricular hypertrophy (46.5% vs 31.4%, chi² = 6.86, p = 0.008) decreased. Number of pts with NG increased from 43 (50%) to 52 (60.5%) (p = 0.05). Number of pts with EH decreased from 31 (36%) to 20 (23.3%) (p = 0.03, chi² = 4.35). Pts who still had CH (7 pts- 8.1%, decrease not significant) had greater DBP in comparison with pts who had EH and NG and the decrease of DBP after 12 month in pts with CH was lower than in pts with EH and in pts with NG (p < 0.05). Pts in whom RWT decreased, decreased also waist circumference and TG/HDL and the main predictor of RWT decrease was decrease of TG/HDL ratio (β = 0.496, R2 = 0.329, p = 0.002).

Conclusions: Antihypertensive treatment leads to significant improvement and normalization of LV geometry. Decrease of abdominal obesity and insulin resistance are the most important predictors of normalization of LV geometry. Pts with CH are less prone to normalize LV geometry and may require more active treatment.

PP.13.366 MYOCARDIAL REMODELLING IN PATIENTS WITH ARTERIAL HYPERTENSION AND TYPE 2 DIABETES MELLITUS OR IMPAIRED TOLERANCE OF GLUCOSE
I. Sapozhnikova, E. Taletovskaya, A. Tarlovsky, Y. Balandina, N. Maksimchuk. Kirov State Medical Academy, Kirov-Russia

Purposes of research: study of the variants of myocardial remodelling and their communication of metabolic abnormalities in patients with arterial hypertension with different studies of metabolic syndrome.

Material and Methods: 154 patients with arterial hypertension were examined. Group I included 91 patients with hyperglycemia (79 patients with type 2 diabetes mellitus, 11 patients with prediabetes), associated with essential hypertension and abdominal obesity. Group II formed 63 comparable patients with essential hypertension and normoglycemia with or without obesity. Evaluation included Echocardiography and checking levels of glucose, glycosylated hemoglobin (HbA1c) and lipids in plasma. Patients with CHD were excluded from the study.

Results: Patients of Group I had a significantly larger body weight index, circumference of the waist, levels of glucose, HbA1c, total cholesterol, triglycerides and LDL, than patients of Group II. Patients of all groups didn’t have differences in blood pressure levels. However, from Echocardiography data, in Group I, in contrast with Group II, left ventricular hypertrophy and myocardial remodelling were met significantly more often, and significantly more were left ventricular mass myocard, thickness of back wall left ventricular, thickness of intraventricular sept. In patients with hyperglycemia (Group I) thickness of intraventricular sept were significantly more, than thickness of back wall left ventricular. We revealed correlation between Echocardiography data and metabolic parameters in Group I, contrasts of Group II. Patients of Group I had significantly frequently disadvantage models of myocardial remodelling: concentric hypertrophy and concentric remodelling of the left ventricular myocard and their correlation with metabolic parameters. 3) Diastolic dysfunction of the left ventricular myocard in patients of Group I had total character (100%). 4) In patients with hyperglycemia (Group I) thickness of intraventricular sept were significantly more than thickness of back wall left ventricular.
Objective: To describe cardiovascular risk factors CVRF distribution and left ventricular (LV) filling pressures among patients referred for STEMI and reperfusion therapy with regard to gender.

Methods: In 258 STEMI patients (203 men, 55 women), mean age 60.2 ± 11.1 from November 2005 to February 2009 we recorded baseline demographics, CVRF, standard echocardiography measurements. Diastolic function using Doppler echocardiography and TDI checked E and A waves, mitral Ea velocity and E/A ratio and the difference in pulmonary venous and mitral duration at atrial contraction, inferior to 30ms in normals.

Results: Mean age in Women 63.7 ± 10yrs and 59.2 ± 10yrs in men (NS). BMI > 25 is found in 32/55 W (58%) in 34/203men (17%); arterial hyperten-
sion (HTN) in 38/55(69%) in 80/203 men (39%); diabetes in 25/55 W(45%) and in 97/203 men (48%) left ventricular ejection fraction (LVEF) between 45 – 60% in 26/55W (47%) and in 97/203 men (48%). Complications occurred (28%); tobacco use in 5/55W(9%) and in 100/203 men(49%). Thrombolysis was performed in 20/55W (36%) and in 97/203 men (48%); dyslipidemia in 13/55W (23%) and in 58/203 men (28%); tobacco use in 5/55W(9%) and in 100/203 men(49%). Thrombolysis was performed in 20/55W (36%) and in 97/203 men (48%) Complications occurred in 17/55W (30%) and in 34/207 men (16%). The echo findings were as follow: left ventricular ejection fraction (LVEF) < 40% in21/55 (38 %) and in 77/203 men (38%), left ventricular ejection fraction (LVEF) between 45 – 60% in 26/55 W (47%) and in 97/203 men (48%) and LVEF > 60% in 8/55 (14%) and in 29/203men (14%). The LV filling pressure was depicted inca delayed relaxation pattern in 28/55 W (50%) and in 69/203men (34%); an increased filling pressure in 125/55 (43%) and in 17/203men (25%), a pseudo normal pattern in 19/55W (34%) and in 99/204(49%): of them with increased filling pressures 10/53% w and 35(35%) men, a restrictive pattern in 8/55W (14%) and in 35 men (17%) and the difference in pulmonary venous and mitral duration at atrial contraction, inferior to 30ms in normals.

Conclusion: Women who present with STEMI are slightly older than men and have significantly more CVRF such as hypertension except tobacco smoking, more complications and are less frequently treated by fibrinolytics.

Objective: To assess after puerperium hsCRP as a marker of vascular risk and presence of MS in a series of women who had HDP.

Methods: Cross-sectional study during 16 consecutive months at postges-
tational evaluation 15 weeks after delivery, including all women who had HDP and were attended in our Hospital. MS was defined according to NCEP-ATPIII criteria: waist circumference > 88 cm, triglycerides ≥ 150 mg/dl, HDL < 50 mg/dl, blood pressure ≥ 130 and/or 85 mmHg, fasting plasma glucose ≥ 110 mg/dl. Plasma levels of hsCRP were measured by immunonephelometry.

Results: 264 women were included (chronic hypertension (CH) n = 53; transient gestational hypertension (TGH) n = 114; preeclampsia (PC) n = 78; PC super-
vised on CH n = 19). Prevalence of MS: 16,7% (CH 42,1%, TGH 33,3%, PC 41,4%). Levels of hsCRP (mean, mg/l): CH 3,79; TGH 3,55; PC 2,89 (PC vs CH p = 0,026; PC vs TGH p = 0,052). hsCRP in patients with MS (mean ± sd): 4,71 ± 3,15, vs those without MS 3,01 ± 2,88 (p = 0,001). When we considered all women (and without MS), the levels of hsCRP depending on the pre-
serum of the patient was a criteria for MS: 0 criteria (18,9% of patients): 1,86 ± 1,87 mg/l; 1 (32,1%): 1,88 ± 1,82 mg/l; 2 (29,2%): 3,89 ± 3,23 mg/l; 3 (12,3%): 3,61 ± 2,41 mg/l; 4-5 (7,5%): 5,38 ± 4,85 mg/l; comparison among groups: p < 0,001.

Conclusions: This study suggests a high prevalence of MS in patients who recently had HDP, mainly in those with CH, and, at the same time, may indicate a different vascular risk early after pregnancy depending on the type of hypertensive disorder (according to the prevalence of MS). Levels of hsCRP may correlate with these differences in prevalence of MS and might be used as a risk marker.
Gynecology Bega, Timisoara-Romania, 1University of Medicine and Pharmacy Victor Babes/Pathophysiology Department, Timisoara-Romania

Objective: Preeclampsia a most common complication during pregnancy may have tremendous consequences for both mother and fetus/newborn and is the first cause of morbidity and mortality in pregnant women. The pathophysiological mechanisms are endothelial dysfunction, oxidative stress and inflammation. The purpose of this study was to compare inflammatory cytokines (tumour necrosis factor (TNF)-alpha and IL-6) in pregnant women with preeclampsia and in healthy pregnant women.

Design and Method: This prospective study included 68 pregnant women and 60 women with uncomplicated pregnancy, aged and gestational age matched that attended the University Clinic of Obstetrics and Gynecology “Bega” from Timisoara-Romania in a six months period. Arterial blood pressure, tumor necrosis factor (TNF)-alpha and IL-6 were determined in all the pregnant women. The diagnosis of preeclampsia was established according to the criteria developed by the National High Blood Pressure Education Programme Working Group, as blood pressure ≥ 140/90 mmHg, and proteinuria ≥ 300 mg in a 24-h urine sample.

Results: Significantly increased maternal serum levels of TNF-alpha and IL-6 were found in pregnant women with preeclampsia in comparison with the control group (p < 0.001). Maternal serum IL-8 and TNF-alpha concentration were significantly higher in patients with severe preeclampsia than in mild preeclampsia (p < 0.001).

Conclusions: Our findings suggest inflammatory cytokines (IL-6 and TNF-alpha) are increased in preeclamptic women and therefore it might play a role in the pathogenic mechanism of preeclampsia.
RELATIONSHIP BETWEEN SLEEP-TIME BLOOD PRESSURE CONTROL AND REDUCTION OF URINARY ALBUMIN EXCRETION AFTER TIMED-TREATMENT WITH OLMESARTAN IN ESSENTIAL HYPERTENSION


Objectives: Clinical studies have indicated that administration of angiotensin-receptor blockers (ARB) at bedtime as opposed to upon awakening increases their efficacy in lowering sleep-time blood pressure (BP) without any loss in reducing awake BP mean. Urinary albumin excretion (UAE) in non-dippers, as well as in patients with nocturnal hypertension, has been shown to be significantly greater than in dipper hypertensive patients. The potential impact of chronopharmacologically timed treatment of hypertension on renal function of specific ambulatory BP parameters has not been clearly elucidated. Accordingly, we evaluated the administration-time-dependent effects on ambulatory BP and UAE of the ARB olmesartan in subjects with essential hypertension.

Methods: We studied 203 previously untreated non-proteinuric subjects with grade 1-2 essential hypertension (58 men and 145 women), 48.5 ± 13.3 years of age, assigned to receive olmesartan (40 mg/day) in monotherapy either upon awakening or at bedtime. BP was measured at 20-min intervals from 07:00 to 23:00h and at 30-min intervals at night for 48h before and after 12 weeks of treatment. Physical activity was simultaneously monitored every minute by wrist actigraphy. The subjects collected their urine during the first 24h of each BP monitoring session.

Results: The BP reduction during diurnal activity was similar for both treatment-times (P > 0.0623). Treatment at bedtime, however, was significantly more effective in reducing sleep-time BP (16.4/12.0 mmHg reduction in systolic/diastolic BP versus 11.6/6.3 mmHg after treatment on awakening; P < 0.001). The sleep-time relative BP decline was significantly increased towards a more dipping pattern only after bedtime dosing (P < 0.001). UAE was significantly reduced after treatment, and to a significantly larger extent after bedtime dosing (P < 0.001). This UAE reduction was independent of the change in awake BP mean after treatment, but highly correlated with both the decrease in sleep-time BP and the increase in sleep-time relative BP decline (r > 0.329; P < 0.001), independently of treatment-time.

Conclusions: Bedtime administration of olmesartan provides a greater efficacy as compared to morning treatment in reducing the sleep-time BP mean, and increases the sleep-time relative BP decline towards a more dipper profile. This might be clinically relevant, as nighttime BP is a better prognostic marker of cardiovascular mortality than awake BP. Most important, the reduction in sleep-time BP mean and normalization of the circadian BP pattern towards a more dipper profile are associated with a significant decrease in UAE.

INFLUENCE OF CIRCADIAN TIME OF BLOOD PRESSURE-LOWERING TREATMENT ON CARDIOVASCULAR RISK IN RESISTANT HYPERTENSION


Objectives: Subjects with resistant hypertension are at a greater risk for stroke, renal insufficiency, and cardiovascular (CVD) events than individuals for whom blood pressure (BP) is well controlled by medical therapy. In resistant hypertension, ingesting one BP-lowering medication at bedtime, as compared to treatment with all medications upon awakening, was associated with a 40% increased BP control, a significant reduction of sleep-time BP, and the corresponding remodeling of the BP pattern towards a more dipping profile. The potential differential reduction of CVD risk by a bedtime versus upon-awakening treatment schedule in resistant hypertension has never been evaluated prospectively. The MAPEC study was specifically designed to test the hypothesis that bedtime chronotherapy with ≥1 hypertension medications exerts better BP control and CVD risk reduction than conventional therapy, i.e., all medications ingested in the morning.

Methods: A total of 776 subjects with resistant hypertension, 387 men/389 women, 61.6 ± 11.2 yrs of age, were randomized to ingest all their prescribed hypertension medications upon awakening or ≥1 of them at bedtime. At baseline, BP was measured at 20-min intervals from 07:00 to 23:00h and at 30-min intervals at night for 48h. Physical activity was simultaneously monitored every minute by wrist actigraphy to accurately determine the beginning and end of daytime activity and nocturnal sleep. Individual assessment was scheduled annually and more frequently (quarterly) if treatment adjustment was required. The Cox proportional-hazard model was used to estimate relative risk of CVD events.

Results: The median time of follow-up was 5.4 yrs (range 0.5 to 8.5 yrs). The Kaplan-Meier survival curves indicate a highly significant difference between timed-treatment groups in event-free survival (log-rank 29.2, P < 0.001). Subjects ingesting ≥1 BP-lowering medications at bedtime evidenced a significantly lower relative risk of total events than subjects ingesting all of their medications upon awakening (relative risk 0.38; 95% confidence interval [0.27–0.55]; P < 0.001). Particularly relevant is the difference between the two treatment-time groups in the adjusted relative risk of major CVD events, i.e., CVD deaths, myocardial infarction, ischemic stroke, and hemorrhagic stroke (0.35 [0.18–0.68]; P = 0.002).

EFFECTS ON AMBULATORY BLOOD PRESSURE OF ADDING LOW-DOSE ASPIRIN AT BEDTIME IN SUBJECTS WITH TREATED HYPERTENSION

D.E. Ayala, R. Hermida. University of Vigo, Vigo-Spain

Objectives: Low-dose aspirin (ASA) ingested at bedtime, as compared to upon awakening, significantly diminishes 24h plasma renin activity and excretion of cortisol, dopamine and norepinephrine in 24h urine. These findings form a biologically plausible explanation for the documented reduction of ambulatory blood pressure (BP) when ASA is ingested at bedtime, but not when ingested in the morning, by subjects with pre-hypertension or untreated mild hypertension. Some studies have reported that morning ingestion of ASA may interfere with the BP-lowering effects of hypertension medication. Accordingly, we investigated the effects on ambulatory BP of bedtime administration of low-dose ASA in treated hypertensives.

Methods: We studied 65 subjects under hypertension treatment with 2.1 ± 1.2 medications (35 men and 30 women), 55.6 ± 12.7 years of age. Among the participants, 26 were ingesting all their prescribed medication upon awakening and the remaining 39 (60%) were ingesting ≥1 medication at bedtime. ASA (100 mg/day at bedtime) was added to the therapeutic scheme, without changing the class, dose, and administration-time of any other medication. BP was measured at 20-min intervals from 07:00 to 23:00h and at 30-min intervals at night for 48 consecutive hours before and after 3 months of adding ASA. Physical activity was simultaneously monitored every minute by wrist actigraphy to accurately calculate the awake and asleep BP means on a per subject basis.

Results: Adding ASA at bedtime just slightly reduced awake BP mean (~2.0/1.7 mmHg for systolic/diastolic BP; P < 0.007). The effects of ASA were significantly larger on asleep BP mean (~3.0/1.9 mmHg; P < 0.001). The reduction of nighttime BP mean was significantly greater in patients who were non-dipper at baseline (~7.8/~6.1 mmHg compared to ~1.2/~1.1 in dipper subjects; P < 0.003). Moreover, nighttime BP mean was also reduced to a larger extent in subjects treated with ≥1 medication at bedtime than in those ingesting all hypertension medications on awakening (~7.5/6.0 versus ~1.7/1.4 mmHg; P < 0.005).

Conclusions: In treated hypertensive subjects, 100 mg/day ASA at bedtime slightly but significantly reduces ambulatory BP, particularly during the nighttime resting span. The reduction of the asleep BP mean is significantly greater in non-dippers as well as in those already ingesting hypertension medication at bedtime. Bedtime administration of low-dose ASA could thus contribute to better regulation of nighttime BP and to potentially reduce cardiovascular risk, mainly in non-dipper hypertensive subjects.
Conclusions: In resistant hypertension, pharmacological therapy should take into account when to treat with respect to the rest-activity cycle of each individual subject. Bedtime chronotherapy with 2-1 BP-lowering medications, compared to conventional upon-waking treatment with all medications, more effectively improved BP control and significantly reduced CVD morbidity and mortality.

PP.14.376 ADMINISTRATION-TIME-DEPENDENT EFFECTS OF ANGIOTENSIN RECEPTOR BLOCKERS IN HYPERTENSIVE PATIENTS WITH CHRONIC KIDNEY DISEASE

R. C. Hermida1, D.E. Ayala1, A. Mojón1, M.J. Fontao1, L. Chayazen2, M.J. Dominguez3, J.R. Fernandez4. 1University of Vigo, Vigo-Spain, 2Urgencias Sanitarias 061 Galicia, Santiago de Compostela-Spain, 3Policlínica La Rosaleda, Santiago de Compostela-Spain

Objectives: Non-dipping (patients with < 10% decline in the sleep-time relative to the awake blood pressure (BP) mean) has been related to increased end-organ injury and cardiovascular risk. Non-dipping and nocturnal hypertension have been associated with microalbuminuria and lower glomerular filtration rate (GFR); thus, these conditions are highly prevalent among patients with chronic kidney disease (CKD). Clinical studies have documented that dosing of angiotensin-receptor blockers (ARB) at bedtime as opposed to upon awakening increases the sleep-time relative BP decline and their efficacy in lowering sleep-time BP. Accordingly, we investigated the BP-lowering efficacy of ARB monotherapy when dosed either on awakening or at bedtime in hypertensive patients with CKD.

Methods: We studied 221 previously untreated subjects (135 men and 86 women; 51.9 ± 15.0 years of age), with grade 1-2 essential hypertension and CKD (GFR < 60 and/or microalbuminuria). Subjects were randomly assigned to receive ARB monotherapy (160 mg/day valsartan; 40 mg/day olmesartan; or 80 mg/day telmisartan) either upon awakening or at bedtime. BP was measured at 20-min intervals from 07:00 to 23:00h and at 30-min intervals at night for 48h before and after 12 weeks of treatment. Physical activity was simultaneously monitored every minute by wrist actigraphy to accurately determine the beginning and end of daytime activity and nocturnal sleep.

Results: The BP reduction during diurnal activity was similar for both treatment-times (14.6±10.0 mmHg reduction in the awake systolic/diastolic BP after treatment on awakening: 13.3/9.5 mmHg after bedtime dosing; p>0.377 between groups). Treatment at bedtime, however, was significantly more effective in reducing sleep-time BP (17.5/11.0 mmHg reduction compared to 13.3/8.5 mmHg after treatment on awakening; P<0.014). The sleep-time relative BP decline was significantly increased (P<0.0001) towards a more dipping pattern only after bedtime dosing, which resulted in a 49% relative reduction of non-dipping. These effects were comparable for all ARB tested, independent of their plasma half-life.

Conclusions: Bedtime administration of ARBs in hypertensive patients with CKD provides a greater efficacy as compared to morning treatment in reducing the sleep-time BP mean, and improves the sleep-time relative BP decline towards a more dipper profile. This is clinically relevant, as nighttime BP is a better prognostic marker of cardiovascular mortality than awake BP, and lowering sleep-time BP has already been shown to markedly reduce cardiovascular risk.

PP.14.377 EFFICACY AND SAFETY OF CARVEDILOL VERSUS METOPROL IN HYPERTENSIVE PATIENTS WITH OVERWEIGHT OR OBESITY

E.A. Gofman, N.P. Kutiskenko, S.Y. Martsevich, A.D. Deev, S.A. Shalnova, R.G. Oganov, on behalf of the Camelia Workgroup. State Institution for Disease Prevention, Moscow-Russia

Objective: To evaluate the efficacy and safety of carvedilol, a nonselective beta-blocker with anti -alpha -adrenergic activity, compared with the selective beta-adrenergic blocker metoprolol in patients with mild to moderate hypertension in the context of such cardiovascular metabolic risk factors as overweight and obesity.

Design and Method: A multi-center, randomized, open labeled, comparative, prospective, parallel-group clinical trial conducted between November, 2007 and April, 2008 at 16 sites in Russia that compared the efficacy and safety of carvedilol and metoprolol tartrate in patients with arterial hypertension and overweight or obesity. The 320 participants were aged 24 to 81 years with hypertension (>130/80 mm Hg) in combination with overweight (n = 99) and obesity (n = 221). Abdominal obesity was measured by waist circumference (WC) (for WC in men ≥ 102 cm, WC in women ≥ 88 cm) and with body mass index (BMI) ≥ 30 kg/m². Participants were followed up for 24 weeks. Participants were randomized to receive a 12.5- to 25-mg dose of carvedilol (n = 160) or 25- to 50-mg dose of metoprolol tartrate (n = 160), each twice daily. Open-label hydrochlorothiazide 12.5-25 mg in weeks 8-10 and amlopidine 5-10 mg in weeks 4-6 were added, if needed, to achieve blood pressure (BP) target (< 140/90 mm Hg, and for patients with diabetes -130/80).

Results: In the 2 groups there was a significant decrease in both systolic (SBP) and diastolic (DBP) blood pressure levels, blood pressure lowering being similar between the groups (p = 0.88 and p = 0.61, respectively). Target BP has been achieved in the carvedilol group for 96.2% of patients, while in the metoprolol group - for 95.5% (p = 0.85). There was a greater need for employing combination antihypertensive therapy with the addition of amlopidine and hydrochlorothiazide in the metoprolol group (p>0.05). Both therapy regimens resulted in statistically significant decrease of BMI, body weight and waist circumference, there were no significant differences between the 2 groups. Blood glucose and uric acid levels improved with carvedilol (p<0.01 and p<0.0001, respectively). There were 34 adverse events (AE) regis-
tered during the trial: 24 in the carvedilol group and 10 - in the metoprolol group (p = 0.05). More than 50% of AE was not related to study drug. The overall frequency of adverse events deemed to be possibly, probably, or definitely related to study drug was 6.3% in the carvedilol group and 3.8% with metoprolol.

Conclusions: Prolonged antihypertensive therapy with metoprolol or carvedilol in patients with overweight or obesity helps to achieve target BP in the majority of cases. Patients on carvedilol are less likely to be transferred on combination with amlopidine and hydrochlorothiazide, and do not require dose titration of those medications. Carvedilol compared to metoprolol has more beneficial effects on glucose and uric acid metabolism. Both carvedilol and metoprolol reduce body weight. Both regimens were well tolerated and had low number of adverse events in favor of metoprolol compared to carvedilol.

PP.14.378 LOW DOSE ATORVASTATIN TREATMENT REDUCES AMBULATORY BLOOD PRESSURE IN PATIENTS WITH MILD HYPERTENSION AND HYPERCHOLESTEROLEMIA: A DOUBLE-BLIND, RANDOMIZED, PLACEBO- CONTROLLED STUDY

A. Kanaki1, PP. Sarafidis1, P. Georgiannos1, P. Stafylas1, I. Tziolos2, A. Sioulis3, E. Geropoulou4, Z. Zebekakis1, S. Gavrilidis2, V. Tyradellis1, A. Lasaridis1.
1Department of Medicine, Ahepa University Hospital, Thessaloniki-Greece, 2Department of Cardiology, Ahepa University Hospital, Thessaloniki-Greece

Background: In the context of pleiotropic effects of statins, background and animal studies have suggested that statins may also induce a mild reduction in blood pressure (BP) levels. However, clinical data were not robust and the potential hypotensive action of statins remains uncertain. Aim of this study was to investigate the effect of atorvastatin treatment on ambulatory BP in patients with mild hypertension and hypercholesterolemia.

Methods: A total of 50 patients with mild hypertension of recent onset or mild uncontrolled hypertension and hypercholesterolemia participated in this double-blind, randomized, placebo-controlled study. Patients were randomized to either 10mg atorvastatin or placebo for 26 weeks. Concurrent antihypertensive treat-
ment, if any, remained unchanged during follow-up. At baseline and study-end (26 weeks) ambulatory BP monitoring and blood sampling for determination of stan-
ard biochemical and safety parameters were performed in all study participants.

Results: Atorvastatin significantly reduced mean 24-hour systolic and diastolic BP as compared with placebo (p<0.001 and p<0.01 respectively). Reductions in systolic and diastolic BP loads between baseline and study-end were evident in the atorvastatin, but not in the placebo group. BP-lowering effects of atorvastatin were consistent in both daytime and nighttime periods. Atorvastatin produced significant reduc-
tions in total and low density lipoprotein cholesterol vs placebo. Changes during follow-up in mean 24-hour systolic and diastolic BP in the atorvastatin group were independent from changes in serum lipid profile.

Conclusion: The present study shows a mild, but consistent throughout the 24-
hour period BP-lowering effect of atorvastatin in patients with mild hypertension and hypercholesterolemia. This potential beneficial effect of atorvastatin on BP may represent another pathway through which this drug-class provides cardiovas-
cular risk reduction.

PP.14.379 THE INFLUENCE OF BODY MASS INDEX ON BLOOD PRESSURE CONTROL AND TOLERABILITY IN HYPERTENSIVE PATIENTS UNDER SINGLE PILL FIXED-DOSE COMBINATION OF ANGIOTENSIN RECEPTOR BLOCKER AND CALCIUM CHANNEL BLOCKER

B boyaci1, P kizilkirmaci2, M berkutas2. 1Department of Cardiology, Gaziantep University Faculty of Medicine, Ankara-Turkey, 2Medical Manager, Novartis Pharma, Istanbul-Turkey
Objective: This interim analysis evaluates blood pressure reduction and tolerability in hypertensive overweight or obese patients under single pill combination of angiotensin receptor blocker (ARB; valsartan) and a calcium channel blocker (CCB; amlopidine) in Turkish population.

Design and Method: A total of 751 patients (62.3% female; mean age: 58.2 ± 11.1 years) under ARB-CCB single pill combination were included in this non-interventional, multi center study at 170 centers in Turkey. The follow-up visits were held at intervals based on the physicians’ initiative. Blood pressure (mmHg; visit 1-3) and adverse event incidence (ES; visit 2-3) were compared in terms of body mass index (BMI) classification (<25, 25-29.9 or ≥30 kg/m²).

Results: At the time of this interim analysis, 612 (81.5%) and 426 (56.6%) patients have attended to the follow-up visits conducted in 34.0 ± 26.0 and 92.0 ± 39.0 days after the initial visit, respectively. The initial BMI (30.4 ± 5.2 kg/m²; n = 744) was <25 kg/m² in 14.9% (n = 111; 45.9% females), 25-29.9 kg/m² in 37.1% (n = 276; 50.4% females) and ≥30 kg/m² in 47.9% (n = 357; 77.0% females) of the patients. A total of 217 (28.9%) patients were ≥65 years of age with a mean initial BMI of 29.2 ± 4.9 kg/m². Initial and visit 3 systolic blood pressure (SBP) in BMI subgroups (<25, 25-29.9, ≥30 kg/m²) were as follows respectively: 170.5 ± 22.6 to 129.1 ± 15.6; 164.7 ± 23.0 to 130.8 ± 13.4; and 166.4 ± 22.4 to 131.1 ± 14.7 mmHg. There was no significant difference in blood pressure reduction and the proportion of patients who achieved target SBP <140 mmHg at visit 3 (48/61 (78.7%), 112/153 (73.2%) and 151/206 (73.3%) in BMI <25, 25-29.9, ≥30 kg/m² groups, respectively) with respect to BMI. A total of 76 adverse events (AE) in 60 patients were reported during the course of the study (50 AEs at visit 2 and 26 AEs at visit 3). The proportion of patients who experienced at least one AE was significantly higher among those with BMI ≥30 kg/m² [(7/111 (6.3%) in BMI <25 kg/m², 15/276 (5.4%) in BMI 25-29.9 kg/m²; and 38/357 (10.6%) in BMI ≥30 kg/m² groups; p = 0.044]. However, only 4 AEs (1, 1 and 3 AEs in BMI groups, respectively) were indicated to be related to valsartan/amlopidine combination.

Conclusions: In conclusion, valsartan/amlopidine single pill combination therapy achieved blood pressure control independent of BMI. Although hypertensive patients with highest BMI values seem to be at higher risk with respect to adverse events, the casualty with the single pill combination therapy was very low indicating that valsartan/amlodipine single pill is well-tolerated.

PP.14.380  OLMESARTAN/HYDROCHLOROTHIAZIDE COMBINATION THERAPY IMPROVES HYPERTENSION GRADE CLASSIFICATION IN UNCONTROLLED HYPERTENSION


Objective: To evaluate the effect of olmesartan/hydrochlorothiazide (OM/HCTZ) 40/12.5, 40/25, and 20/12.5 mg combination therapy in comparison to OM 40 mg monotherapy on BP control by examination of hypertension severity in terms of proportions of patients (pts) who fulfilled the BP criteria for the severity categories: normal, high normal, mild, moderate or severe.

Design and Methods: This was a post hoc analysis of data from a multinational clinical study (EurCard 2006-003876-37) which consisted of an 8-week, open-label period during which pts (N = 1226) received OM 40 mg alone (Weeks 0-8, Period I). Uncontrolled pts (N = 972) were randomised to 8 weeks’ double-blind treatment with OM 40 mg (N = 274), OM/HCTZ 40/12.5 (N = 278), 40/25 (N = 140) or 20/12.5 mg (N = 280) (Weeks 8 [baseline]–16, Period II).

Results: During Period II the proportions of pts with severe, moderate and mild hypertension were reduced from 7.1%, 23.0% and 67.4%, respectively, at baseline to 6.0%, 11.8% and 41.3%, respectively, at Week 16. Moreover, the proportions of pts with normal or high normal BP were increased from 0% and 0.6%, respectively at baseline to 28.3% and 12.6%, respectively at Week 16 (Table). In particular, in the OM/HCTZ 40/25 mg group, the corresponding reductions in the severe, moderate and mild categories were from 6.1%, 24.5% and 68.4%, respectively, to 5.1%, 5.1% and 33.3%, respectively, and the corresponding increases in the normal and high normal BP categories were from 0% and 0.4%, respectively, at baseline to 43.6% and 12.8%, respectively, at Week 16.

Conclusions: OM or OM/HCTZ therapy progressively improved the severity profile of patients with moderate-to-severe hypertension who had not achieved BP control after 8 weeks treatment with OM 40 mg.

PP.14.381  EFFICACY AND SAFETY OF THE LOSARTAN/HYDROCHLOROTHIAZIDE COMBINATION (PREMINENT®) AFTER SWITCHING FROM AN ANGIOTENSIN II RECEPTOR BLOCKER: THE CLINICAL EVALUATION OF COMBINATION THERAPY FOR HYPERTENSIVE PATIENTS IN OMYA (CONCERTO) STUDY

K. Hirata1, Y. Sugawara1, C. Sugai2, T. Iijima3, S. Sairara1, K. Takahashi1, T. Hasagawa1, Y. Hayakawa2, S. Momomura3, on behalf of the concerto study investigators group. ‘Department of Cardiology, Jichi Medical University, Saitama Medical Center, Saitama-Japan, Iijima Clinic, Saitama-Japan, Sairara Clinic, Saitama-Japan, Takahashi Clinic, Saitama-Japan, Hasagawa Clinic, Saitama-Japan, Hayakawa Clinic, Saitama-Japan

Objective: Clinical studies have shown that intensive blood pressure (BP) control is needed to prevent cardiovascular events. However, since target BP is often not achieved in clinical practice in Japan, more effective pharmacologic treatments are required. Losartan/hydrochlorothiazide, a combination of an angiotensin II receptor blocker (ARB) and a diuretic, exerts synergistic antihypertensive activity. We conducted a multicenter open-label prospective study on the efficacy and safety of this drug in patients treated with an ARB but who failed to achieve target BP.

Design and Methods: Patients with essential hypertension who failed to achieve 2004 Japanese Society of Hypertension (JSH) target BP with standard dose ARB treatment for at least 1 month (M) were enrolled at 30 institutions. Treatment was switched to a fixed-dose combination of losartan (50 mg)/ hydrochlorothiazide (12.5 mg). The primary endpoint was changes in BP 3 and 12 M after switching. Secondary endpoints were changes in standard blood test results, brain natriuretic peptide (BNP) concentration, cardiothoracic ratio, and urinary protein concentration at 3 and 12 M; carotid intima-media thickness on electron-densiometry at 12 M; and safety throughout the study period.

Results: Of the 188 patients registered, 171 (mean age, 63.9 ± 11.9 years; 84 men) were included in the analysis after excluding those with protocol violations and/or missing data; 36 had concomitant diabetes, 60 had hyperlipidemia, and 26 had ischemic heart disease. BP was significantly decreased from 156 ± 15/89 ± 11 to 137 ± 14/79 ± 9 (3 M), 135 ± 15/78 ± 10mmHg (12 M) (p < 0.001), with increased success rates for achieving JSH 2004 target systolic/diastolic BP (0.6/33.3 to 31.5/35.1, 42/672.2%). BNP concentration (36.8 ± 31.3, 32.8 ppmL, p < 0.01), cardiothoracic ratio (49.5 ± 48.5, 48.2%, p < 0.01), and urinary protein concentration (semiquantitative score: 0.27 to 0.16, 0.24, p < 0.05) decreased significantly. Concentrations of potassium, fasting blood glucose, hemoglobin Alc, and serum lipids showed no significant change. Serum sodium concentration decreased (142 to 141, 141 mg/mL, p < 0.001) and uric acid concentration increased (5.7 to 5.8, 5.9 mg/dL, p < 0.05) significantly but only slightly. The only adverse event definitely caused by the study drug was one case of solar dermatitis. Good compliance was achieved by all patients, excluding six who dropped out because of adverse events.

Conclusions: The losartan/hydrochlorothiazide combination has significant and substantial antihypertensive effects in patients with hypertension uncontrolled by previous treatment including an ARB. The drug showed additional organ protective effects and had good medical compliance, with little influence on glucose/lipid metabolism and few adverse events. Switching ARB to the losartan/hydrochlorothiazide combination is a useful treatment option for achievement of target BP.

PP.14.382  FIXED-DOSE COMBINATION OF AZILSARTAN MEDOXOMIL/CHLORTALDOXIDE PROVIDES SUPERIOR BP REDUCTION TO MONOTHERAPIES IN STAGE 2 HYPERTENSION

D. Sica1, G. L. Bakris2, W. B. White3, M. A. Weber4, W. C. Cushman5, A. Roberts2, C. Cao6, S. Kupfer6. 1Virginia Commonwealth University Health System, Richmond-USA, 2University of Chicago Pritzker School of Medicine, Chicago, Illinois, 3University of Connecticut School of Medicine, Farmington-Connecticut, 4New York, New York-USA, 5University of Tennessee College of Medicine, Memphis-Tennessee, 6Takeda Global Research & Development Center, Deerfield-USA

Background: We compared the efficacy and safety of various fixed-dose combinations (FDCs) of azilsartan medoxomil (AZL-M) and chlorthalidone (CLD) with individual monotherapies in patients with stage 2 hypertension.

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Methods: In an 8-week, double-blind factorial study, 1714 subjects with clinic systolic BP (SBP) ≥ 160 and ≤ 190 mm Hg were randomized to AZL-M 0, 20, 40 or 80 mg and/or CLD 0, 12.5 or 25 mg, but with no double-placebo arm. The primary efficacy endpoint was change from baseline to week 8 for trough (hour 22–24) SBP by 24-hour ambulatory BP monitoring (ABPM). Trough seated clinic BP was also measured.

Results: Subjects’ mean age was 57 years, 47 % were men, 20% were black. Baseline trough BP was approximately 165/95 mm Hg and approximately 152/90 mm Hg by clinic and ABPM measurements, respectively. Each of the 6 AZL-M/CLD FDCs reduced trough SBP by ABPM more effectively than component monotherapy doses (p < 0.001) (Figure). Clinic BP reduction for AZL-M/CLD ranged from 33.8/14.4 to 40.1/18.5 mm Hg for the 10/21.25 to 80/25 mg doses, respectively. Discontinuation rates and elevations in serum creatinine occurred more commonly and in a dose-dependent manner with AZL-M/CLD. CLD-related hypokalemia was attenuated when combined with AZL-M as an FDC.

Conclusion: FDCs of AZL-M and CLD substantially reduced clinic and ambulatory SBP compared to the individual therapies in patients with stage 2 hypertension. Reversible creatinine elevations with AZL-M/CLD were related to the level of BP reduction in a small proportion of patients and were consistent with the extended diuretic effect of CLD and renin-angiotensin blockade due to AZL-M.

Three-way ANOVA: Change From Baseline to Week 8 in Trough BP by ABPM

<table>
<thead>
<tr>
<th>AZL-M (mg)</th>
<th>CLD (mg)</th>
<th>Least-Squares Mean Reduction (mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0</td>
<td>12.7/6.4</td>
</tr>
<tr>
<td>10</td>
<td>0</td>
<td>15.1/7.8</td>
</tr>
<tr>
<td>20</td>
<td>0</td>
<td>22.9/10.3</td>
</tr>
<tr>
<td>40</td>
<td>0</td>
<td>26.3/12.7</td>
</tr>
<tr>
<td>80</td>
<td>0</td>
<td>31.7/14.4</td>
</tr>
</tbody>
</table>

Conclusion: ALI, at 2 mg/kg and 6 mg/kg dose, was well tolerated and showed clinically relevant decrease in msSBP in pediatric and adolescent pts with HTN.

Preclinical Pharmacology: ALI had no effect on the QT interval.

Table: Mean change in blood pressure from baseline to end of treatment, by dose and age group

<table>
<thead>
<tr>
<th>Mean (SD) BP (mmHg)</th>
<th>N</th>
<th>Aliskiren 2mg/kg [Low-dose]</th>
<th>Mean (SD) BP (mmHg)</th>
<th>N</th>
<th>Aliskiren 6mg/kg [High-dose]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td></td>
<td></td>
<td>Baseline</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change</td>
<td></td>
<td></td>
<td>Change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>msSBP</td>
<td>6-11 years</td>
<td>10</td>
<td>33.7 (12.58)</td>
<td>4.5 (14.82)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>12-17 years</td>
<td>10</td>
<td>140.3 (8.89)</td>
<td>7.6 (9.07)</td>
<td>10</td>
</tr>
<tr>
<td>msDBP</td>
<td>6-11 years</td>
<td>10</td>
<td>75.1 (9.37)</td>
<td>1.7 (9.61)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>12-17 years</td>
<td>10</td>
<td>81.6 (10.26)</td>
<td>5.3 (7.86)</td>
<td>10</td>
</tr>
</tbody>
</table>

Change = Change from baseline to end of treatment (Day 9); msSBP: Mean sitting systolic blood pressure; msDBP: Mean sitting diastolic blood pressure.

PP.14.384 EFFECTS OF OLMESARTAN MEDOXOMIL/AMLODIPINE COMBINATION THERAPY ON AMBULATORY SYSTOLIC BLOOD PRESSURE IN PATIENTS WITH MODERATE-TO-SEVERE HYPERTENSION

G. Parati1, G. Bilo1, W. Koch1. ’1st Luca Hospital, Ircs Istituto Aaeeologico Italiano, Milan-Italy; 2Hauppcs Nibh-, Schrissee-Germa-

Objectives: To assess the effect of olmesartan (OLM) 10–40 mg plus amlo-
dipine (AML) 5–10 mg on 24h ambulatory systolic blood pressure (A-SBP) in pts with moderate-to-severe hypertension (HT).

Design and Methods: This randomised, double-blind study in pts with moderate-to-severe HT (n = 755) began with 8 weeks’ treatment with AML 5mg (period I). Pts with inadequate BP control (office DBP ≥ 90mmHg, office SBP ≥ 140mmHg, 24h DBP ≥ 80mmHg with 35% of read-

gings >85mmHg) were then randomised to 8 weeks’ double-blind treatment with AML 5mg, OLM/AML 10/5mg, 20/5mg or 40/5mg (period II). After this, uncontrolled pts were switched to OLM/AML 20/5mg, OLM/AML 40/5mg or OLM/AML 40/10mg, for a further 8 weeks (period III). Changes in A-SBP from Week 0 (baseline) to the end of period III were analysed by BP category at Week 0; this analysis included 626 patients of the ABPM set who had ABPM data of appropriate quality. Results: Patients were strati-
fied according to their mean baseline 24 h A-SBP using the categories: 120-129, 130-139, 140-149, 150-159, 160-169, 170-179 or ≥ 180 mmHg. Patients with mean baseline 24 h A-SBP in the range 120-129 mmHg showed the smallest mean A-SBP reduction (-5.2 mmHg). In contrast, patients with the highest mean baseline 24 h A-SBP (170-179 and ≥ 180 mmHg) showed the largest reductions (-36.2 and -57.6 mmHg, respec-
tively), demonstrating the efficacy of OLM/AML in patients with more severe HT. Overall, 58.5% of patients achieved a mean 24 h A-SBP < 130 mmHg by the end of period III.

Conclusions: In patients inadequately controlled on AML 5mg, adding OLM effectively reduced 24 h A-SBP. Patients with higher baseline levels of 24 h A-SBP showed the largest BP reductions and thereby the between-category differences in achieved A-SBP were much smaller than the between-category differences in baseline A-SBP.
Cardiovascular disease, the leading cause of death in humans, presents major risk factors: dyslipidemia, hypertension, diabetes and smoking habits. Osteoarthritis is one of the most common diseases in humans, responsible for great morbidity and increasing costs. It is important to treat one without harming the other.

The objective: of the present study is to evaluate the cardiovascular safety of Crystalline Glucosamine Sulfate (CGS), a symptom and structure-modifying drug.

Methods: Retrospective evaluation of the influence of CGS on cardiovascular risk factors, namely blood pressure (BP), lipids (L) or glucose (G) in the patients included in two long term (6 months and 3 years) published studies. The primary endpoints were the mean absolute changes of BP, L or G from baseline at each evaluation point. Secondary endpoints were the same in subgroups of patients who at baseline presented abnormal values of BP, L or G. Statistical comparisons among groups were performed by the one-way analysis of variance (ANOVA). Additionally, least squares means how many patients shifted, from baseline to the end of the study, from normal to abnormal levels or vice versa. These tendencies were evaluated by the McNemar test.

Results: In a total population of 428 patients with osteoarthritis: - There were no significant changes in blood pressure levels during the 6 – month study period, either in the total or in the hypertensive population, with a similar shifting for CGS and placebo. - There were no general significant changes in plasma lipids (total or LDL cholesterol and triglycerides) during the 3 year study period, either in the total or in the dyslipidemic population, with a similar shifting for CGS and placebo. HDL cholesterol tended to increase after 3 years in both groups, with greater changes in placebo than in CGS group (p < 0.05). - There were no significant changes in blood glucose during the 6 – month study period, either in the total or in the hyperglycemic population, with a similar shifting for CGS and placebo. We conclude, based in these two randomized controlled trials, that the long-term use of CGS does not adversely affect blood pressure, blood lipids or glucose in patients with osteoarthritis.

Conclusion: Renal abnormalities are found in a significant number of women hypertensive patients. In women a decrease in eGFR is more frequently observed than microalbuminuria, in respect to men. Associated risk factors and clinical conditions seem to differ between men and women, suggesting the need to develop specific therapeutic strategies to prevent renal dysfunction and reduce associated morbidity and mortality.

PP.14.387 INCREASED DIETARY PROTEIN INTAKE LOWERS BLOOD PRESSURE IN OVERWEIGHT SUBJECTS

J. Doppehe1, J.M. Gelejins2, S.J.L. Bakker3, E.J. Brink1, M.A. van Baak4, on behalf of Top Institute Food and Nutrition, Wageningen, 1Maastricht University, Maastricht-The Netherlands, 2Wageningen University, Wageningen-The Netherlands, 3University Medical Center Groningen, Groningen-The Netherlands, 4TNO Quality of Life, Zeist-The Netherlands

Objective: Several intervention trials have shown that diet composition affects blood pressure (BP). In this study we focused on the effect of dietary protein content on BP.

Design and Method: In this randomized double-blind parallel group study, 94 adult untreated overweight subjects with mildly elevated BP (BMI 25-35 kg/m2, BP >130/85 and <160/100 mmHg) were included. After a 2-week run-in period on a weight-maintaining standardized diet (15 en% protein (P), 30 en% fat (F) and 55 en% carbohydrate (C)), subjects were randomized to a high P or a high C diet for 4 weeks. On the high C diet 60 g of C of the run-in diet was replaced by 3x20 g of maltodextrin supplements, on the high P diet 60 g of C was replaced by 3x20 g of a protein supplement (mixture of 20% pea, 20% soy, 30% egg and 30% milk protein isolate). Supplements were matched for Na, K, Ca and Mg content and taken with each meal. Office and 24-h ambulatory blood pressure measurements (ABP) were assessed at the end of the run-in and after 4 weeks supplement use. BP differences between groups after 4 weeks were analyzed by ANCOVA with BP at the end of the run-in as covariate.

Results: At the end of run-in office BP (mean ± SE) was 142.6 ± 1.692.2 ± 0.9 mm Hg in the C and 143.3 ± 1.892.9 ± 1.0 mm Hg in the P group: daytime ambulatory BP were 147.5 ± 1.891.0 ± 1.1 mm Hg and 147.2 ± 1.892.5 ± 1.2 mm Hg respectively. After 4 weeks, office SBP and DBP were lower in the P than in the C group (4.9 mm Hg (95% CI -1.5, -8.2), p = 0.005 and -2.7 mm Hg (95% CI -0.1, -5.4), p = 0.045) and daytime ambulatory SBP tended to be (-4.1 mm Hg (95% CI +0.2, -8.3), p = 0.06). No significant between-group differences in daytime ambulatory DBP (-1.7 mm Hg (95% CI +1.3, -4.8), p = 0.26) or night-time BP were found.

Conclusions: An increase in dietary protein content, in exchange for dietary carbohydrates (glucose), in a weight-maintaining diet lowers blood pressure in overweight subjects with mild blood pressure elevation.

PP.14.388 FIRST RESULTS OF THE RUSSIAN MULTICENTER PROGRAM STRATEGY A: PERINDOPRIL ARGININE/INDAPAMIDE FOR HYPERTENSION HIGH RISK PATIENTS WITH INADEQUATE BLOOD PRESSURE CONTROL

I. Ye. Chazova, L.G. Ratova, T.V. Martyynuk. Cardiology Research Complex, Moscow-Russia

Aim: To evaluate the possibility of antihypertensive treatment optimization in hypertensive high risk patients with inadequate blood pressure control by adding single pill Perindopril arginine/Indapamide.

Methods: 460 general practitioners and cardiologists from 56 Russian cities enrolled 3680 hypertensive patients of high and very high risk with SBP > 140 mmHg and/or DBP > 95 mmHg. At baseline the pts could be treated with diuretics (except for Indapamide), beta-blockers, CCBs, ACE-inhibitors (except for Perindopril A) ARBs in stable doses for at least 4 wks of monotherapy of free combinations To reach adequate BP control Perindopril A/Indapamide combination (1tab) was added to previous treatment. In pts receiving ACE inhibitors or diuretics these meds were replaced by Perindopril A/Indapamide.
At wk 4 visit in case of SBP > 130 mmHg and/or DBP > 80 mmHg the dose of Perindopril A/ Indapamide was increased to 2 tablets once daily. Office BP levels were evaluated except baseline, at visits wk 4, 12. The 1st results were analysed in 2296 pts finished 12 wk period of treatment (m/f = 31%/ 69%) at age 57.1 ± 11.3y.

**Results:** To 4 wks of treatment BP mean values in all study pts were significantly reduced (from 159/96 to 135/83 mmHg; p < 0.0001). The dose adjustment (Norlep A 2 tab.) was needed for 513 pts. To 12 wks of Perindopril A/ Indapamide treatment SBP/DBP lised in 2296 pts. To week 12 81.5% of pts had BP levels were evaluated at baseline, at visits wk 4, 12. The 1st results were analysed in 2296 pts finished 12 wk period of treatment (m/f = 31%/ 69%) at age 57.1 ± 11.3y.

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**Results:** To 4 wks of treatment BP mean values in all study pts were significantly reduced (from 159/96 to 135/83 mmHg; p < 0.0001). The dose adjustment (Norlep A 2 tab.) was needed for 513 pts. To 12 wks of Perindopril A/ Indapamide treatment SBP decreased from 155 ± 25 mmHg to 127.5 ± 9.9 mmHg (p < 0.0001), DBP decreased from 93 ± 8 mmHg to 79.8 ± 5.8 mmHg (p < 0.0001) that accompanied by statistically significant decrease of HR (5.5 BPM p < 0.0001). In 513 pts received 2 tab. of Perindopril A/ Indapamide SBP decreased from 155 ± 25 mmHg to 127.5 ± 9.9 mmHg (p < 0.0001), DBP decreased from 93 ± 8 mmHg to 79.8 ± 5.8 mmHg (p < 0.0001), HR was reduced by -6.3 BPM (p < 0.0001). To 4 wks of follow up 54.2% of pts received only single pill Perindopril A/ Indapamide. 38.5% of pts were treated with Perindopril A/ Indapamide in combination with one more antihypertensive med. 7.5% of pts received 2 meds except for Perindopril A/ Indapamide. To 12 wks 55.3% of pts received only single pill Perindopril A/ Indapamide. Perindopril A/ Indapamide plus 1 or 2 drugs were recommended to 37.9% and 6.8% of pts accordingly. Single pill Perindopril A/ Indapamide was most frequently combined with CCBs (33%) or beta-blockers (16%). 12 wk Perindopril A/ Indapamide treatment resulted in decrease of the following chemistry parameters: total cholesterol (+0.7mmol/L), LDL-cholesterol (+0.5mmol/L), creatinine (+0.8mmol/L). In diabetic pts (16.1%) we found positive significant dynamic of fasting glucose (+0.5mmol/L), 2-h glucose (+0.3mmol/L), HbA1c (+0.6%). Perindopril A/ Indapamide therapy improved quality of life (Geteberg index + EurQu). It was safe and well tolerated. Only 1.4% of pts were excluded from the study due to AEs. Goal SBP/DBP levels were achieved in 86.1%/90.2% of pts. To week 12 81.5% of pts had BP < 130/80 mmHg. Perindopril A/ Indapamide was recommended for further treatment. To 87.5% of pts.

**Conclusions:** Perindopril A/ Indapamide allowed to optimize antihypertensive treatment in hypertensive high risk patients with inadequate blood pressure control. Goal BP levels were achieved in the majority of high risk pts (81.5%).

**Objective:** Reappraisal of the 2009 ESH guidelines suggests that “systolic blood pressure (SBP)/diastolic blood pressure (DBP) should be lowered to values below 140/90 mmHg in all hypertensive patients, both those at low moderate risk, and those at high risk.” It was proved that most patients need drug combinations to reach these targets and to reduce the frequency of side effects. The ACE inhibitor/diuretic combination is one of the most frequently used in Hungary. The aim of the PICASSO study was to investigate the antihypertensive and metabolic effects and the safety of perindopril 10 mg/indapamide 2.5 mg in hypertensives.

**Methods:** High risk patients with uncontrolled hypertension (Grade 1 or 2, age > 18 years) were included in the open, 3-month, multicenter, prospective, observational clinical study if the treating physician had prescribed a combination treatment with a higher dose of antihypertensive drugs. Blood pressure (BP), including ambulatory blood pressure monitoring (ABPM), heart rate, and metabolic parameters were measured by routine methods. Medical history and quality of life parameters were recorded using a validated questionnaire.

**Results:** After quality control, data were available for 9683 patients (54% women, 46% men; average age 61.8 years). By the end of the study period BP levels had decreased from 159/93 to 131/80 mm Hg (ie, close to the lower recommended guideline values), ABPM from 145/83 to 126/74 mmHg (ie, within the guideline-recommended values for a 24-hour average of < 130/80 mm Hg for SBP and DBP, respectively), and heart rate from 79 to 73 beats/min (P < 0.0001). Target BP < 140/90 mm Hg was achieved in 79.6% of patients who had ABPM and office BP measurements. The diurnal index by ABPM was not changed. Plasma levels of total cholesterol, LDL-cholesterol, triglycerides, fasting glucose, and uric acid decreased significantly, but there were no clinically significant changes in serum levels of Na, K, HDL-cholesterol, or GGT. Quality of life parameters had significantly improved by the end of the study.

**Conclusions:** The fixed combination of perindopril 10 mg/indapamide 2.5 mg can successfully and safely be used in everyday practice. Beneficial trend in metabolic parameters can be explained by cessation of previous drugs with unwanted metabolic side effects (some beta-blockers, HCTZ), and by more frequent visits improving compliance of patients.

**Objective:** Several studies have shown that central blood pressure (BP) is a stronger predictor of cardiovascular risk than brachial BP. Central BP rises with age as arteries stiffen; these age-related increases are thought to be a major risk factor for cardiovascular morbidity and mortality. We present findings for the subset of patients with central BP measurements from an 8-week, double-blind study comparing the efficacy and safety of the direct renin inhibitor aliskiren in combination with hydrochlorothiazide (ALI/HCT) and HCT alone in older patients (≥255 years) with stage 2 hypertension (mean sitting SBP [msSBP] ≥ 160 ± 200 mmHg).

**Design and Method:** After a 1−4-week washout, patients were randomized to ALI/HCT 150/125 mg single-pill combination (SPC) therapy or HCT 12.5 mg monotherapy for 1 week, followed by double the doses for a further 7 weeks. Amlodipine (AML) 5 mg could be added at weeks 4 or 6 if msSBP was ≥ 160 mmHg. Central BP was assessed using the SphygmoCor® device at baseline and week 4 and week 8.

**Results:** At week 4, ALI/HCT provided greater reductions in mean central aortic systolic pressure (CASP) than HCT alone (Table). At week 8, ALI/HCT ≥ HCT ± AML also provided larger mean reductions from baseline in CASP than HCT ≥ AML. CASP reductions were similar to those for brachial msSBP in the overall population (week 4: ALI/HCT, 29.8 mmHg; HCT, 22.4 mmHg). ALI/HCT( ≥ AML) also gave greater reductions from baseline in mean central aortic diastolic pressure (CADP) than HCT( ≥ AML) (Table) at week 4 and week 8. In addition, changes in central pulse pressure were larger for ALI/HCT (−19.5 mmHg) than HCT (−14.6 mmHg) at week 4.

**Conclusions:** Aliskiren/HCT SPC therapy lowered central BP more effectively than HCT alone in older patients with stage 2 hypertension. Aliskiren/HCT thus represents an important potential treatment for lowering central and peripheral BP in these patients.
**Objective:** Accurate measurement of blood pressure (BP) is a key component of any trial aiming to determine the relationship between BP reduction and outcomes. Ambulatory blood pressure (ABP) is considered to be a more accurate predictive parameter for outcomes in hypertension. The aim of this analysis was to evaluate placebo-active treatment differences of 24-h, daytime and nighttime ABP in the HYVET Trial.

**Design and Method:** ABP was measured in 284 out of 3845 participants in the HYVET trial, a double-blind trial of indapamide sustained release (SR) 1.5 mg ± perindopril versus matching placebo in hypertensive subjects (sustained systolic blood pressure [SBP] 160-199 mm Hg) aged over 80 years with Diasys machine (Novacor, France). Forty-seven participants had paired readings at both time points: baseline & on treatment after 12 months. Results and conclusions: At baseline clinic BP (CBP) was 172/90 mm Hg. The paired data indicate that active treatment lowered 24-h ABP by 13/5 mm Hg versus an increase with placebo of 4/1 mm Hg. This gives a net difference of 17/6 mm Hg. Also, the net treatment effect was 17/6 mm Hg for both daytime and nighttime. These data confirm the efficacy of indapamide SR 1.5 mg ± 2 to 4 mg perindopril in lowering BP over 24-h and may explain the 21% reduction in total mortality observed in HYVET.

| Table 1: Ambulatory blood pressure (ABP) results for the 47 participants who had ABP measurement at baseline and on treatment. 24-h, daytime and nighttime ABP results are given. Values are means ± SD (range). SBP, systolic blood pressure; DBP, diastolic blood pressure. |
|-------------------------------------------------|-------------------|-------------------|
| **Active treatment**                            | **Placebo**       |                   |
| **Number of pairs = 27**                         | **Number of pairs = 20** |
| **Daytime ABP (8 AM to 8 PM) recording**         |                   |                   |
| **Baseline** SBP (mm Hg)                        | 134 ± 14 (110–169) | 139 ± 13 (123–167) |
| **DBP (mm Hg)**                                 | 75 ± 10 (56–97)   | 80 ± 9 (61–95)    |
| **On treatment** SBP (mm Hg)                    | 121 ± 13 (97–161) | 143 ± 14 (121–182) |
| **DBP (mm Hg)**                                 | 70 ± 8 (58–89)    | 81 ± 11 (60–103)  |
| **Night time ABP (10 PM to 6AM) recording**     |                   |                   |
| **Baseline** SBP (mm Hg)                        | 118 ± 16 (90–162) | 125 ± 17 (101–163) |
| **DBP (mm Hg)**                                 | 68 ± 11 (45–91)   | 73 ± 13 (48–98)   |
| **On treatment** SBP (mm Hg)                    | 108 ± 17 (86–152) | 132 ± 21 (97–178) |
| **DBP (mm Hg)**                                 | 62 ± 7 (50–78)    | 73 ± 11 (55–96)   |
| **24-h ABP recording**                          |                   |                   |
| **Baseline** SBP (mm Hg)                        | 130 ± 13 (107–154) | 136 ± 13 (119–160) |
| **DBP (mm Hg)**                                 | 73 ± 10 (55–94)   | 78 ± 9 (61–91)    |
| **On treatment** SBP (mm Hg)                    | 117 ± 13 (96–158) | 140 ± 14 (119–181) |
| **DBP (mm Hg)**                                 | 68 ± 7 (56–85)    | 79 ± 10 (61–100)  |
### PP.15.392 NEW COMBINATION THERAPY FOR TREATMENT OF HYPERTENSION (EXPERIMENTAL STUDY)

T. Zvyagintseva, K. Storozhenko, I. Khalin. Kharkov National Medical University, Kharkov-Ukraine

From past studies, it has been indicated that to provide sufficient control over blood pressure and reaching a target blood pressure (BP), more than one medication is required as opposed to monotherapy. The benefits of using combination therapy include high compliance, additive effect and a decrease in side effects due to smaller therapeutic doses. Diuretics decrease BP levels and together with angiotensin-converting enzyme inhibitors (ACEI) make effective antihypertensive combinations. Calcium channel blockers (CCB) are also effective antihypertensive agents, and evidence suggests that a CCB/ACEI combination decreases the risk of cardiovascular and renal disease. We have chosen a combination of CCB amlodipine, ACEI lisinopril and the diuretic indapamide.

**Our objective:** to study AMLID as a new combination therapy for treatment of hypertension in experiment.

**Materials and Methods:** We studied antihypertensive and antarrhythmic actions of AMLID using 24 WAG rats weighing 200-350 g. The antihypertensive action was studied using caffeine-benzoic acid (CBS) experimental model. BP was measured using a piezoelectric sensor. The test subjects were divided into 3 groups: control (hypertension caused by injection of CBS in the dose of 24 mg/kg); rats with experimental hypertension (EH) treated by the comparison drug Hypril-A (amlodipine and lisinopril) in the dose of 0.6 mg/kg and subjects with EH treated by AMLID in the dose of 4 mg/kg. The antihypertensive action was studied using solution of calcium chloride (CC) experimental model using ECG for recording. The animals were divided into 3 groups: control (arhythmia caused by injection of 10% CC in the dose 200 mg/kg), with experimental arrhythmia (EA) treated by Hypril-A in the dose 2 mg/kg and subjects with EH treated by AMLID in the dose of 4 mg/kg. The antihypertensive action was studied using solution of calcium chloride (CC) experimental model using ECG for recording. The animals were divided into 3 groups: control (arhythmia caused by injection of 10% CC in the dose 200 mg/kg), with experimental arrhythmia (EA) treated by Hypril-A in the dose of 2 mg/kg and subjects with EH treated by AMLID in the dose of 4 mg/kg. A single administration of AMLID was administrated by a pipe directly to the stomach 1 hour prior to modeling. Statistics were evaluated using ANOVA.

**Results:** Administration of CBS caused a increase of BP up to 46% in comparison with healthy rats, whereas the administration of CBS to the rats treated by Hypril-A, caused a less prominent rise in BP by 16%, furthermore, subjects treated by AMLID showed an enhancement in BP by 17% in comparison with the control. Administration of CC caused a decrease in heart rates to 22.4% and enhancement of R wave voltage to 45%, while the injection of CC to the rats treated by Hypril-A as well as treated by AMLID did not show any changes in ECG.

**Conclusion:** A single administration of AMLID in the dose of 4 mg/kg declines BP by 21% in comparison with EH, as well as prevents changes in ECG after CC injection and also shares a similar effect with the drug Hypril-A.

### PP.15.393 ALISKIREN PROVIDES MORE PROLONGED REDUCTIONS IN 24-HOUR MEAN AMBULATORY BLOOD PRESSURE DURING TREATMENT WITHDRAWAL THAN TELMISARTAN

R. Düsing1, F. Baschiera2, I-Y. Baek2, P. Brunel2. 1Universitätsklinikum Bonn, Medizinische Klinik Und Poliklinik 1, Bonn-Germany, 2Novartis Pharma AG, Basel-Switzerland

**Objective:** Many patients miss occasional doses of antihypertensive medication, which can adversely affect BP control and increase cardiovascular risk. Interestingly, >50% of these omissions are part of a sequence of ≥2 days. Drugs with a prolonged duration of action may thus help maintain BP reductions in patients who miss an occasional dose. This study compared the BP-lowering efficacy of aliskiren (ALI) and telmisartan (TEL) after 1 week of treatment withdrawal in patients with hypertension (mean sitting systolic BP [mSSBp] ≥140 ≤180 mmHg; 24-hour mean ambulatory SBP [MASBP] ≥135 mmHg).

**Design and Method:** After a 1–2-week placebo run-in, 822 patients were randomized to ALI 150 mg or TEL 40 mg for 2 weeks, then double the doses for 10 weeks, followed by a 1-week treatment withdrawal period. The primary efficacy measure was change in MASBP from end of active treatment (EOW) to end of withdrawal (EOW). The secondary measure was BP reduction at EOA.

**Results:** ALI-treated patients had significantly smaller increases in MASBP and DBP from EOA to EOW than TEL-treated patients (Table). However, in patients who occasionally miss treatment doses.

**Conclusions:** Aliskiren provides clinically relevant BP reductions during active treatment similar to telmisartan, but shows more prolonged BP lowering during treatment withdrawal than telmisartan. Aliskiren may help maintain BP reductions even in patients who occasionally miss treatment doses.

<table>
<thead>
<tr>
<th></th>
<th>Aliskiren 300 mg (n = 412)</th>
<th>Telmisartan 80 mg (n = 406)</th>
<th>Aliskiren vs telmisartan</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP changes during 1-week treatment withdrawal period, mmHg</td>
<td>n End of active treatment Change* n End of active treatment Change*</td>
<td>LS mean difference</td>
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<tr>
<td>MASBP</td>
<td>330 134.3 ± 0.6 2.7 ± 0.5 336 134.3 ± 0.7 6.5 ± 0.5</td>
<td>-3.8*</td>
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<tr>
<td>MADBP</td>
<td>330 81.0 ± 0.5 2.1 ± 0.3 336 80.5 ± 0.5 4.2 ± 0.3</td>
<td>-2.1*</td>
<td></td>
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</tbody>
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*Change from end of active treatment (EOA) to end of withdrawal (EOW).

**Design and Method:** After a 1–2-week placebo run-in, 822 patients were randomized to ALI 150 mg or TEL 40 mg for 2 weeks, then double the doses for 10 weeks, followed by a 1-week treatment withdrawal period. The primary efficacy measure was change in MASBP from end of active treatment (EOW) to end of withdrawal (EOW). The secondary measure was BP reduction at EOA.

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**Conclusions:** Aliskiren provides clinically relevant BP reductions during active treatment similar to telmisartan, but shows more prolonged BP lowering during treatment withdrawal than telmisartan. Aliskiren may help maintain BP reductions even in patients who occasionally miss treatment doses.
IMPACT OF TELMISARTAN TREATMENT ON POSTPRANDIAL FIBRINOLYSIS IN ESSENTIAL HYPERTENSION

S. Solomou1, I. Anyfantis2, C. Basagiani3, D. Tsatsa4, I. Papargyrou2, D. Papadogiannis2. Second Department of Internal Medicine, Nikaia General Hospital, Piraeus, Greece, Piraeus-Greece, 1First Department Of Propaedutic Medicine, Medical School of Athens, Athens-Greece

Objective: The aim of the study was to investigate the effect of telmisartan on the postprandial fibrinolytic activity in patients with essential hypertension after a high-fat meal.

Design and Method: Forty-one newly diagnosed hypertensive patients and 22 healthy controls received a standard fatty meal. Plasma levels of total cholesterol, high and low density lipoprotein cholesterol, fibrinogen, PAI-1 and tPA were measured before and after the meal, before and four weeks after treatment with telmisartan 80 mg daily, and postprandially. Moreover, the hypertensive patients had a 24-hour ambulatory BP measurement. The control group had only the tests done once. Hypertensives repeated the 24-hour ambulatory BP measurement at the end of the 4-week treatment period.

Results: In the tests control group there was a rise in plasma triglyceride levels and reduction of postprandial plasma fibrinogen after the meal. The PAI-1 and tPA antigen levels dropped after the meal significantly. Before the treatment there was a greater tPA reduction for the hypertensive group while the reduction of PAI-1 was similar for the two groups. After the four-week treatment period with telmisartan, the repetition of the high-fat meal significantly raised the plasma triglyceride levels while the PAI-1 and tPA antigen levels significantly reduced. The postprandial fibrinogen levels showed a tendency for reduction. Telmisartan treatment significantly reduced systolic and diastolic BP.

Conclusions: Despite the increase of triglycerides there is no effect in the fibrinolytic profile after the use of telmisartan 80mg daily.

CARDIOVASCULAR PREVENTION: RELATIONSHIPS BETWEEN ARTERIAL AGING AND CHRONIC DRUG TREATMENT

A. Lieber1, M.E. Safar1, D. Agnoletti1, V. Zhang1, J. Perez-Froz1, A. Protogerou1, B.I. Levy1, J. Blacher1. Hotel-Dieu, Paris-France, 2Hospital Lariboisiere, Paris-France

Drugs acting on cardiovascular (CV) prevention are, by definition, interconnected with age-induced arterial changes. However, this question has been poorly investigated along long-term treatment. This goal requires a major prerequisite: to determine statistical links associating age-induced changes in arterial stiffness and wave reflections with drug classes acting on CV prevention. We studied 347 subjects where CV prevention included hypertension, diabetes mellitus, and hypercholesterolemia, and included six drug classes: diuretics; beta-blocking agents; angiotensin II (ANGII)- and calcium channel (CCB)-blockers; insulin therapy; statins. For each class, the total population was divided into 2 subgroups according to the presence or absence of the corresponding class. Statistical comparisons between subgroups involved brachial and central blood pressure measurements, aortic pulse wave velocity (PWV), augmentation index (AIXs), used as a marker of wave reflections. Non-invasive measurements included tonometry and pulse wave analysis. Appropriate adjustments indicated among results the respective role of age, sex, mean blood pressure (MBP), standard risk factors and other confounding variables. CCB and statins did not exhibit statistical association with PWV or AIXs. Beta-blocking agents were significantly linked with PWV or AIx. Independent of age, MBP, CV risk factors were noticed under diuretics, ANGII and CCBs, insulin therapy, statins. For each class, the total population was divided into 2 subgroups according to the presence or absence of the corresponding class. Statistical comparisons between subgroups involved brachial and central blood pressure measurements, aortic pulse wave velocity (PWV), augmentation index (AIXs), used as a marker of wave reflections. Non-invasive measurements included tonometry and pulse wave analysis. Appropriate adjustments indicated among results the respective role of age, sex, mean blood pressure (MBP), standard risk factors and other confounding variables. CCB and statins did not exhibit statistical association with PWV or AIXs. Beta-blocking agents were significantly linked with PWV or AIx. Independent of age, MBP, CV risk factors were noticed under diuretics, ANGII and CCBs, insulin therapy, statins.

Key words: Cardiovascular prevention, arterial aging, drug treatment.

LONG-TERM EFFECTS OF LISINOPRIL TREATMENT ON HAEMODYNAMIC PARAMETERS IN HYPERTENSIVE PATIENTS

V. Stojanov1, B. Jakovljevic1, D. Lovic1. Clinical Centre of Serbia, Belgrade-Serbia, 2Institute of Hygiene and Medical Ecology, School of Medicine, Belgrade-Serbia, ‘Clinic for Internal Diseases ‘Internistica – Dr Lovic’, Nis-Serbia

Objectives: The aim of this study was to assess the long-term effects of lisinopril antihypertensive treatment on blood pressure and hemodynamics parameters.

Design and Methods: The study comprised 111 patients (42 men and 69 women) with arterial hypertension (grade I or II), aged 59 ± 11 years. Ambulatory 24-hour blood pressure monitoring (ABPM, using Space Labs 90202) and thoracic bioelectric impedance (THI, using Task-Force monitor) were performed to estimate haemodynamic parameters (peripheral vascular resistance, PVR, and blood volume, BV). The subjects were treated with 50 mg lisinopril per day. Long-term effects were assessed after 2 months, 6 months and 12 months after initiation of therapy.

Results: At the beginning, 89 (80.2%) of patients were diagnosed with hypertension grade II and 22 (19.8%) were diagnosed with hypertension grade I. After the initiation of lisinopril therapy, hypertension grade I was diagnosed in 26 patients (23.4%) after 2 months, in 16 patients (14.4%) after 6 months, and in 12 patients (10.8%) after 12 months (< 0.001). Vasoconstriction (increased PVR) was present in 49 patients (44.1%) at the beginning of study, in 18 patients (16.2%) after 2 months of therapy, in 9 patients (8.1%) after 6 months, and in 7 patients (6.3%) after 12 months of therapy (< 0.001). Increased blood volume (hypervolaemia) was found in 27 patients (24.3%) at the beginning of study, in 11 patients (9.9%) after 2 months, in 2 (1.8%) patients after 6 months, and in 1 patient (0.9%) after 12 months of therapy (< 0.001). The change of blood pressure category and the change of frequency of vasoconstriction and blood volume were highly statistically significant.

Conclusion: Lisinopril treatment was significantly efficient in reducing blood pressure, peripheral vascular resistance and blood volume in patients with arterial hypertension at 2 months, 6 months, and 12 months after the initiation of therapy.

EFFECT OF INTENSIVE VERSUS MODERATE BLOOD PRESSURE LOWERING ON TOLL-LIKE RECEPTORS 4 GENE EXPRESSION IN PATIENTS WITH ESSENTIAL HYPERTENSION

M. Marketiou, J. Kontaraki, E. Zacharis, A. Giaouraki, Z. Stokos, G. Kochiadakis, P. Vardas. Halki University Hospital, Athens-Greece

Objective: Activation of innate immune receptors, such as Toll-like receptors (TLRs), participates in the pathogenesis of cardiovascular diseases. Angiotensin II modulates the expression of TLR4, a key element of the innate immune system. We investigated the effect of intensive compared to moderate lowering of systolic blood pressure (SBP) on TLR4 gene expression in peripheral blood monocytes in patients with essential hypertension.

Design and Method: We recruited 28 previously untreated patients with mild or moderate essential hypertension (16 male, aged 61 ± 10 years) who were randomly assigned to 1 of 2 treatment targets: an intensive arm with an SBP target of < 130 mm Hg or a moderate arm with an SBP target of < 140 mm Hg. Combinations of candesartan plus amlodipine, with other antihypertensive medications were used as needed. Blood samples were taken before and 3 months after therapy initiation. Mononuclear cells were isolated using anti-CD14+ antibodies and mRNAs were estimated by real-time quantitative reverse transcription-PCR and expressed as fold induction.

Results: Blood pressure was reduced significantly in both groups, from 163.4 ± 12.39/12 ± 11.1 to 128.4 ± 12.37/9 ± 11 mm Hg (p < 0.0001) in the intensive arm and from 164.1 ± 13.5/93 ± 8 ± 12.2 to 139.0 ± 12.9/86 ± 11.9 mm Hg (p < 0.0001) in the moderate arm. In contrast with the moderate arm of SBP treatment, TLR4 gene expression was significantly downregulated after intensive antihypertensive treatment (fold induction in the intensive arm 0.7 ± 0.3 versus 1.7 ± 0.9 in the moderate arm, p = 0.04).

Conclusions: Intensive antihypertensive treatment results in attenuation of TLR4 gene expression in peripheral monocytes in essential hypertension. Our findings provide evidence that a strategy of aggressive SBP lowering not only reduces blood pressure in hypertension, but it also may reverse inflammation in monocytes in hypertensive patients.

DRUG PREFERENCE AND DRUG PRESCRIPTION FOR THE TREATMENT OF PRIMARY HYPERTENSION

B. Georgiev1, N. Gotcheva1, D. Gotchev1. National Heart Hospital, Sofia-Bulgaria, ‘Military Medical Academy, Sofia-Bulgaria


Methods: A nationwide survey of the patients with primary hypertension is performed in 20 hospitals in the Sofia region for the period 2010–2011. The survey includes data on the patients with primary hypertension treated with antihypertensive drugs. The data are analyzed using descriptive statistics.

Results: The survey included 1528 patients with primary hypertension treated with antihypertensive drugs. The most preferred drugs were calcium channel blockers (43.6%), followed by ACE inhibitors (35.3%) and diuretics (25.1%). The most prescribed drugs were losartan (15.2%), enalapril (14.8%) and hydrochlorothiazide (10.9%). The results show a high level of drug preference and drug prescription for the treatment of primary hypertension in the Sofia region for the period 2010–2011.

Objective: The aim of the study was to find out the drugs preferences of the Bulgarian physicians in the field of high blood pressure treatment and to compare these results with the findings of the EUROASPIRE III Bulgarian cohort.

Methods: In 2007, we interrogated 259 GPs about their drug preferences for treatment of hypertension by using an anonymous questionnaire. The EUROASPIRE III survey was carried out in 2006–2007 in 2 regions of Bulgaria and high risk patients were identified, interviewed and examined.

Results: The majority (95%) of GPs prescribed beta-blockers, 95% - ACE inhibitors, 95% - calcium channel blockers, 88% - diuretics and 76% of GPs prescribed ARBs. In 88.1% out of 327 consecutive high risk patients being examined in EUROASPIRE III we found high blood pressure and 86.7% of them were already on treatment - 27.6% of the patients were treated with beta-blocker, 66.6% - with ACE-inhibitor or ARB, 26.3% - with calcium channel blocker, 28.5% - with diuretic and 0.3% of the patients were treated with any other drug group.

Conclusion: Bulgarian physicians preferred to use antihypertensive drugs being approved to have cardioprotective properties. An increased tendency towards greater rate of ACE-inhibitors/ARBs prescptions for blood pressure lowering therapy had been observed. Almost all hypertensive patients from the Bulgarian cohort in EUROASPIRE III were on active treatment. More than 2/3 of all hypertensive patients were treated with ACE-inhibitor/ARB. We found a net difference between the preference and the prescription concerning beta-blockers and calcium channel blockers.

PP.15.401 INTERFERONE INDUCED EFFECT OF CILAZAPRIL IN ESSENTIAL HYPERTENSIVE PATIENTS

M. Mospan, L. Michichenko. NSC Institute of Cardiology After M.D.Strazgesko, Kyiv-Ukraine

Objective: To study antihypertensive efficacy of cilazapril and it influence on serum interferon (SI) level in essential hypertensive (EH) patients (pts).

Design and Method: 116 EH pts (92 with benign and 24 with malignant hypertension) were studied. 16 EH pts with benign hypertension were treated with 20 mg cilazapril once a day during 2 month. Serum interferon concentration was estimated by the method of restraining of cytopathogenic effect of vesicular stomatitis virus in homologous culture of cells L41.

Results: SI concentration in EH pts was significantly (p < 0.05) higher than in healthy control subjects (8.03 ± 0.21 M050 in EH pts with benign hypertension, 11.3 ± 0.21 M050 in EH pts with malignant hypertension and 5.7 ± 0.19 M050 in control group). Under 2-month of cilazapril treatment systolic blood pressure decreased from 187 ± 4 mmHg to 151 ± 7 mmHg (p < 0.001), diastolic blood pressure – from 115 ± 2 mmHg to 99 ± 4 mmHg (p < 0.001). After 24 hours of the first dose of cilazapril SI concentration increased in 5.2 times (from 7.5 ± 0.18 M050 to 39 ± 0.42 M050). Cilazapril save it interferon induced effect after one week of treatment (SI level was 22.5 ± 0.21 M050). At the end of treatment period SI concentration return to the basic level. The significant correlation between SI concentration and SBP (r = 0.79, p < 0.001) was find at the end of the treatment.

Conclusions: EH pts characterizes by significant increase of SI, especially EH pts with malignant hypertension. Cilazapril has interferon induced effect during treatment and normalization of SI level comes at the same time with blood pressure lowering.

PP.15.402 COMPARISON OF CONTROLLED RELEASE CALCIUM ANTAGONISTS AND OTHER ANTIHYPERTENSIVE DRUG IN THE MANAGEMENT OF HYPERTENSION IN SUBARACHNOID HAEMORRHAGE

N. Akiaishvili, M. Janelidze, M. Beridze, N. Lobjanidze, S. Kapianidze, M. Alpaizdze, N. Kvirvelia, M. Kapiandize. Khechinashvili Medical University Clinic, Tbilisi-Georgia

Background: Secondary ischemic damage (SID) due to vasospasm as well as severe hypertension resulting in re-rupture of aneurism are the leading causes of the disability and mortality after subarachnoid hemorrhage (SAH). There are number of studies evaluating the efficacy of Ca-antagonist, such as Nimodipine, in prevention of vasospasm, but the efficacy of antihypertensive drugs are still controversial.

Aim: To assess the efficacy of Ca-antagonist administration after SAH

Methods: 67 SAH (mean age 47, 25/42 m/f) clipped aneurism patients with SID were separated as: group I - hypertensive patient with SID, receiving the standard treatment with Controlled Release Ca-antagonist( Osmo-Adalat, 30-60mg, Bayer Schering Pharma), group II - receiving the standard treatment with other antihypertensive drug. The effectiveness of the end points included the measures of cerebral blood flow (CBF) and level of cerebral vasospasm, which was assessed by Transcranial Doppler Sonography of the middle cerebral artery. Patients neurology and functional state was evaluated by National Institutes of Health Stroke Scale (NIHSS), modified Rankin Scale (mRS), Barthel Index (BI), Western Aphasia Battery (WEB) in acute stage and on 14th day of treatment and at 3 months as well as the side effects and 3 month mortality was recorded.

Results: We did not found any differences between the two groups after treatment and 3 months later in CBF mean flow velocity (150 ± 20 and 55 ± 15mm/sec in I group and 145 ± 20 and 60 ± 15 mm/sec in II group respectively).
At the end of treatment there were no differences in NIHSS score, mRS and BlBP (> 0.5), but the slightly positive improvement was found in WEB in the H group as compared with I group (p < 0.05). The three month follow-up showed the better scores of NIHSS, mRS and WEB (p > 0.5) in the Osmo-Adalat treatment group.

Conclusion: Controlled Release Calcium antagonists(Osmo-Adalat,30-60mg. Bayer Schering Pharma) have the beneficial therapeutic effect of on vasospasm that can reduce of disability after SAH.

**PP.15.403**  
BLOOD PRESSURE-LOWERING EFFECT OF ALISKIREN AND ITS ROLE ON CARDIAC AND RENAL DAMAGE IN HIGH-RISK HYPERTENSIVE SUBJECTS: A 12-MONTHS STUDY

A. Mazza1, D. Montemurro1, S. Schiavon1, A. Zanier1, M. Zanin1, S. Zorzan1, S. Cuppini1, E. Ramazzina1, M. Soc of Internal Medicine, Azienda Ulss 18 Rovigo, Rovigo-Italy, 1Department Of Medicine/Cardiology, Ulss 19, Adria-Italy

Objective: The blood pressure (BP) lowering effect of ACE-inhibitors, angiotensin-II receptor blockers agents on hypertension and organ damage, alone or in combination therapy, is limited by the compensatory increase of renin because it activatrs renin/prorenin receptors and escape mechanisms of angiotensin activation. The aim of this study was to evaluate the antihypertensive efficacy, cardiac and renal damage effect and safety of Aliskiren, a renin direct inhibitor, that it was added in a group of hypertensive high-risk subjects with uncontrolled BP and renal damage effect and safety of Aliskiren, a renin direct inhibitor, that it was added in a group of hypertensive high-risk subjects with uncontrolled BP (i.e < 130/80 mmHg) despite a twofold antihypertensive treatment.

Design and Method: 47 subjects (27 men and 20 women) aged 59.7 ± 11.1 years, were assigned to receive once-daily Aliskiren 150-300 mg for 12 months. Clinic BP measurements were taken at every follow-up visit (after 1, 6 and 12 months), while 24-hours ambulatory BP measurements, echocardiography, Tc(99m)-DTPA renal scintigraphy and 24-h albuminuria assessment were evaluated at the enrolment and at the end of follow-up. Analysis of variance was compared BP, left ventricular mass index (LVMI), glomerular filtration rate (GFR) and albuminuria values changes from baseline to the follow-up.

Results: A significant reduction of systolic (-32 mmHg, p < 0.0001) and diastolic (-13.5 mmHg, p < 0.0001) clinical BP values, of mean systolic (-9.2 mmHg, p < 0.0001) and diastolic (-5.1 mmHg, p < 0.0003) 24-h ambulatory BP values were found. LVMI was reduced from 128.7 g/m² to 113.8 g/m² (p < 0.005); GFR was steady (from 61.3 to 61.5 ml/min/1.73m² NS) while albuminuria values significantly decreased from 57.4 ± 116.2 to 21.3 ± 41 mg/24h (F = 5.67, p > 0.02). Adverse events caused withdrawal of 4 subjects (3 cases of gastrointestinal disease, 1 case of alopecia).

Conclusions: Aliskiren was effective in lowering both clinical and 24-hours ambulatory BP; it was also effective on LVMI improvement in men and women; there was no significant influence on GFR which maintained stable, while albuminuria significantly decreased. Safety was good, even in combination with ACE-inhibitors and angiotensin II receptor blockers.

**PP.15.404**  
HIGH SENSITIVE CARDIAC TROPONIN T IS USEFUL FOR STRATIFICATION OF HYPERTENSIVE TREATMENT

S. Hoshide, M. Fukutomii, K. Eguchi, T. Watanabe, T. Kabutoya, S. Ishikawa, A. Mazza1, D. Montemurro1, S. Schiavon1, A. Zanier1, M. Zanin1, S. Zorzan1, S. Cuppini1, E. Ramazzina1, M. Soc of Internal Medicine, Azienda Ulss 18 Rovigo, Rovigo-Italy, 1Department Of Medicine/Cardiology, Ulss 19, Adria-Italy

Background: A slight elevation of cardiac troponin T (cTnT) levels in the circulating blood can be detected by the recently developed, high-sensitivity TnT (hs-cTnT) assay. However, it is not clear about the clinical implication of hs-cTnT in hypertensive treatment. The aim of this study is to investigate whether hs-cTnT provides the useful information in the choice of antihypertensive drug.

Methods: In this open-label multicenter trial, hypertensive patients were randomly allocated to receive losartan (LOS) 50mg o.d. or amiodipine (AM) 5mg o.d. for 4 weeks, and the treatments were changed to combination of LOS 50mg + hydrochlorothiazide (HCTZ) 12.5mg o.d. or AM 10mg o.d. for a further 4 weeks. We measured hs-cTnT and NT pro BNP at baseline and 8 weeks.

Results: A 62 hypertensive patients, 32 in LOS/HCTZ group and 31 in AM group, were measured hs-cTnT and NT pro BNP level. Both treatments decreased clinic blood pressure (BP), 24-h BP to the same extent. In the lower half group of hs-cTnT level at baseline, there were no significant difference in the reduction of hs-cTnT level between LOS/HCTZ and AM group, while in the upper half group, the reduction of hs-cTnT level was greater in AM group than in LOS/HCTZ group (<23.6 v. 15.1%, P = 0.005). Dividing half of NT pro BNP level at baseline, in the upper half group, both treatment significantly decreased NT pro BNP, but there was no significance difference between two treatment (<20.7 v. -18.3%).

Conclusion: High dose AM monotherapy has superior effect on the patients with high hs-cTnT level compared with LOS/HCTZ therapy. The evaluation of hs-cTnT might be useful for the choice of antihypertensive drug in hypertensive treatment.

**PP.15.405**  
MODERN APPROACHES TO PREVENTION OF THROMBOTIC COMPLICATIONS IN HYPERTENSIVE PATIENTS WITH ACUTE CORONARY SYNDROME WITHOUT ST-SEGMENT ELEVATION

T. Poponina1, Y. Poponina1, 1Siberian State Medical University of Higher Professional Medical Educa; Tomsk, Tomsk-Russia, 2Research Institute of Cardiology of Tomsk, Tomsk-Russia

Aim: To investigate the influence of antithrombotic therapy on the clinical course and the state of platelet hemostasis in hypertensive patients with acute coronary syndrome (ACS) without ST-segment elevation.

Design and Methods: The first phase of work was a study of comparative effectiveness of the original clopidogrel and its first generic - zyllt in hypertensive patients with ACS without ST-segment elevation. 160 hypertensive patients with unstable angina (UA) and ACS without ST segment elevation were included in a randomized, open, comparative, prospective study. Patients in both groups were treated with intravenous infusion of unfractionated heparin (UH) and were randomly assigned to two treatment groups by random sampling; the patients of the 1st group received in addition to the cardiomagyn original clopidogrel (Plavix - production of the company Sanofi Aventis), patients of the 2nd group - zyllt (clopidogrel produced by KRKA). We analyzed the frequency of serious coronary events during 150 days of the observation. Status of platelet hemostasis was studied in 160 hypertensive patients with ACS without ST-segment elevation during the antiplatelet therapy.

Results: We didn’t find statistically significant differences in the therapeutic effectiveness (impact on the firm endpoints) and the effects on platelet function between the original clopidogrel and its first generic zyllt.

Conclusion: The high efficiency and safety, as well as reasonable price of zyllt undoubtedly provide a better adherence to treatment in more hypertensive patients who suffered acute coronary syndrome and underwent revascularization procedure.

**PP.15.406**  
EFFECT OF ORALLY SINGLE DOSE OF EXTENDED ISOSORBIDE-5-MONONITRATE ON CENTRAL BLOOD PRESSURE IN HEALTHY MALE VOLUNTEERS

X. Jiang, P. Wang, Y. Liu, S. Du, Q. Dong, L. Xu, Y. Li. Cardiovascular Institute & Fu Wai Hospital, Beijing-China

Background: The cuff sphygmomanometer failed to show consistent alteration in brachial blood pressure with extended isosorbide-5-mononitrate(IS-5-MN), even though the drug proved very effective in relieving angina pectoris.

Objective: To study the effect of orally single dose of slow-release IS-5-MN on central blood pressure in healthy volunteers using pulse wave analysis.

Methods: Twenty two healthy male volunteers were studied over double 24 h periods at first day (placebo), second day (first dose of IS-5-MN 60 mg). At the start of the study and at 0.5, 1, 2, 3, 4, 5, 6, 8, 12, 16, 24 h thereafter they took placebo on the first day and IS-5-MN 60 mg on the second day, blood samples for measuring IS-5-MN concentration were taken, as well as recordings were taken on two separate occasions of the radial artery pressure waveform using applana-
tometry. The radial pressure waveform was convolved into an ascending aortic wave using a validated generalised transfer function enabling measurement of aortic systolic, diastolic, augmented pressure, augmentation index and left ven-
tricular ejection duration in addition to standard brachial cuff pressures.

Results: After taken the drug, the concentration of IS-5-MN was rapidly increased to peak at 5 h, then linearly decreased to 128.0 µg/L at 24 h. There was no consistent change in heart rate or brachial pressures except for a decrease in systolic pressures and a increase in heart rate (p < 0.05) at 2-4 h. In contrast, there were substantial and significant decreases in aortic systolic pressures, augmented pressures, augmentation index and ejection duration (p < 0.01) at 0.5–16 h.

Conclusion: Pulse waveform analysis exposes nonlinear concentration correlation relationship of IS-5-MN on the aortic waveform, suggesting muscular conduit arterial dilatation with reduced wave reflection at the low and intermediate
concentration, arteriolar dilatation and decreased peripheral resistance at the high concentration. Progressive venous dilatation resulted in delayed decrease in ejection duration.

**Results:**

Non-dippers compared to dippers did not differ regarding age, gender, body mass index, office and 24-hour systolic and diastolic BP (p = NS for all cases). Non-dippers had significantly increased 24-hour pulse pressure (54.1 ± 49.9 ± mm Hg, p < 0.05). Additionally, they exhibited higher c-f PWV values (8.5 vs 7.6 m/sec, p < 0.05), increased hs-CRP (2.8 ± 0.8 vs 2.1 ± 0.6 mg/L, p < 0.05) and homocysteine levels (14.6 ± 6.8 vs 11.9 ± 5.4 mmol/L, p < 0.05). Benzoziadapine’s administration as anxiolytic therapy, was significantly more prevalent among non-dippers compared to dippers (78% vs 23%, p < 0.05).

**Conclusions:** In conclusion, non-dippers compared to dippers hypersensitivies are characterized by increased benzoziadapine’s administration, impaired arterial elasticity and more pronounced activation of proatherogenic mechanisms.

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**TREATMENT OF ANXIETY-DEPRESSIVE DISORDERS IN PATIENTS WITH ARTERIAL HYPERTENSION ASSOCIATED WITH CORONARY HEART DISEASE**

Y. Poponina¹, T. Poponina¹, B. Portnyagin¹, K. Gunderina¹. ¹Research Institute of Cardiology of Tomsk, Tomsk-Russia, ²Siberian State Medical University of Higher Professional Medical Education, Tomsk-Russia

Aim: To study efficacy and safety of administering of a very low dose of potentiated antibodies to brain-specific protein S-100 ("Tenoten" by Materia Medica) in comparison with arterial hypertension (AH) associated with coronary heart disease (CHD).

**Results:**

A very low dose of potentiated antibodies to brain-specific protein S-100 ("Tenoten" by Materia Medica) in comparison with standard treatment of AH associated with CHD led to improvement of clinical condition, psychological status and assessment of life quality.

**Conclusion:** Administration of a very low dose of potentiated antibodies to brain-specific protein S-100 to standard treatment of AH associated with CHD leads to improvement of clinical condition, psychological status and assessment of life quality.

**DIPPING STATUS IS CHARACTERIZED BY AUGMENTED ADMINISTRATION OF BENZODIAZEPINES AND ELEVATED ARTERIAL STIFFNESS**


**Background:** Blunted reduction of blood pressure (BP) fall as well as psychological stress have both been related to adverse cardiovascular prognosis and potentially share the altered sympathetic tone as a common pathophysiologic substrate. We hypothesised that dipping status might be correlated with benzoziadapine’s administration ( sympatholytic action) in the setting of essential hypertension (EH).

**Methods:** Our population consisted of 134 consecutive subjects with stage I-II untreated EH (aged 52 ± 9 years, 72 male, office BP = 151/97 mm Hg). They were classified according to the nocturnal BP fall on 24-hour ambulatory BP monitoring, to non-dippers (those with < 10% nocturnal systolic and diastolic BP fall, n = 36) and dippers (the remaining subjects, n = 98). All participants underwent arterial stiffness evaluation on the basis of carotid to femoral pulse wave velocity (c-f PWV) by means of a computerized method (Complior SP). Anthropometric data were recorded and venous blood samples were drawn for estimation of high sensitivity C-reactive protein (hs-CRP) and homocysteine levels. Self-reported data about benzoziadapine’s administration were obtained via interview.

**Results:** In conclusion, non-dippers compared to dippers hypersensitivies are characterized by increased benzoziadapine’s administration, impaired arterial elasticity and more pronounced activation of proatherogenic mechanisms.
PP.15.411 EFFECT OF SHORT-TERM TREATMENT WITH TELMISARTAN OR NIFEDIPINE ON INSULIN SPHINGOMYELIN PHOSPHOCYTIDES OF ESSENTIAL HYPERTENSIVE PATIENTS

E. Porteri1, V. Flati2, E. Pasini3, C. De ciuciu3, C. Platto1, G. Iacopini1, E. La borla1, D. Assanelli1, S. Specà1, C. Donini2, D. Rizzoni2, E. Agabiti roseli2.
1. Università Di Brescia, Dipartimento Di Scienze Mediche E Chirurgiche, Brescia-Italy, 2. Department of Experimental Medicine, University of L’aquila, L’aquila-Italy, 3. Salvatore Maugeri Foundation, IRCSS, Medical Center of Lumezzane, Brescia-Italy

It was previously demonstrated that metabolic syndrome in humans is associated with an impairment of insulin signalling in circulating mononuclear cells, in particular with reduced molecular concentrations of insulin receptor, of IRS-1 (insulin receptor substrate 1), mTOR (the mammalian target of rapamycin), and other downstream proteins (Pasini E. et al. Cardiovascular Diabetology 2010). At least in animal models of hypertension, ACE inhibitors and angiotensin receptor blockers (ARB) may correct alterations of insulin signalling in the skeletal muscle (Rizzoni D et al. J Hypertens 2008). Therefore, we investigated the effects of a 3 month treatment with an ARB with additional PPARy agonist activity, telmisartan, or with a dihydropyridine calcium channel blocker, nifedipine, on insulin signalling in patients with mild-moderate essential hypertension. Twelve patients were included in the study; six were treated with telmisartan (20-80 mg/ day) and 6 with nifedipine in a slow-release formulation (20-60 mg/day). Insulin signalling was evaluated in mononuclear cells by Ficoll-Paque density gradient centrifugation and Wester-Blot. Results obtained are summarized in the Table (Mean ± SD, * p < 0.05, ** p < 0.01 vs. Basal, ³p < 0.05 vs nifedipine). No difference between groups or versus baseline was observed in the expression of insulin receptor. An increased expression of mTOR and of phosphorylated (active) mTOR (p-mTOR) was observed in patients treated with telmisartan, but not in those treated with nifedipine, while both treatments increased the cellular expression of glucose transporter type 4 (GLUT-4). Therefore, telmisartan and nifedipine are both effective in improving insulin signalling in human hypertension; however, telmisartan seems to have broader effects.

<table>
<thead>
<tr>
<th>Table</th>
<th>Blood pressure (mm Hg)</th>
<th>mTOR/C (Unstim)</th>
<th>p-mTOR/C (Unstim)</th>
<th>GLUT-4 (Unstim)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telmisartan</td>
<td>140±9/110</td>
<td>284±143</td>
<td>21±16</td>
<td>10±17</td>
</tr>
<tr>
<td>Nifedipine</td>
<td>140±9/110</td>
<td>292±119</td>
<td>31±15</td>
<td>21±19</td>
</tr>
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PP.15.412 MELATONIN, FREE RADICAL ACTIVITY AND CONVULSIVE TREATMENT IN HYPERTENSION

C. Grigore1, A.M. Vinitala1, I. Stoian1, O.V. Grigore1, I. Dawkins1, D. Isacoff1, I.V. Bruckner2. 1. Carol dialexa medicine of university and pharmacy, bucurestia-romania, 2. University Politehnica Bucurestia, Bucurestia-Romania, School of Health Sciences, University of Southampton, Southampton-United Kingdom

Objective: The aim of this study is to evaluate the evolution of the urinary metabolite of melatonin level (6-hydroxymelatonin sulphate: aMT6s), lipid peroxidation product (MDA malondialdehyde), vascular inflammation (hs-CRP), and arterial blood pressure (ABP), plasma concentrations of high-sensitivity C-reactive protein (hs-CRP), triglycerides (TG), total cholesterol (TC), LDL and HDL cholesterol, fasting plasma glucose (FPG), uric acid (UA), MDA and urinary metabolite aMT6s. Urinary aMT6s concentration was determined first urine in the morning and adjusted for the creatinine value. The same parameters were evaluated six weeks after these patients were taken 10 mg of ramipril/day.

Results: aMT6s concentrations was reverse associated with age, waist, TC, LDL-C, TG, number of criteria for MetS (r: 0.5 to 0.7, p < 0.005), hs-CRP, smoking (r: 0.5 to 0.7, p = 0.02) and were not correlated with UA. The coefficient of determination (R2) is not significant between aMT6s and considered parameters. After 6 weeks taking Ramipril once-daily, ABP, hs-CRP and MDA decreased significantly (p < 0.01), aMT6s increased with 21.2% (p = 0.001). The lipids profile has not changed statistically significant.

Conclusion: Ramipril treatment is associated with the decrease of ABP in plasma with MDA and hs-CRP, and the increase of aMT6s, without a change in plasma lipids. This work is funded by CNCSIS –UEFIISCU, PNII–IDEI 1472/2008

PP.15.413 THE EXPERIENCE OF USING OF IVABRADINE IN TREATMENT OF PATIENTS WITH PULMONARY ARTERIAL HYPERTENSION

I. Lazareva, A. Miazdvedreva, D. Kovalenko, S. Pushkevich, V. Pahuda. 1. Republican Scientific and Practice Centre Cardiology, Minsk-Belarus

Objective: To assess the influence of Ivabradine on heart rate (HR), WHO class of pulmonary arterial hypertension (PAH) and 6 minute walk test (6MWT) in complex therapy of PAH patients.

Design And Methods: We prescribed 7.5 mg of Ivabradine 2 times per day to 15 patients with idiopathic (4 patients) and secondary (11 patients) PAH (4 men, 11 women; age 46.1 ± 4.2 years) together with furosemide, amiodarone, warfarin and sildenafil. We evaluated HR, WHO class of PAH, distance of 6MWT and Borg index at baseline and after 6 months of treatment.

Results: Tolerability of Ivabradine treatment was rated very good in all PAH patients. HR decreased from 104.2 ± 5.2 to 70.1 ± 1.2 beats per minute, WHO class of PAH decreased from III to II in 11 patients (73.3%), Borg index decreased from 6.2 ± 1.1 to 3.1 ± 0.4, distance of 6MWT increased from 226 ± 10.2 to 402 ± 8.1 metres.

Conclusions: The addition of Ivabradine to standard treatment of PAH patients improves clinical situation, tolerance of exertion, decreases dyspnea.

PP.15.414 ESSENTIAL HYPERTENSION IS ASSOCIATED WITH ALTERED SPHINGOLIPID BIOLOGY WHICH CAN BE NORMALISED BY ANTI-HYPERTENSIVE TREATMENT

L. Spijkers1, R. Van den akker1, B. Janssens2, J. Debets2, M. Meens3, J. De Mey2, E. Stroes1, B-J. Van Den Born1, D. Wijesinghe3, C. Chalfant3, A. Alewijnse1, S. Peters1. 1. Academic Medical Center, Amsterdam-The Netherlands, 2. Maastricht University, Maastricht-The Netherlands, 3. Virginia Commonwealth University, Richmond-USA

Objective: We have previously shown that hypertension in spontaneously hypertensive rats (SHR) is associated with marked alterations in sphingolipid biology. Moreover, elevation of vascular ceramide leads to vasoconstriction due to an iPLA2, COX-1 and thromboxane synthase-dependent release of the endothelium-derived contractile factor thromboxane A2 in vessels of SHR but not to those of normotensive animals. Here we investigated whether also human essential hypertension is associated with increased plasma ceramide levels and whether the observed vascular alterations in SHR can be normalized by antihypertensive treatment.

Design and Methods: Ceramide levels were measured by means of mass spectrometry in plasma of healthy controls, stage 1 and stage 2 + 3 hypertensives. In order to assess the influence of antihypertensive treatment on ceramide-dependent vasoconstriction, SHR rats were treated for 4 weeks with the AT1 receptor blocker losartan (20mg/kg/day) or the vasodilator hydralazine (29mg/kg/day) for 4 weeks.

Results: Human essential hypertension is associated with increased plasma levels of ceramide, corresponding with the severity of hypertension: 183 ± 11 pmol in normotensives, 207 ± 19 pmol in stage 1 hypertensives and 243 ± 23 pmol in stage 2 + 3 hypertensives, respectively (expressed as total ceramide/ sample ± SEM, n = 12-19, p < 0.05). In SHR, both losartan and hydralazine decreased blood pressure to the same extent (SBP losartan: 125 ± 5 mmHg, hydralazine: 113 ± 14 mmHg compared to 191 ± 7 mmHg for untreated SHR, n = 5, p < 0.05), however losartan was more effective in restoring endothelium-dependent relaxation (+ 20%) than hydralazine (+ 13%). Losartan reduced ceramide-induced contractions by more than 75% (untreated SHR: 1,9 ± 0,3 mmN/m, losartan: 0,4 ± 0,1 mmN/m, n = 5, p < 0.05) to levels normally observed in normotensive animals. Interestingly, hydralazine was ineffective in this respect (1,3 ± 0,3 mmN/m, p > 0.05).

Conclusions: We show that human essential hypertension is also associated with increased ceramide levels and that AT1-receptor blockade, but not blood pressure lowering per se, normalizes vascular sphingolipid biology in SHR. This study was performed within the framework of Top Institute Pharma project T2-108.
THE EFFECT OF RESVERATROL TO THE RAT RENAL ARTERY

L. Gojkovic-Bukarica1, V. Kanjuih, J. Markovic-Lipkovski1, H. Heinl1. 1Medical Faculty, University Belgrade, Belgrade-Serbia, 2Medical Faculty, University Tuebingen, Tuebingen-Germany

Resveratrol has recently been found to produce vasorelaxation in endothelium-dependent and endothelium-independent manner. The aim of our study is to define the mechanism(s) of relaxation produced by resveratrol in the isolated rat renal artery (RA). RA rings were precontracted with phenylephrine. Resveratrol produced more prominent relaxation of RA rings with endothelin than of rings without endothelin. Catalase partially antagonised the resveratrol-induced relaxation of RA rings with endothelin, but methylene blue and L-NAME did not. In order to analyze the contribution of different types of K+ channels in endothelium-independent relaxation of resveratrol, K+ channel blockers were used. The relaxation of RA was not blocked by glibenclamide, a selective ATP-sensitive K+ channel blocker, and taurethylamilumnonium, a non selective blocker of calcium-dependent K+ channels. 4-aminopyridine, blockers of voltage-dependent K+ (Kv) channels and margatoxin, highly selective blockers of Kv1.1-1.6 channels antagonised resveratrol-induced relaxation of RA in a noncompetitive manner. Here we have shown that resveratrol produced relaxation of the rat renal artery by activation of smooth muscle Kv channels. In endothelium-dependent relaxation produced by resveratrol H2O2 could be involved, but NO does not.

PP.15.416  PREDICTORS OF ANGIOGENIC THERAPY EFFECTIVENESS IN HYPERTENSIVE PATIENTS WITH CHRONIC LIMB ISCHEMIA

K. Taltisky, O. Bulkina, T. Arefev, A. Samko, Y. Parfyomena, Y. Karpov. Russian Cardiology Research Centre, Moscow-Russia

Background: Therapeutic angiogenesis is a new treatment option for patients with chronic limb ischemia who are not candidates for interventional treatment. Several studies show improvement of ischemia after angiogenic gene therapy, while others do not. Hypertension is reported to reduce collateral formation in ischemic limbs, but other factors influencing the effectiveness of angiogenic therapy are largely unknown.

Methods: 35 hypertensive patients with Fontaine IIb-IV atherosclerotic limb ischemia and no operation or angioplasty received vasodilator endothelial growth factor (VEGF) gene therapy (GT, n = 20), blood-derived stem cell therapy (SC, n = 5) or conventional treatment (CT, n = 10). Treatment effect was assessed by angiography, duplex ultrasound, treadmill test, limb scintigraphy and transcutaneous oximetry. The levels of circulating endothelial progenitor cells (EPC), angiogenic growth factors, homocystine, C-reactive protein were measured in all patients before treatment and at follow-up.

Results: 3 months after treatment GT and SC patients show significant improvement of walking distance, everyday activity, ankle-brachial index and limb perfusion, while angiography showed significant increase of collateral network. 34% of patients had a good treatment effect, 46% had modest effect, and 20% had no effect. No significant change of clinical or laboratory indices were found in CT group patients. In univariate analysis, a variety of factors including EPC and homocystine levels, angiogenic stenotic and collateral indices, severity and duration of ischemic symptoms, blood pressure response to therapy were found to correlate with subsequent treatment effect. In multivariate analysis, only inpatient arterial patency, less duration of smoking and higher ankle-brachial index were independently associated with Rutherford scale improvement.

Conclusions: Angiogenic stimulation with VEGF-plasmid or blood-derived stem cells is overall effective in hypertensive patients with chronic limb ischemia. A number of factors are associated with treatment success possibly reflecting a role of hemodynamic forces and endothelial function in angiogenesis.

PP.15.417  BLOOD PRESSURE NORMALIZATION BY FIXED PERINDOPRIL/INDAPAMIDE COMBINATION IN PATIENTS WITH DIABETES MELLITUS WITH HYPERTENSION: RESULTS OF NIKA STUDY

T. Netchessova1, A. Shepelykevich1, T. Gorbati2, I. Lazareva1. 1Republican Science & Practice Center Cardiology, Minsk-Belarus, 2Belarusian State Medical University, Minsk-Belarus

Objective: Patients with diabetes mellitus and hypertension have a significantly higher level of cardiovascular events. The aim of the prospective study NIKA (Noliprel forte A as the Key therapy for diabetic patients with hypertension) was to evaluate the antihypertensive efficacy and tolerability of Noliprel forte A in patients with diabetes mellitus and hypertension and to assess improvement in the macro- and microcirculation with Noliprel forte A.

Design and Method: In this multicenter, prospective, open clinical study, 445 patients with diabetes mellitus and hypertension were enrolled from all over the country (men 45%; age 57.9 ± 0.43 years). At baseline, systolic/diastolic blood pressure was 157.3 ± 0.8/93.9 ± 0.4 mm Hg, pulse pressure 63.4 ± 0.4 mm Hg. 30% of patients were treated only with Noliprel forte A and 70% with Noliprel forte A plus a β-blocker or calcium channel blocker. Blood pressure and tolerability were assessed at 4 follow-up visits over a 6-month period. Microalbuminuria and pulse wave velocity, assessed by the impedance technique, were evaluated at baseline and over 6 months of treatment.

Results: Systolic/diastolic blood pressure fell by 28/13 mm Hg and pulse pressure by 15 mm Hg (P < 0.001). Systolic blood pressure was normalized (≤130 mm Hg) in 76.3% of patients given Noliprel forte A monotherapy and in 88.9% of patients receiving Noliprel forte A in combination therapy. Pulse wave velocity decreased from 10.8 ± 0.9 to 9.5 ± 0.5 mm/sec (n = 43, z = 2.872, P = 0.004). In 68% of patients with microalbuminuria at baseline (n = 81), there was regression to a normal rate. Tolerability was rated as “very good” or “good” by 98% of doctors and by 99% of patients.

Conclusion: The NIKA study confirms that treatment with Noliprel forte A significantly contributes to achievement of optimal results in antihypertensive treatment and improves the macro- and microcirculation in patients with diabetes mellitus and hypertension in the everyday practice of endocrinologists and cardiologists.
Objective: The aim of the study was to investigate the influence and safety of combined therapy by quinapril (Q) 20mg and hydrochlorothiazide (H) 12.5mg on left ventricular hypertrophy (LVH), reduction and blood pressure (BP) level decreasing at patients (pts) with essential hypertension 1st and 2nd stage and metabolic syndrome (MS) (according to IDF).

Design and Method: We examined 36 pts (20 male, mean age 49.4 ± 3.4) by echocardiography, 24h BP monitoring and performed biochemical analyses (fast glucose level (FGL), insulin level and HOMA estimation, lipogram) before and after 6 months of treatment by fixed combination of Q and H. All pts were obese (mean body mass index 33.7 ± 2.0 kg/m²).

Results: Treatment by combination of Q and H during 6 months caused significant decreasing of BP, left ventricular mass (LVM, g) and LVM indexes (LVMi, g/m² and g/m²). Systolic BP level changed: 124.4 ± 3.1 vs. 141.1 ± 2.2; diastolic BP - 81.3 ± 5.5 vs. 91.2 ± 6.1; LVM at male - 26.2 ± 2.5 vs. 31.1 ± 2.1; LVMi (g/m²) - 54.9 ± 2.3 vs. 65.2 ± 4.8; LVM at female - 20.7 ± 10.5 vs. 24.9 ± 18.2; LVMi (g/m²) - 55.0 ± 2.4 vs. 66.1 ± 5.1 (all p < 0.05). Although LVM and LVMi (g/m²) have significantly decreased, but not achieved normal levels. However LVMi (g/m²) didn’t show LVH presence after treatment at male: 110.5 ± 4.0 and at female: 108.7 ± 4.1. FGL after 6 months was 5.0 ± 2.8 vs. 5.5 ± 0.5; total cholesterol – 7.5 ± 0.38 vs. 6.02 ± 0.45; triglycerides - 1.47 ± 0.32 vs. 1.66 ± 0.41; height density lipoprotein -1.24 ± 0.10 vs. 1.18 ± 0.10 (mmol/l) and HOMA -2.62 ± 0.07 vs. 3.32 ± 1.14.

Conclusions: Quinapril and hydrochlorothiazide treatment had beneficial effect on LVH and BP level in hypertensive patients. Method of LVH estimation as LVMheight 2.7 instead LVM/m² at patients with MS and obesity allows to make more correct measurement LVH reduction during the treatment. Using quinapril and hydrochlorothiazide fixed combination improved metabolic disturbances due to protection action of quinapril and save dose of hydrochlorothiazide at patients with metabolic syndrome.

Objective: To study the effectiveness of a new generic drug ramipril “Chartil®” in patients with essential arterial hypertension (AH) of the first and second degree of a high risk, diabetes mellitus type 2 (DM), metabolic syndrome (CAD), diabetes mellitus (DM), stroke (in anamnesis ), in comparison with the original drug ramipril “Tritatse®” as well as the possibility to achieve the target BP levels in single doses of each drug in combination with calcium channel antagonists amlopidine, if necessary.

Design and Methods: In the final analysis included data of 27 patients: 14 men (52%) and 13 women (48%) (48%) with a high risk of cardiovascular complications. The study was a randomized, open crossover. Before starting the study, all patients for 7 days abolished the previously used antihypertensive therapy. Each of the patients alternately took the 6-week treatment with generic and original drug ramipril. Effectiveness of antihypertensive therapy was assessed during visits to the doctor every 2 weeks throughout the study. During the first two weeks, patients were treated with ramipril 5 mg per day. Over the next two weeks dosages were doubled, if not achieved target BP levels (<130/80 mm Hg), or remained the same in case of achieved target BP level. With the ineffective double doses of drugs during the last 2 weeks amlopidine 5 mg per day was added to each of the treatment arms. After 6 weeks of the treatment with the first randomized drug of ramipril, antihypertensive therapy had been withdrawn for 7 days and then the second drug of ramipril has been added.

Results: 25 patients have completed the treatment with both of the tested drugs. As a result, in the 6-week treatment with the generic ramipril, average systolic BP (SBP) decreased by 20.0 mmHg compared to baseline, after 6-week treatment with original ramipril - by 22.2 mm Hg. The average level of diastolic BP (DBP) decreased by 10.8 and 8.6 mm Hg, respectively (difference between the drugs in the effect on BP are not statistically significant). Additional prescription of amlopidine required 20 patients in the treatment of generic ramipril and 16 - in the original ramipril therapy. Target achievement of BP <130/80 mm Hg was observed in 10 patients (38.5%) in the arm of generic ramipril and in 13 patients (50%) in the arm of original ramipril.

Conclusion: The results of this study demonstrated therapeutic equivalence of the new generic drug ramipril “Chartil®” and the original drug ramipril “Tritatse®”. However, in patients with AH of stage I and II with a high degree of risk caused by a combination of AH with CAD, DM, stroke, found low efficacy of monotherapy and effectiveness of combination therapy with two antihypertensive drugs of only 40-50% of all of the cases.

Objective: To investigate the influence of Felodipine based antihypertensive combination therapy on the blood pressure (BP) and the sexual function in young and middle-aged patients with hypertension.

Methods: In this perspective, randomized, parallelized and fixed combination therapy trial, a total of 218 male and 99 female patients (aged 18 to 60 yrs) with grade 1 and grade 2 hypertension (BP = 140/90 mmHg and <170/109 mmHg, 1mmHg = 0.133kPa) were enrolled. All patients accepted consent form and the research protocol were approved by The Ethic Committee of Lanzhou University Second Hospital. The 5-item version of the international index of erectile function (IIEF-5) questionnaire and the Female Sexual Function Index (FSFI) questionnaire were used respectively to evaluate the erectile function and female sexual function in two different fixed combination therapies, which are F+1 group (Felodipine 5mg q.d + Irbesartan 150mg q.d) and F + M group (Felodipine 5mg q.d + Metoprolol 47.5mg q.d) within 12 months follow up. The serum testosterone and sex hormone binding globulin (SHBG) in male patients as well as estradiol and testosterone in female ones were assessed by radioimmunoassay. Office BP was assessed and the target BP was lower than 140/90 mmHg according the Guideline of Chinese Hypertension of 2005.

Results: The rate of ejection dysfunction (ED) were 35.31% in these 218 male patients. There were similar target BP achievement (P > 0.05) in 2 male groups, F + 1 group was the least affect on the sexual function compared with F + M group (P < 0.05) and the erectile function was no statistical priority (P > 0.05).There were some changes in the testosterone and SHBG but no statistical difference on the 12 months follow up (P > 0.05). 2. There was 66.7% of female sexual dysfunction (FSD) in these 99 female hypertensive patients. The rates of BP control were no statistical differences between 2 treatment groups (P > 0.05). Compared to baseline, in F + 1 treated women, scores for the items related to “desire” and “arousal” were significantly improved (P < 0.05). The level of the serum estradiol was elevated and testosterone was decreased.
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**PP.15.423**

**IRBESARTAN/AMLODIPINE FIXED COMBINATION IN PATIENTS UNCONTROLLED ON IRBESARTAN 150 MG (I-ADD STUDY)**

G. Bobrie. On Behalf of the I-Add Investigators, Hypertension Unit - HEGP - APHP, Paris-France

**Objective:** To compare the antihypertensive efficacy of the fixed combination Irbesartan/amlodipine 300/5mg (I300/A5) to Irbesartan 300mg (I300) monotherapy in lowering Systolic Home Blood Pressure Measurements (SHBPM) after 10 weeks (W10).

**Methods:** It was a multicenter, prospective, randomized, open-label, with blinded endpoint evaluation (PROBE) phase III study. Uncontrolled patients (SHBPM ≥ 135 mmHg) after at least 1 week of treatment by I150 monotherapy were randomised (1:1) in 2 parallel groups: one received I150/A5 from W0 to W5 followed by forced titration I300/A5 from W5 to W10; the other received I150 from W0 to W5 followed by forced titration I300 from W5 to W10. The primary objective was the change in SHBPM between the 2 groups at W10. A secondary objective was SHBPM change between the 2 groups at W5. Compliance was monitored by pill count.

**Results:** 436 patients from 10 countries were enrolled. ITT analysis was performed on 320 patients. Mean age was 56.7 ± 14.4 years, female 55.6%, obesity 42.2% and diabetes 20.3%. History of CV disease: 5.9%. At W0, mean HBPM (SBP ≥ 140 mmHg) randomized to T80/A10 (n = 352) or A10 (n = 354); the other received I150 from W0 to W5 followed by forced titration I300 from W5 to W10. The primary objective was the change in SHBPM between the 2 groups at W10. A secondary objective was SHBPM change between the 2 groups at W5. Compliance was monitored by pill count.

**Conclusions:** This study shows that combination of I300/A5 achieve clinically significant higher BP reduction and BP control than monotherapy with I300.

**PP.15.424**

**SINGLE-PILL COMBINATION OF TELMISARTAN 80 MG/AMLODIPINE 10 MG PROVIDES SUPERIOR BLOOD PRESSURE REDUCTIONS TO AMLODIPINE IN ADDRESSED RISK HYPERTENSIVE PATIENTS: SUB-ANALYSIS OF THE OBESE PATIENTS IN THE TEAMSTA DIABETES STUDY**

A.M. Sharma1, G. Bakris1, T.W. Littlejohn1, J.M. Neutel2, M. Kobe3, N. Ting3, L. Lee2. 1University of Alberta, Edmonton-Canada, 2University of Chicago Pritzker School of Medicine, Chicago-USA, 3Piedmont Medical Group, Winston-Salem-USA, 4Orange County Research Center, Tuatin-USA, 5Boehringer Ingelheim Pharmaceuticals Inc, Ridgefield-USA, 6Boehringer Ingelheim GmbH & Co. KG, Ingelheim-Germany

**Objective:** To compare the efficacy and safety of the single-pill combination of telmisartan 80mg/amlodipine 10mg (T80/A10) with amlodipine 10mg (A10) in patients with diabetes and hypertension who were either obese (BMI ≥ 30 kg/m²) or non-obese (BMI < 30 kg/m²).

**Design and Method:** An 8-week, double-blind, parallel-group study, in 706 patients aged ≥ 18 years with type 2 diabetes and stage 1 or 2 hypertension (SBP > 150 mmHg) randomized to T80/A10 (n = 352) or A10 (n = 354); patients received T80/A5 or A5 for the first 2 weeks. The primary endpoint was change from baseline in mean seated trough sBP CUFF.

**Results:** The primary results showed a significant higher reduction of the com-\text{vs} -19.9 mmHg (p < 0.0001) as reported elsewhere. Of 406 (57.5%) of patients were obese. Mean (SD) SBP at baseline was 160.9 (7.8) and 160.5 (7.8) mmHg in obese and non-obese patients, respectively. Reductions in SBP were greater and goal attainment was higher with T80/A10 versus A10 alone (Table), and this relative benefit was consistent across the obese and non-obese groups (interaction p = 0.6058). Overall, the most frequent adverse events were peripheral oedema (18.8%) and headache (2.3%), and were less frequent with T80/A10 SP than with A10 monotherapy.

**Conclusions:** SBP was reduced in both obese and non-obese patients to a greater extent by T80/A10 SPC compared with A10 monotherapy. Hypertensive patients at added risk, such as those with diabetes and obesity or metabolic syndrome, can benefit from greater SBP reductions and higher goal-rate attainment when treated with T80/A10 SPC compared with A10 monotherapy. Both treatments were well tolerated and the safety profile was comparable to what has been seen in previous trials.

**PP.15.425**

**PHARMACOLOGICALLY MEDITATED HYPOTENSION DURING THE SUMMER**

D. Gourris, E. Dimitrilloes. Clinical Hypertension Unit, Sismanogloeo General Hospital, Maroussia-Greece

**Objective:** Patients on diuretic treatment frequently report lower blood pressure and hypotensive symptoms during the summer, when there is sustained increase in the ambient temperature for long periods of time. We aimed to investigate patients reporting such symptoms.

**Design:** The ambulatory blood pressure measurements of 70 patients on fixed dose ARB + HCTZ combination, who had reported symptoms suggestive of hypotension were analyzed. The ABPMs were performed during the summer period, until mid August 2010. Eligibility criteria were report of hypotensive symptoms, patient had to be receiving fixed dose combination of ARB + HCTZ for at least 6 months and he/she should have a valid ABPM at least 6 months before (including previous Autumn period).

**Method:** We compared the summer visit ABPMs with the previous ABPMs 6 months before. We analyzed the mean BP measurements using the unpaired t-test.

**Results:** Winter Systolic BP Summer Systolic BP p value Mean 134.79 SD 6.37 132.36 SD 8.70 p = 0.0336 Winter Diastolic BP Summer Diastolic BP Mean 80.91 SD 5.44 80.51 SD 7.01 p = 0.8466

**Conclusion:** We observed a statistically significant decrease in mean systolic blood pressure during the warm summer period, but not for the mean diastolic. When therapy with HCTZ is added to a patient, the possible need of decreasing the dose during the warm summer period should be taken into consideration.

**PP.15.426**

**FEATURES OF TREATMENT AND PROGNOSIS OF NON-ST ELEVATION ACUTE CORONARY SYNDROME IN PATIENTS WITH IRON DEFICIENCY ANEMIA**

A. Skotnikov, A. Vertkin, F. Vilkoviski. Moscow State Medical-Stomatological University, Moscow-Russia

The aim of the study was to determine features of clinical course and prognosis of non-ST elevation acute coronary syndrome in patients with iron deficiency anemia and high risk of bleeding. The authors analyzed the medical histories of 2473 patients admitted to the coronary care department from October 2006 to October 2009 year with diagnosis of non-ST elevation acute coronary syndrome, and 339 conclusions of post-mortem examination. Based on analysis of archival...
data shows, that the frequency of occurrence of anemia in patients with non-ST elevation acute coronary syndrome is 64.5%. Physicians rarely assess the risk of bleeding in these patients, and therefore antithrombotic therapy is appointed only in 62.6% of cases. In addition, at patients with hemoglobin below 90 g/l antithrombotic therapy is carried out in only 30.7% of cases. The opposite situation is observed with respect to the correction of iron deficiency anemia. Patients with non-ST elevation acute coronary syndrome and low level of hemoglobin are appointed iron preparations in 44.9% of cases, while patients with mild iron deficiency anemia – only in 6.5% of cases. Meanwhile, the incidence of myocardial infarction and mortality of these patients depends on the initial level of hemoglobin, as well as from ongoing antithrombotic therapy. Without it, antithrombotic complications occur in 22.1% of cases in the structure of all fatal events. In addition, demonstrated, that in patients with non-ST elevation acute coronary syndrome the incidence of myocardial infarction and mortality while severe anemia are 97.3% and 78.1% respectively. Proved that the highest frequency of fatal complications occur in 22.1% of cases in the structure of all fatal events. In addition, demonstrated, that in patients with non-ST elevation acute coronary syndrome and iron deficiency anemia, which antithrombotic therapy in the hospital was not carried out. In these patients the frequency of hemorrhagic complications is equal to 4,3%. We demonstrated that antithrombotic therapy by dalfopristin (Fragmin®) on the background correction of iron deficiency reduces mortality and frequency of myocardial infarction in patients with non-ST elevation acute coronary syndrome, high risk of bleeding and iron deficiency anemia.

**PP.15.427**

**24-HOUR AMBULATORY BLOOD PRESSURE REDUCTION WITH A PERINDOPRIL/AMLODIPINE FIXED-DOSE COMBINATION**

V. Nagy1, e. Lantos2, n. Habony1. Semmelweis University, 2nd Department of Internal Medicine, Budapest-Hungary, 1Department of Medical Information, Egis Nyrt, Budapest-Hungary

**Objective:** 24-hour ambulatory blood pressure control is an important clinical objective in the management of hypertension linked to prognostic benefit. We investigated the efficacy of the fixed-dose combination of perindopril and amlodipine (5/5, 5/10, 10/5, 10/10 mg) on 24-hour ambulatory blood pressure monitoring (ABPM) parameters in a subgroup of the large PEARL study, which included indexpatients with essential grade 1 or 2 hypertension whose target blood pressure values had not been reached (BP ≥140/90 mmHg, or ≥130/80 mmHg in diabetes) with a prior antihypertensive treatment.

**Methods:** In this open, multicenter, observational 3-month study, we included 10 335 patients (5 483 female, 4 852 male; mean age, 61.0 years). At study entry, the fixed-dose combination of perindopril and amlodipine replaced previous treatment with renin-angiotensin system inhibitor and/or calcium channel blocker at dosages defined by the treating physician and up titrated at month 1, as required. Three measurements of 24-hour ambulatory blood pressure monitoring (ABPM) were performed at inclusion, month 1, and month 3, when considered necessary by physicians.

**Results:** Within the ABPM subgroup of patients (n = 262), brachial blood pressure measured at the doctor’s office was reduced from 159.8/94.3 mmHg to 131.0/80.0 mmHg (P < 0.001), while mean 24-hour blood pressure was reduced from 146.184.3 mmHg to 127.675.9 mmHg (P < 0.001) by the fixed-dose combination of perindopril and amlodipine. Both daytime and nighttime mean values decreased in a similar manner. The mean dosage at the end of the study was 8.96 mg perindopril and 7.65 mg amlodipine. The results were consistent across subgroups of different previous treatments and cardiovascular risks. No serious adverse events were reported.

**Conclusions:** The fixed-dose combination of perindopril and amlodipine provides effective reduction in peripheral (brachial) blood pressure and reduction in 24-hour ambulatory blood pressure, and can be administered safely in hypertensive patients who do not reach target blood pressure values with another previous treatment.

**PP.15.428**

**BLOOD PRESSURE LOWERING RESPONSE, CARDIAC REMODELING AND DIASTOLIC FUNCTION WITH THE FIXED LOW-DOSE COMBINATION PERINDOPRIL/INDAPAMIDE IN 300 NEVER PREVIOUSLY TREATED ROMANIAN HYPERTENSIVE PATIENTS**

L. Popescu. University of Medicine And Pharmacy Carol Davila - Bucharest, Bucharest-Romania

**Objective:** The new ESC/ESH guidelines and the reappraisal strongly suggest the use of fixed dose combination from the beginning in the therapy of the essential arterial hypertension. Fixed dose combination ensures a better and quicker therapeutic effect, with diminished adverse effects and the simplification of therapy. Keeping the STRATHIE Study in mind, we aimed to assess the efficacy of fixed dose combination perindopril/indapamide over the blood pressure values and the cardiac echographic morphology and function.

**Design and Method:** We performed a prospective study in 300 never treated grade 1 and 2 hypertensive patients, between 2007 and 2010. The study was extended over 6 months. All patients were evaluated (clinical and echocardiographic) at the inclusion and after 3 and 6 months.

**Results:** Blood pressure was successfully reduced: -24.1 ± 16.2 for the systolic and - 9.7 ± 7.4 for the diastolic. 60% of the hypertensives were controlled after 3 months and 83.3% after 6 months. Therapy with low-dose perindopril/indapamide decreased left ventricular wall thickness: IVS from 1.1 ± 1.5 mm, and LVWP from 0.9 ± 1.7. LVDm decreased with 13.5%. Left ventricular systolic function was preserved, even with a little increase (+ 0.9 ± 1.1). Diastolic function increased with 9% (E/A ratio increased from 0.89 ± 0.26 to 0.96 ± 0.3).

**Conclusions:** Fixed low-dose combination perindopril/indapamide effectively reduced blood pressure. Patients quickly achieved the targeted blood pressure values, with a remarkable decrease in left ventricular wall thickness and mass. Left ventricular systolic function was preserved, and diastolic function was increased.

**PP.15.429**

**THE INFLUENCE OF TELMISARTAN IN COMBINATION WITH TORASEMIDE AND ATORVASTATIN ON THE CARDIOVASCULAR RISK FACTORS IN HYPERTENSIVES WITH HEART FAILURE**

M. Orlychak, O. Shevemeta. Ivano-Frankivsk National Medical University, Ivano-Frankivsk-Ukraine

**Background:** The aim was to investigate the influence of complex treatment with including of telmisartan, torasemide and atorvastatin on the cardiovascular risk and its interconnection with different plasma endogenous insulin (EI) levels in hypertensives with established heart failure (HF).

**Methods:** The study was performed on 61 non-diabetic non-smokers hypertensives (62% female) with HF in NYHA class II-II, aged 58 ± 6 years. The patients were divided into 3 groups. Group 1 included 34 patients with normal EI levels in the range of 2-20 mcU/ml. Group 2 consisted of 15 patients with elevated 2hr postloading EI levels in the range of 25-40 mcU/ml. Group 3 included 12 patients with elevated fasting and 2hr postloading EI levels in the range of 25.110 mcU/ml. Control group consisted of 10 healthy people. Before and after the 8 weeks treatment with including of telmisartan 40-80 mg/d and torasemide 5 mg/d and atorvastatin 10-20 mg/d, oral glucose-tolerant test with determina-

tion of plasma EI, total cholesterol (TC), low-density lipoproteins (LDL), blood pressure (BP) levels were measured. We used the SCORE chart to explore the cardiovascular risk.

**Results:** At baseline low (0-4%), high (5-9%) and very high (≥ 10%) SCORE values were identified in 18 (52.95%), 14 (41.15%) and 2 (5.90%) (group 1); 7 (46.67%), 6 (40.00%) and 2 (13.33%) (group 2); 4 (33.33%), 5 (41.67%) and 3 (25.00%) cases (group 3) accordingly. After treatment control of BP (p < 0.05) was determined in 26 patients (76.48%) (group 1); 11 patients (73.33%) (group 2) and 8 patients (66.67%) (group 3). The plasma TC; LDL levels decreased by 23%; 28% (group 1), 16%; 18% (group 2), 19%; 26% (group 3) accordingly compared to baseline (p < 0.05). In group 1 plasma EI levels didn’t change under treatment and compared to the control group (p > 0.05). In 6 patients (40%) (group 2) plasma 2hr-postloading EI levels decreased by 23% compared to baseline (p < 0.05). After treatment low, high and very high SCORE values were identified in 27 (79.41%), 7 (20.59%) and 0 (0.00%) (group 1); 9 (60.00%), 5 (33.33%) and 1 (6.67%) (group 2); 6 (50.00%), 5 (41.67%) and 1 (8.33%) cases (group 3) accordingly.

**Conclusions:** The hypertensives with HF and hyperinsulinemia are associated with higher cardiovascular risks as compared to those with normal plasma EI levels. Complex treatment with telmisartan, torasemide and atorvastatin increases BP control, decreases hyperinsulinemia levels and significantly reduces relevant metabolic markers of cardiovascular risk.
Background: Current antihypertensive treatment including angiotensin-converting enzyme inhibitors/angiotensin II receptor blocker (ARB), are beneficial but do not prevent progression of the disease. The aim of the investi- 
gation was to estimate renoprotective properties of the combined antihyperten-
sive therapy with including of ARBs irbesartan, antagonist-calcium felodipine 
and diuretic indapamide in hypertensives with nephropathy.

Methods: The study included 42 hypertensives (33 female, 9 male), aged 58 ± 10 years. Systolic and diastolic blood pressure (BP), plasma creatinine 
levels, oral glucose-tolerant test with determination of plasma insulin levels 
(El), microalbuminuria (MAU)/proteinuria were measured at baseline and 
after 6 months treatment with irbesartan 150-300 mg/d, felodipine 2.5-10 mg/d 
and indapamide 1.5-2.5 mg/d. Patients were divided into 3 groups. Group 1 
included 16 patients with normal plasma El levels. Group 2 consisted of 14 
patients with reactive hyperinsulinemia. Group 3 consisted of 10 patients with 
fasting and 2hr postloading hyperinsulinema.

Results: At baseline, systolic and diastolic BP were increased by (25.10) ± 
in all groups vs. control (p < 0.05). Plasma fasting and 2hr postloading EI levels 
were equal to (10.83 ± 6.26) and (11.25 ± 4.56) mcU/ml (group 1); (14.9 ± 6.59) 
and (43.07 ± 10.27) mcU/ml (group 2); (38.86 ± 3.91) and (52.41 ± 12.09) mcU/ 
ml (group 3) accordingly vs. (12.16 ± 2.16) mcU/ml in the control (p < 0.05).
The mean plasma creatinine levels were equal to (87.32 ± 25.10) mcoul/ml 
in the patients without nephropathy vs. (65.00 ± 15.00) mcoul/ml in the 
control (p < 0.05). At patients with nephropathy creatinine levels were increased 
to (219.67 ± 88.88) mcoul/ml (p < 0.05). MAU/proteinuria was not presented 
in group 1. MAU/proteinuria were revealed in 3 (21%)/2 (14%) (group 2) and 
3 (30%)/4 (40%) (group 3) cases respectively. After the treatment 28(67)% 
patients had their BP controlled to <140/90 mmHg (p < 0.05). There were 
no changes in plasma EI levels. The patients with nephropathy had decreased 
plasma creatinine levels by 13.87% (p < 0.05). Regress/reducing of MAU/pro-
teinuria levels were revealed relative to baseline measurements (p < 0.05) also.
Treatment was generally safe and well tolerated.

Conclusions: Triple antihypertensive therapy with irbesartan and felodipine 
and indapamide is effective in lowering BP and decreasing progression of hyper-
tensive nephropathy.

Objective: To evaluate persistence with fixed and unfixed dose combinations 
of angiotensin receptor blockers (ARBs) in comparison to other fixed and unfixed 
combination doses of antihypertensive therapies in patients with hypertension in 
France.

Design and Method: This retrospective study analyzed prescription data col-
lected by general practitioners (n = 655) in France, using a longitudinal database, 
the IMS Disease Analyzer (DA). The DA database was searched for patients with 
hypertension (ICD-10 code I10) in the period 09/2008-08/2009 with a follow-
up of at least 12 months. Persistence was defined as the proportion of patients 
who remained on their initially prescribed therapy for 1 year. The differences 
between mean persistence values (days) were calculated by using multiple regres-
sion analyses, adjusted for age, gender, region, insurance status and co-morbidity.

Results: Out of 68.006 patients with hypertension in the DA database, 13.437 
patients (mean age 65.8 years [SD: 13.2]; women 53.3%) were eligible for 
analysis, according to inclusion and exclusion criteria. Fixed or unfixed dose 
combinations of ACE inhibitors were prescribed to 18.9% of the patients, 14.9% 
received unfixed diuretics, 15.2% unfixed calcium antagonists, and 19.1% fixed 
or unfixed dose combinations of beta-blockers. 4.224 (31.4%) patients received 
fixed or unfixed treatments with ARBs. Twelve months after the first prescrip-
tion the persistence with antihypertensive treatment was comparable among 
patients receiving prescriptions for unfixed ARBs (52.8%), unfixed diuretics 
(50.8%), unfixed beta-blockers (58.1%), unfixed calcium antagonists (52.2%), 
and unfixed ACE inhibitors (48.5%). A higher percentage of patients, on a fixed 
treatment with ARBs, remained persistent after 12 months (61.9%), compared 
to subgroups of patients on fixed dose combinations of ACE inhibitors (51.4%) 
and fixed dose combinations of beta-blockers (59.4%). Mean duration of persistence 
in patients receiving fixed ARBs (289.1 days/ patient) was higher compared to 
antihypertensive treatment with unfixed ARBs (265.8 days). Same trend was 
shown for ACE inhibitors (fixed 261.9 days, unfixed 249.1 days), and beta-
blockers (fixed 281.5 days, unfixed 278.5 days).

Conclusions: These real-life data demonstrate that persistence with treatment 
regimen containing fixed dose combinations (in particular ARBs, beta block-
ners and ACE inhibitors) in patients with hypertension in France is better com-
pared to unfixed dose combinations of mentioned antihypertensive therapies. 
These differences should be addressed in hypertension management strategies 
of patients to ensure their adequate blood pressure control.

Comparative effectiveness of renin angiotensin system blockade plus ccbs 
or diuretics for essential hypertension: a systematic review

Comparative analysis of metabolic effects of angiotensin converting enzyme 
 inhibitor monotherapy and its combination with thiazide diuretic

The patterns of treatment persistence with antihypertensive medications in France

Abstracts e281
**Introduction:** The use of single pill combinations is associated with a higher degree of patients’ compliance in comparison to treatment with the respective free combinations. Consequently, the European guidelines of ESH/ESC for the treatment of hypertension recommend preferring single pill combinations (SPC) where possible. Based on the assumption that an increased compliance leads to a reduction of cardiovascular events related to hypertension, data of hypertensive outpatients in Germany who have been treated either with the free (FC) or the single pill combination of Valsartan and Amlodipine were analyzed.

**Materials and Methods:** Based on a representative database (IMS® Disease Analyzer), hypertensive patients that received treatment with either the free (608 patients) or the single pill (2,949 patients) combination of Valsartan and Amlodipine were identified. Treatment (index therapy) had to be started after January, 15th 2007 (availability of the single pill combination in the market). For patients included, data had to be available for at least 12 continuous months before and after the start of the index therapy. Data for the following baseline variables were collected: age, gender, insurance status, regional area and physicians’ specialisation, duration and kind of prior antihypertensive therapies and prior diagnoses. The dependent variable was defined as the occurrence of prespecified cardiovascular events. Data were evaluated using a Cox Proportional Hazards regression analysis adjusted for the baseline variables.

**Results:** The adjusted analysis demonstrated that patients treated with a single pill combination of Valsartan and Amlodipine had a significantly lower risk for cardiovascular events compared with patients receiving the free combination. The average estimated costs per event and patient for the first year amounted to 3,770 € for the free combination and only to 2,931 € for the single pill combination.

**Conclusion:** Treatment with the single pill combination of Valsartan and Amlodipine in daily practice in Germany was associated with a significantly lower incidence of cardiovascular events. Respectively, the average estimated costs per event and patient to be covered by the statutory health insurance for patients treated with the single pill combination were lower compared to the ones treated with the free combination.

**Methods:** 75 patients with coronary atherosclerosis (verified by angiography), diabetes different state of compensation were examined before coronary artery bypass grafting (CABG). After examination, patients were sent to the surgical clinic, where they were held revascularization. All patients had to make coronarography in 1-year time after operation.

**Results:** After repeated coronarography, for analysis patients were divided into three groups depending on the compliance: group 1 - patients who regularly take treatment, group 2 - patients who take drugs are not all designed or used < 0.201E > exchange rate" therapy, group 3 - patients who discontinued treatment. In group 1 level of cholesterol almost reached the target value in group 2 marked downward trend, in group 3 - to increase. In group 1 reached the target level of LDL values in group 2 marked tendency to decrease LDL levels in group 1 - significant increase of this index. In groups 1 and 2 there is a tendency to increase ejection fraction in group 3 - there is little change. In groups 1 and 2 there is a trend towards decreased of left ventricular myocardium mass, in group 3 - to increase. In group 1 appears better 24-hour BP profile, in groups 2 and 3 - deterioration. In group 1 is much less progression of coronary atherosclerosis (50%) than in group 2 (71%), in group 3 progression of atherosclerosis present in all patients.

**Conclusions:** 1. Found that only 66% of patients with coronary heart disease and type 2 diabetes after CABG partially or fully adhere to treatment recommendations, accompanied by the progression of coronary atherosclerosis. Declining the therapy is associated with deterioration of lipid metabolism, ejection fraction, LV hypertrophy and negative changes in blood pressure profile. 2. Found that regular admission recommended therapy in patients with coronary heart disease and type 2 diabetes after CABG is associated with normalization of lipid profile, a trend towards improvement of LV function profile of left ventricular hypertrophy, increase the percentage of patients with physiological blood pressure profile 3. Revealed changes demonstrate the need for strict adherence to medical recommendations for the prevention of progression of coronary atherosclerosis and its complications in patients with coronary heart disease and type 2 diabetes after CABG.

**Objective:** Assessment of clinical effectiveness measured by clinical efficacy and safety of a fixed-dose combination (FDC) therapy with ramipril plus felodipine ER compared with FDC therapy with trandolapril and verapamil SR or verapamil and amlodipine as monotherapy.

**Method:** Clinical assessment was performed according to PoAHTA (The Polish Agency of Health Technology Assessment). Following data bases were searched: The Cochrane Controlled Clinical Trials (CENTRAL), Medline (Pubmed), Embase.

**Results:** Four reference publications were found. No publication directly comparing clinical effectiveness of the combinations was found. Therefore an indirect comparison was performed using the Bucher method. The parameters assessed were changes of systolic blood pressure, changes of diastolic blood pressure and safety profile. The usage of the FDC of ramipril 5 mg and felodipine 5 mg resulted in a similar reduction of systolic blood pressure (WMD [CI 95%] = -8.00 [-2.92; 18.92]; p = 0.15) and diastolic blood pressure (WMD [CI 95%] = 1.60 [-3.72; 6.92]; p = 0.56) as the FDC of trandolapril 2 mg and verapamil SR 180 mg; no significant differences between the two FDCs in regard to the reduction of the SBP and DBP. As for the safety profile there was no difference in regard to the risk of occurrence of specific side effects (headache, cough, dizziness) between the analyzed groups. The usage of the FDC of ramipril 5 mg and felodipine 5 mg results in a similar reduction of systolic blood pressure and diastolic blood pressure as the FDC of valsartan (80 mg or 160 mg) and amlodipine 5 mg (it was not possible to determine the statistical significance between the analyzed groups). As for the safety profile it was shown that the usage of the FDC of ramipril and felodipine ER was connected with a more often occurrence of headaches. There was no difference in regard to the risk of occurrence of other side effects (peripheral oedema, dizziness, nausea) between the analyzed groups.

**Conclusions:** The FDC of ramipril and felodipine may be used as a first-line antihypertensive therapy. It may also be a clinically efficient alternative for...
other FDCs (when a patient does not tolerate other active compounds which other fixed-dose combinations contain).

**DO YOU USE MORE THAN ANGIOTENSIN RECEPTOR BLOCKERS IN THE TREATMENT OF HYPERTENSIVE PATIENTS MENTORS PHYSICIANS IN FAMILY MEDICINE AND COMMUNITY VERSUS THOSE WHO ARE NOT?**

J. Burradile-Irso1, G. Mediviala-Tri2, A. Rodriguez-Fernandez1, J. Martinez-Gerostaga1, E. Lopez De Uralde-Perez De Alben1, Ma Alarce-Ceballos1, G. Arnaz-Garcia1, A. Alcalde-Lozano1, L. Lopez De Villaspre-Miguereza1, A. Ruiz De Loiaga-Arellano1, Me Ortega-Horillo1, T. Esparrar-Otero1, E. Perez-Urrutia1, Ma Basabe-Perez1, M. Pinel-Mongel1, 1C.S Casco Viejo (Vitoria-Gasteiz), Vitoria-Spain; Comarca Araba, Vitoria-Spain

**The aim:** Of our study was to determine whether there are differences in the use of Angiotensin Receptor Blockers (ARBs) in hypertensive patients depending on whether the doctor’s family is for training residents in family medicine or not.

**Material and Methods:** Cross sectional study. We collected data through OSABIDE program, all physicians of an urban population that serve a population over 14 years of about 227,000 people. Data were collected in January 2010. For statistical analysis using the G-STAT program. Analysis is used to test Mann-Whitney U.

**Results:** The sample is 143 physicians. The 67.13% are women. They are mentors 17.48% of all of them. No significant differences in number of patients according to age group between the 2 groups (we have made sections of 14-64 years, 65-74 years and more than 75 years, p: 0.19, 0.90, 0.71 respectively). Of total antihypertensives, ARBs mentors use a 16.98% Standard deviation (sd) 4.25% and no mentors a 21.90% tutors sd 6.37 with p < 0.05. The no mentors follow the lead of an tutors from the clinical practice guideline for hypertension Osakidetza (Basque Health Service) is 83.3% with a sd 2.83. The no mentors follow the lead of an tutors from the clinical practice guideline for hypertension Osakidetza (Basque Health Service) is 83.3% with a sd 2.83. The no mentors follow the lead of an tutors from the clinical practice guideline for hypertension Osakidetza (Basque Health Service) is 83.3% with a sd 2.83.

**Conclusions:** Physicians who are mentors, have lower utilization than non non mentors of ARBs, and increased monitoring to guide clinical practice of hypertension, can be explained by a manual tracking of the specialty of family medicine and the use of rational drug use.

**PP.15.438 ROSUVASTATIN EFFECT ON BLOOD PRESSURE, IS DOSE-DEPENDENT?**


**Introduction and Objective:** Patients with hypercholesterolemia (HC) and hypertension (HT) have endothelial dysfunction and lipid-lowering therapy with statins, can have “antihypertensive effect, through the endothelium-dependent vasodilatation, which is reduced in these patients. The aim of this study was to analyze the effects of rosuvastatin on ambulatory BP in a cohort of hypertensive hypercholesterolemic patients and to assess if this effect depends on the dose of statin used.

**Methodology:** We studied 96 patients (49 women, mean age 56.3 ± 8.8 years) with essential hypertension, previously treated with ACE inhibitors, ARBs and/ or calcium antagonists, which have primary HC. Patients were assigned to three types of therapeutic intervention: hygienic-dietary recommendations, treatment with rosuvastatin 10 mg/day or treatment with rosuvastatin 20 mg/day in nocturnal administration for 8 weeks. In all cases, antihypertensive therapy did not change during the period of lipid-lowering therapy. The effects on ambulatory BP before and after treatment, using 24-hour ABPM (SpaceLabs monitor 90207) and modifications on the biological and lipid profile were evaluated comparatively.

**Results:** In patients with non-pharmacological treatment (n = 32), no changes in ambulatory BP or in lipid profile were observed. In the patients treated with rosuvastatin 10 mg/day (n = 33), we observed a significant reduction in ambulatory SBP and DBP (reduction of 4.5/3.1 mmHg in 24-hour BP, 3.9/2.8 PA mmHg-day, 6.5/4.0 mmHg in PA-night, p < 0.001) with an increasing depth of the PAS also showed a significant reduction in total cholesterol and LDL cholesterol, reaching goals lipid control 69.7% of patients. In those treated with rosuvastatin 20 mg/day (n = 31), we observed significant and sustained reductions in ambulatory SBP and DBP (reduction of 6.0/3.7 mmHg in 24-hour BP, 5.4/3.4 PA mmHg-day, 8.2/4.9 mmHg in PA-night, p < 0.001) with increasing depth in systolic Blood pressure. Lipid control was achieved in 83.9% of patients.

**Conclusions:** In addition to its cholesterol-lowering effect in hypertensive patients associated with hypercholesterolemia, rosuvastatin reduces significantly ambulatory BP, especially nocturnal BP and increases the depth of systolic blood pressure. The cholesterol-lowering effect and “antihypertensive effect” of rosuvastatin are dose-dependent. Hypotensive effect could be related to improved endothelial dysfunction in these patients with some statins.

**PP.15.439 EFFECTIVENESS AND SAFETY OF VASOACTIVE Beta-ADRENOBLOCKERS UNDER THE CONDITIONS OF ACUTE PHARMACOLOGICAL TEST IN ARTERIAL HYPERTENSION PATIENTS OF DIFFERENT AGES**

A. Drzizinski1, K. Protasov1, V. Protasova1, T. Kucherova1, O. Perkova1, O. Fedorishina1, 1 Institute of Advanced Medical Studies, Irktusk-Russia, 2 The Angarsk City Hospital, Angarsk-Russia

**Aim:** To evaluate a short-term effectiveness and safety of nebivolol and carvedilol in people of different ages with arterial hypertension (AH) under conditions of acute pharmacological test (APT).

**Material and Methods:** 119 patients with AH aged from 33 to 89 years in subgroups – of young and middle (30-59), elderly and older ages (≥ 60 years) - have been studied. A 48-hours ambulatory blood pressure monitoring (ABPM) has been performed. At the end of the first twenty-four hours of monitoring 12.5 mg a day of carvedilol or 5 mg a day of nebivolol was administered orally. The ABPM indices in the first (before taking the preparations) and the second twenty-four hours of monitoring against a background of taking the first dose have been compared.

**Results:** In APT with carvedilol and nebivolol in patients of young and middle ages a reliable hypotensive effect on the level of systolic (-6.9 mm Hg and -6.0 mm Hg, respectively), diastolic (-4.6 mm Hg and -4.7 mm Hg) and pulse (-1.7 mm Hg and -1.4 mm Hg) blood pressure (BP) has been revealed. In older age the first daily dose of nebivolol did not have any effect on systolic and pulse BP (2.73 mm Hg and + 0.50 mm Hg, respectively; p > 0.05), unlike carvedilol (-5.27 mm Hg and -1.43 mm Hg, respectively; p < 0.05). Both preparations increased the diastolic BP hypotensive index of in the first subgroup as much as 7.7% and in the second one - 11.0% and 8.2%, respectively.

**Conclusion:** In patients with AH at the age of 60 the depressing influence of the initial dose of carvedilol on systolic and pulse BP has been more marked in comparison with nebivolol. The revealed increase of the diastolic BP hypotensive index under the influence of both preparations can limit their use by the people with the initially low diastolic AP.

**PP.15.440 EFFECT OF TELMISARTAN AND INDAPAMIDE ON THE LIPID AND GLUCOSE METABOLISM IN HIGH-NORMAL BLOOD PRESSURE PATIENTS**

L. Liu, S. Zhao, X. Liu, W. Yu, A. Wang. Hypertension Dept, Beijing-China

**Objective:** To investigate the effect of Telmisartan and Indapamide on lipid and glucose metabolism in high-normal blood pressure patients.

**Method:** Ninety-nine high-normal blood pressure patients were randomly divided into two groups, Telmisartan and Indapamide. Independent t test was respectively carried out to compare two group biochemical indicators of pre- and post- treatment.

**Results:** Blood pressure was well controlled in 2 groups, the difference in systolic and diastolic blood pressure was not significant between pre- and post -treatments (p > 0.05). The mean of lipids, glucose between Telmisartan and Indapamide group had no significant difference p > 0.05. After 12-month treatment the mean of TC, LDL-C and HDL-C had significant differences between the two groups (p < 0.05). (See the table)

**Conclusion:** Telmisartan can not only decrease blood pressure but also improve lipid metabolism in people with high-normal blood pressure.

Table 1 Comparison of lipids and glucose between two groups at before and after treatment

<table>
<thead>
<tr>
<th>group sample</th>
<th>TC (mmol/L)</th>
<th>TG (mmol/L)</th>
<th>LDL-C (mmol/L)</th>
<th>HDL-C (mmol/L)</th>
<th>FPG (mmol/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>before</td>
<td>after</td>
<td>before</td>
<td>after</td>
<td>before</td>
<td>after</td>
</tr>
<tr>
<td>A</td>
<td>5.0±1.0</td>
<td>4.2±0.9</td>
<td>2.1±0.5</td>
<td>1.9±0.5</td>
<td>0.8±0.5</td>
</tr>
<tr>
<td>B</td>
<td>4.9±1.1</td>
<td>4.9±0.9</td>
<td>0.8±0.5</td>
<td>0.8±0.5</td>
<td>0.4±0.3</td>
</tr>
</tbody>
</table>

| p | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |

A: Telmisartan B: Indapamide
MORTALITY PATTERNS IN HYPERTENSION

J. Chalmers, H. Arima, F. Barzi. The George Institute for Global Health, University of Sydney and the Royal Prince Alfred Hospital, Sydney-Australia

Objective: To document worldwide and regional trends in mortality attributable to hypertension and blood pressure related disease.

Methods: Analysis of data on mortality and disease burden from WHO reports, large scale observational studies and control groups in large clinical trials.

Results: As reported in World Health Reports in the Twenty-first century, sub-optimal (raised) blood pressure is responsible for 7.6 million deaths per annum worldwide (13.5% of the global total), more than any other recognized risk factor. Around 54% of strokes and 47% of coronary heart disease globally are attributable to high blood pressure. Large scale observational studies have demonstrated strong continuous relationships between cardiovascular death and blood pressure down to pressure of 115/75mmHg across major WHO regions.

Age specific blood pressure levels and cardiovascular mortality rates have been falling in developed nations, with approximately half the decrease attributable to improved treatments and half to reductions in risk factors. On the other hand, both blood pressures and cardiovascular mortality continue to rise in lower and middle income countries. And even in higher income countries, the rapid aging of societies is such that the overall number of cardiovascular deaths continues to rise.

There are marked variations in the patterns of cardiovascular mortality in different regions of the world. While coronary heart disease causes most cardiovascular deaths in the caucasian populations of the “western world”, stroke is the bigger killer in Asian populations such as those in China and Japan.

Estimates of disease burden attributable to blood pressure reveal that over 80% of premature cardiovascular deaths occur in lower and middle income countries. Furthermore, about half this burden occurs in people with pressures below the hypertensive threshold of 140/90mmHg.

Conclusions: Hypertension remains “The silent killer” and blood pressure related disease is even more deadly! Reductions in this burden require the parallel application of the population strategy addressing risk factors at community level, and the clinical strategy focused on new and improved treatments.

A NEW DIMENSION IN HYPERTENSION MANAGEMENT WITH THE AMLODIPINE/PERINDOPRIL COMBINATION

N. R. Poulter. Cardiovascular Studies Unit International Centre for Circulatory Health, London-United Kingdom

Raised blood pressure is currently the biggest single contributor to death worldwide. Despite our increasing knowledge of the aetiology of hypertension, it is anticipated that the absolute numbers affected by and the prevalence of hypertension are expected to increase over the next 2 decades.

It is therefore critical that preventive strategies are implemented urgently to prevent the development of hypertension. Furthermore, in the short to medium term, more effective ways of improving the management of hypertension need to be implemented. For the vast majority of hypertensive patients this means optimising the drug therapy used for their routine management. Among such hypertensive patients, the majority require 2 antihypertensive agents to reach current treatment targets.

Whilst extensive trial data for the optimal combination of antihypertensive agents are limited, evidence from the ASCOT-BPLA and ACCOMPLISH trials provide the best currently available evidence that the combination of a RAS-blocker and a dihydropyridine calcium channel blocker are the best evidence-based combination for the prevention of major cardiovascular (CV) events.

In the ASCOT-BPLA trial, amlodipine ± perindopril was superior to atenolol ± thiazide in the prevention of all major CV events, all-cause mortality and new-onset diabetes, and these benefits were apparent among all subgroups of patients.

In the ACCOMPLISH trial, benazepril ± amlodipine (supplied as a single-pill combination) was superior to benazepril + HCTZ (also supplied as a single-pill combination) in terms of preventing major CV events among over 11 500 hypertensive patients, 60% of whom were diabetic.

The benefits in terms of CV prevention of both perindopril and amlodipine have been established separately in several major trials in a wide range of clinical settings (e.g., PROGRESS, EUROPA, ADVANCE, HYVET, ALLHAT, VALUE, ASCOT).

The potential benefits of ACE inhibition on coronary events and of calcium channel blockers on strokes beyond those anticipated from blood pressure lowering reinforce the extensive trial evidence to suggest that perindopril and amlodipine together provide an obvious first-line combination of antihypertensive agents.

WHICH PATIENTS BENEFIT THE MOST FROM THE PERINDOPRIL/AMLODIPINE COMBINATION

J. J. Mourad. Department of Internal Medicine, Avicenne Bobigny Hospital, Bobigny-France

Fixed-dose combinations have been strongly endorsed by European guidelines for first-line and second-line treatment of hypertension. These recommendations are based on clinical practice and clinical study data. Among recommended combinations, that of an angiotensin-converting enzyme (ACE) inhibitor and a calcium channel blocker (CCB) stands out because the mechanisms of action of these two therapeutic classes are complementary, leading to enhanced efficacy. The forthcoming British guidelines suggest using an ACE inhibitor/CCB combination as the preferred dual combination for all hypertensive patients.

In the large multicenter ASCOT-BPLA trial, treatment based on the combination of amlodipine and perindopril significantly reduced the risk of cardiovascular and all-cause death, stroke, coronary events and procedures, new-onset diabetes, and new-onset renal impairment in a wide range of patients with hypertension and other cardiovascular risk factors, when compared with atenolol/thiazide-based therapy. In a population of hypertensive patients, many of whom had coronary artery disease, the ACCOMPLISH trial showed that blood pressure and cardiovascular outcomes were significantly reduced with an ACE inhibitor/CCB combination in comparison with an ACE inhibitor/hydrochlorothiazide.

Further ASCOT trial analyses revealed advantages of the amlodipine/perindopril-based treatment in subgroup of patients with type 2 diabetes or with hypercholesterolemia. Co-treatment with a statin resulted in 53% reduction in the risk of major coronary events with amlodipine/perindopril, compared with 16% in the atenolol/thiazide group. In patients with stable coronary artery disease in the EUROPA trial, a CCB plus perindopril reduced the risk of major coronary events and mortality significantly more effectively than a CCB alone.

The perindopril/amlodipine single-pill combination was developed based on guideline recommendations for combination treatment, the indications of each component, and ASCOT-BPLA trial data. It is the only combination of a renin–angiotensin system inhibitor and amlodipine indicated for the treatment of patients with hypertension and/or coronary artery disease. Molecular and physiological pathway mechanisms also suggest improved tolerability with such a combination. Several studies in real-life settings show that a wide range of hypertensive patients, including everyday hypertensives with common risk factors, would benefit from the perindopril/amlodipine combination.

CURRENT OBJECTIVES FOR ANTIHYPERTENSIVE TREATMENT IN DIABETES

P. M. Nilsson. Department of Clinical Sciences, Medicine, University Hospital of Malmö, Malmö-Sweden

Hypertension in diabetes is one of the most widespread, important, and treatable cardiovascular risk factors in clinical practice. The goal is thus to prevent macro- and microvascular complications of diabetes by effective blood pressure (BP) control. Data from randomised trials have shown the benefits of improved BP control in patients with type 2 diabetes, but the BP goal is still not well established due to lack of evidence. Recent international and national guidelines and recommendations have emphasised the screening, evaluation, and vigorous treatment of elevated BP if combined with diabetes, especially systolic BP (SBP). Epidemiological data indicate some improving trends in BP control reflecting increased awareness and more appropriate treatment over time.

Recently, in the ACCORD-BP study, a total of 4733 participants with type 2 diabetes were randomly assigned to intensive therapy, targeting an SBP of less than 120 mm Hg, or standard therapy for SBP of less than 140 mm Hg. However, intensive therapy, as compared with standard therapy, did not reduce the rate of a composite outcome of major cardiovascular events. In other recent observational studies, the message is similar. There is no clinical benefit in general associated with very low BP targets, except for stroke reduction, but a potential harm. This has been shown in a report from the National Diabetes Register from Sweden and in post-hoc analyses of the INVEST, TNT and PROVE-IT trials.

Therefore, the general consensus for treatment of hypertension in type 2 diabetes is now to aim for a well controlled SBP < 130–135 mm Hg, but the exact BP goal would depend on the individual clinical circumstances.
has not been fully established. Such a strategy is usually based on polypharmacy with synergistic drug combinations. Blockade of the renin–angiotensin system seems to be of special choice as one of the partner drugs in offering combination therapy to hypertensive patients with diabetes or glucose intolerance. In the ADVANCE study in 11,140 patients with type 2 diabetes, treatment with a perindopril/indapamide combination resulted in a SBP of 134.7 mm Hg and a significant reduction in macro- and microvascular events and mortality.

In patients with type 2 diabetes, marked alterations in small artery structure are present, in particular a clear increase in the media to lumen ratio, which may be an early marker of atherosclerosis.

Microvascular complications are major contributors to morbidity and mortality of patients with diabetes. Reversal of microvascular alterations is an important treatment goal achievable through the use of a proven therapy. In the ADVANCE trial in 11,140 diabetic patients, with or without hypertension, a perindopril/indapamide fixed combination were accompanied by significant reductions in all-cause mortality, cardiovascular death and coronary events. Recently the ROADMAP trial in 4447 patients with type 2 diabetes showed an increase in fatal cardiovascular events with olmesartan despite reduction in blood pressure treatment targets and the routine use of blood pressure-lowering agents in nonhypertensive people with diabetes who do not have specific concomitant risk factors.

In conclusion, combination therapy of renin–angiotensin–aldosterone system may have specific renoprotective properties, and the relationships between renal, cardiovascular and mortality endpoints is evidenced. There is evidence that blockers of the renin–angiotensin–aldosterone system may have specific renoprotective properties. However, studies with angiotensin receptor blockers have shown a lack of concordance between renal outcomes and mortality, which is consistent with concerns over the use of perindopril as a surrogate for kidney disease progression.

Diabetic patients are probably the most difficult hypertensive patients to treat and combination therapy of antihypertensive agents is usually required, especially for those with renal dysfunction. In most large recent hypertension trials the study drug is given on top of usual antihypertensive therapy, which is often left to the discretion of the investigator. Thus, most trials evaluate the efficacy of drug combinations, but the type and dose of the components other than the randomised study drug are not standardised.

ADVANCE, the only trial to have evaluated an antihypertensive combination in diabetics, compared a fixed-dose combination of the angiotensin-converting enzyme inhibitor perindopril and the original diuretic indapamide versus placebo on top of standard therapy in 11,140 patients with type 2 diabetes. In contrast to earlier trials of angiotensin receptor blockers, the renal benefits of the perindopril + indapamide fixed combination were accompanied by significant reductions in all-cause mortality, cardiovascular death and coronary events.

Recently the ROADMAP trial in 4447 patients with type 2 diabetes showed an increase in fatal cardiovascular events with olmesartan despite reduction in new-onset microalbuminuria. Mortality increase was related to previous cardiovascular disease and low blood pressure.

In patients with type 2 diabetes, marked alterations in small artery structure are present, in particular a clear increase in the media to lumen ratio, which may be an early marker of atherosclerosis.

Microvascular complications are major contributors to morbidity and mortality of patients with diabetes. Reversal of microvascular alterations is an important treatment goal achievable through the use of a proven therapy. In the ADVANCE trial in 11,140 diabetic patients, with or without hypertension, a perindopril/indapamide fixed combination had favourable microvascular effects in non-coronary vascular areas. Furthermore, we have recently shown that in hypertensive patients with left ventricular hypertrophy, treatment with perindopril/indapamide for 6 months resulted in significant reductions in blood pressure and left ventricular mass index that were accompanied by a significant increase in baseline and hyperaemic myocardial blood flow measured noninvasively with positron emission tomography. In ancillary experiments in the spontaneously hypertensive rat, restoration of coronary flow reserve with perindopril/indapamide was accompanied by reverse remodelling of intramural coronary arteries suggesting that the improvement in flow observed in patients was most likely due to the same phenomenon.

The improvement in the structure and function of the coronary microvasculature achieved with perindopril/indapamide, along with its efficacy in controlling blood pressure, might contribute to the beneficial effects of this drug combination on cardiovascular outcomes and mortality in diabetic patients in the ADVANCE trial.

Recently the ADVANCE study has provided data on the benefits of dual blood pressure and glucose lowering. The ADVANCE 2 × 2 factorial design includes 2783 people with type 2 diabetes who received treatment with perindopril-indapamide and intensive blood glucose lowering with glitazone MR-based therapy. Follow-up over a mean of 4.3 years showed that, compared with neither active intervention, combined treatment reduced the risk of microvascular events by 19% (P = 0.02) and the risk of all-cause mortality by 18% (P = 0.04). Combined treatment reduced the risk of all renal events by 28% (P < 0.0001), including a 33% reduction in the risk of new or worsening nephropathy (P = 0.005), a 54% reduction in the risk of new-onset microalbuminuria (P < 0.0001), and a 25% reduction in the risk of new-onset microalbuminuria (P < 0.001). The effects of each intervention on renal events were intermediate between those of joint treatment and neither active intervention.

ADVANCE showed no interaction between the effects of routine blood pressure lowering and intensive glucose control for any of the pre-specified clinical outcomes, while the separate effects of the two interventions on renal outcomes and death appeared to be additive, and the effect of each intervention was unaffected by the other treatment. These results provide support that joint management of blood pressure and glucose in type 2 diabetes is both appropriate and effective in reducing diabetes complications. Unanswered questions include appropriate blood pressure treatment targets and the routine use of blood pressure-lowering agents in nonhypertensive people with diabetes who do not have specific concomitant risk factors.
but not with losartan, increased the number of circulating endothelial progenitor cells, thus facilitating postschismic revascularization in hypertension. It has been shown that higher numbers of circulating endothelial progenitor cells are associated with a lower Framingham risk score. It is likely that ACE inhibition, through activation of bradykinin signaling, upregulates vascular endothelial growth factor and endothelial nitric oxide synthase, and thus promotes neovascularization. Other non-blood pressure-dependent actions of perindopril and losartan may also be involved in their effects on the different steps of vasculogenesis. Activation of vasculogenesis may participate in the reduction in major macrovascular and microvascular events observed in patients with stroke or type 2 diabetes. Evidence from large-scale clinical trials suggests that ACE inhibitors are more effective than ARBs in this respect.

**WHAT ARE THE TRUE DIFFERENCES BETWEEN RENIN–ANGIOTENSIN SYSTEM INHIBITORS? CLINICAL RESEARCHER’S POINT OF VIEW**

S. Taddei. Hypertension Unit, Department of Internal Medicine, School of Medicine, University of Pisa, Pisa-Italy

The renin–angiotensin system (RAS) modulates salt and water homeostasis, is involved in regulation of blood pressure, in vascular response to injury and inflammation, and in protection of the endothelium, heart, brain, and kidney. Dysfunctional RAS plays a central pathogenic role in the development of hypertension and associated vascular disorders. Two classes of agents acting on the RAS, angiotensin-converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs), are commonly used for the treatment of hypertension. ACE inhibitors and ARBs block the RAS at different levels, but whether or not they have similar effects on the pathological mechanisms underlying hypertension in patients remains controversial.

To address this issue, we conducted the first prospective study designed to compare the effects of the main antihypertensive classes, including the ACE inhibitor perindopril and the ARB telmisartan, on endothelial dysfunction in the conduit arteries of patients with essential hypertension. Endothelium-dependent vasodilation was measured as brachial artery flow-mediated dilation. At 6 months, despite similar reduction in blood pressure, the ACE inhibitor perindopril was the only treatment to improve flow-mediated endothelium-dependent dilation of the brachial artery, while telmisartan did not improve endothelial dysfunction in the study population. As both treatments significantly reduced oxidative stress, other specific mechanisms not shared by drug classes could play a role. One peculiar effect of ACE inhibitors is inhibition of bradykinin degradation, which can increase endothelium-dependent vasodilatation by a pathway involving hyperpolarization. Thus, the beneficial effect of perindopril on endothelial function seems to be related to bradykinin-dependent mechanisms. This would be in line with the lack of effect observed for an ARB in our study.

Endothelial dysfunction is an independent predictor of cardiovascular events and could act as a promoter of atherosclerosis in hypertensive patients. Beneficial effects of perindopril on endothelial function could at least in part explain the results of large-scale trials in patients with hypertension with or without concomitant vascular disease, where perindopril-based therapy reduced risk of cardiovascular events and mortality.

**WHAT ARE THE TRUE DIFFERENCES BETWEEN RENIN–ANGIOTENSIN SYSTEM INHIBITORS? CLINICAL TRIALIST’S POINT OF VIEW**

A. S. Hall. Heart Research Center Leeds General Infirmary, Leeds-United Kingdom

A properly functioning renin-angiotensin-aldosterone system (RAAS) is essential to healthy life. Understanding of this system and its relevance to clinical medicine has been aided by development of drugs that block the RAAS at various levels. This now comprise: (i) renin enzyme inhibitors; (ii) angiotensin-converting enzyme (ACE) inhibitors; (iii) angiotensin II type 1 receptor blockers (ARB); (iv) aldosterone receptor antagonists. All four classes have the intended and actual effect of increasing salt and water excretion through the kidney. While this aspect of shared efficacy is of clinical value in lowering elevated systemic blood pressure (BP), a primary objective of cardiovascular care is prevention of major clinical events such as myocardial infarction (MI), stroke and death.

ACE inhibitors and ARB gained an important place in hypertension treatment. Evidence is lacking that renin enzyme inhibitors prevent major cardiovascular events and death, while aldosterone receptor antagonists are used in few patients. In regard to reduction in the risk of cardiovascular events and death, ACE inhibitors and ARB have demonstrated important differences that appear to relate to the “off-target” effects. Since its introduction in 2006, the concept of an ARB-MI paradox has been supported by numerous data. The Blood Pressure Lowering Treatment Trialists’ Collaboration found that despite similar BP-dependent reduction in stroke and heart failure, ACE inhibitors, but not ARBs, show significant BP-independent reduction in MI risk. In the ONTARGET trial, despite a greater reduction in BP, there were more MIs in the ARB group as compared with an ACE inhibitor. In our meta-analysis, ARBs compared with active treatment significantly increased MI risk, with no reduction in all-cause death or stroke. ARBs compared with placebo did not reduce MI or all-cause death despite significant reduction in BP and in stroke.

In view of the evidence from large-scale randomized clinical trials among RAS inhibitors, ACE inhibitors should be preferred for prevention of cardiovascular events and death in patients with hypertension. Among ACE inhibitors, perindopril, in monotherapy or in combination with indapamide or amlodipine, has the most complete evidence in prevention of myocardial infarction, stroke and death.
LATE-BREAKER POSTER SESSION

**PPLB1.451 CARDIAC NATRIURETIC PEPTIDES INDUCE BROWNING OF HUMAN ADIPOCYTE PHENOTYPE BEHAVING AS CARDIOMETABOLIC HORMONES**

M. Borducchi1, S. Collins1, D. Liu1, E. Amri1, G. Ailhaud1, P. Dessi-Fulgheri1, R. Sarzani1, 1Department of Internal Medicine, University Politecnica delle Marche, Ancona-Italy, 2Stanford-Burnham Institute for Medical Research, Lake Nona-Orlando-USA, 3ISBDC, Université de Nice Sophia-Antipolis, Nice-France

Cardiac natriuretic peptides (NPs) ANP and BNP are reduced in obesity and metabolic syndrome and lower NPs activity may contribute to dysmetabolism and higher blood pressure. Indeed, NPs regulate fluids and hemodynamics but metabolic syndrome and lower NPs activity may contribute to dysmetabolism Cardiac natriuretic peptides (NPs) ANP and BNP are reduced in obesity and France

**Abstract**

Background: To our knowledge, no previous study assessed the reproducibility of non-mydriatic imaging of retinal microvessels using state-of-the-art Bland and Altman statistics.

Methods: In 194 subjects randomly selected from a Flemish population, we post-processed retinal images (Canon CR-Dgi) using IVAN software to generate the retinal arteriole and venule equivalents (CRAE and CRVE) and the arteriole-to-venule ratio (AVR). We searched for significant (p ≤ 0.05) correlates of the retinal phenotypes, using stepwise multiple regression. To study intra- and inter-observer variability, 2 observers post-processed a random subset (n = 84) in duplicate. According to Bland and Altman’s approach, reproducibility was twice the standard deviation of the pairwise differences between duplicate measurements, expressed as a percentage of the average of all measurements.

Results: In 194 participants (age range, 18–79 years; 52.5% women), CRAE, CRVE, and AVR averaged (± SD) 175.3 ± 22.8 μm, 284.3 ± 20.5 μm, and 0.621 ± 0.098, respectively. CRAE increased with female sex (+ 8.4 μm) and current smoking (+ 9.1 μm) and decreased with age (< 0.30 μm/year) and mean arterial pressure (< 0.41 mmHg/mMg). CRVE decreased with age (< 0.42 μm/ year), AVR increased with female sex (+ 0.03 μm). The intra-observer reproducibility of CRAE, CRVE and AVR was 13.2%, 8.4% and 9.0% for observer 1 and 10.3%, 9.6% and 16.0% for observer 2. Inter-observer reproducibility amounted to 10.8%, 9.9% and 14.6%, respectively.

Conclusion: Our study further validates the non-mydriatic approach to phenotyping retinal microvessels, because it showed acceptable intra- and inter-observer variability and because the correlates of these retinal phenotypes were consistent with those reported in the literature.

**PPLB1.453 RETINAL ARTERIOVASCULAR AND VENULE PHENOTYPES IN A FLEMISH POPULATION: REPRODUCIBILITY AND CORRELATES**

Y. Liu1, T. Richani2, H. Stuiver-Jongeijer1, J. Staessen1, 1Division of Hypertension And Cardiovascular Rehabilitation, University of Leuven, Leuven-Belgium, 2Department of Epidemiology, Maastricht University, Maastricht-The Netherlands, 3Department of Pharmacology, Maastricht University, Maastricht-The Netherlands

Background: To our knowledge, no previous study assessed the reproducibility of non-mydriatic imaging of retinal microvessels using state-of-the-art Bland and Altman statistics.

Methods: In 194 subjects randomly selected from a Flemish population, we post-processed retinal images (Canon CR-Dgi) using IVAN software to generate the retinal arteriole and venule equivalents (CRAE and CRVE) and the arteriole-to-venule ratio (AVR). We searched for significant (p ≤ 0.05) correlates of the retinal phenotypes, using stepwise multiple regression. To study intra- and inter-observer variability, 2 observers post-processed a random subset (n = 84) in duplicate. According to Bland and Altman’s approach, reproducibility was twice the standard deviation of the pairwise differences between duplicate measurements, expressed as a percentage of the average of all measurements.

Results: In 194 participants (age range, 18–79 years; 52.5% women), CRAE, CRVE, and AVR averaged (± SD) 175.3 ± 22.8 μm, 284.3 ± 20.5 μm, and 0.621 ± 0.098, respectively. CRAE increased with female sex (+ 8.4 μm) and current smoking (+ 9.1 μm) and decreased with age (< 0.30 μm/year) and mean arterial pressure (< 0.41 mmHg/mMg). CRVE decreased with age (< 0.42 μm/ year), AVR increased with female sex (+ 0.03 μm). The intra-observer reproducibility of CRAE, CRVE and AVR was 13.2%, 8.4% and 9.0% for observer 1 and 10.3%, 9.6% and 16.0% for observer 2. Inter-observer reproducibility amounted to 10.8%, 9.9% and 14.6%, respectively.

Conclusion: Our study further validates the non-mydriatic approach to phenotyping retinal microvessels, because it showed acceptable intra- and inter-observer variability and because the correlates of these retinal phenotypes were consistent with those reported in the literature.

**PPLB1.454 RETINAL VENOUS PULSATILITY IS REDUCED IN PATIENTS WITH CYANOTIC CONGENITAL HEART DISEASE**

M. Golzani1, S. Graham1, J. Leaney1, R. Cordina2, D. Celemajer1, A. Avolio1, 1Macquarie University, Sydney-Australia, 2University of Sydney, Sydney-Australia

Objective: Morphological changes in the ocular circulation are often used to assess cardiovascular disorders associated with high blood pressure. However, little is known of the effects of cardiac- related disorders on spontaneous retinal veins pulsations (SRVP). SRVP are used as a clinical marker to investigate ophthalmic and neurological abnormalities by assessment of alterations of retinal venous pressure (RVP) and cerebrospinal fluid pressure (CSFp). We have studied SRVP in patients with cyanotic congenital heart disease (cCHD) and control subjects.

Methods: The study was conducted in 22 subjects; 11 cCHD patients (42 ± 14 yrs, 4 female) and 11 healthy volunteers (35 ± 15 yrs, 3 females) with no history of eye disease and no vascular changes. Pupil of all subjects was dilated and intracocular pressure (IOP) was measured using standard tonometry. Dynamic changes of SRVP were recorded non-invasively within 1 optic disc diameter from the centre of optic disc using the Dynamic Vessel Analyser (DVA, Imedos, Germany) for 6 minutes. Mean SRVP was subtracted from the original recordings and SRVP determined from peak-trough amplitudes in each cardiac cycle. SRVP in cCHD subjects were comparably low compared to the same positions in non-cyanotic subjects. In summary, our results suggest a new method to assess cardiovascular function in cCHD patients.
pared to normal subjects with similar IOP. Heart rate (HR) was monitored from the finger pulse.

**Results:** IOP was in the normal range (10–19 mmHg) for all subjects. SRVP amplitude was 12.1 ± 6.7 mmHg and 8.3 ± 6.7 mmHg at mean IOP of 14.5 ± 4.5 mmHg for controls and cCHD subjects respectively. Similarly for a given paired IOP, SRVP was significantly lower in cCHD patients compared to controls (p < 0.0001). Mean venous diameter was 164.6 ± 21.4 μm and 189.2 ± 22.4 μm for controls and cCHD respectively (p < 0.01), suggesting dilation of retinal veins. There was no significant change in HR.

**Conclusion:** Findings of reduced SRVP in cCHD patients are consistent with studies by other investigators showing elevated CSFp and RVP in CHD.

**Objective:** To investigate the effects of a chronic oral antihypertensive treatment using centrally-acting sympatho-inhibitory drugs on functional capillary density in the skin and skeletal muscle in rats under long-term high-fat/high-salt diet.

**Methods:** Fifty male adult Wistar rats were maintained under normal (CON, n = 10) or high-fat (HFD, n = 40) during 20 weeks. Thirty rats of the HFD group received clonidine (HFD-CLO, 0.1 mg/kg), rilmenidine (HFD-RIL, 1 mg/kg), LNP 599 (HFD-LNP, 10 mg/kg) or vehicle (HFD-CON). Functional capillary density was evaluated in the gracilis muscle and skin of the ear using intravital videomicroscopy after intravenous injection of fluo-rescein coupled to dextran. Systolic blood pressure was evaluated weekly by photoplethysmography.

**Results:** There was an increase in systolic blood pressure (178 ± 2 vs. 138 ± 3 mmHg, p < 0.05) and heart rate (412 ± 8 vs. 336 ± 5 bpm, p < 0.05) in the HFD-CON compared to the CON group. The HFD-CON group also presented a decrease in the number of spontaneously perfused capillaries in the gracilis muscle, compared to CON group (153 ± 8 vs. 253 ± 16 capillaries/mm², p < 0.05). There were no alterations in capillary density in the skin. The groups of animals submitted to HFD and treated with clonidine, rilmenidine and LNP 599 presented a similar reduction in systolic blood pressure (155 ± 4, 161 ± 4 and 156 ± 4 mmHg, respectively, p < 0.05) when compared to the HFD-CON group (178 ± 2 mmHg) accompanied by an increase in the number of capillary density in the skeletal muscle (HFD-CLO 229 ± 13, HFD-RIL 255 ± 16 and HFD-LNP 241 ± 10 capillaries/mm², p < 0.05) when compared to the HFD-CON group (218 ± 16 capillaries/mm²).

**Conclusions:** These results show that chronic antihypertensive treatment with centrally-acting drugs induces a reduction of arterial pressure accompanied by a reversion of capillary rarefaction in the skeletal muscle in an experimental model of metabolic syndrome in rats.

**PPPLB1.455 CENTRALLY-ACTING ANTIHYPERTENSIVE DRUGS REVERSE MICROVASCULAR RAREFACTION IN A RAT MODEL OF METABOLIC SYNDROME AND HYPERTENSION**

A. Nascimento, P. Jotha, M. Machado, F. Gomes, N. Jesus, L. Bonomo, E. Tiberia. Oswaldo Cruz Institute - Fiocruz, Rio de Janeiro-Brazil

**Introduction:** Microvascular rarefaction and sympathetic hyperactivity are involved in the pathophysiology of different components of the metabolic syndrome including high blood pressure, obesity and glucose intolerance. We have previously demonstrated that chronic antihypertensive treatment with centrally-acting drugs is able to reverse capillary rarefaction in the heart and skeletal muscle of spontaneously hypertensive rats (J Cardiovasc Pharmacol 55:240–7, 2010).

**Methods:** Microvascular density in the skeletal muscle was evaluated in rats maintained under long-term high-fat/high-salt diet. A. Nascimento, P. Jotha, M. Machado, F. Gomes, N. Jesus, L. Bonomo, E. Tiberia. Oswaldo Cruz Institute - Fiocruz, Rio de Janeiro-Brazil

**Results:** There was a decrease in the number of spontaneously perfused capillaries in the skeletal muscle of the HFD-CON group (178 ± 2 mmHg) compared to the CON group (253 ± 16 capillaries/mm², p < 0.05). Similarly for a given paired IOP, SRVP was significantly lower in cCHD patients compared to controls (p < 0.0001). Mean venous diameter was 164.6 ± 21.4 μm and 189.2 ± 22.4 μm for controls and cCHD respectively (p < 0.01), suggesting dilation of retinal veins.

**Conclusion:** Findings of reduced SRVP in cCHD patients are consistent with studies by other investigators showing elevated CSFp and RVP in CHD.

**Objective:** To investigate the effects of a chronic oral antihypertensive treatment using centrally-acting sympatho-inhibitory drugs on functional capillary density in the skin and skeletal muscle in rats under long-term high-fat/high-salt diet.

**Methods:** Fifty male adult Wistar rats were maintained under normal (CON, n = 10) or high-fat (HFD, n = 40) during 20 weeks. Thirty rats of the HFD group received clonidine (HFD-CLO, 0.1 mg/kg), rilmenidine (HFD-RIL, 1 mg/kg), LNP 599 (HFD-LNP, 10 mg/kg) or vehicle (HFD-CON). Functional capillary density was evaluated in the gracilis muscle and skin of the ear using intravital videomicroscopy after intravenous injection of fluo-rescein coupled to dextran. Systolic blood pressure was evaluated weekly by photoplethysmography.

**Results:** There was an increase in systolic blood pressure (178 ± 2 vs. 138 ± 3 mmHg, p < 0.05) and heart rate (412 ± 8 vs. 336 ± 5 bpm, p < 0.05) in the HFD-CON compared to the CON group. The HFD-CON group also presented a decrease in the number of spontaneously perfused capillaries in the gracilis muscle, compared to CON group (153 ± 8 vs. 253 ± 16 capillaries/mm², p < 0.05). There were no alterations in capillary density in the skin. The groups of animals submitted to HFD and treated with clonidine, rilmenidine and LNP 599 presented a similar reduction in systolic blood pressure (155 ± 4, 161 ± 4 and 156 ± 4 mmHg, respectively, p < 0.05) when compared to the HFD-CON group (178 ± 2 mmHg) accompanied by an increase in the number of capillary density in the skeletal muscle (HFD-CLO 229 ± 13, HFD-RIL 255 ± 16 and HFD-LNP 241 ± 10 capillaries/mm², p < 0.05) when compared to the HFD-CON group (218 ± 16 capillaries/mm²).

**Conclusions:** These results show that chronic antihypertensive treatment with centrally-acting drugs induces a reduction of arterial pressure accompanied by a reversion of capillary rarefaction in the skeletal muscle in an experimental model of metabolic syndrome in rats.
phy in automatic mode. Twenty-four-hour blood pressure monitoring was measured. Blood plasma endothelin-1 (ET-1) was measured with radioimmunoassay and interleukin-8. E- and P-selectin were determined immune enzymatic assays. The investigations were done at baseline and 30-day therapy.

**Results:** It marked a similar antihypertensive effect of the both of the drugs according to the blood pressure daily monitoring. There was a tendency to the decline plasma levels of E-selectin in the both groups of patients. The difference between the groups was 35.9% (p < 0.05). Noted a significant decrease in plasma levels of P-selectin by 38.3% (p < 0.01) in I group and slight increase by 4.1% in II group. The difference between the groups was 39.7% (p < 0.05). There was a decrease in plasma levels of ET-1 by 35.1% (p < 0.05) in I group and by 21.3% (p < 0.05) in II group vs basal data. The difference between the groups was 35.9% (p < 0.05). There was a significant decrease of plasma concentration interleukin-8 by 41.7% (p < 0.05) in I group and by 16.9% (p < 0.05) in II group. The difference between the patients groups was 47.9% (p < 0.05).

After treatment in patients with AH the correlation analysis has shown that activity of ET-1, E- and P-selectin and interleukin-8 linearly reduced with decrease in heart rate and increase left ventricular ejection fraction (SAF 12.1%, p < 0.05 in I group, the difference between the groups was ΔE= 9.6% (p < 0.05). It is shown that activity of interleukin-8 is linearly reduced with a decrease in activity of ET-1 and P-selectin and increase the activity of E-selectin. Our data suggest that the prescription of adenosine-triphosphate-Mg (II)-gluconate addition to AH standard therapy increased efficacy of the therapy. This is evidenced by the favorable changes in central haemodynamic and inflammatory and interleukin-8, E- and P-selectin were determined immune enzymatic assays. The investigations were done at baseline and 30-th day of treatment. This is evidenced by the favorable changes in central haemodynamic and inflammatory activity.

**Discussion:**

There was a decrease in plasma levels of ET-1 by 35.1% (p < 0.05) in I group and by 21.3% (p < 0.05) in II group vs basal data. The difference between the groups was 35.9% (p < 0.05). There was a significant decrease of plasma concentration interleukin-8 by 41.7% (p < 0.05) in I group and by 16.9% (p < 0.05) in II group. The difference between the patients groups was 47.9% (p < 0.05).

**Conclusion:** CRP strongly associates with AO than HYP in Moscow aged 55 and older particular in woman.

**References:**

1. Akkera, M., Oros, J., Baladze, M., Virokosalo, T., Varkonyi, I., Backzo, T., Wittmann, J., G. Papp, A., Varro, C., Lengyel, G. 1st Department of Internal Medicine, University of Szeged, Szeged-Hungary, 2 Department of Pharmacology and Pharmacotherapy, University of Szeged, Szeged-Hungary

**Background and Aims:** Determination of short-term QT interval variability (QTIV) is an intensively investigated new and non-invasive method for assessment of arrhythmic risk. Several studies have demonstrated that temporal QTIV is a more sensitive predictor of ventricular arrhythmias than conventional QT measurements. Enhanced QTIV has been observed in patients with diabetes mellitus. The aim of the present study was to evaluate the possible association between the QTIV and plasma glucose levels in subjects with normal carbohydrate metabolism according to the WHO criteria.

**Materials and Methods:** Fifty-five healthy subjects (age: 33.9 ± 12.8 years, male/female ratio: 30/25, fasting plasma glucose: 4.8 ± 5.0 mmol/l [3.2–5.9 mmol/l], HbA1c: 5.5 ± 0.4%, BMI: 24.6 ± 4.1 kg/m^2, blood pressure: 127/77 ± 16.9/8.4 mmHg, mean ± SD) were enrolled into the study. Twenty-eight of them were involved in an oral glucose tolerance test substudy to determine 6-point (30, 60, 90, 120, 150, 180 min) post-load plasma glucose levels and parallel QTIV values. ECGs were recorded continuously for 5 min and all leads were acquired by an ECG signal processing system. After analogue-to-digital conversion, the data were stored on hard disk and analyzed off-line using Cardioysis H-1 software. The QT intervals were measured in 31 consecutive beats. To characterize the temporal instability of beat-to-beat repolarization, Poincare’ plots of the QT intervals were constructed, where each QT value was plotted against its former value. QTV was calculated using the following formula: QTV = ΣQT|t+1-QT|t/ (30–t/2).

**Results:** In subjects with normal carbohydrate metabolism, a U-shaped relation between the QTV and plasma glucose levels in subjects with normal carbohydrate metabolism. The relationship between sub- and supra-optimal FPG levels within the normal range and the growing short-term QTIV in healthy subjects. The post-load glucose status does not influence the actual QTIV values.

**Conclusion:** This study provides support for the use of musical therapy in patients with HT and AMI after previous revascularization to reduce blood pressure, heart rate and new coronary events expression. These effects of music therapy are probably because of decreasing in sympathetic nervous system activity.

**References:**


In this study 740 patients (males 82.4%, mean age 58.9 ± 7.2 years) with AMI after previous revascularization have been selected from the patients consecutively submitted from April 1990 to January 2010. The patients with early perioperative AMI were excluded from the study. The average time interval from CABG to AMI was 92.6 ± 14 months. The average number of grafts was 3.2 grafts/plts. Hypertension (HT) was registered in 380 (51.3%) pts with AMI after previous revascularization. All patients with HT were randomized and divided in 2 groups: Study group of 190 patients treated with music therapy and Control group of 190 patients with no music therapy. Each patient in study group underwent two sessions of medical therapy (12 minutes) in a day. Both groups were similar in baselines, post-AMI characteristics and post-AMI medical therapy.

**Results:** Comparing parameters of Study and Control group of patients in 9-year follow-up period, Study group had lower anxiety score (r = 0.22, p = 0.14) with statistically significant reduction in systolic blood pressure (p = 0.0014), diastolic blood pressure (p = 0.0040), heart rate (p = 0.0186), angina (p = 0.0108), reinfarction (p = 0.0190), sudden deaths (p = 0.0014) and reoperation (p = 0.0096).

**Conclusion:** This study provides support for the use of musical therapy in patients with HT and AMI after previous revascularization to reduce blood pressure, heart rate and new coronary events expression. These effects of music therapy are probably because of decreasing in sympathetic nervous system activity.
Methods: One hundred forty six never treated hypertensive patients and one hundred five normotensive healthy subjects (controls) were examined. BR has been studied by sequential method. SBR is the slope of spontaneous sequences increasing (SBP+/RR+) or decreasing (SBP-/RR-) simultaneous changes in systolic blood pressure (SBP) and pulse interval (RR), by recording blood pressure (BP) continuously for 20 min at rest. BR was analyzed on at least three consecutive cardiac cycles. The minimum threshold changes were set at 1 mmHg for SBP and 4 ms for the pulse intervals. The ABR corresponded to the number of recorded sequences.

Results: Patients with hypertension were older (50.6 ± 10.5 vs. 47.5 ± 8.9, p = 0.03) and were more often men (h/f: 97/54 vs. 49/56, p = 0.005) than control subjects. In hypertensive patients, the SBR was reduced with an increase in ABR compared with normotensive subjects.

<table>
<thead>
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<td>Number of seq. SBP - /RR -</td>
<td>18.4 ± 20.5</td>
<td>26.0 ± 24.4</td>
<td>0.007</td>
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Conclusion: When the SBR is altered (as in hypertensives), its activation is increased, probably to compensate for its lower efficiency. The clinical implications of the distinction between SBR and ABR stay to be determined.

PPLB1.463 DIMINISHED CARDIAC RESPONSES TO POSTURAL MANEUVERS ARE ASSOCIATED WITH INCREASED LEFT VENTRICLE MASS INDEX

H. Mayrovitz, A. Trif. College of Medical Sciences; Nova Southeastern University, Aventura-USA

To determine if increased left ventricle mass index (LVMI) is associated with reduced cardiac functional responses, standing-to-supine changes in stroke volume index (SVI) and cardiac index (CI) were assessed by transthoracic impedance cardiography in 100 hypertensive subjects (28–86 years, 56 female). Postural provocation responses were compared to echocardiographic determinations of LVMI. Median LVMI for female and male sub-groups were 111.8 and 119.7 g/m². Based on female/male left ventricular hypertrophy (LVH) thresholds of 112/125 g/m², 28 females (50%) and 17 males (38.5%) had LVH. Percentage changes in CI were compared after stratifying subjects by LVMI above and below their respective gender-based medians. Low (n = 50) vs. high (n = 50) LVMI groups (96.0 ± 1.6 vs. 137.2 ± 4.9 g/m², p < 0.001) were slightly younger (58.4 ± 1.6 vs. 63.9 ± 1.1 years, p = 0.006), but did not significantly differ in BSA (1.88 ± 0.03 vs. 1.84 ± 0.03 kg/m²), or supine heart rate (69.4 ± 1.4 vs. 69.9 ± 1.8), mean blood pressure (105.0 ± 1.6 vs. 104.0 ± 1.5 mmHg), SVI (46.2 ± 1.8 vs. 45.7 ± 1.9 ml/m², or CI (3.08 ± 0.11 vs. 3.04 ± 0.12 l/m²).

Provocation results showed that SVI and CI increases, expected to accompany the standing-supine maneuver, were significantly blunted in the higher LVMI group. For the lower vs. higher mass group, changes in SVI were 58.5 ± 4.7 vs. 35.4 ± 5.6%, p = 0.002 and changes in CI were 40.8 ± 4.6 vs. 20.4 ± 4.5, p = 0.002. In conclusion, these findings indicate a significant negative impact of increased LVMI that is unmasked via the postural provocation and suggests the possibility that the procedure may be useful for rapid and cost-effective screening for LVH.
O. Rice1, M. Ahmad1, R. Sahibzada2, M. Rehan2, N. Heeney3.

PP.16.01 HYPTENSION IN DEVELOPING COUNTRIES
O. Rice1, M. Ahmad1, R. Sahibzada2, M. Rehan2, N. Heeney3.

Methods: A descriptive research conducted through registry-screening.

RESULTS:

OBJECTIVE:

To study the dynamics of hypertension (HP) prevalence in Russian population,
awareness, adherence to antihypertensive medications, effect of treatment.

PP.16.02 PREVALENCE OF HYPERTENSION IN CEMENT PLANT WORKERS
M. Kilic, A. Dogan. Bozok University, Health School, Yozgat-Turkey

OBJECTIVE: The aim of this study is to determine the prevalence of hypertension (HT) in cement plant workers by examining medical records.

RESULTS:

The representative casual samples of Russian population have minimal changes: 2003-04 - 39.5%, 2005-06 - 39.3%, 2007-08 - 39.2% and 2009-10 - 39.7%. Prevalence of HP in women was higher than in men during all surveys, for example in 2009-10 - 40.5% vs 38.0%. Awareness of HP in Russia also did not change during 2003-2010 and in 2010 it was 81.1%, in women higher than in men (82.9% vs 77.9%). During the program the frequency of adherence to antihypertensive medications increased: from 66.2% in 2003-04 till 66.1%. In women adherence to antihypertensive medications was higher than in men during all surveys, for example in 2009-10 - 67.1% in women vs 62.4% in men (p < 0.001). But during 7 years if surveys the frequency of effective treatment did not change: 23.1% in 2003-04 and 23.9% in 2009-10. In women frequency of effective treatment was higher than in men during all surveys, for example in 2009-10 - 27% in women vs 18.3% in men (p < 0.001). But in men frequency of effective treatment slightly decreased (from 21.3% till 18.3%, p < 0.05) and in women - increased from 24.2% till 27.0% (p < 0.01). In 2009-10 BP control was achieved in 14.9% of HP patients, in women it was higher than in men (19.3% vs 10.9%). In men during the program realization BP control did not change (10.8% in 2003-04 and 10.9% in 2009-10), in women BP control increased from 13.7% till 19.3%.

CONCLUSION: The prevalence of HP did not change in 21 century in Russia (near 40% of adult population). During this period the frequency of adherence to antihypertensive medications increased but the frequency of effective treatment and BP control did not change.

PP.16.03 EPIDEMIOLOGY OF HYPERTENSION IN RUSSIAN FEDERATION. RESULTS OF FEDERAL MONITORING PROGRAM IN 2003-2010
Y. Balanova, T. Timofeeva, V. Konstantinov, I. Koltunov, A. Kapustina, L. Lopatina, G. Gromovska, A. Demina, 0. Balonova. State Research Center for Preventive Medicine, Moscow-Russia

OBJECTIVE: To study the dynamics of hypertension (HP) prevalence in Russian population, awareness, adherence to antihypertensive medications, effect of treatment.

METHODS: The representative casual samples of Russian population from different regions of Russia were investigated with response non-less than 80% in 2003-04 (30 834), 2005-06 (20 654), 2007-08 (11 365) and 2009-10 (3 340) in the framework of Russian federal program “Prevention and treatment of HP in Russia”. Sample formation included 3 stages: 1 - clinics sampling, 2 - physicians practice sampling, 3 - families sampling. Epidemiological survey was made by the standard methods with using standard HP criteria. Effective treatment was considered when target blood pressure (BP) was achieved in the patients receiving antihypertensive medications. BP control means the share of the patients achieving target BP in total number of HP patients.

RESULTS: Standardized BP prevalence in Russian population have minimal changes: 2003-04 - 39.5%, 2005-06 - 39.3%, 2007-08 - 39.2% and 2009-10 - 39.7%. Prevalence of HP in women was higher than in men during all surveys, for example in 2009-10 - 40.5% vs 38.0%. Awareness of HP in Russia also did not change during 2003-2010 and in 2010 it was 81.1%, in women higher than in men (82.9% vs 77.9%). During the program the frequency of adherence to antihypertensive medications increased: from 66.2% in 2003-04 till 66.1%. In women adherence to antihypertensive medications was higher than in men during all surveys, for example in 2009-10 - 67.1% in women vs 62.4% in men (p < 0.001). But during 7 years if surveys the frequency of effective treatment did not change: 23.1% in 2003-04 and 23.9% in 2009-10. In women frequency of effective treatment was higher than in men during all surveys, for example in 2009-10 - 27% in women vs 18.3% in men (p < 0.001). But in men frequency of effective treatment slightly decreased (from 21.3% till 18.3%, p < 0.05) and in women - increased from 24.2% till 27.0% (p < 0.01). In 2009-10 BP control was achieved in 14.9% of HP patients, in women it was higher than in men (19.3% vs 10.9%). In men during the program realization BP control did not change (10.8% in 2003-04 and 10.9% in 2009-10), in women BP control increased from 13.7% till 19.3%.

CONCLUSION: The prevalence of HP did not change in 21 century in Russia (near 40% of adult population). During this period the frequency of adherence to antihypertensive medications increased but the frequency of effective treatment and BP control did not change.

PP.16.04 PHARMACOEPIDEMIOLOGY OF ARTERIAL HYPERTENSION IN RUSSIA (PYFAGOR III STUDY)
M. Leonova, Y. Belousov, A. Galitski, L. Sheinberg. Russian State Medical University, Moscow-Russia

OBJECTIVE: National pharmacoepidemiology study of medical practice of treatment of hypertensive patients in Russia (PYFAGOR).

METHODS: This was a population-based study of hypertensive patients by means of special questionnaires; the number of valid questionnaires was 3030. Patients' mean age was 58.3 years (from 20 to 95 years), 63.0% men, 35.0% women. 43.5% hypertensive patients had coronary heart disease, 32% - chronic heart failure, 21% - diabetes, myocardial infarction and stroke had 14% and 9%, accordingly.

RESULTS: 79% of patients were taking antihypertensive therapy permanently; mean number of antihypertensive drugs per patient was 2.22. 28% received monotherapy, 37% received combination of 2 drugs and 37% received combination of 3 and more drugs. The parts of antihypertensive drugs were: 33.2% - ACE-inhibitors, 20.3% - β-blockers, 19.7% - diuretics, 13.4% - calcium channel blockers, 3.1% - angiotensin II receptor antagonists, 2.9% - centrally acting drugs, 7.2% - fixed combinations. Among ACE-inhibitors there were 3 leading drugs: enalapril (44%), lisinopril (15%), perindopril (10.3%), and also fixed combinations (12%); the part of captopril decreased from 8% to 5.5% since 2002 (PYFAGOR II study). Among β-blockers the
major parts were bisoprolol (41.3%) and metoprolol (27%); the parts of atenolol (5.7%) and propranolol (1.4%) considerably decreased since 2002. Among diuretics the part of indapamide was 67%, hydrochlorothiazide 23.7%. In calcium channel blockers the leading drug was amlodipine (53.4%); the total part of short-acting drugs was 30% (represented by nifedipine), the part of prolonged-acting drugs including II and III generation of calcium channel blockers increased up to 70% (vs 22% in 2002). Among centrally acting drugs the part of clonidine was 28%. 31% for reserpine-contained agents and 32% for moxonidine. The part of original hypertensive drugs was 39%. 69% of patients achieved their goal blood pressure level (<140/90 mm Hg); the mean blood pressure was 137.2/85.1 mm Hg (vs 141.7/87.4 mm Hg in 2002). 83% of patients measure their blood pressure at home, 16% attend Hypertension schools for patients.

Conclusions: The positive tendencies in quality and quantity of hypertension pharmacotherapy were found out by the conception of evidence based medicine, modern drugs were introduced in clinical practice; patients’ motivation and compliance to treatment increased.

PP.16.05 PROGNOSIS OF LEFT VENTRICULAR HYPERTROPHY AND OTHER CARDIOVASCULAR STRUCTURAL AND FUNCTIONAL PARAMETERS IN THE VERY ELDERLY: THE PROTEGEE STUDY

Y. Zhang1, D. Agnoletti2, J. Peroz2, A. Lieber2, P. Iaria2, A.D. Protogerou3, M.E. Safar1, J. Blacher1. 1Shanghai Institute of Hypertension, Shanghai-China, 2Diagnosis and Therapeutic Center; Hôtel-Dieu Hospital; AP-HP; Paris-France, 3Hypertension Center; Third Department of Medicine; Sotiria Hospital; University of Athens, Athens-Greece

Objectives: To investigate the prognostic value of left ventricular hypertrophy (LVH) and other cardiovascular structural and functional parameters in an old-age old population.

Methods: We studied cardiovascular structural and functional parameters, including intima-media thickness, pulse pressure, pulse wave velocity, LVH, E/A ratio and left ventricular ejection fraction (LVEF), assessed by blood pressure monitoring, tonometry, and ultrasonography, and investigated their associations with cardiovascular and all-cause mortality in a population of 331 hospitalized elderly patients (mean age ± standard deviation: 87 ± 7 years). After a mean follow-up of 378 days, 110 deaths occurred.

Results: In quantitative analysis, as compared to survivors, left ventricular mass index (LVMI) was significantly higher in cardiovascular mortality group (P = 0.03), and LVEF was significantly lower in both cardiovascular and all-cause mortality groups (P = 0.03 and P = 0.002, respectively). In qualitative analysis, concentric LVH and reduced LVEF were significantly associated with cardiovascular mortality, and the reduced LVEF was significantly related to all-cause mortality (P = 0.01). On the contrary, none of arterial structural and functional abnormalities showed any significant association with mortality. After full adjustments, LVEF was the only predictor of cardiovascular and all-cause mortality with a HR of 0.70 and 0.77, respectively.

Conclusions: Among all measured cardiovascular parameters, LVEF was the only significant predictor of CV and all-cause mortality in the elderly, independent of traditional CV risk factors.

PP.16.06 10-YEAR POPULATION-BASED FOLLOW UP STUDY OF INFLAMMATORY, PROTHROMBOTIC MARKERS AND THE MARKERS FOR THE RISK OF ALL-CAUSE DEATH


Objective: Few investigations have evaluated the incremental usefulness of prothrombotic and inflammatory markers for predicting the risk of all-cause death in a general population.

Design and Methods: A total of 1920 (age over 40: 794 men and 1126 women) received a health examination in a farming community (Tanushimaru town) in 1999. We measured prothrombotic factors (von Willebrand factor; vWF, fibrinogen, plasminogen activator inhibitor-1; PAI-1, and tissue factor) and inflammatory markers (C-reactive protein; CRP, high-sensitivity CRP; hsCRP, and WBC) in 1,920 participants. Subjects were followed periodically until 2009. We succeeded in a very high follow-up rate (96%).

Results: During the periods, 255 participants died. In Cox proportional-hazards models adjustment for conventional risk factors, the markers that most strongly predicted the risk of all-cause death were hsCRP [Hazard ratio:1.231; (95%C.I.:1.104-1.373), p = 0.0001] and vWF [Hazard ratio: 1.005; (95% C.I.:1.001-1.010), p = 0.0074]. Each group of vWF and hsCRP was divided into three groups. Odds ratios for all-cause death with combined factors of vWF and hsCRP in the highest group after adjustments for age and sex was 4.91 (p = 0.005) compared with the lowest group.

Conclusions: This 10-year prospective study demonstrated that elevated serum hsCRP and vWF levels were strong and independent predictors for all-cause death in a general population. We may propose the synergic effect of hsCRP and vWF on predictive markers for all-cause death in clinical practice.

PP.16.07 CARDIOVASCULAR RISK IN PATIENTS AT THE TIME OF ARTERIAL HYPERTENSION DIAGNOSIS IN SPAIN: RISCOR-E STUDY (FINAL RESULTS)

J. L. Llistierra1, J. Garcia-Puiga2, Ma Orellana2, L. Bermudez3. 1Centro De Salud Joaquín Benlloch, Valencia-Spain, 2Unidad De Riesgo Cardiovascular, Servicio De Medicina Interna Del H. La Paz, Madrid-Spain, 3Unidad De Endocrinología Y Cardiometabolismo, Merck S.L., Madrid-Spain

Objective: To assess cardiovascular risk (CVR) in hypertensive patients at the time of being diagnosed with arterial hypertension.

Design and Method: Transversal and multicenter study, in which patients aged between 40 and 74 years with recent diagnosis of arterial hypertension were recruited through consecutive sampling from Spanish primary care and specialist units. Blood pressure measurements were carried out according to standardised practice. Patients were diagnosed with arterial hypertension when the mean value after three SBP/DBP determinations was ≥140/90 mmHg, measurements were taken during three consecutive visits, at least one week apart. Patients were excluded if they had previous diagnosis of arterial hypertension, cardiovascular disease, type I or II diabetes with microalbuminuria, chronic renal disease or high values of at least one cardiovascular risk factor (cholesterol >320 mg/dl and LDL > 240 mg/dl). Cardiovascular risk was determined using the SCORE scale calibrated for its use in Spain and patients were classified into four categories: <1%, 1-4%, 5-9%, 10-14% and 15%. Social-demographic, clinical, analytical data and cardiovascular risk factors were collected. The study was approved by the La Paz Hospital Ethical Committee.

Results: 590 physicians (80.7% primary care) participated in the study. 2,366 patients were recruited (56.8% male), average age (SD) 55.5 (6.6 years). 36.2% were smokers (49.7% male, 22.6% female; p < 0.001). The mean BPS/BPD was 154.8 (9.8)/92.4 (7.4) mmHg, respectively, mean total cholesterol was 217.1 (39.0) mg/dl, with no statistically significant gender differences. According to the SCORE scale assessments at the time of arterial hypertension diagnosis, 62.2% of the patients showed a CVR between 1-4%, 21.0% between 5-9%, 7.8% between 10 – 14% and 1.9% ≥ 15%. Mean CVR was 3.9% (CI 95%; 3.7 – 4.1), median 2% with 0% as minimum and 37% as maximum. Significant statistical gender differences were found, showing a mean CVR of 5.4% (4.4) in male patients and 1.8% (1.6) in the female patients (p = 0.001). It was also observed that CVR rose in correlation with increasing age (p = 0.001).

Conclusions: More than three in every ten patients at the time of first diagnosis of arterial hypertension showed a high or very high cardiovascular risk according to the SCORE scale calibrated for use in Spain.

PP.16.08 CARDIOVASCULAR RISK STRATIFICATION IN HYPERTENSIVE PATIENTS

Objective: Cardiovascular risk stratification in hypertensive patients treated according to established criteria in 2007 by (ESH/ESC).

Design and Methods: Descriptive study. A total of 100 hypertensive patients treated 53% female and 47% males with a mean age of 58.34 ± 11.60 years, examined between (October-December 2010). We evaluated: presence or absence of cardiovascular risk factors (CRF) and associated clinical conditions, subclinical organ damage (OD) by: echocardiography, carotid doppler, radial applanation tonometry using (HDI/PW CR-2000 and SphygmoCor), creatinine and glomerular filtration rate. Results expressed in absolute and percentage frequencies.

Results: 28% patients were low risk, 35% at medium risk, 19% at high risk and 15% at very high risk. Only 49% of hypertensives were controlled. The prevalence of the sample had 1 or 2 risk factors, while 39% or more, the dyslipidemia with a 76% the most prevalent factor. In the presence of (OD) in the total sample: 40% with carotid intima-media thickness (IMT) > 0.9mm, with plaque 25%, left ventricular mass index (LVMi) increased by 29%, systolic blood pressure and aortic pulse pressure (AoSp and AoPP) increased by 49% and 38%, respectively, augmentation index increased by 9% and the index of large artery elasticity (C1) decreased by 76%.

Conclusion: The coexistence of different (CRF) and the presence of subclinical organ damage, increased vascular risk of the hypertensive population and difficult to control.

**PP.16.09 MANAGEMENT OF HYPERTENSIVE PATIENTS IN FRANCE AS A FUNCTION OF GENDER AND CARDIOVASCULAR RISK. PARITE STUDY**


1. Chu Saint-Antoine, Paris-France, 2Hospital Cardiologique de Lille, Lille-France, 3Cardiologist; CNCP, Paris-France, 4Cardiologist, Giff/Yvette-France, 5Cardiologist;Novartis, Rueil-Malmaison-France, 6Novartis, Rueil-Malmaison-France, 7Cardiologist;CNCP, Marseille-France

Objective: To define ways of approaching essential hypertension as a function of gender and cardiovascular risk (CVR).

Method: Cross-sectional, multicentric study conducted in France with 654 cardiologists, each of whom included four consecutive, gender-paired patients with hypertension.

Results: 3,440 patients included (53% M, 47% F). F were older and had a more sedentary lifestyle but smoked less, had less diabetes, were less obese and had less LVH (p < 0.01 for all). CVR was high in about 66% and 24.4% of patients are controlled.(without difference MF). No difference was observed in the management of hypertension between M and F.

<table>
<thead>
<tr>
<th>Females</th>
<th>Males</th>
<th>Total</th>
<th>P (M vs F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low CVR (n) %</td>
<td>(81) 43.2</td>
<td>(20) 30</td>
<td>(101) 40.6</td>
</tr>
<tr>
<td>Medium CVR (n) %</td>
<td>(559) 54</td>
<td>(441) 52.8</td>
<td>(969) 53.5</td>
</tr>
<tr>
<td>High CVR (n) %</td>
<td>(1012) 56.2</td>
<td>(1358) 53</td>
<td>(2370) 54.4</td>
</tr>
</tbody>
</table>

In uncontrolled patients, the treatment modification was 68.9% in F and 66.3% in M (p = 0.16). If the blood pressure is ≥160/100, the cardiologists change the treatment in 90% of patients, without difference MF.

Conclusion: The PARITE study did not show any differences between males and females in the management of essential hypertension, whatever the risk level. In addition, the blood pressure level appears more important than the level of cardiovascular risk for the decision to change antihypertensive treatment in the uncontrolled patients.

**PP.16.10 SCREENING OF CARDIOVASCULAR RISK FACTORS ON THE SAINT-PETERSBURG STREETS**

O. Rotar, A. Tanicheva, L. Korostovtseva, V. Ivanenko, N. Lisovskaya, A. Konradi.

1. Almazov Federal Center Heart, Blood and Endocrinology, Saint-Petersburg-Russia

Objective: Screening actions help to detect risk factors of cardiovascular disease in patients who consider themselves healthy and don’t take regular medical advice. The aim of our study was to appreciate the prevalence of risk factors in random subjects on the streets of Saint-Petersburg.

Design and Methods: The all-Russian non-governmental organization “Antihypertensive League” organized the action “Healthy Heart” on the streets on May and October 2010. 5 groups of 3 cardiologists performed the screening. All subjects were interviewed with special questionnaire which included smoking status, physical activity, alcohol and fruit/vegetables consumption. Standard anthropometry was performed. Blood pressure (BP) was measured on right arm in the sitting position after 5 minute rest tree times with an interval of 2 minutes. Random capillary glucose was measured by Accu Check glucometer.

Results: Totally 654 subjects were screened. The mean age was 57 years (mean 61 ± 11 years). pre-hypertension was females - 530 (81.5%); pre-hypertension and 657 (18.5%) in males. The majority of subjects were currently working – 456 (69.7%), the obesity (waist circumference (WC) > 80 cm in females and > 94 cm in males) was highly prevalent in females - 250 (47%) vs 38 (30.6%) on male gender. The hypertension (systolic blood pressure (SBP) ≥ 140 and diastolic blood pressure (DBP) ≥ 90 mmHg) was revealed in 102 (15.5%) of subjects. Glucose level ≥ 5.6 was registered in 320 (49%), more than 6.1 181 (27.6%) and more than 7.0 mmol/l in 70 (10.7%) subjects. Subjects with low physical activity (duration of sitting during day (TDS)) had significantly higher WC, patients with TDS of 10 hours had WC 89.5 cm vs 83.4 cm in patients with TDS about 2 hours (p < 0.02). Subjects with TDS of 12 hours compared with subjects with TDS of 1 hour had significantly higher systolic blood pressure (148.2 ± 18 vs 132.6 ± 16.7 mm Hg, p < 0.02). Subjects with low consumption of fresh fruits/vegetables (0-1 day per week) had significantly higher level of glucose (6.6 mmol/l vs 5.8 mmol/l in 70 subjects with regular consumption of 7 days per week).

Conclusions: Screening revealed high prevalence of obesity and hyperglycemia (random) and relatively low prevalence of hypertension. Females were more frequently obese than males. Low physical activity and low consumption of fresh fruits/vegetables seems to be associated with metabolic disorders.

**PP.16.11 PREHYPERTENSION IN ASTURIAS. ANNUAL EVOLUTION OF THE PREVASTURIAS STUDY**


1. Primare Health Center Pola De Laviana, Pola De Laviana-Spain, 2Primare Health Center Raices, Aviles-Spain, 3Primare Health Center Valladolid - La Florida, Oviedo-Spain, 4Primare Health Center Ventianellas, Oviedo-Spain, 5Primare Health Center Luanco, Luanco-Spain, 6Primare Health Center Pola De Siero, Pola De Siero-Spain, 7Primare Health Center Natahoyo, Gijon-Spain, 8Primare Health Center El Cristo, Oviedo-Spain, 9Primare Health Center La Eria, Oviedo-Spain, 10Centro Medico De Asturias, Oviedo-Spain

Objective: The aim is to know the the proportion of subjects who progress from prehypertension (high-normal BP subgroup ) to hypertension and to know the incidence of target organ damage and cardiovascular disease.

Methods: A multicenter and a 5-year prospective follow-up study. Baseline data included 646 subjects attended in primary care, both sex and age between 18-80 years, mean age 57 (11- max 86 years), predominantly females (530 (81%)). The majority of subjects were currently working – 456 (69,7%). The obesity (waist circumference (WC) > 80 cm in females and > 94 cm in males) was highly prevalent in females - 250 (47%) vs 38 (30,6%) on male gender. The incidence of target organ damage and cardiovascular disease.

Results: 646 subjects were selected at baseline. At the first year of follow-up, the subjects who continue in the study were 587, 59 lost (9.1%), 291 men (49.6%) and 296 women (50.4%). The mean age 55.7 ± 6.7 years. 69 prehypertensive subjects (11.8%) had developed hypertension. The incidence of new diagnosis of diabetes was 12 (2%). The prevalence of other CVRF was: dyslipidemia 47.9%, obesity 40.7%, smoke 18.4%, glucose intolerance 6%, 27.1% had not CVRF, while 32.7% had two or more CVRF. 31.2% of the subjects had criteria for metabolic syndrome. The prevalence or TOD was: 6%: LVH 1%, slight increase in plasma creatinine (1.2%), microalbuminuria 2.1% and decrease of glomerular filtration rate (GFR) by the MDRD formula, microalbuminuria by albumin- creatinine ratio and slight increase in plasma creatinine and cardiovascular or renal disease (CVD): stroke, coronary heart disease, heart failure, peripheral vascular disease and renal disease.

Conclusions: After one year of follow-up, 12% of prehypertension subjects had developed hypertension. The prevalence of target organ damage was 6%,
especially microalbuminuria and decrease in glomerular filtration rate. 2.6% had developed cardiovascular or renal disease, essentially coronary heart disease and stroke. Cardiovascular risk was high or very high in 45% of the subjects.

**PP.16.12 COULD INTRATHORACIC FAT BE RELATED TO HYPERTENSION?**


**Objective:** Visceral fat is an important marker of metabolic risk. Intrathoracic fat (ITF) may be regarded as a visceral fat closest to the heart and the great vessels. This study aims to examine the association between IGF, body mass index (BMI) and hypertension (HT).

**Design and methods:** Retrospective study of 144 consecutive patients (P) who underwent cardiac MDCT (Phillips Brilliance, 16-slices): 37.5% men, 62 ± 13 years, 23.6% diabetics, 79.2% hypertension, 52.1% with dyslipidemia. Intrathoracic fat tissue volumes (cm3) were measured with a workstation (Aquarius 3D, TeraRecon). ITF was defined as the difference between the adipose tissue within the chest and that located within the pericardial sac.

**Results:** The ROC curve analysis revealed a strong relationship between ITF and HT prevalence: AUC de 0.66, p = 0.021, better than BMI (AUC 0.627, p = 0.058). This association was seen in different systolic blood pressures (SBP) classes, mainly in the higher ones (SBP ≥ 130mmHg; AUC 0.62, p = 0.028; ≥ 160mmHg: AUC 0.68, p = 0.002; ≥ 180mmHg: AUC 0.74, p = 0.01). Relating to SBP ≥ 180mmHg, the best threshold of ITF was 94.5 cm3 (70% sensibility, 63% specificity). P with ITF were older (66 ± 10 vs 60 ± 14 years, p = 0.008), mostly males (50.0 vs 29.9%, p = 0.015) and diabetics (35.2 vs 17.4%, p = 0.017). They had higher BMI (31 ± 5 vs 28 ± 4.0Kg/m2, p < 0.001), SBP (145 ± 24 vs 137 ± 21mmHg, p = 0.038) and pulse pressure (70 ± 25 vs 61 ± 21mmHg, p = 0.018). CRS were also superior in the ITF + group (Framingham: 14 ± 12 vs 10 ± 10%, p = 0.020; SCORE: 3.4 ± 3.1 vs 2.0 ± 2.3%, p = 0.007), but no differences were found regarding other CRF. On multivariable regression only male gender (OR 3.2; p = 0.006), age (OR 1.04; p = 0.015) and BMI (OR 1.19; p = 0.001) were independent predictors of ITF +.

**Conclusions:** In this sample, ITF was strongly associated to HT, particularly in upper classes of SBP. ITF was also associated with some CRF (age, gender and diabetes) and with CRS. Despite that the association with HT aroused in patients with higher cardiovascular risk, what suggests that ITF could have a similar meaning and importance as abdominal fat and could be used as a metabolic risk marker.

**PP.16.13 IS HIGH PREVALENCE OF ELEVATED HEART RATE IN HUNGARIAN HYPERTENSIVES A FACTOR FOR THE HIGH CARDIOVASCULAR AND CEREBROVASCULAR MORTALITY IN HUNGARY?**


**Introduction:** Increased resting heart rate (HR) has been identified as an independent predictor for increased cardiovascular (CV) mortality in the Framingham cohort. 1 The impact of elevated HR on mortality has been well established among hypertensives, and according to more recent studies, it has also been found to be associated with increased risk for coronary heart disease and increased overall mortality among individuals with prehypertension. 2 For the present study, we examined the prevalence of increased HR and elevated blood pressure (BP) in a cohort consisting of 2,012 young and middle-aged employees from two worksites in Hungary. Hungary has a highly unfavourable CV and stroke mortality profile compared to other countries in Europe and North America.

**Methods:** The employees were screened for their BP and HR at their worksite using an automated instrument (BpTRU). Respondents were classified as normotensive (NT), prehypertensives (PH) and hypertensives (HTN) according to their BP levels as defined by the JNC 7 guidelines. Elevated HR was defined by the median HR in the cohort as ≥ 78 beats/min.

**Results:** Compared to a US cohort, 1 the proportion of prehypertensives with elevated HR was much higher among the Hungarian respondents (21.2% vs. 13.1%). The ratio of high versus low HR increased form NT to HTN. In all BP categories, individuals with high HR had significantly higher DBP. Among hypertensives, individuals with high HR had also significantly higher SBP.

**Conclusion:** The high prevalence of increased HR among young Hungarians, in particular among those with prehypertension, warrants further attention as this might be a population requiring early treatment. Moreover, elevated HR may be a contributing factor to the high CV mortality in Hungary.

**References:**


N. Malan, L. Malan, A. Schutte, J. Van Rooyen, H. Huisman, R. Schutte, C. Fourie. North West University, Potchefstroom-South Africa

**Objective:** Lifestyle changes occur during urbanisation which is associated with the increasing risk of stroke.

**Design and Method:** An assessment is done of the stroke risk profile of 356 urbanized black Africans of similar socio-economic status in two different cross sectional studies, THUSA (Transition and Health during Urbanization in South Africa, 1998) and SABPA (Sympathetic activity and Ambulatory Blood Pressure in Africans, 2008) from the North-West Province in South Africa. Fasting resting metabolic syndrome (MS) indicators using the WHO definition (blood glucose (FBG), high-density lipoproteins, waist/hip ratio (WHR), hypertension prevalence (HT), and triglyceride (TG), associated MS values, i.e. fibrinogen were obtained. The Riva-Rocci Korotkoff method measured blood pressure. Resting 12-lead ECG measured 6 cardiac cycles in SABPA participants. Co-variates included age and body mass index.

**Results and Conclusion:** SABPA men and women revealed higher (p ≤ 0.05) diastolic BP and MS values, particularly glucose and fibrinogen, compared to THUSA men and women (Figure 1). In SABPA men their diastolic BP predicted hypertension (OR: 1.7, CI: 1.16, 2.51). In SABPA women both systolic BP (OR: 1.3, CI: 1.08, 1.54) and diastolic BP (OR: 1.4, CI: 1.04, 1.93) predicted hypertension. Automated myocardial infarction prevalence in SABPA participants were 47.52 % in men and 30.30 % in women. In conclusion, during a ten year period an increase in stroke risk factors occurred in urban African populations in the high socio-economic group in the same region of South Africa. This clearly indicates an increased risk for ischemic heart disease and stroke in future in this population group.

**Figure 1:** Stroke risk factors in male (a) and female (b) urban African populations.
Introduction and Objectives: The unification of criteria for the diagnosis of Nuestra Señora De Candelaria, Santa Cruz De Tenerife-Spain who needs preventive measures. Recommendations decrease the prevalence although leaving a large population.

Conclusions: In this large population based-sample of elderly, risk of developing sustained hypertension during one-year follow-up was, respectively in participants with WCHT and MHT, three times and seven times higher than in normotensive. Our results provide a new argument in favor of the clinical significance of these two types of HT in elderly individuals. They also confirm the need to assess BP at home in the elderly.

Results: SH at one year was diagnosed in 13% of the participants with baseline WCHT and in 26% of those with baseline MHT. Risk of SH was multiplied by 2.9 in individuals with WCHT (age-and-sex adjusted OR = 2.9; CI95% = 1.5 to 5.5; p = 0.002) and by 6.8 in those with MHT (age-and-sex adjusted OR = 6.8; CI95% = 3.8 to 12.2; p < 0.0001) compared to normotensive. Multivariable analysis revealed that the main predictive factor of SH was the mean home systolic BP in both WCHT and MHT.

Conclusion: The significative difference in prevalence between sexes was observed from the decade of 45-54 years in men and 55-64 years in women. The prevalence was conducted on a history of cardiovascular risk factors, measuring blood pressure, waist circumference and collecting a fasting blood sample for all participants.

Methods: We performed a cross-sectional population-wide randomly selected sample of 2833 individuals. Male 46.5%. Average age 51.2 years. The prevalence of metabolic syndrome was 33.6%, significantly higher in men (36.7% vs. 30.9%; p = 0.001). The difference in prevalence between the different criteria was significant for the whole population and by sex (p < 0.0001).

The significant difference in prevalence between sexes was observed from the decade of 45-54 years in men and 55-64 years in women. The prevalence of metabolic syndrome fell significantly after the exclusion of patients with diabetes or cardiovascular disease (20.8%; p < 0.001).

Conclusion: The prevalence of Metabolic Syndrome in Badajoz is the highest reported in Spain in population based studies. The new international recommendations decrease the prevalence although leaving a large population who needs preventive measures.
**PP.16.19**  IS DIASTOLIC HEART FAILURE VERY PREVALENT IN ELDERLY HYPERTENSIVE PATIENTS?  
J. Borges1, A. Carvalho2, N. Araujo1, S. Grespan1, H. Demmler1, M. Borges1, D. Coelho1, R. Souza1, F. Neto1, M. Bertolami1, L. Piegas1. *Doutor Pauzanne Institute of Cardiology, Sao Paulo-Brasil, 2Federal University of Sao Paulo - UNESCOPF, Sao Paulo-Brasil*

**Background:** Diastolic heart failure (HF) is a common form of HF (40-70%) in elderly hypertensive patients (EHP). We evaluated the impact of diastolic HF in a predominantly (2/3) primary prevention EHP population.

**Methodology:** In a consecutive, cross-sectional way, 487 EHP, 63.8% women, ≥ 70 years old (YO), mean age: 79.27 YO (70-101), were included in this analysis. Mean: height, 1.58 m; weight, 67.47 Kg; BMI, 26.73 kg/m². In total, 18.5% had dilated cardiomyopathy (DCM) by echocardiogram and 27.5%, HF clinically diagnosed.

**Results:** Looking exclusively at HF patients, 60.6% had systolic HF (dilated left ventricle and ejection fraction < 40%) and 39.4%, diastolic HF. Among all patients, however, only atrial fibrillation (AF) and coronary artery disease (CAD) were considered independent causes of DCM, increasing the odds ratio (OR) 3.5 times and 2.0 times, respectively (p < 0.0001). DCM was not included in the logistic model for HF because of its strong correlation with HF presence (90% vs 13%; p = 0.0001; OR: 58 [24-118]). The potential factors associated with AF were age, sex, and BMI, by OR 3.4 times and 2.0 times, respectively (p < 0.01). For CAD, OR was 2.4 times (p < 0.01).

**Conclusions:** Considering exclusively HF patients, the frequency of diastolic HF was high (~40%); but, systolic HF prevalence was still higher (~60%). AF and CAD were the main causes of DCM. DCM was much more prevalent as a potential cause of HF than absence of DCM by echocardiogram in this EHP. Probably, to highlight ways to prevent DCM development seems to be as important to avoid HF in the future as to emphasize left ventricle diastolic dysfunction as an important cause of HF in EHP.

**PP.16.20**  CARdiovascular OUTCOME of BLACK HYPERTENSIVE PATIENTS in the OASIS of ALGERIAN SAHARA  
A. Bachir Cherifi1, F. Hamida1, A. Taleb1, S. Benkhedda1, A. Safar1, A. Benetos1, M. Bouafia1, M. Termmar1. *Cardiology University Department Hospital, Bliida-Algeria, 2Cardiology Department University Hospital, Masapha-Algeria, 3Hôtel Dieu Hospital, Paris-France, 4Geriatric Department University Hospital, Nancy-France, 5Cardiology Center, Ghardaia-Algeria*

**Background and Objective:** Black subjects represent about half of the population of the oasis of the Algerian Sahara. Arterial hypertension concern 53% of them, aged 40 years and more. Studying the fate of this sector of the Algerian people can help us classify and characterize the complications of hypertension, and to establish a plan to address public health. Objective: Longitudinal study of becoming long-term in term of cardiovascular morbi-mortality (death, myocardial infarction, heart failure, stroke, number of hospitalizations) of the hypertensive black Algerian subjects of the oasis of the Algerian Sahara.

**Design and Populations:** This longitudinal study consists on examining with a 06 years passing, from 2004 to 2010, 656 subjects aged 40 years and more of 7 oasis of the Algerian Sahara, with collect of anthropometric parameters, three blood pressure measurements, using a validated electronic blood pressure monitor (Omron 705 CP), Blood chemistry: Glucose, plasma Cholesterol, HDL cholesterol and Triglycerides were measured after fasting conditions according to standard techniques. Mortality was assessed, with determination of the causes of death. Cardiovascular documented complications were evaluated, with analyze of drugs effects.

**Results:** Men were slightly more likely than women (52% Vs 48%). Mean values of age was 60.2 ± 11.6 years, weight 67.9 ± 12.5kg, waist 89.8 ± 13.1cm, BMI 27.8 ± 4.3 kg/m², systolic blood pressure 140 ± 18 mmHg and MAP 119 ± 18 mmHg. Prevalence of arterial hypertension became 61.2% versus 42.4% 6 years before. Cardiovascular complications happened as follow: documented stroke 5.8%, heart failure 3.1%, myocardial infarction 2.2%. Death rate was 14.5% in hypertensives versus 6% in non hypertensives. Comparing with age, mortality rate was more important among hypertensives aged between 40-60 years and tends to balance afterwards.

**Conclusion:** Arterial hypertension is very common among Algerian black subjects and characterized by a high rate of consequent morbi-mortality in the young population, requiring an assumption of responsibility and an early therapeutic reinforcement in order to lessen these grave evolutions.

**PP.16.21**  HIGH PREVALENCE of UNDIAGNOSED HYPERTENSION in YOUNG MALE SUBJECTS: DATA FROM the BRISIGHELLA HEART STUDY  
M. Rosticci, A. Cicero, A. Dormi, S. D’Addato, C. Boffi, on behalf of Brisighella Heart Study staff. *Internal medicine, Aging, Kidney Disease Dept., University of Bologna, Bologna-Italy*

**Background:** An early diagnosis of hypertension is very relevant for preventive purposes, in particular in young subjects who will be exposed to the risk factor for a longer life time.

**Methods:** The Brisighella Heart Study is an epidemiological investigation on the main cardiovascular disease risk determinants, active from the 1972. At each survey a complete medical examination of a cohort, representative of the whole Brisighella population. The following parameters are usually sampled: family and personal history, life-style habits, anthropometric data, haemodynamic data, full metabolic evaluation, drug use. For this study we evaluated the hypertension prevalence in newly entered younger subjects and described the characteristics of the newly diagnosed hypertensives.

**Results:** In the 2008 survey we visited 1638 subjects (M:789, W:849; mean age: 53 ± 18 years, Body Mass Index: 26 ± 4 kg/m², TC = 203 ± 39 mg/dL, LDL-C = 135 ± 34 mg/dL, TG = 113 ± 68 mg/dL, HDL-C = 46 ± 10 mg/dL, apoA = 88 ± 21 mg/dL, apoB = 80 ± 21 mg/dL, Glycemia = 105 ± 18 mg/dL. The 18% of the population had been in hospital for hypertension, and the 2.5% had been in hospital for heart failure. Overall the prevalence of hypertension was 42%. In the group of subjects aged less than 30 years, the hypertension prevalence was 14%, 23% among men and 7% among women. Comparing men and women aged less than 30, men appeared to have significantly higher Body Mass Index (25 ± 3.4 kg/m² vs. 22.4 ± 4.4 kg/m²) and lower HDL-cholesterol (43 ± 7 mg/dL vs. 50 ± 11 mg/dL), and consequently a higher prevalence of metabolic syndrome.

**Conclusions:** In a representative sample of general population participating in the Brisighella Heart Study, we observed a relatively high prevalence of hypertension in male subjects aged less than 30, in particular in men.

**PP.16.22**  SCREENING of LIFESTYLE RISK FACTORS in VISITORS of MUSEUM  

**Background:** Screening actions help to detect risk factors of cardiovascular disease in patients who consider themselves healthy and don’t take regular medical advice. The aim of our study was to appreciate the prevalence of risk factors in visitors of historical museum in Saint-Petersburg.

**Methods:** The all-Russian non-governmental organization “Antihypertensive League” organized the action “Healthy Heart” in historical museum in October 2010. 2 days 4 cardiologists made screening of museum visitors. All subjects were interviewed with special questionnaire which included smoking status, physical activity, alcohol and fruits/vegetables consumption. Standard anthropometry was performed. Blood pressure (BP) was measured on right arm in the sitting position after 5 minute rest three times with an interval of 2 minutes. Capillary glycose was measured by glucometer Accu Check.

**Results:** During action 208 subjects were screened. The mean age was 62 years (min 12- max 84). Females were the majority (146 (71%) vs 59 (29%) ). The important fact that half of sample was working subjects – 117 (57%), pensioners contained 39%. The obesity (waist circumference > 80 sm in females and > 94 sm in males) had high prevalence in females - 95 (46%) vs 12 (5.8%) in males. The hypertension (systolic blood pressure (SBP) > 140 and diastolic blood pressure (DBP) > 90 mm Hg) was revealed in 46 (22.4%) of subjects. Increasing of only SBP > 140 mm Hg was diagnosed in 72 (35%). Glucose level more than 5.6 was revealed in 35 (17%), more than 6.1 in 27 (13.1%) and more than 7.1 mmol/l in 11 (5.36%) subjects. Smoking was detected in 23 (11.2%), though females had the same prevalence (females 16 (11%) vs 7 (11.8%) in males). Everyday consumption of fresh fruits and vegetables was revealed in 108 (52%) subjects, but consumption less than 2 days in week had 22 (10.7%). Persons with consumption of fish less than 1 time per week were enough high amount – 40 (19.5%). Subjects with regular physical activity were 54 (26%). Subjects with alcohol consumption every day or few times per week were 15 (7.5%). BP level was correlated with age (r = 0.45), waist (r = 0.33) and less strong with fruit consumption (r = 0.26), p < 0.05 for all.

**Conclusions:** Screening revealed high prevalence of obesity and smoking in females. Rather high percentage of subjects don’t have enough consumption of...
fresh fruits/vegetables and fish. Predominant female gender of subjects might be the reason for normal rate of alcohol consumption.

**PP.16.23** DIFFERENCES IN THE CONTROL LEVEL OF BLOOD PRESSURE AND CARDIOVASCULAR RISK BY GENDER IN A HYPERTENSIVE POPULATION WITH METABOLIC SYNDROME SEEN AT PRIMARY CARE. OPENMNET STUDY

O. González1, A. Galgo2, C. Álvarez3, P. Tarlonte4, 1. Endocrinology Department, Ramón Y Cajal Hospital, Madrid-Spain, 2Expressoeda HC., Madrid-Spain, 3Pfizer Spain, Madrid-Spain

**Aim:** To describe possible differences by gender in the control level and treatment of cardiovascular risk factors (CVRF) of hypertensive patients with metabolic syndrome (MS).

**Methods:** Transversal, multicentric, descriptive study carried out in Spanish primary care centers. Data for different associated CVRF included MS components, achievement of goals proposed by the main clinical practice guides and the treatments used in the common clinical practice by consecutive random sample of HBP and MS diagnosed patients according to NCEP-ATPIII criteria was registered. A size sample of 2,000 patients allowed us to consider the prevalence in the worst case p = q = 0.5, with a precision not exceeding 3.1%, a level of meaning of 95% in a bilateral test.

**Results:** Data from 3,655 patients were included. 51.9% were women. Mean age was 60 ± 11 years. 54.4% of men (M) and 54.6% of women (W) had diabetes mellitus 2 (DM2). Age at HBP diagnosis (52.6 ± 10.4 year) and HBP evolution time (7.8 ± 6.3 years) were significantly lower in M than W (p < 0.01). Controlled BP (< 140/90 mmHg) in non-diabetic patients was found in 25.3% (M) and 28.8% (W). Among DM2 patients only 5% of M and 5.6% of W (p = 0.6) had controlled BP (< 130/80 mmHg). Most of the patients had HT stage 1 (51.4%) and normal-high BP (20.7%), followed by HT stage 2 (17%), only 3.8% of the patients had HT stage 3, with differences among genders the percentage of women with stage 2 and 3 HT was lower than in men (p < 0.001). 40.43% of hypertensive patients with MS had CV disease or established nephropathy, gender differences were found: M (43.31%) and W (37.8%) p < 0.0005. Moreover, it was worth pointing that the percentage of women with CV disease or established nephropathy and controlled BP (15%) was significantly lower than in M (28.3%), p < 0.0001. Pharmacologic treatment was used in 96.8% of M and 98.8% of W. The use of RAS inhibitors was 96.2% (M) and 95.6% (W). Gender differences were only present in the use of ß-blockers (13.6% in M and 8.4% in W, p < 0.0001), and α-blockers (4.7% vs 1.6% in M and W respectively; p < 0.0001). Glycemic control (HbA1c < 7%) was achieved by 40.5% of M and 43% of W; 93.4% of the patients were treated with antidiabetic drugs. ASA antiaggregation was used by 34.6% (M) and 27.6% (W) (p < 0.0001). Smoking cessation medication was only used by 1.3% of all patients (1.8% M and 0.7% M; p < 0.05) but there was a smoking prevalence of 23% in the sample.

**Conclusions:** Openmnet study showed that hypertensive patients with MS seen at PC had a poor BP control and especially diabetic patients. By gender, men had a higher CV risk measured by higher percentage of stage 2 and 3 hypertension, and the presence of cardiovascular disease or established nephropathy. In spite of this, women with a very high risk (CV disease or established nephropathy) had worst control than men. These data suggest that women with established nephropathy need more attention in the clinical practice in order to improve their prognosis.

**PP.16.24** ANTIHYPERTENSIVE MEDICATION NONADHERENCE IN ZAGREB, CROATIA: CROSS-SECTIONAL STUDY

M. Leppić1, J. Culig1, J. Boskovic1, 1. Andrija Stampar Institute of Public Health, Zagreb-Croatia, 2Faculty of Pharmacy and Biochemistry Zagreb, Zagreb-Croatia

**Objective:** The impact of poor adherence grows as the burden of chronic disease grows worldwide. Medical nonadherence has been identified as a major public health problem in the treatment of hypertension. There is a large body of record focusing on the understanding of this phenomenon. Patient’s adherence to therapy prescribed is influenced by a number of objective and subjective factors. The study addressed medication adherence with antihypertensive therapy.

**Design and Method:** The study was designed as a cross-sectional survey by use of a self-administered questionnaire. The survey was conducted at Zagreb pharmacies and the questionnaire was filled out by study subjects with instructions and help provided by the pharmacist as questionnaire administrator. According to medication adherence, study subjects were divided into two groups of adherent and nonadherent subjects, as declared by themselves. The subjects answering the respective question that they had never failed taking their medications on time were considered as adherent, and all others as nonadherent subjects. The questionnaire listed 16 common reasons for nonadherence and study subjects had to answer questions on each of these reasons as the possible cause of his/her nonadherence.

**Results:** The study included in first phase 152 individuals collecting or buying drugs for the treatment of chronic diseases, with special reference to subjects taking antihypertensive agents. In the second survey, after average 25.4 days, only 87 patients collected their drugs. More than half (n = 51; 58.6%) of 87 study subjects were on therapy for arterial hypertension and possibly for some other diseases. We analyzed hypertensive patients in order to determine possible changes in their adherence to drugs. Despite pharmacist advice, the increase of adherence was insignificantly (only 2.6%). The majority of study subjects stated forgetting as the main reason for skipping drug dosing (36.0%). Absence from home was the second leading reason.

**Conclusions:** Research on adherence has typically focused on the barriers patients face in taking their medications, specially antihypertensive. Common barriers to adherence are under the patient’s control, so that attention to them is a necessary and important step in improving adherence.

**PP.16.25** RELATIONSHIP BETWEEN QUALITY OF LIFE AND LEVEL OF CARDIOVASCULAR RISK IN SPANISH HYPERVENTSIVE PATIENTS

J. Abellà1, A. Roca-Cusachs2, R. Lahoz2, J. Salazar3, 1Centro De Salud De San Andrés, San Andrés-Spain, Hospital De La Santa Creu i Sant Pau, Barcelona-Spain, 2Novartis Farmacéutica S.A., Barcelona-Spain

**Aim:** To establish the relationship between cardiovascular (CV) risk and health-related quality of life (HRQoL) in a Spanish hypertensive population, through the implementation of the HRQoL MINICHAL questionnaire.

**Methods:** Epidemiological, crossover, multicentric and national study performed under clinical practice conditions in adult patients with essential high BP and diagnosis of hypertension of at least one year. Patients were stratified in 5 categories according to the CV risk within 10 years: average risk, low added risk, moderate added risk, high added risk and very high added risk (ESH/ESC, 2007). HRQoL was measured by MINICHAL questionnaire. It comprises two domains: mental status (10 items) and somatic manifestations (6 items), referred to the past seven days. The points range from 0 (best health level) to 30 (worst health level) for the first domain and from 0 to 18 for the second domain.

**Results:** A total of 834 centres participated [581 primary care (PC) and 253 hospital units (HU)] that included 6654 patients (67.1% PC and 32.9% HU). Fifty-five percent were men, median age (Q1, Q3) of 63.0 (55.0, 72.0) years, study levels mostly primary (46.9%) and in 58.3% were retired or housewives. Average risk was presented in 3.5%, low added risk in 13.6%, moderate added risk in 12.8%, high added risk in 39.0% and very high added risk in 31.0% of patients. HRQoL measured by the total MINICHAL questionnaire showed higher scores at greater CV risk, with a median of 4.0 (2.0, 8.0) in patients with average risk and reaching values of 11.0 (5.0, 18.0) in patients with very high added risk (p < 0.0001). The HRQoL assessment according to the mental status domain also showed a higher scores at higher CV risk, revealing values of 4.0 (1.0, 6.0) for average risk and 8.0 (4.0, 13.0) for very high added risk (p < 0.0001). Somatic manifestations domain scores were 0.0 (0.0, 2.0) for average risk and 3.0 (1.0, 6.0) for very high added risk (p < 0.0001).

**Conclusions:** Spanish hypertensive patients with increased CV risk show significant worse quality of life, in both mental status and somatic manifestations domains.

**PP.16.26** QUALITY OF LIFE ACCORDING TO BLOOD PRESSURE AND COMORBIDITIES IN HYPERTENSIVE SPANISH PATIENTS

A. Roca-Cusachs1, J. Abellà2, B. Font3, R. Lahoz2, J. Salazar3, 1Hospital De La Santa Creu I Sant Pau, Barcelona-SPAIN, 2Centro De Salud De San Andrés, San Andrés-Spain, 3Novartis Farmacéutica S.A., Barcelona-Spain

**Aims:** To establish the relationship between health-related quality of life (HRQoL) and blood pressure (BP) level, as well as the presence or absence of comorbidities, in a Spanish hypertensive population.

**Methods:** Epidemiological, crossover, multicentric and national study performed under clinical practice conditions in adult patients with essential high BP and diagnosis of hypertension of at least one year. HRQoL was determined by the MINICHAL questionnaire. It comprises two domains: mental status (10...
items) and somatic manifestations (6 items), referred to the past seven days. The points range from 0 (best health level) to 30 (worst health level) for the first dimension and from 18 to the second domain. Participants' classification according to BP values was performed following the ESH-ESC (2007) recommendations. Presence of the following comorbidities was evaluated: obesity, diabetes mellitus (DM), dyslipidemia, kidney disease and cardiovascular disease.

**Results:** A total of 6654 hypertensive patients (55.2% male) were assessed, with a median age (Q1, Q3) of 63.0 (55.0, 72.0) years. Total MINICHAL questionnaire scores according to the BP values were 8.0 (4.0, 15.0) in grade 1 hypertension, 10.0 (4.0, 16.0) in grade 2 hypertension and 12.0 (5.0, 20.0) in grade 3 hypertension patients (p < 0.0001). HRQoL assessment scores of mental status were 6.0 (3.0, 10.0) in grade 1 hypertension, 7.0 (3.0, 11.0) in grade 2 hypertension, and 8.0 (3.0, 14.0) in grade 3 hypertension patients (p = 0.0003). MINICHAL scores in relation to somatic manifestations were 2.0 (0.0, 4.0) in grade 1 hypertension, 3.0 (1.0, 5.0) in grade 2 hypertension, and 3.0 (1.0, 7.0) in grade 3 hypertension patients (p < 0.0001). Overall MINICHAL score estimation related to different comorbidities (presence vs absence) was: obesity, 9.0 (4.0, 15.0) vs 6.0 (2.0, 10.0); DM, 10.0 (5.0, 16.0) vs 6.0 (3.0, 11.0); dyslipidemia, 7.0 (3.0, 14.0) vs 6.0 (3.0, 11.0); kidney disease, 13.0 (7.0, 20.0) vs 7.0 (3.0, 12.0); and cardiovascular disease, 10.0 (5.0, 17.0) vs 6.0 (3.0, 12.0), (p < 0.0001, in all cases). HRQoL assessment of mental status and somatic manifestations also showed worse scores when presence of the different comorbidities was observed (p < 0.0001).

**Conclusions:** The presence of comorbidity and higher blood pressure in Spanish hypertensive patients is associated with a worse HRQoL.

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**PP.16.27 PREVALENCE OF TARGET ORGAN DAMAGE IN HYPERTENSIVE SUBJECTS ATTENDING PRIMARY CARE: C.V.P.C. STUDY (EPIDEMIOLOGICAL CARDIOVASCULAR STUDY IN PRIMARY CARE)**

E. Skliros, A. Papazafiropoulou, A. Sotropoulos, C. Papafragos, A. Gikas, G. Apostolou, C. Xenopouls, C. Tountas. Hellenic Association of Research and Continuing Education in Primary Care, Athens-Greece

**Background:** Except for the established risk factors, presence of target organ damage has an important role in the treatment of hypertensive subjects. The aim of the present study was to estimate the prevalence of target organ damage in primary care subjects.

**Methods:** The C.V.P.C. study was a multi-center, cross-sectional survey which was carried out in 115 primary care physicians. The study included 1093 subjects, 611 men (55.8%) and 482 women (44.2%). A detailed history for the presence of cardiovascular disease and a thorough clinical examination was performed to each participant.

**Results:** Of the total study population, 44.5% (n = 487) had target organ damage (33.0% had left ventricular hypertrophy, 21.8% increased carotid intima media thickness, 11.0% elevated plasma creatinine levels and 14.6% microalbuminuria). Target organ damage was more prevalent in males than in females (33.0% had left ventricular hypertrophy, 21.8% increased carotid intima media thickness, 11.0% elevated plasma creatinine levels and 14.6% microalbuminuria). A significant proportion of hypertensive subjects in primary care had documented associated target organ damage, with left ventricular hypertrophy (p = 0.35) and elevated plasma creatinine levels (p = 0.21). Logistic regression analysis showed associations between target organ damage and dyslipidemia (p < 0.001), presence of metabolic syndrome (p = 0.005), diabetes (p < 0.001) and coronary artery disease (p < 0.001).

**Conclusion:** A significant proportion of hypertensive subjects in primary care had documented associated target organ damage, with left ventricular hypertrophy being the most prevalent target organ damage.

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**PP.16.28 PREVALENCE OF ARTERIAL HYPERTENSION AND OTHER CARDIOVASCULAR RISK FACTORS IN AN ETHNIC GROUP VERSUS ROMANIAN ADULT POPULATION – ARE THEY DIFFERENT?**

M. Dobreanu, D. Bartos, E. Badila, G. Oprea, S. Ghiorghie, R. Lungu, M. Hoiatuac, A. Nastac. Emergency Hospital Bucharest, Bucharest-Romania

**Objectives:** To assess the prevalence of all main cardiovascular risk factors in a gipsy population, an ethnic group known with severe CV disease at premature age, and to compare these results with those from Romanian adult general population.

**Methods:** 511 gipsy subjects (age range 18-83 years), a representative sample for this ethnic group, were included in the study. Each selected subject was examined by anthropometric and blood pressure measurements and laboratory tests (glycemia, total cholesterol). The diagnosis of hypertension (HT) was based on 3 separate measurements (BP ≥140/90mmHg) or antihypertensive medication. The visceral obesity was defined as waist circumference > 102 cm in males and > 88 cm in females. The results were compared with those obtained from SEPSTAR, the first epidemiological representative study in Romania. In SEPSTAR were included 2,017 subjects (age range 18-85 years).

**Results:** See table. Conclusions: The prevalence of HT (including newly diagnosed cases) is higher in the Romanian adult population compared with the gipsy population. The percentage of treated and controlled hypertensive subjects is higher in the gipsy group. The prevalence of other main CV risk factors - obesity (especially visceral), diabetes, hypercholesterolemia - is significantly higher in the gipsy population when compared with Romanian general population.

<table>
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<th>General population</th>
<th>Gipsy population</th>
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<tbody>
<tr>
<td>Number of subjects</td>
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<td>Prevalence of HT (%)</td>
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<td>HT newly diagnosed (%)</td>
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<td>Treatment of HT (%)</td>
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<td>Control of HT (%)</td>
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<td>Visceral obesity (%)</td>
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<td>Cholesterol ≥200mg/dl (%)</td>
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<td>51%</td>
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</table>

**PP.16.29 MAIN CARDIOVASCULAR RISK FACTORS AND HYPERTENSION IN A SUBGROUP OF WOMEN POPULATION IN TALLINN DURING 10 YEARS OF FOLLOW-UP**


**Objective:** Some European countries, including Estonia, showed a rapid increase in cardiovascular disease (CVD) mortality between 1993 and 1999. Risk factors for CVD are supposed to be related to ethnic origin. It is time to evaluate the levels of risk factors for CVD among inhabitants of Tallinn, the capital of Estonia.

**Design and Methods:** An independent random sample of population (719 men and 815 women) in the framework of a population study for CVD risk factors, aged 35 to 59, were examined in 1999. Measurements of arterial hypertension (AH), electrocardiographic, echocardiographic, and complex laboratory examinations were repeated in 314 female participants (pts) in 2009. An examinee was classified as hypertensive if mean values of two blood measurements at the screening or the third measurement before echocardiography exceeded 140/90 mmHg.

**Results:** In the past 10 years the most prevalent CVD factors were AH and hypercholesterolemia. Rate of hypercholesterolemia rose substantially from 69.1 to 81.2%. Number of pts who regularly used lipid-lowering drugs and had target lipid levels was sporadic. Prevalence of obesity, hyperteglycemia, and diabetes insignificantly increased (from 27.4% to 31.2%; 12.5 to 16.2%; 3.7 to 8.0%, respectively). Only prevalence of smoking had a tendency to decrease. AH had increased over this decade from 28.7 in 1999 to 44.6% in 2009. 25% of women with AH – 3 times more than in 1999 (8.4%) - received antihypertensive therapy and achieved target blood pressure limits. New onset of AH was significantly associated with obesity (OR 5.37; 95% 2.66-10.84) and hypercholesterolemia (OR 2.93; 95% 1.36-6.39).

**Conclusion:** The prevalence of AH and other main risk factors for CVD in a subgroup of female population of Tallinn increased during 10 years follow-up. However, improvements in AH awareness, treatment, and control were also remarkable.

**PP.16.30 GLUCOSE METABOLISM IN ELDERLY PATIENTS WITH ESSENTIAL HYPERTENSION AND RISK OF CARDIOVASCULAR DISEASES**

Xinjun Zhang, Yan Zhang. West China Hospital, Chengdu-China

**Objective:** To investigate the characteristics of glucose metabolism in elderly patients with essential hypertension and its association with cardiovascular diseases.
Methods: One hundred and nineteen elderly patients with essential hypertension and no diagnosed diabetes mellitus were recruited. Thirty-one elderly patients with neither diagnosed diabetes mellitus nor essential hypertension served as controls. Data about the history of smoking, BMI, IRI and ISI were collected from the participants. According to oral glucose tolerance test (OGTT), the patients with essential hypertension were divided into normal glucose tolerance group (NGT), impaired glucose regulation group (IGR) and diabetes mellitus group (DM). The BMI, FPG, PPG, TG, TC, HDL, LDL, SBP, DBP, IMT, LVMi and LVEF were compared between the groups.

Results: The patients with essential hypertension had significantly higher smoking rate and higher BMI, IRI, ISI, FPG, FIN, PIN, Cr, UA, TG and HDL than the controls (P < 0.05). IRI was correlated with BMI, SBP, DBP, TG and HDL. DM, IGR and abnormal glucose metabolism were identified in 23.5%, 31.6%, and 63% of the elderly patients with essential hypertension patients, respectively. The patients in the IGR group and DM group had significantly higher FPG, PPG, PIN, IRI, ISI, BMI, Cr, TG, HDL, LDL and SBP than those in the NGT group (P < 0.05). The incidence of plaque and LVEF in the patients with IGR and DM were higher than in the patients with normal glucose tolerance (P < 0.05).

Conclusion: Elderly patients with essential hypertension have abnormalities in glucose metabolism. OGTT should be offered to the elderly patients with essential hypertension as a measure to detect DM and prevent cardiovascular diseases.

**PP.16.31 EASTERN EUROPEAN HYPERTENSIVE IMMIGRANTS ARE CHARACTERIZED BY POOR HEALTH-RELATED QUALITY OF LIFE IN COMPARISON TO NATIVE HYPERTENSIVES**


Background: Much of the variance in hypertension related sequelae across ethnic groups, is highly related to deficits in accurate health related data. We sought to evaluate the burden of migration on health related quality of life (HRQoL) in the setting of essential hypertension (EH). We hypothesised that immigrants would indicate lower scores in the most dimensions of HRQoL than natives, reflecting differences in social economic status.

Methods: We studied 67 Eastern European immigrants with newly diagnosed untreated stage 1 II EH (aged 51 ± 15 years, 35 male, office blood pressure (OBP) = 159/92 mm Hg), who immigrated to Greece within the previous two years and 61 hypertensives natives matched for age, gender and OBP. The validated Greek version of the Short Form 36 (SF 36) General Health Survey questionnaire was administered to all participants. The subscales were further grouped into two summary scales: the physical component summary (PCS) and the mental component summary (MCS). Non parametric Mann Whitney tests were performed.

Results: Hypertensive immigrants scored significantly lower in all dimensions of SF 36 when compared to natives. (Table)

Conclusions: In conclusion, immigration process and resettlement experience jeopardizes HRQoL in the setting of EH. It is crucial for primary health care units and other social services to conduct screening programmes for hypertension and its impact to the psychological well being of the migrating people.

**PP.16.32 METABOLIC CHARACTERISTICS AND HEART RATE OF NEWLY DIAGNOSED NON-TREATED HYPERTENSION, PREHYPERTENSION AND NORMOTENSIVE SUBJECTS**

S. Karanovic1, D. Juric1, J. Juras3, V. Capkun4, Z. Dika1, I. Vukovic Lela1, M. Fisteck1, J. Kosi1, M. Laganovic1, A. Crveticovic1, V. Premuzic1, I. Pecin1, M. Bitunjac1, N. Lekos1, B. Jelakovic1. *Department Of Nephrology And Arterial Hypertension UHC Zagreb, University of Zagreb School of Medicine, Zagreb-Croatia, 2Department of Nuclear Medicine, UHC Split, Split-Croatia, 3Department of Metabolic Diseases UHC Zagreb, University of Zagreb School of Medicine, Zagreb-Croatia, 4General Hospital Dr. Josip Benevic Slavonski Brod, Slavonski Brod-Croatia*

Objective: Both the metabolic abnormalities and a faster heart rate are recognized cardiovascular risk factors and both are associated with hypertension. However, it is still matter of debate whether the high risk profile is also present in prehypertension (PH). Our aim was to analyse presence of these additional risk factors in newly diagnosed non-treated hypertension (HT) and PH.

Design and Method: Out of 1181 subjects enrolled in population based cohort study conducted in Croatian rural area, 203 participants (65 men, 138 women, mean age 50.7 years, range 19-87) had all the laboratory and clinical data and were included in this report. We also excluded eligible subjects if they had an acute illness, chronic terminal disease, pregnancy, treated HT, diabetes, arrhythmias, dementia, immobility and if taking NSAID or corticosteroids. Blood pressure (BP) and HR were measured 3 times in a sitting position with OMRON M6 device. Body mass index (BMI) and waist circumference (WC) were determined. Fasting blood was analysed for glucose (FBG), insulin, total cholesterol (T-C), HDL, LDL, triglycerides (TG), haematocrit, C reactive protein (CRP), white blood cell (WBC) and neutrophil count. HOMA index was used to calculate insulin resistance (IR). Subjects were divided in three groups; optimal BP (< 120/80; N = 59) (OBP), PH (120/80-139/89; N = 79), and HT (> 140/90; N = 65). ANOVA, Kruskal-Wallis, post hoc (Tukey, Mann Whitney) and Spearman’s correlation test were used. Significance was set at 0.05.

Results: There were no differences in age between groups. IR prevalence increased from OBP to PH and HT (33.8%, 51.9%, 67.6%, respectively). Differences were significant between OBP vs. PH and HT (p = 0.035, p < 0.001, respectively), but not between PH and HT (p = 0.057). We found significant correlation between IR, systolic, diastolic BP, and HR (r = 0.22; 0.29; 0.24, respectively; p < 0.001). HT patients and PH subjects with IR had significantly higher values of BMI, WC, insulin, T-C, LDL-C, TG than those without IR (p < 0.001). Even OBP subjects with IR had significantly higher BMI WC, insulin, TG and lower LDL values than ones without IR (p < 0.001). In all groups HR was higher in subjects with IR. Values on CRP and WBC will be presented separately.

Conclusions: Observed high prevalence of IR, metabolic syndrome and faster heart rate in OBP and PH groups call for lifestyle modification in general population, at least in those with IR. Individuals with metabolic syndrome and tachycardia should be followed closely and considered for drug therapy if they failed to respond to lifestyle modification. Correlation between IR and HR (starting from OBP) in this study suggests that a common mechanism - sympathetic overactivity- may be involved in both conditions.
Conclusions: High presence of MS in primary care especially after 60 years of age, where coexist 3, 4 and 5 components. High association of the MS to the 4 most prevalent factors: obesity, diabetes, dyslipidemia and hypertension, which indicates a detection and/or inadequate treatment. It was observed little register of MS diagnosis in medical records. Lipid-lowering treatment is associated with an increased presence of lipid damage criteria for MS, probably because this treatment is insufficient because of clinical inertia or lack of association with cardiovascular risk.

Objective: To assess the difference of age characteristics between monotherapy and combination therapy

Design and Method: Patients with newly diagnosed or established hypertensive were enrolled in an observational study by 213 primary care physicians from 49 sites countryside. Patients were followed monthly during the first three months, and every three months until Month 12. Patient data were automatically stored on a central database via an internet-based management system. t test, chi-square test, logistic regression analysis were performed in the analysis of the data and p < 0.05 was accepted significant. Data were expressed as mean ± SD or as percentages.

Results: Data on antihypertensive drug regimen of 770 patients (260 men and 510 women) were recruited. Mean age was 4.41 years older in combination therapy than monotherapy group (54.39 years vs 58.80 years, p < 0.001) but there was no significant difference in mean age of men and women between therapies (p = 0.727). Combination therapy group had significantly more established hypertensive patients than monotherapy group (32% vs 67.8%, p = 0.017).

Logistic regression analysis revealed that every one year increment in age reduces blood pressure control rates 1.01 times (p = 0.0007).

Conclusion: Combination therapy group was 4.41 years older than monotherapy group. Combination therapy group had more established hypertensive patients. Increasing age significantly worsened blood pressure control.

Design/Methods: Observational, population-based descriptive study, where 150 migrant and 150 native treated hypertensive patients followed at Primary Care Health Centres of the Lisbon Region were applied a questionnaire to collect data about: 1) dietary knowledge and behaviour; 2) nutritional intake; 3) health status (measurement of BP); 4) weight, height and waist circumference. Statistical significance (P < 0.05) was assessed by the X² test or Fisher’s exact test for categorical variables and by Mann-Whitney U test for continuous variables.

Results: 125 treated hypertensive individuals were analysed: 76 natives and 49 migrants with a mean age of 65 ± 8.6 years and 57 ± 9.7 years, respectively. A higher percentage of blood pressure control was observed in the natives’ group (49% vs 39%). It was observed a very high prevalence of overweight and obesity in both groups (88% overall). Plus, 73% of natives and 77% of migrants had a waist circumference that indicates a higher CV risk. The knowledge about food recommendations did not vary between the two study groups but it varied among the food groups analyzed. Significant differences were observed between groups when considering the reported daily fruit intake (p < 0.001) and the reported weekly fish intake (p = 0.014) intake. There were 49% of migrants (vs 14% of natives) not consuming fruit daily and only 22% of migrants (vs 44% natives) meet the fruit recommendations. Considering the fish intake, there were 18% of migrants (vs 5% natives) not consuming fish weekly.

Conclusions: The current data showed food-related disparities between migrants and natives, with expected impact on health and HTN control. The confirmation of these results with the completion of the analysis of the final sample will support the importance of leading future effective intervention strategies based on educational programs directed to the specificities of each group, in order to improve eating habits while reducing the CV risk.
hypertensive drugs, the data of participants with free of antihypertensive drugs were used for analysis.

Results: The mean of age was 57 ± 11.1 years in the whole population. The prevalence of hypertension was 61.8%. There 103 and 57 persons were included in the data analysis at 3-month and 6-month intervention. The mean of SBP and DBP at baseline were 133 mmHg and 79 mmHg for usual salt group, and 137 mmHg and 77 mmHg for PES group respectively. There was no significantly difference for both SBP and DBP between two groups at baseline. After 3 months intervention, there was no significantly difference of BP between two groups. After 6 months intervention, the mean of DBP was lower in PES than in usual salt group (80 vs. 85 mmHg, P < 0.05), the augmentation of SBP with winter was higher in usual salt group than in PES group (13.3 vs. 3.7 mmHg, P < 0.05).

Conclusion: The preliminary results suggested that long term using Potassium-enriched salt had a additional effects on lower BP while reduced salt intake. Further large scale study was needed.

**PP.16.38 ASSESSMENT OF THERAPEUTIC BEHAVIOUR IN UNCONTROLLED HYPERTENSIVE PATIENTS**

J.I. Alonso Moreno1, J.R. Banegas1, J.I. De La Cruz1, C. Alvarez1, P. Tarilonte1 1Sillería H.C., Toledo-Spain, 2Preventive Medicine & Public Health University Autonoma De Madrid, Madrid-Spain, 3Pfizer Spain, Madrid-Spain

**Aim:** To assess therapeutic behavior in an uncontrolled hypertensive population at Spanish primary care centers.

**Methods:** Epidemiological, descriptive, cross-sectional cohort and multicentre study was performed in Spanish primary care centers. Patients of both sexes, ≥ 18 years old and with uncontrolled hypertension (BP ≥ 140/90 mmHg or ≥ 130/80 mmHg in patients with diabetes mellitus) and under antihypertensive treatment for at least 3 months were selectable. A total of 9,670 patients were included, of whom 1,597 patients (16.5%) were withdrawn for not fulfilling inclusion criteria. Final sample was 8,073 patients.

**Results:** 54.2% were men, mean age was 64.4 (± 11.0) years, and mean BMI was 29.5 (± 4.6)kg/m². Mean SBP was 152.9 (± 13.1)mmHg and mean DBP was 88.9 (± 8.8) mmHg. Investigators considered that 85.2% of the patients with one or more years of hypertension diagnosis and 82.8% of those with at least one year diagnosis, had uncontrolled hypertension. Therapeutic behavior in uncontrolled hypertensive patients was to adjust treatment in 6,157 patients (76.3%), and to postpone it in 850 (10.5%). The main cause for treatment adjustment (5,621 patients (91.3%)) was lack of treatment efficacy; followed by bad patient control (59.7%). Patients that received the most frequent therapeutic behavior when treatment was adjusted (was (see Table 1).

**Conclusions:** These data show that most commonly used treatments are being used in combination with diuretics. ARBs were used more frequently than ACE-inhibitors.

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<th>Reduce Dose</th>
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**PP.16.39 ANTIHYPERTENSIVE THERAPY IN SCREENING OF RUSSIAN MENTALLY WORKING SUBJECTS**

O. Rotar, V. Ivanenko, L. Korosiovtseva, I. Fursova, K. Kitaialeva, A. Konradi, E. Shlyakhito. Almazov Federal Center Heart, Blood and Endocrinology, Saint-Petersburg-Russia

**Objective:** The study addresses the prevalence of different classes of antihypertensive drugs application in the working population of bank employers.

**Design and Methods:** 1600 bank office workers were screened at their working places in 5 bank offices in St.Petersburg in June-August 2008. The responding rate was 86%. The informed consent was obtained from all participants. Special questionnaire regarding lifestyle factors, medical history was performed. Antihypertensive medication (yes or no) and its character were registered specially. Blood pressure (BP) were measured on right arm 3 times at 5 minutes of rest. Data were collected by trained physician.

**Results:** 1561 responders were included in the database (338 males and 1223 females). Hypertension (HTN) was diagnosed according BP elevation over 130 mm Hg for systolic BP and/or 85 mm Hg for diastolic BP or in case of regular antihypertensive medication. HT was revealed in 519 patients (33.3%), 208 (61.5%) males and 311 (25.4%) females. Only 122 patients, or 7.9% of patients, were under antihypertensive therapy. The patients took next drugs as monotherapy: ACE-inhibitors 44.2% (54 subjects), beta-blockers 36.8% (45), diuretics 12.3 (15), Ca-blockers 6.55% (8), and combination blockers 1.63 (2) and combination ACE-inhibitor and diuretic had enough high prevalence – 18.8 % (23). The most often ACE-inhibitor was enalapril 35 from 54 subjects (65%). The most common combination of ACE-inhibitor and diuretic were perindopril/indapamide and enalapril/hypothiazide. The most common beta-blocker was bisoprolol. Males took therapy in 14.5% of cases (30 from 208 subjects) and females in 29.3% (92 from 311).

**Conclusions:** The prevalence of hypertension is high, but the taking of anti-hypertensive therapy is poor. Females had better compliance to therapy. The most common monotherapy was ACE-inhibitors and combination was ACE-inhibitor and diuretic. Especial feature of sample was very low application of Ca-blockers and ATH blockers.

**PP.16.40 HYPERTENSIVE URGENCY AND EMERGENCY - A PROSPECTIVE STUDY**


Hypertension is the most prevalent controllable lethal disease in the present century. It is an extremely common clinical problem, affecting approximately 1 billion individuals worldwide. Approximately 1% of these patients will develop acute elevations in blood pressure at some point in their lifetime. A number of terms have been applied to severe hypertension, including hypertensive crises, emergencies and urgencies. By definition, acute elevations in blood pressure that are associated with end-organ damage are called hypertensive crises, which require immediate reduction in blood pressure. Hypertensive crises are one of the most common causes of visits in private offices and general clinics, although the prevalence and clinical picture of hypertensive urgencies and emergencies in an emergency department are poorly known. In our region, no extensive study has been done on the prevalence and precipitating factors of hypertensive crises. The authors conducted a prospective study on hypertensive patients referring to hypertensive crises, in an emergency department of a district hospital, during a 6-month period. The aim of our study was to evaluate the prevalence of hypertensive crises (urgencies and emergencies), epidemiology and characteristics of the population, precipitating factors, symptoms and signs at presentation, types and frequency of end-organ damage, kinds of treatment and management at the hospital and prognosis.

We concluded that hypertensive crises are common events in the emergency department and differ in their clinical patterns of presentation. Hypertensive urgencies were the most frequent hypertensive crisis presenting to the emergency department, with headache and epistaxis as the most frequent signs of presentation. Chest pain, dyspnea and neurological deficit were the most frequent signs of presentation of end-organ damage, most frequently associated with cerebral infarction and acute pulmonary edema. Hypertensive urgencies were most frequently associated with hypertension that was unknown at presentation. We present and discuss also our results about population characteristics, and most frequent treatments applied in our hospital.

**PP.16.41 AUGMENTED SALT INTAKE MAY EXPLAIN THE EXCESSIVE CARDIOVASCULAR BURDEN OF HYPERTENSIVE IMMIGRANTS**

V. Katsi, G. Sourctis, C. Vlachopoulos, D. Tousoulis, C. Stefanadis, I. Kallikazaros. Hippokration Hospital, Athens-Greece
Background: Much of the variance in hypertension related sequelae across ethnic groups is highly related to differences in socioeconomic conditions, attitudes and deficits in accurate health related data. East European countries exhibit higher morbidity and mortality from coronary disease than the rest of Europe. We assessed the hypothesis that target organ damage in this vulnerable population may be different than the one of the autochthonous hypertensives.

Methods: The study population consisted of 128 hypertensives: 67 immigrants from Eastern Europe to Greece and 61 native inhabitants, matched for age, gender and office BP. Demographic characteristics were recorded, while echocardiography was performed and arterial stiffness was estimated by measuring carotid femoral pulse wave velocity in all subjects. In addition, glomerular filtration rate (GFR) was evaluated and fundoscopy was performed in all study subjects.

Results: Although immigrants exhibited lower body mass index (BMI) compared to natives, they had significantly increased arterial stiffness (p = 0.003), increased left atrial volume index (p < 0.05) and left ventricular mass index (p < 0.05), worse left ventricular diastolic dysfunction (p < 0.05), elevated levels of serum cholesterol (p = 0.046) and sodium urinary excretion (p < 0.05) and considerably lower GFR (p < 0.05). Finally, univariate analysis showed a positive correla on between LVMI and LAVI (r = 0.43, p < 0.0001), and a negative correlation between LAVI and GFR (r = 0.45, p = 0.001) as well as between PWV and GFR (r = 0.538, p < 0.0001) in both groups.

Conclusions: Hypertensive immigrants appear to have lower BMI compared to native Greeks, but they are characterized by unfavourable lipidemic profile, increased aortic stiffness, structural and functional atrio ventricular maladaptations and marked acceleration of the renal damage. Evidence indicate that dietary peculiarities like augmented salt intake might paralially explain the increased target organ damage burden in this group.
**AUSCULTATORY VERSUS OSCILLOMETRIC MEASUREMENT OF BLOOD PRESSURE IN OCTOGENARIANS**

L.A. Jacobsen, J.U. Rosholm, S. Arnspan, L. Matzen. Odense University Hospital, Odense-Denmark

**Objective:*** To compare blood pressure by auscultatory and oscillometric measurements in patients ≥80 years.

**Method:** 100 patients admitted to the Dept. of Geriatrics, Odense University Hospital in Denmark had blood pressure measured by auscultation with a sphygmomanometer and by an electronic device using the oscillometric method. For each patient the mean of 2 blood pressures with each method measured within 15 minutes were compared. Arm circumference and the presence of heart disease, hypertension and arrhythmia were recorded.

**Results:** The mean age of participants was 85.8 years. 55.8% were women. 5 patients were excluded due to invalid oscillometric measurements. The agreement between the two methods was good. The correlation coefficient for systolic blood pressure was 0.88 and for diastolic 0.79. Differences between auscultatory and oscillometric values were less than 10 mmHg in 70.6% of systolic blood pressures and in 83.2% for diastolic. Arrhythmia, heart disease and hypertension did not influence the results, and there was no correlation between the size of the differences and the level of blood pressure. 17.2% of the patients had arm circumferences requiring a small (pediatric) cuff.

**Conclusion:** Oscillometric measurement of blood pressure in octogenarians was found to be reliable with results only modestly different from auscultatory measurements. Thus semiautomatic equipment, which is observer-independent, can be used even in the very elderly avoiding toxic mercury as will be required by new legislation.

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**THE RELATIONSHIP OF VARIABILITY OF ARTERIAL BLOOD PRESSURE, PULSE PRESSURE AND EARLY MORNING PRESSURE FROM AMBULATORY ARTERIAL BLOOD PRESSURE MONITORING WITH TISSUE DOPPLER ECHOCARDIOGRAPHIC PARAMETERS IN PATIENTS UNDER ANTIHYPERTENSIVE THERAPY**

D. Bastac1, Z. Joksimovic2, on behalf of Serbian Society of Hypertension. 'Private Cardiology Clinics, Zajecar-Serbia', 'Internal Medicine Office, Bor-Jugoslavija

**Background:** Recent findings suggest that, apart from reducing the mean arterial pressure, the decrease in arterial blood pressure variability under therapy has prognostic significance as an independent factor in the prevention of stroke.

**Patients and Methods:** This retrospective transversal study included 196 hypertensive patients under treatment with mean 24-hour arterial pressure of 123/76 mmHg in ambulatory blood pressure monitoring. The elevated blood pressure variability is shown as a standard deviation of the values of systolic > 17 and diastolic blood pressure > 13. All of the patients underwent echocardiography with emphasis on myocardial mass index and parameters of systolic and diastolic left ventricular function, including the ratio of transmitial E velocity/mitral annulus velocity Eprim on Tissue Doppler Imaging.

**Results:** Statistical analysis of the examined parameters of ambulatory 24 hour pressure and echocardiographic parameters did not show significant correlation between mean arterial pressure and standard deviation of daytime and night-time pressure and the degree of left ventricular hypertrophy (coefficients of linear correlation r < 0.20). However, there is a moderate but significant correlation between the ratio E/Eprim and the variability of daytime systolic pressure r = 0.41, a weak correlation with the variability of night-time diastolic pressure r = 0.30, while there is no correlation with the variability of daytime diastolic pressure r = 0.01 and night-time systolic pressure r = 0.16.

**Conclusion:** The variability of daytime systolic blood pressure, until recently a controversial parameter and now a recognized independent prognostic risk factor for stroke in hypertensive patients, shows no correlation with the degree of myocardial hypertrophy, whereas it shows a good correlation with ratio E/Eprim which best represents the diastolic left ventricular dysfunction as a subclinical organ damage.
Ten studies (2,043 and 1,808 patients evaluable for systolic and diastolic BP measurements respectively) reported data for OBP (r = 0.22±0.18) and HBP measurements (r = 0.44±0.32; p < 0.001/0.002 for r comparisons).

Conclusion: This meta-analysis suggests that HBP is superior to the conventional OBP measurements and at least as good as ABP monitoring in terms of the association with hypertension induced preclinical target organ damage as assessed by LVMl measurement.

Conclusions: As previously observed for ambulatory WCE, home WCE does not reflect the true alarm reaction to doctor’s BP measurement. The BP reaction to psychosocial stressors is increased in subjects with true white-coat hypertension but not in subjects with white-coat hypertension identified with either ambulatory or home BP measurement.

The ambulatory WCE was correlated with the home WCE (systolic BP: p < 0.001/diastolic BP: p < 0.001). However, both the ambulatory WCE (p = 0.93±0.36) and the home WCE (p = 0.11±0.36) were unrelated to the true WCE. The true WCE was correlated with the BP changes caused by the speech test (p = 0.001/di < 0.001). In contrast, both the ambulatory WCE and the home WCE were unrelated to the BP response to public speaking (all p > 0.21). Subjects were subsequently divided into tertiles according to the systolic BP response to the medical visit. Subjects with BP response to the visit in the top tertile (true white-coat hypertension) showed a greater age- and sex-adjusted systolic BP (48 ± 3 vs 27 ± 4 mmHg: p = 0.001) and diastolic BP (25.2 ± 2 vs 13 ± 2 mmHg: p = 0.004) reactivity to the speech test compared to the subjects of the bottom tertile. No association was found between true white-coat hypertension and ambulatory or home white-coat hypertension for either crude or age- and sex-adjusted data. Reactivity to the speech test did not differ between the subjects with ambulatory or home white-coat hypertension and the subjects with ambulatory or home sustained hypertension.

Conclusions: The day-to-day variability of night-to-day ratio is large. The dipping status classification in individual patient is not reliable. Support MSTM 0021622402.

The evaluation of night-to-day blood pressure variability during 7 days of ambulatory blood pressure measurement (ABPM) was the aim of the present study.

Methods: Thirty subjects (18 males, 12 females), twenty one years to seventy three years old, were recruited for seven-day ABPM. Colin Medical Instruments (Komaki, Japan) were used (oscillation method, 30-minute interval between beam-to-beat measurements). Diaper status was evaluated every day. Diapers were defined as those individuals with a 10-20% fall in nocturnal blood pressure. Non-dipping was defined as a less than 10% nocturnal fall, and those with no fall in blood pressure were defined as reverse-dippers.

The median time of follow-up was 5.4 yrs (range 0.5 to 8.5 yrs). Based on the baseline ABPM profiles, the sleep-time mean of systolic BP was the best predictor of CVD risk than the awake or 24h BP means. Subjects with resistant hypertension are at a greater CVD risk than subjects with controlled BP with < 3 BP-lowering medications. Moreover, no- dipping and nocturnal hypertension are highly prevalent in resistant hypertension. Accordingly, we compared to prognostic value of clinic and ambulatory BP in subjects with resistant hypertension participating in the MAPEC study, designed to test the hypothesis that bedtime chronotherapy with ≥ 1 hypertension medications exerts better BP control and CVD risk reduction than conventional therapy, i.e., all medications ingested in the morning.

Methods: A total of 776 subjects with resistant hypertension, 387 men/389 women, 61.6 ± 11.2 yrs of age, were randomized to ingest all their prescribed hypertension medications upon awakening or ≥ 1 of them at bedtime. At baseline, BP was measured at 20-min intervals from 07:00 to 23:00h and at 30-min intervals at night for 48h. Physical activity was simultaneously monitored every min by wrist actigraphy to accurately determine the beginning and end of daytime activity and nocturnal sleep. Idential assessment was scheduled annually and more frequently (quarterly) if treatment adjustment was required. The Cox proportional- hazard model was used to analyze event-free survival.

Results: The median time of follow-up was 5.4 yrs (range 0.5 to 8.5 yrs). Based on the baseline ABPM profiles, the sleep-time mean of systolic BP was the best predictor of CVD risk in a Cox proportional-hazard model adjusted for sex, age, diabetes, and time of hypertension treatment (relative risk 1.31 [1.24-1.37]).
P < 0.001, for each 10 mmHg increase in sleep-time BP). The corresponding risk associated with progressively increased clinic systolic BP was 1.16 [1.10-1.22]. Values associated with diastolic BP were much lower, and significant only for sleep-time mean. CVD risk was again more strongly associated with sleep-time BP on the basis of the ABPM profile closer to the events.

Conclusions: ABPM is markedly superior to clinic BP in predicting CVD risk, rendering this technique as a requirement for proper CVD risk assessment in resistant hypertension. After adjustment for relevant contributing risk factors, only sleep-time systolic BP provides a significant prediction of outcome in a survival model that jointly included multiple clinic and ambulatory BP parameters.

PP.17.49 INTER-ARM DIFFERENCE IN AUTOMATED OFFICE BLOOD PRESSURE MEASUREMENTS
E. Andreadis, A. Taskanikas, E. Angelopoulos, G. Agaliotis, G. Moussoulis. Evangelismos General Hospital, Athens-Greece

Automated office blood pressure (AOBP) has been recognized as a valuable tool in the diagnosis of hypertension. AOBP devices have the capability of simultaneous measurement of systolic and diastolic BP of the 3 readings from its arm was analyzed.

Aim of the study: To evaluate whether AOBP measurements display important differences between left and right arms.

Material and Methods: A total of 127 consecutive subjects, 65 men and 62 women mean age 52.5 ± 13.5 years were recruited, none of which had obstructive arterial disease. The patients sat quietly with their back supported and with both arms positioned at heart level for 5 minutes. Three readings of BP were recorded using Microlife WatchBP Office device simultaneously in both arms. The average of systolic and diastolic BP of the 3 readings from its arm was analyzed.

Results: The mean systolic and diastolic AOBP in the right arm was 140.7 ± 17.12 mmHg and 87.95 ± 12.46 mmHg, respectively. The mean systolic and diastolic AOBP in the left arm was 140.70 ± 16.79 mmHg and 88.07 ± 11.79 mmHg, respectively. The difference between left minus right systolic BP was 0.33 ± 5.87 mmHg. This minimal difference was not statistically significant (p = 0.52). Similarly, the difference between left minus right diastolic BP was 0.43 ± 3.89 mmHg. This minimal difference was, also, not statistically significant (p = 0.21). Sixteen patients showed systolic BP differences > 5 mmHg in the right arm and 20 showed systolic BP differences > 5 mmHg in the left arm. Bland-Altman plots did not show any tendencies for the inter-arm BP differences to vary as a function of the mean SBPs.

Conclusion: AOBP measurements taken simultaneously in both arms are virtually identical, suggesting that the choice of arm for the diagnosis of hypertension is of minimal importance.

PP.17.50 ACCURACY OF A 14.5 X 32 CM CUFF FOR SELF BLOOD PRESSURE MEASUREMENT IN OBSESE SUBJECTS OVER A WIDE RANGE OF ARM CIRCUMFERENCES
S. Massiero, C. Fanai1, F. Saladini1, G. Frick1, P. Palatini1. University of Padova, Padova-Italy, Microlife AG, Widnau-Switzerland

Objective: Obesity is an emerging problem in developed countries and overweight and obese patients often require the use of large-sized cuffs. However, even for obese subjects the cuff should be tailored according to the arm circumference and several patients will require the use of an extra large-sized cuff. Aim of the study was to determine whether a single large cuff can provide accurate measurements in obese subjects over a wide range of arm circumferences up to 52 cm.

Design and Methods: We tested the L-XL cuff coupled to a Microlife Watch BP Office ABI monitor according to the 2002 ESH protocol. The L-XL cuff is provided with a 145 ± 1 x 320 ± 1 mm bladder and is designed to provide accurate blood pressure (BP) measurements in subjects with arm circumferences ranging from 32 to 52 cm. The cuff is provided with a novel technology that performs an analysis of the measurement signal during cuff inflation and adjustment of the device parameters to the individual arm circumference and arm composition for the following deflationary measurement phase. The evaluation was performed in 33 subjects with a mean ± SD age 53 ± 17 years (range 30-96 years). Their systolic BP (SBP) was 142 ± 21 mmHg (range 110-180 mmHg), diastolic BP (DBP) was 87 ± 14 mmHg (range 62-106 mmHg), and arm circumference was 36 ± 5 cm (range 32-50 cm). BP measurements were performed in the sitting position.

Results: The L-XL cuff coupled to the Watch BP Office ABI passed all three phases of the ESH protocol for SBP and DBP. Mean blood pressure differences between device and observer were -1.3 ± 5.1 mmHg for SBP and -1.8 ± 5.8 mmHg for DBP. For both SBP and DBP, no relationship of the device-observer BP difference was found with age, gender, entry SBP and DBP, and arm circumference. Similar device-observer differences were observed in the subjects divided into two subgroups according to whether their arm circumference was above or below the median in the group (p = 0.52 for SBP and p = 0.18 for DBP).

Conclusions: The present results indicate that the L-XL cuff coupled to the Watch BP Office ABI monitor provides accurate BP readings in subjects with large arms over a wide range of arm circumferences. The cuff was accurate also in subjects with very large arms for whom a thigh cuff should be used.

PP.17.51 PRACTICAL SOLUTION FOR ACCURATE AUTOMATIC ASSESSMENT OF MORNING BP SURGE, NIGHT BP DIP AND OTHER ABPM INDICES AFFECTED BY INDIVIDUAL VARIABILITY OF DAYTIME/NIGHTTIME PATTERN
P. Pekarskiy, V. Mordovin, M. Kolodina, G. Semke. Tomsk Research Institute of Cardiology, Tomsk-Russia

Automated analysis of dozens of BP/HR values is critical for practical use of ABPM. However, majority of ABP indices depends on separate estimations for daytime/nighttime periods and currently may not be accurately assessed in automated mode due to high individual variability of daytime/nighttime pattern.

Objective: To develop simple practical method for accurate automated assessment of ABP indices depending on individual daytime/nighttime pattern.

Methods: Running total of HR after subtraction of 24-h HR average was computed that gradually increases during daytime activity, decreases during nighttime rest and increases again next daytime so that individual nighttime are precisely separated by primary maximum and minimum of the function allowing accurate assessment of morning BP surge, nighttime BP dip etc.

This algorithm was implemented in 2 ways: 1) combination of sheet functions in popular MExcel program performing automatic calculations when ABP data are “copy-pasted” in predefined sheet area; 2) cross-platform DHTML – web page with scripted functions executed on ABP data ecopy-pasted into text-input field.

To test new method 16 men, 10 women, essentially hypertensive, aged 36-65 undergone 48-h ABPM. We use Bland Altman approach to compare first-second day reproducibility 1) of morning BP surge - between the new method and the best (prospectively) verified method of Kario; 2) of night BP dip - between the new method and most accurate existed technique of using sleep time from patient diaries.

Results: The first-second day reproducibility of the ABP indices was better for new method (SD of the differences: 10.57/12.64 vs 14.03/17.01 for morning BP surge and 8.19/6.17 vs 8.39/6.84 for night BP dip, SBP/DBP respectively).

Conclusions: Morning BP surge and other ABP indices depending on daytime/nighttime pattern may be accurately and automatically calculated from ABPM data by simple technique.

PP.17.52 IN TYPE 2 DIABETIC PATIENTS HIGH 24-H AMBULATORY PULSE PRESSURE AND LOW 24H DIASTOLIC PRESSURE VALUES PREDICT CARDIOVASCULAR EVENTS WITHIN A J SHAPE PATTERN
T. Teixeira, J.N. Figueiredo, M. Bastos, J. Nobre Dos Santos, J. Polonzi. Instituto D.Pedro Hospital, Aveiro-Portugal, 2Faculdade Medicina Porto, Oporto-Portugal

Introduction: It is still uncertain whether 24-h ambulatory blood pressure (ABP) predicts cardiovascular (CV) events in diabetic hypertensive patients.

Methods: After ABP, we followed-up for 4.6 years 277 hypertensive patients with type 2 diabetes (139 men, ageing 58.7 ± 11 years, BMI 30.3 ± 4.6) under stabilized antihypertensive medication and without previous CV events.

Results: There were 50 CV events:18 strokes, 18 coronary(CE),27 Heart Failure(HF). At baseline, patients with events during the follow-up were older 62 ± 9 vs 58 ± 11 years (p < 0.01), had higher: Hba1c 8.8 ± 2 vs 7.5 ± 1(p < 0.02), casual SBP 166 ± 28 vs 158 ± 24 mmHg(P < 0.02), daytime systolic SBP 134 ± 16 vs 127 ± 17 mmHg (p = 0.02), 24h Pulse Pressure(PP) 63 ± 14 vs 59 ± 12 (p < 0.05) and nighttime PP (68 ± 9 vs 63 ± 12 mmHg) (p < 0.02). In a Cox regres-
tion analysis, independent predictors of subsequent CV events were: age, BMI, casual SBP, 24h and daytime PP (all p < 0.05). For CE casual SBP (p < 0.05) whereas for HF were age, dyslipidemia, minus 24 h and daytime DBP, and 24 h and daytime PP (p < 0.05). Kaplan-Meier CV event-free curves showed a better outcome in patients with PP < 55 mmHg vs those with PP > 55 mmHg (log rank 6.84 p < 0.009).

Figure 1 shows that the rate of CV outcome per 1000 patient – years in the quintiles of distribution of 24h DBP for total CV events assume a J shaped curve.

Conclusions: In diabetic patients, ABP’s high 24-h PP and low 24 DP are strong predictors of cardiovascular events, within a clear J shaped curve pattern.

**PP.17.53 AUTOMATED OSSICLOMETRIC ANKLE BRACHIAL INDEX (ABI) ASSESSMENT: HOW MANY MEASUREMENTS ARE REQUIRED?**
A. Kollias1, A. Xilomenos1, A. Protogerou1, E. Dimakakos1, Gs. Stergiou2. 1Hypertension Centre, Third University Department of Medicine, Sotiria Hospital, Athens-Greece

The ankle-brachial index (ABI) is recommended by current guidelines for cardiovascular risk screening and is widely used in general practice. Automated oscillometric blood pressure monitors have been recently developed for ABI measurement, aiming to simplify this procedure and avoid the observer error and bias. This study examined the number of oscillometric measurements required for a reliable ABI assessment in terms of its agreement with conventional Doppler ABI measurement. Ninety-three patients (mean age 62.5 ± 1.1 [SD] years, 58 men, hypertension 83%, dyslipidemia 72%, diabetes 45%, cardiovascular disease 23%, smoking 15%) had Doppler and automated ABI measurements using a professional oscillometric BP monitor (Microlife WatchBP Office ABI; triplicate simultaneous arm-leg blood pressure measurements) in randomized order. The mean difference of Doppler ABI (1.08 ± 0.17) versus the first oscillometric ABI reading was 0.03 ± 0.11, versus the average of the first two oscillometric readings 0.02 ± 0.10 and of all the three 0.02 ± 0.09 (p < 0.01 for all comparisons). Strong correlations were found between oscillometric and Doppler ABI (r 0.80, 0.85 and 0.86 for average of 2 and 3 oscillometric readings respectively, p < 0.001 for all). Agreement between oscillometric and Doppler ABI in diagnosing PAD (defined as Doppler ABI < 0.9) was found in (i) 95% of cases (kappa 0.79) for the first oscillometric ABI reading; (ii) 97% (0.86) for average of 2 readings and (iii) 96% (0.82) for average of 3 readings. These data suggest that a single automated oscillometric ABI measurement is sufficient in terms of its relationship with Doppler ABI and clinical PAD diagnosis. By averaging two oscillometric measurements there is marginal improvement, with no further benefit by averaging 3 measurements.

**PP.17.54 SHORT TERM REPRODUCIBILITY OF AUTOMATED OSSICLOMETRIC ANKLE BRACHIAL INDEX (ABI) MEASUREMENT**
A. Kollias, A. Xilomenos, A. Protogerou, E. Dimakakos, Gs. Stergiou. 1Hypertension Centre, Third University Department of Medicine, Sotiria Hospital, Athens-Greece

The ankle-brachial index (ABI) is a widely used method for cardiovascular risk prediction and peripheral artery disease (PAD) detection. This study examined the reproducibility of an automated ABI measurement taken using a validated professional oscillometric blood pressure (BP) monitor. A total of 93 patients (mean age 62.5 ± 1.1 [SD] years, 58 men, hypertension 83%, dyslipidemia 72%, diabetes 45%, cardiovascular disease 23%, smoking 15%) had duplicate automated ABI measurements using the professional oscillometric BP monitor Microlife WatchBP Office ABI. The reproducibility of ABI was assessed using the following criteria: (i) repeatability coefficient (RC = 2*SD of differences); (ii) RC expressed as a percentage of close to maximal variation (MV = 4*SD of the mean of paired recordings); (iii) coefficient of variation (CV); (iv) correlation coefficient (CC); (v) agreement (kappa) between the two ABI measurements to detect subjects with ABI < 0.90. The second ABI assessment was lower compared to the first one (1.09 ± 0.18 vs. 1.11 ± 0.17 respectively, p = 0.001). The reproducibility criteria were as follows: (i) RC 0.15; (ii) pMV 22.1; (iii) CV 6.7; (iv) CC 0.91 (p < 0.001); (v) agreement 98.9% in detecting subjects with ABI < 0.90 (kappa 0.95). Differences between ABI values were larger for limbs with PAD (defined as those with ABI < 0.90 in the first assessment; n = 24) compared to those without (0.05 ± 0.10 vs. 0.01 ± 0.07 respectively, p = 0.03). These data suggest that the short-term reproducibility of the automated oscillometric ABI measurement is satisfactory in terms of both repeatability and clinical value in PAD detection.

**PP.17.55 ASSESSMENT OF PATIENTS’ AWARENESS OF HIGH BLOOD PRESSURE IN LITHUANIAN UNIVERSITY OF HEALTH SCIENCES HOSPITAL**
G. Sakalyte, R. Slapikas, R.M. Babarskienë, R. Karaliute, E. Rumbinaite. Lithuanian University of Health Sciences, Department of Cardiology, Kaunas-Lithuania

Objective: to assess awareness of arterial hypertension (AH) with respect to both the systolic and diastolic component of blood pressure (BP).

**Design and Method:** The study was performed in Lithuanian University of Health Sciences hospital, Department of Family Medicine and Department of Cardiology. Anonymous questionnaires were distributed among 700 randomly selected patients. The response rate was 76% (534/700). The original questionnaires supplied information on the patients’ demographics, cardiovascular status, sources of information on AH, knowledge about medical terms concerning BP and most recent self-reported BP measurements and their assessment.

**Results:** Patients were asked to identify the meaning of the terms “arterial hypertension”, “systolic BP”, and “diastolic BP”. Most of the respondents (90%) correctly identified the term AH as the meaning of “high blood pressure.” Conversely, only 41% chose the correct meanings of the terms “systolic BP” and “diastolic BP”. Most of the respondents correctly indicated the normal levels for systolic (90%) and diastolic (88%) BPs. The respondents’ subjective evaluation of their BP matched our objective BP evaluation in 56.3% of cases (kappa = 0.347; p = 0.005). Self-reported BP levels were uncontrolled in more than one-half (59.8%) of the patients. 56.3% of these patients labeled their BP as “high”, and 20% as “borderline high”. 14.2% of the respondents reported that their BP was “borderline-high”. Only 12% of these respondents labeled their reported BP as “borderline-high”. 83% of the patients with “borderline-high” BP believed their BP level was normal. Reported BP was normal in nearly one-third (26%) of the patients. Most patients with controlled BP correctly labeled their BP as “normal” (87%). We also sought to explore sources of information used by people with AH. The majority of the respondents (52.1%) reported physicians as the main source of information about AH. Other reported sources were: TV/radio (40.6%), popular press (29.8%), relatives (29.6%), medical literature (26.8%), internet (24.7%), friends (20.2%), and nurse (13.7%). The knowledge score was statistically significantly greater among patients who reported physicians as one of the sources of information about AH than among patients who reported other sources of such information (p = 0.048).

**Conclusions:** More than one-half of all respondents correctly assessed their self-reported BP. Recipients of information on AH from a physician, had more knowledge than those who receive information from other sources.
Methods: A systematic review is made of the studies reporting on double-arm measurements and the association of IAD with procedure characteristics (Medline/PubMed, Embase and Cochrane Library).

Results: The average absolute IAD was 5.4 mmHg (95% CI 2.1-8.7 mmHg) and 3.6 mmHg (95% CI 1.2-6.0 mmHg) for systolic and diastolic BP, respectively. Of all subjects 16 % (95% CI 10.2-21%) had a systolic IAD ≥ 10 mmHg, 10% (95% CI 5.1-15.9%) a diastolic IAD ≥ 10 mmHg and 6% (95% CI 2.1-10%) a systolic MV ≥ 20 mmHg. Measurement with an automatic BP monitor led to a lower prevalence of systolic IAD ≥ 10 mmHg (13% [95% CI 1-25%]) lower, p < 0.05, diastolic IAD ≥ 10 mmHg (14% [95% CI 1-25%]; p < 0.01) and systolic IAD ≥ 20 mmHg (9% [95% CI 3-15%]; p < 0.01) than when a manual device was used. Simultaneous double arm measurements led to a 14% (95% CI 4-23%) lower prevalence of systolic IAD ≥ 10 mmHg (p < 0.01) than obtained with sequential measurements. The systolic IAD ≥ 10 mmHg prevalence decreased by 2.2% (95% CI 0.4-4.0%) with each extra double-arm measurement used to assess IAD (p < 0.03).

Conclusion: Screening for IAD of BP is important but the measurement methodology has a major influence on IAD results. For preventing overestimation and observer bias IAD should be assessed simultaneously at both arms, with an automatic device and multiple readings should be taken.

Higher physical activity is associated with lower nighttime systolic blood variability: A cross sectional study

G. Wuerzner1, M. Bochud2, M. Pruijm1, C. Zweiacker1, S. Tremblay1, M. Burnier1.

Background: Several studies have reported that increased short-term blood pressure variability (BPV) is associated with target organ damage and with poor cardiovascular outcome. It has been suggested that physical activity is a determinant of BPV. The objective of this analysis was to study the relation between physical activity and systolic BP variability during daytime and nighttime. Design: Cross-sectional study in patients referred for ambulatory blood pressure monitoring (ABPM). Methods: Physical activity (steps, standard metabolic equivalent (MET), active energy expenditure (AEE)) and blood pressure (BP) were recorded simultaneously for 24 hours using validated actigraph and ABPM devices. Wake up and bed times recorded from the actigraph were used to define daytime and nighttime BP. To assess the relationship between physical activity and BPV, Spearman’s rank correlation coefficient was used. If significant, the relation was adjusted for sex, age, mean 24 hour blood pressure and the use of antihypertensive drugs.

Results: 103 ABPM and physical activity recordings were available for analysis. 66% of the patients were males, 83% had hypertension of which 64% were treated. Mean age (± SD) was 55.1 ± 15.2 years, mean BMI was 26.8 ± 4.5 Kg/m2. Mean daytime systolic, diastolic BP and heart rate were 135.6 ± 16.6mmHg, 88.5 ± 12.2 mmHg and 80.1 ± 10.7 bpm. Mean nighttime systolic, diastolic BP and heart rate were 117.1 ± 13.7 mmHg, 71.7 ± 8.6 mmHg and 65.6 ± 9.9 bpm. Nighttime systolic BPV was associated negatively with the total number of steps, METS and AEE and positively with the homeostatic metabolic (HOMA) index (p < 0.05 respectively) (Figure 1). The association persisted after correcting for potential confounders.

Conclusion: Nighttime systolic BPV was negatively associated with physical activity. A decreased sympathetic drive secondary to increased daytime physical activity may explain these findings. Further studies are needed to explore whether these relationships are causal.

Dynamics of the circadian blood pressure profile in patients with arterial hypertension receiving rilmenidine monotherapy

E. Velizhanina, A. Rudakov. Tyumen Cardiology Center, Tyumen-Russia

The methods of influence on central mechanisms of blood pressure control are not widely used in treatment of arterial hypertension.

Objective: To assess the dynamics of the circadian blood pressure profile in patients with arterial hypertension degree II and low and medium risk of vascular complications after 4 and 8 weeks of receiving rilmenidine monotherapy.

Methods: The study included 36 men with arterial hypertension degree II (mean age 33.31 ± 1.6 years). Rilmenidine was prescribed to young and active men as a monotherapy after the clinical examination. The dose was 1 mg per day, dose titration was up to 2 mg per day. Patients underwent office blood pressure and ambulatory 24-hour blood pressure monitoring (ABPM) measurement in dynamics using MEDITEX, ABPM (Hungary) device.

Results: Significant reduction in systolic and diastolic office blood pressure was observed after 4 weeks of rilmenidine therapy. The target level of office blood pressure was achieved in 68.7% of patients after 4 weeks of the therapy and in 87.5% of patients after 8 weeks of the therapy. The dose of rilmenidine was 1 mg per day for 27 patients. After 4 weeks of the therapy the dose was increased to 2 mg per day for 9 patients. According to the ABPM data, the statistically significant reduction of the daily average systolic and diastolic blood pressure, heart rate and systolic and diastolic blood pressure time and area indices was detected after 4 weeks of the therapy. The significant decrease in diastolic blood pressure variability was revealed in the daytime period. No adverse events were detected in the period of observation. Patients had high adherence to the treatment.

Conclusion: The significant antihypertensive effect of rilmenidine especially during the active wakeful state in increased sympathetic nervous system activity was noted.

The influence of chronotherapy on circadian blood pressure rhythm in hypertensive patients

E. Fedorova1, V. Gorbunov1, E. Platonova2, A. Deev1, V. Belolipetskaya1. National Research Centre For Preventive Medicine, Moscow-Russia, 2Diagnostic policlinic 5, Moscow-Russia

Objective: The aim of the trial was to study the influence of morning (M) and evening (E) antihypertensive drugs (AHD) intake on circadian blood pressure (BP) rhythm in stable hypertensive patients (pts).

Methods: 44 pts (age 62.1 ± 1.9, 20 males, mean day-time ambulatory BP (ABP) > 135/85 in each pts) were enrolled in two similar open cross-over randomized studies (14 pts were treated by verapamil, mean daily dose — 240.0 ± 16.3 mg and 30 – by ramipril, mean daily dose — 8.9 ± 0.7 mg). The duration of the initial wash-out period was 2 weeks, the treatment courses — 3 weeks, the interval between courses – 1 week. AHD were administrated in the M at 9.00 and in the E at 21.00. ABPM with Spacelabs 90207 was performed initially and at the end of each treatment period. ABPM-FIT and CV-SORT software was used for the preliminary ABP data analysis including Fourier transformation. We analyzed about 50 rhythm variables including nocturnal BP fall (nBPf), mesors, amplitudes (AMP), acrophases (ACR), percent of rhythm (%R), which indicates how well Fourier fitting estimates the BP variability. Mahalanobis distance and t-criterion were used to determine the individual value (M vs. E) for each variable. The analysis was performed separately for each trial. After that the data of two studies were summarized.

Results:

Table 1: The main rhythm variables changes for mean BP.

<table>
<thead>
<tr>
<th>Regime</th>
<th>nBPf (M ± m)</th>
<th>AMP (M ± m)</th>
<th>ACR (M ± m)</th>
<th>% R (M ± m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>basis</td>
<td>10.0 ± 1.0</td>
<td>10.1 ± 0.5</td>
<td>15.5 ± 0.5</td>
<td>53.3 ± 1.5</td>
</tr>
<tr>
<td>M</td>
<td>10.8 ± 1.0**</td>
<td>10.1 ± 0.8**</td>
<td>14.3 ± 0.8*</td>
<td>50.0 ± 2.3*</td>
</tr>
<tr>
<td>E</td>
<td>14.1 ± 1.0***</td>
<td>13.1 ± 0.6**</td>
<td>16.2 ± 0.7**</td>
<td>56.1 ± 2.2**</td>
</tr>
</tbody>
</table>

(Treatment vs. no treatment: *p < 0.05; **p < 0.01; M vs. E
*p < 0.05; ***p < 0.01)
Conclusions: E AHD intake modifies the main rhythm variables towards dipper pattern. These changes indicate the decrease of spontaneous BP variability after E administration of both drugs.

PP.17.60  OFFICE AND AMBULATORY BLOOD PRESSURE MEASUREMENTS: CONCEPTIONS AND MISCONCEPTIONS OF BELGIAN PHYSICIANS (SHARE-BELGIUM)

A. Persu1 P. Van der Niepen1, on behalf of the Supporting Hypertension Awareness and Research Europe-wide (Share) Steering Committee. 1Department of Cardiology, Cliniques Universitaires Saint-Luc, Université Catholique De Louvain, Brussels-Belgium, 2Department of Nephrology and Hypertension, Universitäts-Ziekenhuis Brussel, Brussels-Belgium

Background: Appropriate blood pressure (BP) measurements and interpretation of BP readings are a fundamental prerequisite for the diagnosis and management of hypertension. The Supporting Hypertension Awareness and Research Europe-wide (SHARE) survey aimed to investigate the current situation in hypertension management in Europe (Redon J. et al., J. Hypertens. 2010. 28:e210-11). In Belgium, the survey included additional questions about office and ambulatory BP measurements.

Objectives: To analyze conceptions and attitudes of Belgian physicians towards office and ambulatory BP measurements.

Design and Methods: Physicians from Belgium were invited to complete the SHARE-Belgium survey between May 2009 and July 2010. Appropriate T-tests and Chi-Square tests were used to compare physician's response.

Results: The survey was completed by 293 physicians (age: 49.9 ± 11.1 years, 72% men) including 68% general practitioners (GPs), 22% of cardiologists (C) and 10% other specialists. Eighty-five % thought that ESH-ESC BP targets (< 140/90 mmHg) were “about right” or “not tight enough”. Ninety-three % took into account both systolic and diastolic BP in the management of their hypertensive patients. However, their preferred guide was systolic BP in only 58% of cases (GPs: 46% vs. C: 93%; p < 0.01). A majority of physicians regularly recommended 24h ambulatory BP measurement (57%; GPs: 48% vs. C: 76%; p < 10^-3) and home BP measurement (84%; GPs: 79% vs. C: 95%; p = 0.004). When asked whether BP target for diurnal ambulatory BP is < 135/85 mmHg or < 140/90 mmHg, only 50% chose the lower goal. A slight majority (54%) recommended arm rather than wrist BP devices. While 59% claimed that they know whether the BP devices they recommend have undergone independent validation, when asked on what basis, i.e “EC certification”, “bought in pharmacy” or “recommended on the “www.dableducational.com” website, the distribution of answers was 61%, 26% and 13%, respectively.

Conclusions: A large majority of Belgium physicians are aware and accept the office BP goals proposed by the ESH-ESC guidelines and value the additional information provided by ambulatory BP measurements. However, 40% under-estimate the ambulatory BP targets, over 40% still recommend wrist devices for home BP measurement, and only a small minority knows how to check that home BP devices are validated. Furthermore, the majority of Belgian general practitioners still use diastolic BP as preferred guide for treatment. Such misconceptions may lead to underdiagnosis and undertreatment of hypertension and make a substantial contribution to the poor BP control rate in Belgium.

PP.17.61  REPRODUCIBILITY OF NON-DIPPING STATUS IN ACUTE ISCHEMIC STROKE PATIENTS

V. Kotlis, L. Gamvriili, G. Kurilis, G. Gouloupouli, M. Sion. Aristotele University, Thessaloniki-Greece

Objectives: To study nocturnal blood pressure fall in acute ischemic stroke (AISTR) patients.

Methods: 85 consecutive patients who hospitalized for AISTR were examined. 24h blood pressure monitoring was performed for the first 3 days after admission at the hospital. Patients were diagnosed for AISTR from their onset of symptoms during the last 24h and the diagnosis was confirmed with CT or MRI. Patients were classified as risers if their nighttime SBP was higher than daytime SBP; dippers if the difference of daytime and nighttime SBP was higher than the 10% of the daytime SBP and lower than 20%, extreme dippers if the difference of daytime SBP and nighttime was higher than the 20% of daytime values and finally non-dippers if difference of daytime minus nighttime was lower than the 10% of the daytime SBP. Daytime to nighttime SBP was also calculated during each day of blood pressure monitoring. Nighttime was defined as the time from midnight to 6:00 and daytime from 6:00 to 22:00 hours.

Results: Average clinic systolic BP during the three days was found 145.1 ± 23.6 mmHg and diastolic BP 81.5 ± 13.1 mmHg. Average 24h systolic BP during the three days was found 142.2 ± 22.1mmHg and 24h diastolic BP 78.0 ± 10.5mmHg. No statistical significant differences were found in day to nighttime SBP ratio (1.026 ± 0.083 for day 1, 1.029 ± 0.07 for day two and 1.034 ± 0.086). Percentage of dippers, non-dippers, extreme dippers and risers is reported in the figure.

Conclusions: Patient with acute ischemic stroke have an impaired but reproducible nocturnal circadian rhythm.

PP.17.62  COMPARISON OF BLOOD PRESSURE CHANGES IN THE STANDING POSITION AFTER SUPINE-VERSUS SEATED-REST IN ESSENTIAL HYPERTENSIVES

M. Rescaldani, C. Sala, F. Magrini. Heart and Lung Department and Centro Fisiologia Clinica e Ipertensione, Università Di Milano, Milan-Italy

Background: Orthostatic hypotension (OH) in patients with essential hypertension (EH) is hardly detectable in clinical practice, as the procedure is time-consuming. In EH subjects we measured blood pressure (BP) changes from seated to active standing (Up/seated) and from supine to standing (Up/supine) during an office visit in order to detect OH (systolic and/or diastolic BP decline > 20/10 mmHg, respectively, within 3 minutes of standing from the supine position) and evaluate the corresponding BP falls in the Up/seated posture.

Methods: In 462 treated EH (age 61 ± 0.6 yrs, M/F = 230/232, BMI 27 ± 0.2 kg/m², drugs number = 2.2 ± 0.1, diabetics n = 42), BP (sphygmo) and heart rate (HR, pulse rate) were measured within 3 minutes of active standing after a 5 minutes rest both in the seated (Up/steated) and supine position (Up/supine), in a random sequence, during a morning visit.

Results: Table shows means ± sem, * p < 0.05 vs Up/seated values In subjects with OH (n = 103, ΔSBP -27 ± 1 and ΔDBP -4.5 ± 0.6 mmHg from supine to standing), SBP and DBP changes from seated to standing were -9.5 ± 1.0 and + 1.8 ± 0.6 mmHg, respectively. In subjects without OH (n = 359, ΔSBP -5.7 ± 0.5 and ΔDBP + 3.0 ± 0.3 mmHg from supine to standing), SBP and DBP changes from seated to standing were -3.0 ± 0.4 and + 3.7 ± 0.3 mmHg, respectively (p < 0.01 for both for the corresponding changes in OH patients). A correlation was present between BP changes in both standing positions, for systolic BP (r = 0.40) and for diastolic changes (r = 0.25; p < 0.01 for both).

Conclusions: Standing BP changes after a seated rest may largely identify OH in treated EH subjects during a clinic visit; thus, the procedure should be implemented in clinical practice.

PP.17.63  FACTORS ASSOCIATED WITH HOME BLOOD PRESSURE MEASUREMENT

S. Pereira, C. Paulo, M. J. Lima. Hospital De São João, Porto-Portugal

Objective: To evaluate if home blood pressure measurement (HBPBM) is associated with control of blood pressure measured at a physician office and determine the factors associated with HBPBM.

Design and Methods: We selected a convenience sample of 74 patients attending a hypertension (HTN) clinic in a public university hospital, which included all patients observed by one of the authors, during an official year, excluding first consultations. We collected data on demographic variables, cardiometabolic diseases and antihypertensive drugs use. Age was grouped in less than 65 and 65 years or older. Obesity was defined as a body mass index equal or greater to 30kg/m².
m². Blood pressure (BP) control at office was considered a BP in last visit lower than 140/90 mmHg. HBPM was considered having blood pressure self-monitoring preceding last consultation. The Student t test was used for analyzing continuous variables and the chi-square was used for categorical variables. A P < .05 was considered significant. Statistical analysis was performed using SPSS package.

Results: Forty four patients (59.5%) were females; the mean age was 59.2 ± 14.2 years. HTN was classified as secondary in 6 (8.1%) out of 69 patients. HTN was controlled at office in 41 patients (55.4%). Sixteen (21.6%) patients had HBPM. The prevalence of HTN control at office was similar in patients who had and had not HBPM (43.8% Vs 58.6%, p = .219). HBPM prevalence was similar in males compared to females (30% Vs 15.9%, p = .124), in older compared to younger than 65 years (25.8% Vs 18.6%, p = .322), in secondary compared to essential HTN (33.3% Vs 22.2%, p = .425), as in those staying in consultation more than one year compared to staying one year or less (19% Vs 25%, p = .368). HBPM was significantly more frequent in patients with dyslipidemia (31.8% Vs 6.7%, p = .009) and with cerebrovascular disease (41.2% Vs 15.8%, p = .033). Its frequency was similar in diabetics (26.3% Vs 20%, P = .389), patients with kidney disease (20.8% Vs 22%, p = .582) and coronary diseases (20% Vs 21.9%, p = .630), heart failure (23.1% Vs 21.3%, p = .572), obstructive sleep apnea (23.1% Vs 21.3%, p = .572) and obesity (18.8% Vs 26.9%, p = .298). Number of antihypertensive drugs was similar in those who had HBPM compared to those who had not (3.5 ± 1.26 Vs 2.91 ± 1.35, p = .125).

Conclusions: The frequency of HBPM by self-monitoring in our sample was 21.6%. HBPM did not affect the prevalence of HTN control at office. Patients with dyslipidemia and with cerebrovascular disease more frequently had HBPM.

PP.17.64 DIFFERENCES IN DAY TIME PULSE PRESSURE VARIABILITY BETWEEN THE BRACHIAL ARTERY AND THE AORTA IN HEALTHY SUBJECTS

Athanase Prostogerou1, Theodoros Papasianou2, Petros Stilakakis1, Jacques Blacher1, Emmanuel Karatzis1, John Lekakis1, Dimitris Papadopoulous1, Chistodoul Stefanadis1, Michel Safar3. 1Hypertension Center and CV Research Laboratory, 1st Dept. of Propaeutic Medicine, Laikon Hospital, Athens-Greece, 2Biomedical Engineering Unit, First Dept. of Cardiology, Hippokration Hospital, Athens-Greece, 3Paris Descartes University; AP-HP; Diagnosis and Therapeutic Center, Hôtel-Dieu, Paris-France, 2nd Dept. of Cardiology, Attikon Hospital, Athens-Greece

Background: Brachial blood pressure (BP) variability is a risk factor, but also a source of inaccuracy for the assessment of PB-related cardiovascular risk. PP differs substantially in simultaneous measurements at the brachial artery and the aorta. This is of clinical importance regarding accurate cardiovascular risk assessment and reduction strategies. Whether the brachial and the aortic PP time variability is similar, and whether the AIB PP disparity varies during the day is not known.

Aim: To search for: (i) potential differences in the within-subject pulse pressure (PP) day time variability between the brachial artery and aorta; (ii) the presence of substantial day time variation in the aortic-to-brachial (AIB) PP disparity. Methods: In 13 healthy volunteers hourly assessment of brachial and aortic PP (Sphygmocor Device) was performed (8:00 to 19:00) under controlled conditions at home.

Results: Aortic PP day variability was consistently and significantly lower than brachial PP (assessed by: standard deviation, variance and time rate variation index, p < 0.05 for all). Individual AIB PP difference (brachial – aortic PP, mmHg) varied substantially within all the 13 subjects; a significant variation during the day in the AIB PP amplification (defined as brachial/aortic PP) was evident (p = 0.006).

Conclusions: By taking into account both time and arterial space important physiological differences in PP variability between the brachial artery and the aorta was observed. These novel findings suggest that non-invasive 24-hour aortic ambulatory BP monitoring is warranted in order to significantly improve CV risk assessment and reduction strategies. This possibility must be tested in future clinical studies.

PP.17.65 GENDER DIFFERENCES AND TIME RATE OF BLOOD PRESSURE VARIATION

E. Koroboki, E. Manios, G. Barlas, F. Michas, E. Alexaki, A. Panoutsopoulos, V. Chouzouris, K. Vemmou, N. Zakopoulos. Hypertension Center, Clinical Therapeutics, Alexandra Hospital, Athens, Athens-Greece

Objective: Time rate of blood pressure (BP) variation derived from ambulatory blood pressure monitoring (ABPM), has been associated with the extension of target organ damage in essential hypertension. On the other hand, many studies have shown gender differences in essential hypertension explained by the specific role of the sex hormones. However, little is known about gender differences concerning blood pressure variability.

Design and Method: A total of 3850 consecutive, untreated subjects referred to our department due to abnormal casual blood pressure measurements, underwent 24-hour ABPM. The time rate of systolic BP (SBP), diastolic BP (DBP) and heart rate (HR) variation was computed as the first derivative of the SBP, DBP and HR values against time, respectively.

Results: The study population consisted of 1881 men (mean age = 46 ± 23) and 1969 women (mean age = 49 ± 23). No differences existed between the two groups regarding body mass index. Statistical analysis revealed that women presented significantly higher time rate of HR 24h (0.40 ± 0.27 vs 0.38 ± 0.18, p < 0.001), significantly higher time rate of HR during daytime (0.47 ± 0.23 vs 0.44 ± 0.23, p < 0.001) and during morning surge (0.42 ± 0.25 vs 0.39 ± 0.28, p = 0.006) as well as higher daytime time rate of DBP (0.51 ± 0.33 vs 0.49 ± 0.17, p = 0.038) compared to men. Men presented significantly higher time rate of SBP (0.58 ± 0.32 vs 0.54 ± 0.22, p < 0.001) and time rate of DBP (0.48 ± 0.25 vs 0.46 ± 0.19, p = 0.003) during morning surge, as well as significantly higher nocturnal time rate of SBP (0.54 ± 0.22 vs 0.50 ± 0.52, p = 0.01) and DBP (0.44 ± 0.19 vs 0.4 ± 0.42, p = 0.003) compared to women.

Conclusion: The present data show that there are gender differences regarding time rate of blood pressure and heart rate variation which might explain a different cardiovascular profile in men and women.

PP.17.66 BLOOD PRESSURE MONITORING AND LVM IN CENTENARIANS

D. Solari1, S. Carage1, A. Esposito1, A. Pernigotti1, C. Redaelli1, M. Maisardi1, F. Magrini1, G. Mancia1. 1Thoraco-Pulmonary and Cardiovascular Dept, Policlinico; Pio Albergo Trivulzio; Univ of Milan, Milan-Italy, 2Thoraco-Pulmonary and Cardiovascular Dept, Policlinico Ca’ Granda, University of Milan, Milan-Italy, 3Dept of Clinical Medicine, University Milano-Bicocca, S. Gerardo Hospital, Monza-Italy

Objective: Few studies report the correlation between 24-h blood pressure profile and left ventricular structure in very elderly (over 100 ys). The aim of this study was to evaluate left ventricular mass (LVM) and 24-h ambulatory blood pressure monitoring (ABPM) in a group of centenarians.

Design and Method: We studied 17 patients (16 females and 1 male) hospitalized in our Geriatric Institute (Pio Albergo Trivulzio of Milan) aged over 100 ys (mean age 103 ys; range 100-106 ys). They underwent a clinical visit including BP and HR values, blood samples, EKG, echocardiogram and 24-h ambulatory BP. Clinically blood pressure was the mean of three measurements and ambulatory blood pressure monitoring was performed with Spacelab device. Left ventricular hypertrophy (LHV) was defined by two gender-specific criteria (LVM ≥ 125 g/m² in men and 110 g/m² in women, LVM ≥ 51 g/m² in men and 47 g/m² in women). During the study, 4 patients died and therefore they didn’t undergo echocardiogram.

Results: We observed that prevalence of hypertension and cognitive impairment were respectively 71% (12 pt) and 53% (9 pt). 50% of subjects with an history of hypertension was affected by cognitive impairment, and 67% of patients with cognitive impairment showed an anamnes of hypertension. 85% of patients (11 pt), both with an history of hypertension and without, showed a concentric LHV and the others (2 pt - 15%) had a concentric remodelling (mean LVM: 131.9 ± 28 g/m²; 58.8 ± 13.2 g/h2.7). Mean clinic blood pressure, day-time BP and night-time BP were 115.3 ± 17.9/76.7 ± 8.3 mmHg, 124.9 ± 14/86.6/6.7 ± 7.5 mmHg, 120.3 ± 17.2/60.4 ± 5.4 mmHg, respectively. Mean clinic HR, day-time HR and night-time HR were 75.2 ± 11.2, 77.9 ± 12.1, 72.9 ± 13.3 bpm. Clinic pulse pressure was 47.6 ± 13.5 mmHg; all patients showed a non-dipping profile, especially for systolic blood pressure, and a low HR variability.

Conclusions: Our results suggest that also centenarians, like between VII and IX decade of life, are characterized by concentric LHV remodelling and reduction of HR and BP variability, in accordance with well-known paradoxic modifications of cardiovascular system with aging. Instead, we observed a normalisation of pulse pressure. Finally, in our study we didn’t find a correlation with history of hypertension and development of cognitive impairment.

PP.17.67 A METHOD TO IMPROVE EFFICACY OF ABPM IN EVALUATION OF HYPERTENSION

S. Pekarskiy, V. Mordovin, G. Semke, T. Ripp. Tomsk Research Institute of Cardiology, Tomsk-Russia

Abstracts e309
More than 2/3 of ABPM data analysis is based on separate calculations for daytime/nighttime periods and currently may not be done accurately in automated mode because of high individual variability of daytime/nighttime periods. We used analysis of ABPM data as time function to recognize individual daytime/nighttime patterns and thereby develop a new method of ABPM data analysis allowing automatic assessment of daytime/nighttime BP.

Objective: To evaluate whether the new method of automated ABPM data analysis with ability to recognize actual individual daytime/nighttime periods directly from the data may produce BP estimates better related to target organ damage in hypertension than conventional approach.

Methods: One hundred fifty patients with uncomplicated grade II essential hypertension were included in cross-sectional study. Eligible data of 24-h ABPM and echocardiography were obtained in 54 men, 43 women aged 34-64. Running total of HR after subtraction of 24-h HR average is a time function that gradually increases during daytime activity, decreases during nighttime rest and increases again during next daytime so that its primary maximum/minimum precisely marks the actual start/end of individual nighttime allowing accurate assessment of daytime/nighttime BP. This algorithm was implemented as combination of sheet functions in MS Excel program. Then we assess relationship between left ventricle mass index (LVMI) and daytime/nighttime BP means obtained by 1) new method using individual daytime/nighttime autodetected from 24-h HR profile; 2) conventional ABPM data analysis using sleep time from patients diaries.

Results: Both methods produced daytime BP means significantly related to LVMI. However, nighttime BP means were significantly related to LVMI when obtained by new method only and not related with conventional analysis: Pearson R = 0.31/0.26; p = 0.002/0.01 vs R = 0.08/0.10; p = 0.44/0.33 (new vs conventional, systolic/diastolic respectively). These relationships remained significant in multiple regression model after inclusion of age, gender, weight and height as covariates: partial r = 0.45/0.52; p = 0.01/0.04 vs r = 0.23/0.30; p = 0.18/0.26.

Conclusions: New method of automated ABPM data analysis based on recognition of individual daytime/nighttime periods from 24-h HR profile allows more accurate evaluation of hypertension than conventional approach.

PP.17.68 ESTIMATION OF CENTRAL SYSTOLIC BLOOD PRESSURE FROM ARM CUFF PRESSURE.

A. Gaikther1, S. Breit1, B. Clapp2, P. Chowienzycki3. 1King's College London, Cardiovascular Division, London, UK, 2Royal United Hospital, Bath, UK, 3University College London, London, UK

Objective: Central systolic blood pressure (cSBP) is usually estimated by application of a transfer function (TF) to a peripheral arterial waveform calibrated from measurements obtained from an arm pressure cuff. The aim of the present study was to determine whether cSBP may be derived directly from pressure waves within the arm.

Methods: We compared estimates of cSBP obtained using a TF from a peripheral arterial waveform acquired non-invasively with a servo-controlled finger cuff and those obtained by application of a TF to arm cuff pressure waveforms with measured values obtained using a high fidelity Millar pressure tipped catheter placed at the proximal arterial root in 29 subjects (at the time of cardiac catheterisation for diagnostic angiography and/or angioplasty). Measurements were made at baseline and after nitroglycerin (400 μg sublingually). Waveforms were calibrated from arterial intra-arterial mean and diastolic blood pressure.

Results: Both methods gave close agreement between estimated and measured cSBP: mean difference (SD) 0.3 (4.6) and -0.1 (6.4) mmHg for digital arterial waveforms and arm cuff waveforms respectively.

Conclusion: These results suggest that cSBP can potentially be determined directly from an upper arm blood pressure cuff with similar accuracy to that obtained using a non-invasively acquired arterial waveform. Measurement of cSBP using a single upper arm cuff as used for the usual oscillometric determination of BP should therefore be possible with acceptable accuracy.

PP.17.69 THE IMPORTANCE OF 24-OUR AMBULATORY BLOOD PRESSURE MONITORING IN TAKAYASU ARTERITIS.

O. Sivakova, N. Chkhidze, A. Rogoza, I. Chazova. Cardiology Research Complex, Moscow, Russia

The absence of nocturnal blood pressure (BP) fall is associated with increased cardiovascular risk. The circadian rhythm has been widely studied in essential hypertension but not in Takayasu arteritis (TA) - chronic inflammatory large-vessel vasculitis that occurs predominantly in young females.

Objective: to evaluate circadian BP rhythm in pts with TA.

Materials and Methods: 52 patients with TA; aged 17 to 76 years (42.7 ± 14.6 years) were studied. Among them only in 10 patients with absence of significant stenosis of subclavial arteries it was possible to perform 24-hour ambulatory blood pressure monitoring (ABPM, device BpLab by Russia, PTeleign).

Results: Prolonged stenosis of carotid arteries were detected at all 10 patients by ultrasound doppler. In 8 cases - coexisting with lesion of abdominal aorta, in one case coexisting with renal arteries stenosis. Disease activity has been found in 8 pts. All patients received the antihypertensive drug combination and steroids. According to clinical measurement target BP level have been reached by 9 pts.

Daytime systolic (SBP) and diastolic (DBP) BP were 130 ± 19 and 70 ± 11 mm Hg, respectively. Nighttime SBP was 125 ± 25.4 mm Hg, SBP and DBP variability was 14.5 ± 4.3 and 9.9 ± 2.1 mm Hg, respectively. Individual analysis detected systolo-diastolic arterial hypertension (AH) in day or night time in 8 pts, isolated systolic AH - in 2 pts. Non-dipping status on the base of SBP was detected in 6 pts, in 4 pts-by DBP.

Conclusions: In spite of achieved clinic target BP level, occurrence of non-dipping status was high in pts with TA. That is why ABPM is important in this group pts.

PP.17.70 BLOOD PRESSURE AND GLOBAL RISK ASSESSMENT

J. Eckner1, C.A. Larsson2, E. Bog-Hansen1, L. Rastam2, U. Lindblad1. 1University of Gothenburg, Gothenburg-Sweden, 2Lund University, Malmö-Sweden

Objective: To identify people with high blood pressure for medical treatment a global risk assessment is critical. We compared SCORE to clinical categorisation using JNC7.

Design and Method: In 2001-2005 a random sample of residents aged 30-74 years in the municipalities of Vara and Skövde, South-western Sweden, were invited to a survey of cardiovascular risk factors. In all 1811 participants in Vara (participation rate 81%) and 1005 participants in Skövde (70%) were enrolled, and of these we selected those aged 40-65 years for this study. This study entails a detailed phenotypic characterization by anthropometric measures, lipids and glucose (oral glucose tolerance test). Blood pressure was measured twice and the mean was used for analyses. Definite hypertension was based on ongoing medication, or three consecutive readings ≥ 140 mmHg systolic and/or ≥ 90 mmHg diastolic. If the blood pressure was high at the first visit, but < 140 mmHg and < 90 mmHg at visit 2 or 3, the blood pressure was categorised as unstable. Validated questionnaires were employed for lifestyle (smoking), socio-economy and stress. Blood pressure categorization is based on the JNC7 classification. Global risk of 10 year CVD death is estimated first using a modification of the Swedish chart for originally SCORE, and then the SCORE accounting for diabetes risk.

Results and Conclusions: In all 1593 subjects, 784 men (49%) and 809 women (51%) were included. Mean SCORE in men was 1.0 (SD 0.9), and 0.3 (0.9) in women, respectively. Hypertension compared to optimal blood pressure was 1.5 (1.1) vs 0.9 (1.1) p < 0.001 in men, and 0.5 (0.5) vs 0.3 (0.5) in women p = 0.001. Corresponding findings for unstable blood pressure vs optimal was, 1.9 (1.0) vs 0.9 (1.1) p < 0.001 in men, and 0.7 (0.5) vs 0.3 (0.5) p < 0.001 in women. When SCORE also accounted for diabetes the same pattern remained, however, differences were more pronounced. SCORE in normal and high normal blood pressure did not differ from optimal blood pressure. Our study confirms the current blood pressure guidelines given that repeated readings are employed for the diagnosis of hypertension, and that high random blood pressure values should be carefully evaluated for global risk.
difference between clinical and ambulatory blood pressure (CABP) level in patients with arterial hypertension (AH).

**Design and Methods:** We analyzed 252 ambulatory blood pressure monitoring (ABPM) data of patients with AH. The CABP discrepancy was assessed as the difference between clinical BP measurement and mean daytime BP. The inclusion criteria were: wash-out period; ABPM (SpaceLabs 90207) before and after treatment; 2-3 months treatment period with mean therapeutic doses. The BB group included betaxolol and metoprolol receiving patients (35), ARA group - losartan and telmisartan (34), ACEI group - captopril and enalapril (35), AC group - amldopine (30). We used Spearman Partial Coefficient for correlation analysis adjusted for age, sex and duration of AH.

**Results:** We found that all antihypertensive drugs significantly decreased systolic and diastolic BP (SBP, DBP) level: see table (M ± SD). BB significantly reduced difference between systolic and diastolic clinical and ambulatory blood pressure (SCABP and DCABP accordingly), ACEI – only DCABP discrepancy.

**Conclusion:** BB reduced difference between clinical and ambulatory blood pressure ACEI – only diastolic CABP discrepancy.

**PP.17.72 | BP VARIABILITY, CARDIOVASCULAR RISK FACTORS AND ANTIHYPERTENSIVE MEDICATIONS.**

J. Al-Said, K. Mzyzen, A. Kouba. 'Bahrain Specialist Hospital, Manama-Bahrain

**Aim of the Study:** (A) Identify the relation between BP variability and single and cumulative cardiovascular risk factors. (B) Identify the relation between BP variability and different single and combined antihypertensive medications. BP variability is either represented by (1) standard deviation of systolic and diastolic BP readings. (2) Diurnal and nocturnal difference in systolic and diastolic BP.

**Methodology:** Medical Chart review of outpatient Ambulatory BP measurement for uncontrolled Hypertensive patients. Data including: age, gender, BMI, presence of DM, coronary artery disease (CAD), Hyperlipidemia, stroke, chronic Kidney Disease (CKD) and Hyperturcemia were recorded from the medical charts. Medications used were also obtained.

**Results and Conclusion:** Diabetes was the only variable related directly with systolic standard deviation. There was a significant correlation between BP variability encountered with Diurnal and nocturnal diastolic BP. CAD and CKD were inversely related with the difference in Diurnal and Nocturnal systolic and diastolic BP. Beta blockers were directly related to diurnal and nocturnal BP in systolic and diastolic BP. Diuretics were inversely related with the difference in systolic and diastolic systolic BP.

**PP.17.73 | PROGNOSTIC SIGNIFICANCE OF MASKED AND WHITE-COAT HYPERTENSION IN THE GENERAL POPULATION: THE FINN-HOME STUDY**


**Objective:** The clinical significance of masked and white-coat hypertension is still somewhat controversial. The aim of the present study was to investigate the prognosis of masked and white-coat hypertension using home blood pressure (BP) measurement.

**Design and Methods:** A multidisciplinary epidemiological survey, the Health 2000 study, was carried out in Finland during 2000 and 2001. A nationally representative sample of 8,028 individuals was drawn from the population registries of the country. A subsample of 2,046 individuals was selected to participate in the home BP measurement substudy. After excluding individuals with < 14 BP measurements at home or missing laboratory or health examination data, the study population consisted of 2,046 individuals. At baseline, body mass index, smoking, drinking, diabetes, hypercholesterolemia and previous cardiovascular disease were determined.

Office BP was measured by a trained nurse using a mercury sphygmomanometer and averaged over two measurements. Duplicate self-measurements at home were taken with a validated, automatic oscillometric device (Omron HEM-722C) for 7 days. Masked hypertension was defined as office BP < 140/90 mmHg with home BP ≥ 135/85 mmHg and white-coat hypertension as office BP ≥ 140/90 mmHg with home BP < 135/85 mmHg. The end point consisted of cardiovascular mortality, nonfatal myocardial infarction, nonfatal stroke, hospitalization for heart failure, percutaneous coronary intervention, or coronary artery bypass graft surgery.

**Results:** After a mean follow-up of 8.2 years, 227 events were recorded. The incidence of cardiovascular events increased progressively from normotension to white-coat, masked and sustained hypertension. In age and gender adjusted Cox model, both masked and sustained hypertensives had significantly higher cardiovascular risk than normotensives (hazard ratios 1.64, p = 0.04 and 1.78, p < 0.001, respectively). When we adjusted Cox model for age, gender and office BP, the risk remained significantly higher in masked hypertension than in normotension. Masked hypertension lost its predictive significance in Cox models adjusted for age, gender and either home BP or concomitant other cardiovascular risk factors.

**Conclusion:** Neither masked nor white-coat hypertension was an independent predictor of cardiovascular risk when concomitant other risk factors or baseline home BP levels were taken into account. The present study suggests that home BP level, along with other traditional risk factors, may be enough to stratify cardiovascular risk.

**PP.17.74 | THE NORMALIZATION QUOTIENT AVOIDS THE INTERFERENCE FROM SYMPATHETIC IN AMBULATORY BLOOD PRESSURE MONITORING**

G. Malgieri. *Centro Per L’Ipertensione - A1 Boi, Sant’agata Dei Goti-Italy*

**The aim:** of this study is to identify that patient with elevated values of arterial pressure but not hypertensive. Under conditions of psychic-physical stress for the increase of the sympathetic activity, the values of the arterial pressure are increased, but these are not hypertensive patients. The heart rate is a tool recognized of evaluation of the activity of the autonomous nervous system. A contemporary increase of the values of the arterial pressure and the heart rate, therefore, to mean an increase of the sympathetic activity. Dividing the values of the arterial pressure for the values of the heart rate we have the arterial pressure for every pulsation. In this way the arterial pressure becomes independent from the number of pulsations and therefore from the sympathetic stimulations. We have named Normalization Quotient (NQ) the relationship among the average of the 24 hours of the Mean Arterial Pressure (mMAP) and of the Heart Rate (mHR).

**Materials and Methods:** 2170 ABPM tests has been divided in two groups: A with BP < 130/80 mmHg; B with PA > 130/80 mmHg. The mean, the standard deviation (SD), the confidence interval(CI) of the following were calculated: mMAP, mHR, NQ, SDmMAP/SDmHR named Relationship of Variability (RV) between systolic blood pressure (mSBP) and diastolic blood pressure (mDBP), relationship mSBP/mDBP.

**Results:** A group has been individualized (gr E) of 371 patients with equal or inferior mNQ to that of the group A. There is a significant difference (p < 0.001) in the data of the various group. These patients younger and with higher mHR than patient of other two groups.

**Conclusion:** In the diagnosis of essential hypertension it needs to exclude the interference of the sympathetic tone, connected to physical activity and/or daily emotion. The quotient of normalization allows us to falsely individualize the hypertensive patients.

**Table of data with 0.95 CI**

<table>
<thead>
<tr>
<th>Group</th>
<th>n.</th>
<th>mMAP</th>
<th>mHR</th>
<th>NQ</th>
<th>mSBP</th>
<th>mDBP</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>462</td>
<td>89.72</td>
<td>72.49</td>
<td>1.24</td>
<td>120.08</td>
<td>74.95</td>
<td>60.94</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.41)</td>
<td>(0.79)</td>
<td>(0.01)</td>
<td>(0.59)</td>
<td>(0.40)</td>
<td>(1.37)</td>
</tr>
<tr>
<td>B</td>
<td>1337</td>
<td>105.58</td>
<td>72.35</td>
<td>1.46</td>
<td>139.68</td>
<td>88.90</td>
<td>58.76</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.44)</td>
<td>(0.42)</td>
<td>(0.00)</td>
<td>(0.60)</td>
<td>(0.44)</td>
<td>(0.73)</td>
</tr>
<tr>
<td>E</td>
<td>371</td>
<td>100.61</td>
<td>85.89</td>
<td>1.17</td>
<td>130.83</td>
<td>85.91</td>
<td>51.90</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.58)</td>
<td>(0.64)</td>
<td>(0.00)</td>
<td>(0.79)</td>
<td>(0.56)</td>
<td>(1.43)</td>
</tr>
</tbody>
</table>
Results: MH were assessed by logistic regression including gender, age, antihypertensive treatment (when classification was based on ABP) or younger age and antihypertensive treatment (when classification was based on HBP) (See Table).

Table:

<table>
<thead>
<tr>
<th></th>
<th>ICH (%)</th>
<th>MH (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>p</td>
<td>ABP</td>
<td>p</td>
</tr>
<tr>
<td>Gender</td>
<td>16/24</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>(male vs.</td>
<td>14/10</td>
<td>NS</td>
</tr>
<tr>
<td>female)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (&lt; 60</td>
<td>19/19</td>
<td>NS</td>
</tr>
<tr>
<td>median 56</td>
<td>10/14</td>
<td>NS</td>
</tr>
<tr>
<td>years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antihypertensive treatment</td>
<td>18/20</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>no vs. yes</td>
<td>6/15</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

Conclusions: In a Mediterranean population of hypertensive patients HBP and ABP provide a similar but not identical assessment of ICH and MH prevalence. Age, gender and presence of antihypertensive treatment are significant predictors of ICH and MH, with a different impact when HBP rather than ABP monitoring is considered. These findings may have practical implications for the diagnostic evaluation and decision making in hypertensive patients.

Objective: To evaluate risk factors of negative dynamics in resting blood pressure (BP) during first year education in medical school.

Design and Methods: 40 males (M) level 1 medical student 16-26 years (mean 18.3 ± 2.2) and 96 females (F) 16-25 years (mean 17.7 ± 1.4) were included. BP and heart rate (HR) were measured in October 2005, in April 2010 (30 M and 71 F) and in October 2010 (26 M and 65 F). Psychophysiological parameters (logistic perception, active attention – “corrector” probe and Munsterberg’s test, short-term visual memory) and behavior habits were obtained in October 2009. Physiological status and emotional tension value were investigated using the M.Luscher Color Test (1961, 8 color row). “Morningness-eveningness” scale (shortened variant of Horne-Ostberg questionnaire) was used to assess chronotype.

Results: 11.7% of students had moderate over- (body mass index 25-26 g/ m²) and 9.5% low body weight; 22.5% of M and 19.8% of F were smokers. In October in M systolic/diastolic BP mean was 121.4/71.8 mm Hg, in April – 118.8/70.3 (P < 0.01) and in October 2010 - 120.5/67.0 mm Hg (P = 0.02). BP in F didn’t change: 118.5/71.0 mm Hg in October; 117.8/73.0 in April and 115.0/70.2 mm Hg in October 2010, when 12.3% were hypotensive. HR trend was absent both in M and F BP in April only in 26.9% of M was normal. Those (57.7%) with negative BP dynamics more often (40%, P < 0.01) didn’t satisfy with own personality, especially with physical condition, 40% had low flexibility in spine, 40% - sleep disorders, 33% - morning chronotype, 50% - brown iris, 75% of those with keen rise (≥ 20-30 mm Hg) reported gastrointestinal impairments. Psychoemotional tension (interpersonal conflict, blue color position in the Luscher color test, P = 0.02) was higher. 54% of students had attention deficit, 62% - weak short-term visual memory. F were divided into 4 groups: with BP rise (n = 15), BP stable normal (n = 23), BP fall up to hypotension (n = 13) and high variable BP (n = 14). F with BP fall were very similar to M group with BP rise: they had the same psychological and social problems, especially love, sympathy and understanding deficit. Initial BP in this group was significantly
higher (125.4/75.0 mm Hg) and mental skills (attention and speed) – worse, 77% providing more targeting interventions.

**Conclusion:** psychological problems and difficulties in studying at medical school may lead to BP change, but trends in males and females may be contrary. This contributes to take into account gender differences in adaptation for providing more targeting interventions.

**PP.17.78 RELATIONSHIP BETWEEN KIDNEY DAMAGE AND BLOOD PRESSURE MEASUREMENTS IN THE PHYSICIAN’S OFFICE, THE PALMERA STUDY.**


**Objective:** To evaluate the correlation between community pharmacy blood pressure measurement and kidney damage and to compare this relationship with correlations obtained for physician office blood pressure measurement and home self blood pressure.

**Method:** Cross-sectional study attempting to cover the treated hypertensive population, older than 18 years and users of a rural community pharmacy located in Palmera (Valencia, Spain). Blood pressure was measured at 3 different settings: community pharmacy (5 visits), physician office (3 visits) and home (4 consecutive days). The albumin/creatinine ratio was measured on a first urine sample of one morning. To assess the correlation between blood pressure measurements and kidney damage (logarithmic transformation of albumin/creatinine ratio) the Pearson correlation coefficient (r) was used.

**Results:** The study sample was made up of 70 patients. Systolic blood pressure in the pharmacy and at home showed a positive and statistically significant correlation with r = 0.367 and r = 0.309, respectively, P < 0.01. The correlation found at the physician office was lower and not statistically significant (r = 0.221, p = 0.066). Only diastolic blood pressure at home showed a statistically significant correlation with the logarithm of albumin/creatinine ratio (p < 0.05). Correlation between diastolic blood pressure in the pharmacy and log albumin/creatinine ratio was not significant (p = 0.055) but its magnitude was similar to the correlation coefficient estimated for diastolic blood pressure at home (r = 0.230 vs. r = 0.243, respectively) and higher than the correlation coefficient for physician office (r = 0.108; p = 0.376).

**Conclusion:** The correlation between community pharmacy blood pressure measurements and kidney damage in this sample of treated hypertensive patients was positive and statistically significant for systolic blood pressure, but not for diastolic blood pressure. Moreover, these correlations were similar to those for home blood pressure measurements and higher than correlations for physician office blood pressure measurements. These results suggest that the community pharmacy blood pressure measurement method could be a good alternative to assess the hypertensive state of treated patients.

**PP.17.79 CIRCULATORY PATTERNS AND REST/ACTIVITY INDEX: THE CORRELATION WITH VASCULAR RISK IN THE AMBULATORY MONITORING BLOOD PRESSURE**

S. Suarez Ortega, J. Artiles Vizcaíno, B. Alonso Ortiz, A. Gil Diaz, P. Jimenez Santana, Jc. Rodriguez Perez, P. Betancor Leon. Hospital General De Gran Canaria Dr. Negrín, Santa Brigida-Spain

**Objective:** The ambulatory blood pressure monitoring (ABPM) is a suitable method to confirm the diagnosis, to study the circadian rhythm and to analyze the level of control of hypertension. We analyze the ABPM of 780 hypertensive patients, in order to estimate the prevalence of circadian patterns, the rest/activity index and the relationship with vascular risk in the hypertension.

**Design and Methods:** In the course of 3 years we have been an ABPM to 912 hypertensive patients, according to the project Cardiorisk. Characteristics of validity had 780 of 912 ABPM. These are discussed in this presentation. Hypertensive patients evaluated includes a subgroup rated first in an office or with control difficulty. We study the prevalence of circadian patterns, the rest/activity index and the relation to vascular risk with the rest-activity index. Data are analyzed with SPSS 16.

**Results:** The mean age was 52.4 ± 5.3 years with a range of 14-89 years. 404 (51.8%) of 780 hypertensive patients were women. 58 patients (7.4%) had secondary hypertension. The distribution in the classic patterns have been: dipper (304, 38.9%), non-dipper (333, 42.7%), riser (95, 12.2%) and extreme dipper (48, 6.1%). Rest-activity index ranged from 0.65 to 1.97, with a mean value of 0.90; Of the 780 index values 750 values were different, which constitutes almost a different value for each analyzed ABPM. Vascular risk in the value of less than 0.9 (395, 50.6% of hypertensive patients) was distributed in low in 293 (74%) and high in 102 (36%), when the index was greater than 0.9 (385, 49.4%) the distribution of the risk was low in (224, 58%) and high (160, 42%). Establishing a Pearson correlation coefficient between the level of risk (value of 1 to 5) and the rate of 0.192, with p = 0.001, were statistically significant value of < 0.01. If risk is considered as a qualitative variable the Kendall correlation coefficient was also statistically significant. The rest/activity indexconditioned chronotherapeutic change in 385 hypertensive (49%).

**Conclusion:** 1. The distribution of the classic patterns of ABPM is similar to the cases of Cardiorisk project. 2. The ratio activity-rest has a similar meaning to the classic patterns of ABPM, but with more precise meaning. Instead there are 4 patterns there are 750 linear values, which increase the risk so on the index increases. 3. The patterns of ABPM and the rest-activity index provide a suitable method to chronotherapeutic treatment hypertension.

**PP.17.80 MASKED HYPERTENSION PREDICTION IN TREATED HYPERTENSIVE PATIENTS**

M. Smirnova, A. Deev, V. Gorbonov, G. Andreeva. National Research Center for Preventive Medicine, Moscow-Russia

**Objective:** The phenomenon of masked hypertension (MH) may lead to overestimation of the antihypertensive drugs efficacy. The aim of the study was to work out the MH probability evaluation method in treated hypertensive patients (TP) on the base of the randomized cross-over comparative trial.

**Design and Method:** 39 hypertensive patients (20 females, 19 males, mean age 53.7 ± 10.0 years) were enrolled into the study. The duration of the initial wash-out period was 2 weeks; the duration of the each treatment course – 4 weeks; the interval between courses - 1 week. The dose of amlodipine (A) was 5-10 mg once a day, the dose of spirapril (S) – 6 mg once a day. A and S were combined with hydrochlorothiazide (HT) if clinic blood pressure (CBP) exceed 140/90 mm Hg. The standard questionnaire and examination, 12-lead ECG (initially), ambulatory BP (ABP) monitoring, Marburg University “General Well-Being Questionnaire” (GWBOQ) (initially and at the end of both treatment courses) were done. The “MH effect” (the difference between working-time ABP and CBP; MHE) was used as a measure of MH in TP. We used the multivariate regression model of MHE adjusted for A and S intake for the joint analysis of MH predictors. Age, sex, height, weight, body mass index, ECQG indexes of the left ventricular hypertrophy (Sokolov-Lyon index, Cornell voltage index and QRS duration [used in Cornell product]), Gubner index, Romhilt-Estes scores, orthostatic BP (OBP), hypertension duration, previous antihypertensive treatment, combination treatment (A + HT, S + HT), GWBOQ scales, smoking, alcohol intake were examined as MH predictors (more then 40 variables).

**Results:** 30 patients completed all study protocol. The data of 98 observations were analyzed. A and S caused similar antihypertensive effect. The prevalence of MH under A was 43%, under S – 40%. The following joint variables were selected as predictors of the MH probability in TP: age (p < 0.05), sex (p < 0.001), height (p = 0.069), systolic OBP (p < 0.01), diastolic OBP (p < 0.05), Cornell voltage index (p < 0.001), QRS duration (p = 0.001), quantity of cigarettes per day (p < 0.01). Ist GWBOQ scale (p = 0.058), negative important events in the patient life during last year (p = 0.07). Being classified into three-categorical status variable (“white coat hypertension”, “grey zone”, MH) the method diagnosed correctly 69.1% cases of MH, additional 29.9% were one cell of diagonal and only 1.0% was classified incorrectly.

**Conclusions:** This MHE evaluation method in TP allows MH prediction before administration of ABP control. It needs to be investigated in larger databases.
POSTER SESSION

BASIC PHARMACOLOGICAL ASPECTS

**PP.18.81**  COMPARISON OF ABDOMINAL AORTA MECHANICS AND STRUCTURE IN LONG-TERM CHEMICAL-SYMPATHETICIZED VS. SINOARTIC-DENERVATED RATS

C. Bouissou-Schurtz, M. Safar, P. Lacolley, G. Gabella, P. Challande, V. Bezie

**Objective:** Surgical sino-aortic denervation (SAD) and pharmacological sympathectomy by daily administration of guanethidinium (SNX) are two models of decreased arterial distensibility free from interference of other established cardiovascular risk factors. The marked difference of the structural changes in the two experimental conditions indicate that, in spite of a similar effect on arterial stiffness and on blood pressure variability, the underlying pathology is different in the two conditions. We hypothesized that in SAD and SNX rats, the increased arterial stiffness is due to alterations of cell-matrix anchoring leading to spatial organisation of the ECM.

**Design and Methods:** The study is composed of (i) determination of the arterial stiffness (Einc), (ii) immuno-histochemistry of fibronectin, alpha5-beta1 and alphav-beta3 integrins, alpha-actin and vimentin, (iii) ultrastructural characterization of aortic media by electronic microscopy.

**Results:** We observed the same strong increase in wall stiffness for the same wall stress compared to controls in both experimental conditions. Nevertheless, the structural changes in the vessel wall are different. In SAD rats, aortic hypertrophy is coupled with an increase in muscle cell attachments to its extracellular matrix. The cell perimeter occupied by dense bands appear obviously increased in SAD rats compared with controls (57% ± 2.1% vs. 42 ± 2%; p < 0.05) and association with accumulate of fibronectin (17.0 ± 1.5 vs. 11.8 ± 1.7%; p < 0.05) and its alpha5-beta1 integrin (4.2 ± 0.7 vs. 1.4 ± 0.3%; p < 0.05). In contrast, in SNX rats, the predominant feature is an alteration of elastin fibers coupled with an accumulation of alphav-beta3 integrin (27.8 ± 4.5 vs. 12.6 ± 2.3%; p < 0.05), vimentin (30.1 ± 8.1 vs. 9.9 ± 2.1%; p < 0.001) and EIIIA-Fibronectin (3.0 ± 0.9 vs. 1.6 ± 0.6; p < 0.05).

**Conclusion:** An increase in the proportion of less distensible (collagen) to more distensible (elastin) components in both models, accompanied by an increase in alphav-beta3 or alpha5-beta1 integrins, contribute to remodeling and stiffening of the abdominal aorta. Our data confirm that a therapeutic intervention should not just be targeted on the cardiovascular symptom (arterial stiffness) but should also take into account the actual and specific alterations of the arterial wall that cause it.

**PP.18.82**  CATALASE INHIBITION INTO THE FOURTH CEREBRAL VENTRICLE AFFECTS BEZOLJARIS REFLEX IN SPONTANEOUSLY HYPERTENSIVE RATS

L.C. De Abreu, C. Ferreira, J.H.N. Saldiva, V.E. Valentí

**Objective:** We evaluated the effects of central catalase inhibition on cardiopulmonary reflex (Bezol-Jarisch reflex) in spontaneously hypertensive rats (SHR).

**Design and Method:** Twelve male SHR (eight weeks old) were implanted with a stainless steel guide cannula into the fourth cerebral ventricle (4thV). The femoral artery and vein were cannulated for mean arterial pressure (MAP) and heart rate (HR) measurement and drug infusion, respectively. The cardiopulmonary reflex was tested with phenylbiguanide (PBGI, 8 ug/kg, bolus, i.v.). Cardiopulmonary reflex was evaluated before and 15 minutes after 3-amino-1,2,4-triazole (ATZ, 0.01g/100ml) injection into the 4th V. We compared bradycardic reflex and hypotension induced by PBGI before and 15 minutes after its administration. We also treated another group of animals with vehicle (saline 0.9%) into the 4th V as a sham group. We applied paired Student T test to compare variables. Significant levels were considered for p < 0.05.

**Results:** We observed no alterations in the group treated with saline (N = 6) regarding basal MAP and HR and bradycardia and hypotension induced by PBGI. ATZ into the 4th V did not change basal MAP and HR, however, it increased bradycardic reflex (130 ± 17 bpm vs. -221 ± 15 bpm; p < 0.05) and hypotension (-15 ± 8 mmHg vs. -27 ± 11 mmHg; p < 0.05) induced by PBGI (N = 6).

**Conclusion:** ATZ into the 4th V increase the sympathetic and the parasympathetic components of the cardiopulmonary reflex in SHR. Grants: Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP).

**PP.18.83**  MODULATION OF NADPH OXIDASE ACTIVITY

A. Schulz, V. Jankowski, W. Zidek, J. Jankowski

**Objective:** Recent studies showed that uremic toxins play a role in the development of the cardiovascular damage in patients with renal failure. The enzymatic activity of the lymphocytic NADPH oxidase in this study.

**Methods:** Lymphocytes from healthy volunteers were isolated, lysed and incubated with NADPH in the presence and absence of the uremic toxin of interest. The enzymatic degragation of NADPH by the lymphocytic NADPH oxidase within 120 minutes was quantified by monitoring UV absorbance at 340 nm. Additionally, we investigated the effects of plasma from healthy volunteers, from CKD patients before and after dialysis and the corresponding hemofiltrate on the NADPH oxidase activity.

**Results:** Thirty nine of seventy eight known uremic toxins showed an effect on the NADPH oxidase activity. Thirty five of the uremic toxins decreased the NADPH oxidase activity. Orotic acid has been characterized as the strongest inhibitor of the NADPH oxidase. Four of the investigated uremic toxins increased the NADPH oxidase activity. SDMA showed the strongest stimulating effect. Plasma from CKD patients before dialysis and the resulting hemofiltrate showed a significant inhibitory effect on the NADPH oxidase activity. Plasma after dialysis did not show any effect on the NADPH oxidase activity.

**Discussion:** Uremic toxins with stimulating effect on the NADPH oxidase activity seem to contribute to cardiovascular disease directly. On the other hand the inhibitory uremic toxins may fulfills a direct protective function in the development of the cardiovascular damage in patients with renal failure. However, these potential protective substances are removed during dialysis; this may result in a known increased cardiovascular morbidity and in a reduced life expectancy of the dialysis patients.

**Conclusions:** The results of the study demonstrate that uremic toxins may play an important role in the pathogenesis of the cardiovascular complications in chronic kidney disease by modulation of the NADPH oxidase activity.

**PP.18.84**  ANTIHYPERTENSIVE EFFECT OF THE MOSS RHODOBRYUM ONTARIENSE IN VIVO


**Objective:** the anti-hypertensive effect of the Moss Rhodobryum ontariense in vivo.

**Background:** Chronic kidney disease (CKD) and uremia are frequently associated with cardiovascular complications. A number of cardiovascular diseases is characterized by increased concentration of reactive oxygen species (ROS). However, the link between genesis of cardiovascular complications, uremic toxicity and increased oxidative stress in patients with chronic kidney disease is not well-understood until now. Following the approach of systematic screening of the effect caused by known uremic toxins proposed by the “European Uremic toxin work group” of the ESAO and ERA-EDTA, we investigated the effect of seventy eight known and commercial available uremic toxins on the enzymatic activity of the lymphocytic NADPH oxidase in this study.

**Methods:** Lymphocytes from healthy volunteers were isolated, lysed and incubated with NADPH in the presence and absence of the uremic toxin of interest. The enzymatic degragation of NADPH by the lymphocytic NADPH oxidase within 120 minutes was quantified by monitoring UV absorbance at 340 nm. Additionally, we investigated the effects of plasma from healthy volunteers, from CKD patients before and after dialysis and the corresponding hemofiltrate on the NADPH oxidase activity.

**Results:** Thirty nine of seventy eight known uremic toxins showed an effect on the NADPH oxidase activity. Thirty five of the uremic toxins decreased the NADPH oxidase activity. Orotic acid has been characterized as the strongest inhibitor of the NADPH oxidase. Four of the investigated uremic toxins increased the NADPH oxidase activity. SDMA showed the strongest stimulating effect. Plasma from CKD patients before dialysis and the resulting hemofiltrate showed a significant inhibitory effect on the NADPH oxidase activity. Plasma after dialysis did not show any effect on the NADPH oxidase activity.

**Discussion:** Uremic toxins with stimulating effect on the NADPH oxidase activity seem to contribute to cardiovascular disease directly. On the other hand the inhibitory uremic toxins may fulfills a direct protective function in the development of the cardiovascular damage in patients with renal failure. However, these potential protective substances are removed during dialysis; this may result in a known increased cardiovascular morbidity and in a reduced life expectancy of the dialysis patients.

**Conclusions:** The results of the study demonstrate that uremic toxins may play an important role in the pathogenesis of the cardiovascular complications in chronic kidney disease by modulation of the NADPH oxidase activity.
Objective: Traditional Chinese medicine suggests that some mosses of the genus Rhodobryum can cure cardiovascular diseases as crude drugs in form of medicinal tea. The aim of this study was to examine for the first time potential acute antihypertensive effect of lyophilized aqueous extract of Rhodobryum ontaniense (Kindih.) Kindih. (RO) in vivo.

Design and Method: RO was prepared by hot water extraction of air-dried parts of R. ontaniense (10 g) for 30 minutes at room temperature (yield, 7 %), and it was chemically screened by nuclear magnetic resonance spectroscopy and thin layer chromatography. Adult male spontaneously hypertensive rats (SHRs) were selected in two experimental groups: the first control group (SHR-C) received vehicle, and the second group (SHR-RO) received bolus of RO (100 mg/kg b.w. dissolved in 0.2 ml saline). Systolic (SAP), diastolic (DAP), and mean arterial pressure (MAP), as well as heart rate (HR), cardiac output (CO), total peripheral vascular resistance (TPVR), and stroke volume (SV) were directly measured in anesthetized rats 3 minutes after bolus injection of vehicle or RO.

Results: RO mainly contained carbohydrates and triglycerides rich in polyunsaturated fatty acids (both n-3 and n-6). SAP, DAP, MAP, and CO were significantly lowered in the group SHR-RO compared to control (SAP 119.57 ± 10.30 mmHg vs. 237.43 ± 8.70 mmHg, p < 0.001; DAP 74.57 ± 12.70 mmHg vs. 160.29 ± 5.45 mmHg, p < 0.001; MAP 96.04 ± 11.75 mmHg vs. 196.71 ± 5.07 mmHg, p < 0.001; CO 131.66 ± 8.68 ml/min/kg vs. 296.58 ± 22.73 ml/min/kg, p < 0.001). In addition, this treatment also resulted in decrease of HR and SV in the group SHR-RO (HR 300.29 ± 20.53 bpm vs. 392.57 ± 8.61 bpm, p < 0.001; SV 0.46 ± 0.05 ml/kg vs. 0.75 ± 0.04 ml/kg, p < 0.01). However, the treatment with RO did not affect TPVR (0.72 ± 0.06 mmHg/ml/min/kg vs. 0.68 ± 0.05 mmHg/ml/min/kg).

Conclusion: Results reported here showed that RO induced a normalization of arterial blood pressure in SHR, supporting the traditional use of the genus Rhodobryum in the treatment of cardiovascular disorders.
Differential Response to Endothelin-1 in Normal and Uremic Rats Treated with Erythropoietin

B. Falafanou, S. Belanger, R. Lariviere, M. Lebel. Chum Research Center, L'Hotel-Dieu De Quebec Hospital and Laval University, Quebec Canada

Background/Aims: We previously showed that erythropoietin (EPO) aggravates hypertension in uremic rats while having no effect on blood pressure in normal animals. This finding in uremic rats was associated with an increase in the vascular endothelin-1 (ET-1) production and a decrease in the ETB receptor expression which is involved in the vasodilatory response to ET-1 and the tissue ET-1 clearance. The present study was designed to investigate the response to ET-1 in normal and uremic rats receiving EPO.

Methods: Normal controls and rats with chronic renal failure (5/6 nephrectomy) were divided into two groups and received subcutaneous injection of either the vehicle (saline 0.9%) or EPO (100 U/kg) three times per week for three weeks. The blood pressure hemodynamic in vivo response to ET-1 was measured via the carotid artery. ET-1 and IRL-1620, a selective ETB receptor agonist, were administered through the jugular vein.

Results: The rats which received EPO had higher hematocrit, but this treatment increased blood pressure only in uremic animals. The injection of ET-1 induced a strong transient hypertensive response followed by a prolonged hypertensive response. This vasopressor response was greater in uremic animals treated with EPO, a phenomenon not observed in normal animals receiving EPO. IRL-1620 produced a similar vasodilatatory effect than ET-1, without inducing hypertension. The vasodilatory effect induced by IRL-1620 was increased in normal and uremic animals treated with EPO as compared to animals receiving the vehicle.

Conclusion: These results demonstrate that the vasodilatory response to ET-1 is increased in uremic rats under EPO therapy compared with normal animals receiving the same treatment.

Early Artery Remodeling in Rats with Fetal Zinc Restriction


We have shown that inadequate zinc intake during fetal life and lactation promotes development of cardiovascular disease in adult rats. Moreover, in young rats we observed myocytes remodelling and increased perivascular collagen deposition.

Objective: To evaluate vascular alterations in growing and adult zinc deficient and normal rats and to compare the effects in males and females.

Methods: Wistar rats were exposed from the beginning of pregnancy up to adulthood: low (L, 8 ppm) or control (C, 30 ppm) zinc diet. At day 6, 21 and 81, m and f offspring of each group of mothers (Cm, Lm, Cf and Lf) were sacrificed to perform morphological studies in thoracic aorta sections stained by haematoxylin-eosin (intima thickness(μm); media thickness(μm)) and picrosirius red (perivascular collagen thickness(μm)) and scored by an automated image analysis software. Zn deficiency produced a similar vasodilatatory effect than ET-1, without inducing hypertension. The vasodilatory effect induced by IRL-1620 was greater in normal animals.

Results: These results demonstrate that the vasodilatory response to ET-1 is increased in uremic rats under EPO therapy compared with normal animals receiving the same treatment.

Glutathione Peroxidase, Glutathione Reductase, Superoxide Dismutase, and Catalase Activity in the Kidney of Spontaneously Hypertensive Rats: Effect of Wild Thyme

N. Mihailovic-Stanoevic1, V. Bugarski2, D. Komes1, Z. Miloradovic1, J. Grujc Milanovic1, M. Ivanov3, D. Bugarski4, D.J. Jovovic5. 1University of Belgrade, Institute for Medical Research, Belgrade–Serbia, 2Department of Chemical Engineering, Faculty of Technology And Metallurgy, University of Belgrade, Belgrade–Serbia, 3Faculty of Food Technology and Biotechnology, University of Zagreb, Zagreb–Croatia

Objective: Earlier we have shown that wild thyme extract (TE) possesses strong antihypertensive and antilipidemic effects in spontaneously hypertensive rats (SHR). Here we evaluate the effects of TE on antioxidant enzymes activity in the kidney of male SHR and age match normotensive Wistar rats (WR), and their correlation with mean arterial pressure (MAP) and plasma thiobarbituric acid reacting substances (TBARS).

Material and Methods: Rats were divided in 4 groups: SHR-TE and WR-TE received bolus of TE, 100 mg/kg b.w. dissolved in 0.2 ml saline. SHR-C and WR-C groups received vehicle. After pentobarbital anesthesia MAP was measured directly. Glutathione peroxidase (GSH-Px), glutathione reductase, superoxide dismutase, and catalase activity were determined in kidney homogenates.

Results: MAP, GR, GPs and CAT activity were significantly increased in the group of SHR-C compared to WR-C (200.80 ± 5.61 vs. 93.67 ± 5.04 mmHg, p < 0.001; 78.01 ± 16.95 vs. 16.29 ± 2.11 nmol NADPH/min/mg protein, respectively). The decrease of vascular ROS activity and the inadequate growth in conduct arteries would impair vascular smooth muscle relaxation and would be reflected in a normal or abnormal postnatal vascular function in response to increases in flow and in shear stress.
Results: The long-term living (4 months) the normotensive rats under stress state (overpopulation and isolation) caused to development of persistent arterial hypertrophy. Since both the scavenging of O_2^- radicals using tempol and inhibition of O_2^- generation by xanthine NADP(H) oxidase (apocynin, APO, 20mg/kg i.p. on two days preceding acute experiment) throughout experiments arterial blood pressure (BP) and left kidney perfusion of the cortex, outer- and inner medulla (CBF, OMBF, IMBF; laser-Doppler fluxes)) were recorded.

In untreated rats sequential bilateral renal denervation progressively and significantly increased BP from a mean of 128 to 154 mmHg i.e. by 19.6%. In rats treated with tempol or APO, BP significantly decreased from 118 to 101 mmHg i.e. by 10.6% and from 128 to 123 mmHg i.e. by 16.6%, respectively. After denervation CBF and OMBF did not change in the untreated and tempol groups, a usual finding in rats on high-sodium diet. The enhanced vascular stress-reactivity plays an important role in the formation of hypertension. Decrease in activity of vasorelaxation mechanisms: beta-2 (isoproterenol), NO-(acetylcholine), K + ATP-channel-mediated (glybenclamide), but not activity in vasoconstruction mechanisms: alpha-1 and alpha2-adrenergoreceptors (phephrine and clonidine) and neural release of norepinephrine (tyramine) may be one of main reason of enhanced vascular stress-reactivity in prehypertension state and progression of stress-induced hypertension. Supported by Grant GK-441P

**PP.18.94** IMPACT OF HIGH FRUCTOSE CONSUMPTION ON VASCULAR REACTIVITY AND CARDIAC FUNCTION IN HIGH SODIUM FED RATS

C. Oudot1, S. Tanguy2, G. Du Callar1, B. Jove1, C. Rugale1. 1Cruz/Montpellier University, Montpellier-France, 2Avignon University, Avignon-France, "Laparayone Hospital, Montpellier-France

The aim of this study was to evaluate the impact of fructose-induced insulin resistance on cardiac and vascular changes induced by a high sodium intake in rats. Immediately after weaning, rats were fed normal salt diet (NS, 0.64% NaCl), or a high salt diet (HS, 8% NaCl) for 20 weeks. After 8 weeks, a diet enriched in fructose (HF, 13% fructose) was superimposed to both NS and HS, the latter diet being divided in two groups: a usual finding in rats on high-sodium diet. Heart weight index (HWI) and left ventricle developed opresure (LVPD) in response to imposed progressive increase in diastolic pressure (from 5 to 50 mmHg) in isolated perfused heart were calculated. The contractive capacity to phenylephrine (PE) and to angiotensin II (Ang II), and the relaxation to acetylcholine (Ach) were assessed on aorti rings.

**PP.18.95** PHOSPHODIESTERASE 5 ACTIVATION ATTENUATES VASODILATORY RESPONSE IN RENOVASCULAR HYPERTENSION

J. Stegbauer1, E. Mergia2, Sa. Potthoff1, I. Quack1, S. Friedrich1, D. Koesling2, Lc. Rump1. 1Department of Nephrology, Heinrich-Heine University Düsseldorf, Düsseldorf-Germany, 2Department of Pharmacology and Toxicology, Ruhr-University Bochum, Bochum-Germany

In the regulation of vascular tone, the vasoconstractor response of angiotensin II is balanced by the NO/cGMP pathway. In the 2 kidney 1 clip (2K1C) model of renovascular hypertension, elevated angiotensin II levels lead to hypertension and reduced endothelium-dependent relaxation. To examine the role of the NO/cGMP pathway in renovascular hypertension, we have used the 2K1C model to challenge mice lacking the NO receptor guanylyl cyclase (NO-GC1 knockout [KO]). Unexpectedly, the blood pressure increase induced by the 2K1C-operation did not differ between NO-GC1 KO and WT. Furthermore, in the NO-GC1 KO's the 2K1C operation did not induce any reduction in endothelium-dependent relaxation of isolated perfused kidneys or aortic rings. In contrast, operated WT mice showed a markedly reduced endothelium-dependent relaxation in aortas and kidneys and developed a lower vascular relaxation toward exogenous NO in kidneys independent of altered cGMP synthesis or cGMP signaling. Yet, the reduced NO sensitivity induced by the 2K1C operation was restored by sildenafil,
Ciliary Neurotrophic Factor Plays an Important Role in Age-Dependent Vascular Function

Department of Nephrology, Medical Faculty, Heinrich-Heine University Duesseldorf, Duesseldorf, Germany

Ciliary Neurotrophic factor (CNTF), an interleukin-6-like cytokine with distinct impact on neuronal cell survival, mediates anti-inflammatory effects and immune apoptosis by activating the JAK2-STAT3-signaling cascade and MAP kinases. CNTF is highly expressed in vessels and the kidney. First, CNTF-/- and WT-mice were untreated and WT-mice were untreated. Subsequently, chronic treatment with wildtype reduces blood pressure in operated WT kidneys significantly. This study demonstrates that the reduced renal vascular relaxation observed in renovascular hypertension is due to a reduction in NO sensitivity caused by PDE5 activation. This mechanism might become a potential target in the treatment of renovascular hypertension.

PP.18.96

PP.18.97

The PhaRmakokinetics and Myocardial Levels of Coenzyme Q10 after Intramuscular Injection of its Solubilized Form

E. Kalemikova, E. Gorodetskaya, E. Charitonova, O. Medvedev. Lomonosov Moscow State University, Moscow, Russia

Objective: Coenzyme Q10 (CoQ10, hypotensive and cardioprotective agent) has very poor oral bioavailability due to its high lipophilicity and limited solubility. Cardioprotective effect of CoQ10 is provided with increased PPAR-α and PPAR-γ expression. In this study the pharmacokinetics and tissue levels of CoQ10 following intramuscular injection of its solubilised form were examined.

Design and Methods: The experiments were carried out on two groups of male Wistar rats with implanted arterial catheters. Solubilized CoQ10 (Kudasan solution, “Akvion”, Russia) was administered in dose 10 mg/kg intramuscularly (i.m.) in the first group and per os in the second group. The content of CoQ10 were determined in plasma, left ventricle myocardium and liver by HPLC with electrochemical detection. Blood samples were taken from the jugular vein and heart blood was taken from control and experimental groups at 31, 7, 14 and 21 days of treatment. Blood samples were centrifuged at 3000 rpm for 5 min and plasma was collected in selected conditions. Then the plasma samples were frozen at -70°C until analysis. Pharmacokinetics parameters of i.m. administrated CoQ10 differed significantly from those of per os administrated CoQ10. The plasma concentrations of CoQ10 during 48 h after i.m. administration were significantly higher than those after per os administration. Tmax after i.m. administration was about 8 h, after per os administration – about 3 h. The maximum plasma concentrations after i.m. bolus was 8-fold (p < 0.01) higher than that after per os administration. AUC for i.m. administrated CoQ10 was 134.6 ± 10.5, for per os administrated CoQ10 – 6.7 ± 2.3. Hence, bioavailability of CoQ10 after i.m. versus per os administration was 1900% (p < 0.01). It was accompanied with increase of CoQ10 level in myocardium by 17% and in liver by 175%.

Conclusion: Intramuscular administration of solubilized CoQ10 ensures growth of myocardial CoQ10 content and gives occasion to investigation efficiency of this route of administration at acute cardiovascular events.
Objective: It is well accepted that such native NO accumulation forms, as mononuclear and binuclear dinitroryl-iron complexes with thiol-containing ligands (DNIC) act as potent hypotensive species in mammalians. The aim of the present research was the study of the mechanisms of DNIC various forms action during natural blood circulation and regional cardiac ischemia.

Design and Method: DNIC with low-molecular thiol-containing ligands (glutathione, cysteine) was injected intravenously into rat (normotensive and hypertensive) or rabbit during native blood circulation. Mononuclear paramagnetic DNIC with protein ligands were detected by EPR method in whole blood and animal organs. Arterial pressure was monitored before and after this injection. In the other experiments, this substance was injected on the onset of 40-min regional cardiac ischemia, followed by reperfusion. The short-life toxic oxygen radicals and NO levels were registered in tissue interstitial in situ by EPR method using spin traps and microdialysis approach.

Results: The injection of DNIC during native blood circulation resulted in substantial and long-lasting hypotensive action on normotensive (Wistar) and hypertensive (SHR) rats. After this treatment a clear increase in NO level in such animal organs, as heart, lung, liver, and kidney during tissue interstitium as inside the cells) was obtained. The effective formation of stable DNIC with protein ligands in whole blood was registered for a long period after DNIC injection (mononuclear centers - in rat blood, mononuclear and binuclear ones – in rabbit blood). Meantime, these complexes exerted a cardioprotective action during regional ischemia and reperfusion, decreasing cardiac rhythm disturbance and myocardial infarct size. Mononuclear DNIC accumulation in ischemic area of myocardium was certainly more effective, as compared with intact one. It has been shown that the injection of this substance clearly suppressed the ischemia-induced increases in NO level and oxygen radical generation in myocardial ischemic area.

Conclusions: Thus, DNIC molecules after their intravenous injection form mononuclear and binuclear protein-bound complexes in blood and animal organs. Then, DNIC slow decomposition results in NO production which cause mononuclear and binuclear protein-bound complexes in blood and animal myocardial ischemic area.

Objective: Preclinical studies and a few clinical trials have proven the efficacy of Olea europaea leaf extract (OLE) in hypertension. Since a certain role of the pathogenesis of hypertension is ascribed to oxidative stress, our aim in this study was to assess whether OLE, with oleuropein as the major component, influences the oxidative stress parameters in spontaneously hypertensive rats (SHR).

Design and Method: Experiment was performed in four groups of anesthetized adult male rats. Wistar albino (normotensive) treated with saline, Wistar rats treated with OLE, SHR treated with saline, and SHR treated with OLE. Standardized OLE (50 mg/kg) was given by bolus injection in the jugular vein of experimental animals. Blood pressure was monitored directly by Cardiomax III for 30 minutes. The effects on oxidative stress markers such as lipid peroxidation estimated as TBA-reactive substances, superoxide dismutase (SOD), catalase, reduced glutathione, and glutathione reductase were also assessed in plasma, erythrocytes, liver and kidney tissue homogenates to evaluate in vivo antioxidative enzyme activity.

Results: Significant blood pressure (both systolic and diastolic) reduction in group of SHR treated with OLE was confirmed in this study. SOD and catalase activity in tissue homogenates were significantly influenced by OLE treatment. Furthermore, lipid peroxidation in plasma was significantly decreased in SHR group treated with OLE (4.57 ± 0.75 nmol/ml) in comparison with result in SHR treated with saline (7.21 ± 0.79 nmol/ml).

Conclusions: The results obtained indicate that OLE strongly modulates the oxidative status in SHR and that its antihypertensive effect is possibly related to its strong antioxidant peroxidative activity as well as its certain influence on antioxidative enzyme activity.
**Results:** Isoprenaline caused the complete relaxation of phenylephrine-contracted aortic rings only in newborn rabbits (n = 10). The maximal relaxation to isoprenaline in young adult rabbits was 21 ± 4 % (n = 8) of the precontraction to phenylephrine. The isoprenaline potency was higher in neonates (EC$_{50}$ = 1.5 x 10$^{-8}$ ± 2.8 x 10$^{-9}$ M, n = 10) than in adults (EC$_{50}$ = 1.9 x 10$^{-7}$ ± 4.2 x 10$^{-8}$ M, n = 8). The catecholamine content in the adrenal gland of neonates was 586 ± 128 nmol/mg and 1915 ± 356 nmol/mg (n = 4), for noradrenaline and adrenaline, respectively. In adults noradrenaline was 112 ± 12 nmol/mg, and adrenaline was 3644 ± 403 nmol/mg (n = 6).

**Conclusion:** In rabbits, β$_2$-adrenoceptor-mediated responses develop earlier than in the dogs and at a similar time to rats, such that at birth these responses are already fully expressed. In rabbits, as well as, in rats (3) adrenaline is already the major catecholamine in the adrenals at birth, whereas in neonatal dogs adrenaline is absent (4). These results are consistent with the view that there is a parallel time-course between the postnatal increase in adrenaline, which is the only biogenic catecholamine with high potency to β$_2$-adrenoceptors, and the development of β$_2$-adrenoceptor-mediated postjunctional responses (4).

**Bibliography:**
POSTER SESSION 19
ATHEROSCLEROSIS

PP.19.103  FETUIN-A AND INTIMA-MEDIA THICKNESS IN ESSENTIAL HYPERTENSIVES

F. Incalcaterra, C. Geraci, R. Arsenia, F. Tornese, R. Riccobene, F. Vaccaro, C. Altieri, G. Cerasola, S. Cottone. Dipartimento Di Medicina Interna E Specialistica. University of Palermo, Palermo-Italy

Cardiot intima-media thickness (IMT), is marker of early atherosclerosis and subclinical disease. Fetuin-A plasma levels are decreased in patients with moderate chronic kidney disease (CKD), inversely related to plasma concentrations of markers of inflammation and to Left ventricular Hypertrophy.

Aim: of this study was to detect the presence of correlations between plasma Fetuin-A and cardiovascular morbidity, as increased IMT, in patients with CKD stage 1 to 4 NKF and in EHs, and its predictive role.

Material and Methods: We enrolled 100 EHs with normal renal function, and 100 patients with CKD stage 1-4 NKF as controls. All patients underwent an Eco-color Doppler of carotid arteries; plasma samples were obtained to measure markers of inflammation (hs-C-reactive protein, TNFa), endothelial activation (ICAM, V-CAM, E-Selectin), and oxidative stress (8-Isoprostane).

Results: Among CKD 74/100 patients had increased IMT-max, and in EHs group 51/100 subjects had IMT > 0.9 mm. Fetuin-A was reduced in CKD when compared with EH (p < 0.00001). The comparison between CKD having increased IMT with those with normal IMT did not showed significant differences of plasma levels of molecules in study. Conversely plasma levels of Fetuin-A (p > 0.001), IL-6 (p >0.01), hs-CRP (p < 0.02), TNFa (p > 0.01), adhesion molecules and stress oxidative indexes showed significant differences in EH with IMT-max > 0.9 than those with normal IMT. CKD with increased IMT-max had lower values of Fetuin-A (p < 0.00001), and higher values of IL-6 (p < 0.00001) TNFa (p > 0.00001), than EH with IMT-max > 0.9. No difference was revealed in plasma hs-CRP. The multivariate analysis of correlation demonstrated that in CKD patients TNFa (ß 0.83 p < 0.05), 8-Isoprostane (ß 0.5 p < 0.01) and age (ß 0.96 p < 0.0001) were independent predictors of increased IMT. The relationship between increased IMT and Fetuin-A did not reach statistical significance. The same model of multiple regression applied on EHs showed that only age (ß 0.44, p < 0.0001) and Fetuin-A (ß -0.34, p < 0.01) were independent predictors of IMT-max. ROC curves considering Fetuin-A, hs-CRP, IL-6 and TNFa as increased IMT-max predictors were analyzed. In EH Fetuin-A resulted to be a good predictor of increased IMT-max (p = 0.0001).

Conclusion: Our data demonstrate in patients whit CKD 1 to 4 stage NKF that Fetuin-A is decreased and related not directly to increased IMT-max being its biological role dependent on inflammation. Moreover these data show the predictive power of Fetuin-A on IMT-max in Essential Hypertensives without renal dysfunction.

PP.19.104  KNOWN HISTORY OF HYPERTENSION AND MYOCARDIAL INFARCTION AS ONSET MANIFESTATION OF CORONARY ARTERY DISEASE

A. Ioamidis, D. Tsounis. Hellenic Open University, Patra-Greece

Objective: To assess the incidence and effects of known history of hypertension (HxHTN) in patients with acute myocardial infarction (AMI) as onset manifestation of coronary artery disease (CAD).

Design and Method: The sample consisted of 112 patients treated for AMI in a prefectural hospital in northern Greece who satisfied all inclusion criteria. Data was partially retrieved retrospectively from electronic archives and completed at 1 year follow-up visit.

Results: HxHTN was reported by 69 patients (61.6%). Although there was no difference in type of AMI, these patients in comparison with the 43 (38.4%) patients without HxHTN, had more severe CAD as demonstrated by coronary angiography and were treated more often with coronary-aortic bypass grafting (CABG). Moreover, they had higher levels of CRP (4.90 vs. 3.49 μg/ml, p = 0.039), ESR (23.0 vs. 16.1 mm/h, p = 0.015) and NT-proBNP (1416 vs. 1099 pg/ml, p = 0.011). At follow-up visit no difference was observed in NYHA and CCS classification. Blood pressure (BP) control was more successful in patients without HxHTN than with HxHTN (Systolic BP: 120.5 vs. 127.7 mmHg, p = 0.005 and Diastolic BP: 71.0 vs. 76.5 mmHg, p = 0.001). Additionally, patients with HxHTN were prescribed more medicines per day (6.67 vs. 5.74, p = 0.010).

Conclusions: HxHTN is common in patients with AMI as onset manifestation of CAD. HxHTN is related with multi-vascular CAD, treatment with CABG and poorer blood pressure control.

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PP.19.105  HYPERTENSION AND HEALTH RELATED QUALITY OF LIFE ONE YEAR AFTER MYOCARDIAL INFARCTION

A. Ioamidis, D. Tsounis. Hellenic Open University, Patra-Greece

Objective: To assess the effect of known history of hypertension (HxHTN) in health related quality of life (HRQoL) of patients with acute myocardial infarction (AMI) as onset manifestation of coronary artery disease (CAD).

Design and Method: The sample consisted of 112 patients treated for AMI in a prefectural hospital in northern Greece who satisfied all inclusion criteria. HRQoL was assessed at 1 year follow up visit with a generic and a disease specific instrument, the 15D and the MacNew Heart Disease HRQoL Questionnaire respectively. Reported major CAD risk factors (RF) included: HxHTN, diabetes mellitus, dyslipidemia, smoking and family history of CAD.

Results: HxHTN was reported by 69 patients (61.6%) and was the most frequent RF, followed by dyslipidemia (51.8%) and smoking (42.0%). Patients with HxHTN reported poorer HRQoL as assessed with both instruments (in all scores and subscales) though not statistically significant. A subgroup of 17 patients (group A) reported HxHTN as the only present RF and was compared with the subgroup of 18 patients (group B) that also reported only one RF but other than HxHTN. Group A demonstrated lower level of HRQoL, with variations in some scales exceeding the minimum clinically important difference (0.03 for 15D and 0.5 for MacNew).

Conclusions: HxHTN is common in patients with AMI as onset manifestation of CAD. HxHTN seems to affect the reported HRQoL level, particularly strongly when HxHTN is the only present major CAD RF.
USEFULNESS OF OXIDIZED-LDL-CHOLESTEROL (MDA-LDL) EVALUATIONS TO ESTIMATE CARDIOVASCULAR ORGANE DAMAGE IN THE EARLY STAGE OF HYPERTENSION AND METABOLIC SYNDROME

E. Geshi, S. Irie, T. Katagiri, S. Goto. Showa University, Yokohama-Japan,

Background and Object: In addition to classical cardiovascular risk factors, oxidized-LDL-cholesterol has been considered as the upper stream of pathogenesis for atherosclerosis and following cardiovascular complications. Recently modified form of LDL (MDA-LDL) has been able to measure as oxidized-LDL, and usefulness of MDA-LDL to estimate cardiovascular events and restenosis after PCI in diabetic patient has been established. We evaluated MDA-LDL level in health-examination subjects with/without hypertension (HT) and/or metabolic syndrome (Mets) and compared to other cardiovascular events related risk factors.

Method: In the subject of health-examination without any cardiovascular events (n = 183, (M: 85, F: 98), mean ages: 45.7 yrs), after the informed-consents of this study, they were divided into with/without HT and/or Mets, and routine health examinations, serum MDA-LDL and other cardiovascular events related factors (adiponectin, HOMA, high-sensitive CRP, NT-PRO-BNP, RLP-C, etc) were evaluated.

Result: Mean systolic BP were 118.2 mmHg in HT+ and 146.4 mmHg in HT+, respectively. MDA-LDL was significantly higher in hypertension (HT+);111.7U/L (n = 34), HT+; 96.6, (n = 149), p < 0.01, and it was correlated with Apo-B (p < 0.01) and RLP-C (p < 0.05), significantly. HOMA (p < 0.001), high-sensitive CRP (p < 0.01) and NT-PRO-BNP (p < 0.01) were also significantly higher and adiponectin (p < 0.05) and HDL-cholesterol (p < 0.05) were significantly lower in HT+. There were no significant differences with/without HT in total-cholesterol, LDL-cholesterol, fasting blood glucose and HbA1c. However MDA-LDL/LDL ratio was significantly higher (p < 0.05) in HT+. Furthermore ratio of MDA-LDL level between HT+ (HT+) was significantly higher (p = 0.05) compared to ratios of other organ damage markers. In the evaluation with/without Mets, similarly, MDA-LDL was significantly higher in metabolic syndrome (Mets+); 132.6U/L, Mets +; 103.5, p < 0.05, and MDA-LDL level was correlated with numbers of metabolic syndrome related risk factors (low HDL, high TG, high glucose and central obesity). High-sensitive CRP (p < 0.01) and NT-PRO-BNP (p < 0.01) were also significantly higher in Mets and tendencies of other cardiovascular events related factors were similar to HT+.

Conclusion: MDA-LDL was significantly higher in hypertension and metabolic syndrome without any cardiovascular complication. MDA-LDL was a useful parameter to estimate potential cardiovascular organ damage in the early stage of hypertension and metabolic syndrome.

PP.19.109  FASTING INSULIN AS A PREDICTOR OF INTIMA-MEDIA THICKNESS OF CAROTID ARTERY IN ESSENTIAL HYPERTENSIVE PATIENTS

L. Mishchenko, O. Yarynkina, S. Savytskyi, L. Mkhitarian. NSC Institute of Cardiology under M.D.Szurzegosz, Kyiv-Ukraine,

Objective: To evaluate the role of cardiovascular risk factors and insulin in atherosclerotic damage of carotid artery in essential hypertension (EH) patients (pts).

Material and Method: 83 EH pts without diabetes mellitus were examined after 2-weeks of wash-out period. Intimal-medical thickness (IMT) of common carotid artery was estimated by using of B-mode ultrasound according to standard methodology. Concentration of serum creatinine, glucose, total cholesterol, triglycerides were determined by using multifunctional biochemical analyzer. Fasting insulin was estimated by radioimmunoassay. GFR was calculated by Cockcroft and Gault formula.

Results: According to univariate regression analysis IMT was significantly related with age (β = 0.353, p = 0.001), length of EH (β = 0.297, p = 0.005), systolic blood pressure (β = 0.219, p = 0.005), pulse pressure (β = 0.224, p = 0.004), creatinine (β = 0.200, p = 0.01), GFR (β = 0.235, p = 0.003), fasting insulin (β = 0.370, p = 0.001) and HOMA (β = 0.338, p = 0.002).

Association between IMT on one hand and BMI, diastolic blood pressure, fasting glucose, total cholesterol, triglycerides one the other hand were not established. Multiple regression analysis was performed with entered in a model each significantly related factor for clarifying a predictor of IMT. This analysis demonstrates that fasting insulin is the powerful and independent predictor of IMT in studied EH pts.

Conclusions: Fasting insulin concentration determined as independent predicting factor of IMT. This fact indicate that increase insulin level in EH pts could contribute to carotid atherosclerosis regardless of age, blood pressure and other risk factors of cardiovascular disease.

PP.19.108  HIGHER RISK OF SUBCLINICAL ATHEROSCLEROSIS IN PATIENTS WITH PSORIASIS: A CALL TO ACTION?


Background: Psoriasis is associated to an increased cardiovascular risk. Cardiovascular events are more frequent in younger patients presenting moder-ate to severe psoriasis. As atherosclerosis can be detected at early stages using non invasive evaluation (NIVE) this might be of key importance for a timely CV prevention in this population.

Objectives: To identify the presence of subclinical atherosclerosis in psoriatic patients and to determine if psoriasis is an independent cause of atherosclerosis.

Methods: We evaluated 175 patients in a cohort, prospective and controlled study. Two groups were identified; (I) group with psoriasis (PS) (n: 35, 50.6 ± 12 years; 80% male) and (II) a control group C(n: 140, 45 ± 8.2 years; 70% male, similar CV risk factor profile). PASI score and lesion biopsy were used to diag-nose and stratify psoriasis and NIVE to evaluate arterial structure and function (intima media thickness (IMT), carotid and/or femoral atherosclerotic plaques (AP), pulse wave velocity (PWV) and flow mediated dilation (FMD)).

Results: Framingham score in patients of both groups was low (7.2 ± 2.3% vs 5.7 ± 1.8% for PS vs C respectively, p = 0.003). In PS group vascular Risk Score was higher 29.7 ± 12 vs 2.2 ± 0.8, p = 0.002, IMT was increased (0.7 ± 0.2 vs 0.6 ± 0.1 mm, p < 0.01), and a higher prevalence of AP was found (94% vs 62.5%, p < 0.001), mostly fibrolipidic and vulnerable lesions. PWV (10 ± 2 vs 9.5 ± 2 m/s) and abnormal FMD (14% vs 21%) didn’t reach statistical significance.

Conclusions: An early atherosclerotic disease is present in asymptomatic young psoriatic patients. Non invasive vascular evaluation could be useful for a proper assessment of their risk currently underestimated if using only conventional risk factors.

PP.19.107  CORRELATION OF C-PEPTIDE WITH THE CAROTID ATHEROMATOSIS OF TREATED HYPERTENSIVE PATIENTS

M.V. Papavasileiou, I. Vassilaidis, I. Tsiatnis, G. Lambropoulou, G. Papadimitriou, S. Charizopoulos, S. Karas. Sismanoglion General Hospital, Athens-Greece,

Objective: To look into the correlation of c-peptide with the carotid atheromatosis of treated hypertensive patients.

Methods: We monitored 153 treated hypertensive patients (male 42%), mean age 64.8 years, MS/DBPi (mean office systolic/diastolic blood pressure) 135.3/82.7 mmHg. We measured the fasting C-Peptide levels and after glucose loading. This proves the significance of insulin resistance to the growth of carotid atheromatosis.

Results: According to Table 1. ANOVA comparison for c-peptide c-peptide 0 (pmol/L) c-peptide 120 (pmol/L) Group &ALPHA; 2.3 6.6 Group &BETA; 2.3 9.6 NS p = 0.021

Conclusion: The carotid atheromatosis of well-controlled treated hypertensive patients exists in high percentage (77.7%) and coexists with higher c-peptide levels after glucose loading. This proves the significance of insulin resistance to the growth of carotid atheromatosis.

PP.19.110  A COMPARATIVE STUDY OF COMMON CAROTID INTIMA-MEDIA THICKNESS AS A DIRECT SIGN OF ATHEROSCLEROTIC SUBCLINICAL DISEASE IN RUSSIAN AND GERMAN POPULATIONS

I. Sovenin1, R. Erbel2. 1Institute of General Pathology and Pathophysiology, Moscow-Russia, 2University Dussberg-Essen, Essen-Germany,
Background: Carotid intima-media thickness (cIMT) is thought to be a surrogate marker for generalized atherosclerosis as well as a novel risk factor for the development of atherothrombotic disease. Increased cIMT has increasingly become a target for detecting subclinical atherosclerosis. Ultrasonographic evaluation of increased cIMT in one individual at risk for atherosclerosis might help to better stratify the risk of the patient. However, the decision on normal and high values of cIMT is highly dependent of the difference between populations as well as the methodology used for its measurement. Aim: In this study we have compared the difference in distributions of cIMT values between population samples from industrially developed Moscow (Russia) and Ruhr (Germany) regions.

Patients and Methods: We have examined 863 men and 877 women in Ruhr (a subsample from Heinz Nixdorf Risk Factors, Evaluation of Coronary Calcium and Lifestyle (RECALL) Study), as well as 442 men and 658 from Moscow, aged 45-75 and free from atherosclerotic disease. High resolution ultrasonography of the distal centimeter of common carotid arteries was used for the measurement of cIMT, which was performed in the similar manner independently at both sites.

Results: For all age groups compared (below 50, 51-60, 61-70 and above 70) and for both genders there was a striking difference in cIMT distributions between population samples. For the whole group the difference accounted for 0.182 mm (95% CI 0.162-0.202) in men, and 0.191 mm (95% CI 0.178-0.205) in women, p < 0.001. For men in Moscow, interquartile values of cIMT were 0.770-0.960 mm (25th and 75th percentiles), median 0.860 mm, as compared to 0.600-0.780 mm in Ruhr, median 0.680 mm (p < 0.001). In women, these values accounted for 0.718-0.890 mm, median 0.810 mm, in Moscow, as compared to 0.543-0.696 mm, median 0.618 mm in Ruhr (p < 0.001).

Conclusions: These findings demonstrate the geographical and socio-economic impact on the predisposition for atherosclerosis development in different populations, and should help explaining, at least in part, the role of cIMT as the risk factor for atherosclerotic disease for the striking difference in cardiovascular morbidity and mortality between Russia and Germany.

Acknowledgements: This study was supported in part by Russian Ministry of Education and Science.

Conclusion: In a young non-treated low risk population, VitD deficiency was associated with subclinical atherosclerosis and RAAS activation. Our results may suggest that VitD deficiency is related to vascular damage even before increased BP can be detected.

PP.19.112 GAMMA-GLUTAMYLTRANSFERASE AND ADIPONECTIN AS DETERMINANTS OF PRESENCE AND ACOUSTIC PROPERTIES OF EARLY CAROTID PLAQUES IN NORMAL SUBJECTS

M. Kozakova1, C. Palombo1, C. Morizzo2, M. Paterni2, E. Ferramini1. 1Department of Internal Medicine, University of Pisa, Pisa-Italy, 2CNR, Institute of Clinical Physiology, Pisa-Italy

The initiation of atherosclerosis at predilection sites results from a complex interaction between local anatomical and hemodynamic factors and biologically active circulating factors, like low-density lipoprotein (LDL), gamma-glutamyltransferase (GGT) or adiponectin. Aim of the present study was to evaluate, in an apparently healthy caucasian population, whether the presence, magnitude and acoustic properties of small hemodynamically not significant plaques at carotid bifurcation and origin of internal carotid artery (ICA) is related to plasma levels of LDL, GGT or adiponectin.

Design and Methods: B-mode ultrasound of extracranial carotid arteries was performed in 1.141 subjects (mean age 44.2 ± 8 years, age range 30 to 60 years) recruited in a multicentre European study (RISC cohort), and the presence of early plaque was defined as intima-media thickness > 1.5 mm. The acoustic properties of the plaques were evaluated by means of digital densitometric analysis and described as average pixel intensity, i.e. mean grey level (MGL).

Results: Fifty-eight subjects (4.4%) had 1 or 2 small atherosclerotic plaques at carotid bifurcation (altogether 71 plaques without calcification, average plaque thickness = 2.01 ± 0.41 mm). In multiple regression model (after adjustment for sex, alanine aminotransferase, alcohol consumption and family history of cardiovascular disease), independent determinants of the presence of plaque were age (p = 0.001), current smoking (p = 0.01) and plasma GGT (p < 0.001), but not blood pressure and LDL. Plaque area was inversely related to adiponectin (r = -0.33, p < 0.05) but not to age, atherosclerotic risk factors and GGT. MGL was independently associated with current smoking (directly, p = 0.01) and plasma adiponectin level (inversely, p < 0.05).

Conclusions: In healthy, young-to-middle-aged population, the presence of early carotid plaque in predilection location of carotid bifurcation is determined by age, plasma GGT level and current smoking. Current smoking and plasma adiponectin level seem to influence the acoustic properties of these early plaques, probably through their effect on vascular smooth muscle cells.

PP.19.113 THE INFLUENCE OF CHRONIC HEMODIALYSIS ON CAROTID INTIMA-MEDIA THICKNESS PROGRESSION

V. Kovacic, D. Ljutic, M. Sain, J. Radic, I. Jelicic. Department of Nephrology and Dialysis, University Hospital Center Split, Split-Croatia

Introduction and Aims: ESRD (end-stage renal disease) patients treated by hemodialysis (HD) have increased intima-media thickness (IMT) of the carotid artery. The aim of the study was to analyze the relationships between parameters of chronic hemodialysis treatment and carotid IMT in ESRD patients on hemodialysis.

Subjects and Methods: Fifty-two (19 females, 33 males) adult patients on chronic maintenance (5.65 ± 3.29 years) HD aged 60.88 ± 15.49 years were investigated. Ultrasonographic studies were performed with 7.5 MHz high-resolution probe. Common carotid artery IMT were measured at the beginning of the study, and prospectively after 15 months.

Results: Significant differences were found in average carotid IMT at the study beginning between subjects with delivered dialysis dose (Kt/V) ≥ 1.2 and < 1.2 (0.87 ± 0.19 vs. 1.03 ± 0.11 mm, p = 0.002). A correlation between Kt/V and beginning IMT(r = 0.404, p = 0.014) was demonstrated. It was found significant differences between IMT values at the beginning and at the end of the study (delta IMT)0.093 ± 0.17 vs. 1.03 ± 0.17 mm; p < 0.001). Delta IMT was correlated with differences between predialysis and postdialysis pulse pressure (r = 0.372; p = 0.008) and with low molecular weight heparin per kg of body mass per dialysis (r = 0.292; p = 0.036). In a multiple linear regression model a products of lipid peroxidation measured as FOX (Ferrous Oxidation - Xylenol orange assay) were independently correlated with percent of maximal carotid delta IMT values (beta = 0.401; p = 0.015).

Conclusion: This study has demonstrated the association between hemodialysis procedure and carotid IMT as an atherosclerosis marker.
PP.19.114 NO RELATIONSHIP BETWEEN GAMMA-GLUTAMYLTRANSFERASE (GGT) LEVELS AND INTIMA-MEDIA THICKNESS IN HIGH RISK REFERRALS

M. Nuti, C. Grigoratos, P. Spontoni, G. Dell’omo, A. Balbarini, R. Pedrini. *Dipartimento Cardio Toracico, Pisa-Italy, 1University of Pisa, Pisa-Italy, 2University of Florence, Florence-Italy, 3University of Rome Tor Vergata, Rome-Italy, 4University of Rome "La Sapienza", Rome-Italy.

**Purpose:** To evaluate the association between circulating GGT, a correlate of metabolic risk factors and a predictor of CV events, and common carotid intima media thickness (IMT), a surrogate index of systemic atherosclerosis.

**Methods:** Cross-sectional analysis of 703 consecutive high-risk (diabetes:17%, hypertension:73%) referrals for CV screening. Subjects with known hepatic disease and GGT > 95% percentile distribution (Males, M, 90, Females, F, 77U/L) were excluded. Due to evident gender-related differences (M: 72.2 ± 15.6, n = 460, vs F: 66.6 ± 6.6U/L, n = 243, p < .001). M were analyzed separately from F in samples dichotomized by the median GGT (M: > = 29U, F: > = 31U/L). IMT (B-mode ultrasonography) values were the mean of the near- and far-wall measurements.

**Results:** (Table 1): In M &F higher GGT associated with fasting plasma glucose (FPG), triglycerides (TRIG), BMI and total cholesterol (C); HDL-C, ≤ 40% of females, FPG (mg/dL) and triglycerides (mg/dL) were increased in male HCQ treated females (M:F, 32.2 ± 6.6U/L, n = 243, p = 0.014).

**Conclusions:** The prevalence of carotid artery atherosclerotic disease (CAAD) defined by presence of plaques and/or by IMT > 0.9 mm, was 13.2% in general population (18.8% and 9.0% in men and women, respectively; p = 0.014). The average IMT was of 0.63 (SD 0.21) mm in men and 0.56 (SD 0.16) mm in women (p = 0.003). Conventional risk factors (sex, age, systolic blood pressure, body mass index, smoking and total cholesterol) explained 39% of the IMT variability. The CAAD phenotype was not associated with the MMP9 C5162T polymorphism. In multi-variable adjusted models among men, the odds of CAAD were of 7.6 (95%CI, 1.08-54.22; p = 0.042) in MMP3 5A5A homozygotes compared with 5A6A/6A6A carriers. Men carrying the Glu/Glu eNOS genotype, had a risk of 4.2 (95%CI, 1.01-17.57; p = 0.048) compared to Glu/Asp/Asp carriers. Among women the IMT was associated with eNOS 4a allele, (0.60mm in 4a carriers vs 0.55mm in 4b/b homozygotes, p = 0.006).

**Conclusion:** We found association of CAAD with MMP3 5A5A and eNOS Glu/Glu genotypes. For MMP3 5A5A and eNOS Glu/Glu, these associations were context dependent, being confined to men and modulated by HDL-cholesterol level and Ischemic heart disease. The association of IMT with eNOS 4a allele was confined to women.

PP.19.115 EFFECT OF HYDROXYCHLOROQUINE TREATMENT ON ATHEROSCLEROSIS IN APOE DEFICIENT MICE

K. Makaritsis, M. Ioannou, K. Kapatou, E. Kouvaras, E. Begas, G. Koukoulis, G. Dalekos. *University of Thessaly School of Medicine, Larissa-Greece.

Autoimmune rheumatic diseases are associated with higher rates of cardiovascular morbidity and mortality, primarily because of accelerated atherosclerosis. It has been suggested in previous clinical studies, that the use of hydroxychloroquine (HCQ) in patients with systemic lupus erythematosus might have a beneficial effect on lipid profile and atherosclerosis. Since its introduction in the early 1990s, the apolipoprotein E-deficient (ApoE knockout) mouse has been the most widely studied animal model for atherosclerosis.

**Objective:** To determine the effect of HCQ treatment on lipid profile and atherosclerosis area in ApoE knockout mice.

**Methods:** Hydroxychloroquine at a dose of 100 mg/kg was administrated to the mice in the drinking water. Seventy (70) animals were used in the present study, divided in four groups as follows: forty eight (48) animals (24 male and 24 female mice) were given HCQ whereas 22 animals (10 male and 12 female mice) used were as Controls. All mice were purchased from the Jackson laboratory, USA and designated C57BL/6J-apoE. The mice were maintained on a standard chow diet containing 5% fat. Drug treatment was initiated at the 16th week of age, and the animals were maintained for 16 additional weeks on the designated treatment. At 32 weeks of age blood was drawn under anesthesia from the inferior vena cava for plasma lipid determination. Subsequently the proximal aorta was removed for atherosclerosis area measurement and evaluation of eNOS expression in the atherosclerotic plaques. ANOVA was used for statistical analysis and all values are expressed as Mean ± SEM.

**Results:** Cholesterol and LDL-C (mg/dL) were increased in male HCQ treated male mice compared to Controls (Chol: 641.54 ± 24.04 vs 483.33 ± 27.61, p < 0.001 - LDL-C: 24.04 vs 483.33 < 22.08, p < 0.001). Atherosclerosis area per section (mm²) was significantly increased in HCQ treated male and female mice compared to Controls (Males: 0.2546 ± 0.020 vs 0.1213 ± 0.034, p = 0.009 - Females: 0.3576 ± 0.035 vs 0.1765 ± 0.025, p < 0.001). eNOS expression was also significantly increased in HCQ treated male and female mice compared to Controls (Males: 4.666 ± 0.280 vs 1.500 ± 0.341, p < 0.001 - Females: 4.857 ± 0.198 vs 1.166 ± 0.440, p < 0.001).

**Conclusions:** HCQ treatment at the afore mentioned dosage results in augmentation of atherosclerotic lesions in ApoE knockout mice. Our data suggest that HCQ results in eNOS overexpression which along with hypercholesterolemia may promote atherogenesis via increased superoxide generation from dysfunctional eNOS.

PP.19.116 ASSOCIATION OF CAROTID ATHEROSCLEROSIS WITH POLYMORPHISM OF MATRIX METALLOPROTEINASE AND ENDOThelial NITRiC OiD XySe SYNTHASE GENES

A. Ryabikov, E. Mazdorova, S. Maluytina, V. Maximov, M. Voevodina, T. Kuznetsova, J.A. Staessen, Y. Nikitin, "Novosibirsk State Medical University, Novosibirsk-Russia, 1Institute of Internal Medicine, Novosibirsk-Russia, 2University of Leuven, Leuven- Belgium, 3Maastricht University, Maassicht-The Netherlands.

Carotid intima-media thickening and plaques as atherosclerosis- and hypertension-related vascular phenotypes are associated with genetic and environmental factors.

**Objective:** We assessed in a Caucasian population the association of carotid arterial lesions with genetic polymorphisms in matrix metalloproteinase-3 and -9 (MMP3, 5A/6A; MMP9, C1562T) and endothelial NO synthase (eNOS, Intron 4, 4a/4b; Glu298/Asp).

**Methods:** We recruited a random population sample (n = 295, aged 18-60 years) from the population of Novosibirsk, Russia (56.6% women; mean age 39.2, SE 0.88). We assessed intima-media thickness in the far wall of the common carotid artery (IMT) and carotid plaques by high-resolution ultrasonography. PCR-based genotyping was applied for MMP3, MMP9, eNOS genes.

**Results:** The prevalence of carotid artery atherosclerotic disease (CAAD) defined by presence of plaques and/or by IMT > 0.9 mm, was 13.2% in general population (18.8% and 9.0% in men and women, respectively; p = 0.014). The average IMT was of 0.63 (SD 0.21) mm in men and 0.56 (SD 0.16) mm in women (p = 0.003). Conventional risk factors (sex, age, systolic blood pressure, body mass index, smoking and total cholesterol) explained 39% of the IMT variability. The CAAD phenotype was not associated with the MMP9 C5162T polymorphism. In multi-variable adjusted models among men, the odds of CAAD were of 7.6 (95%CI, 1.08-54.22; p = 0.042) in MMP3 5A5A homozygotes compared with 5A6A/6A6A carriers. Men carrying the Glu/Glu eNOS genotype, had a risk of 4.2 (95%CI, 1.01-17.57; p = 0.048) compared to Glu/Asp/Asp carriers. Among women the IMT was associated with eNOS 4a allele, (0.60mm in 4a carriers vs 0.55mm in 4b/b homozygotes, p = 0.006).

**Conclusion:** We found association of CAAD with MMP3 5A5A and eNOS Glu/Glu genotypes. For MMP3 5A5A and eNOS Glu/Glu, these associations were context dependent, being confined to men and modulated by HDL-cholesterol level and Ischemic heart disease. The association of IMT with eNOS 4a allele was confined to women.
evaluated brachial and central blood pressure in hypertensive patients under-
going carotid endarterectomy for significant carotid stenosis and the effects of adjuncive therapy (aliskiren or lercanidipine) on BP control and cogni-
tive function. Patients with indication for urgent endarterectomy, heart fail-
ure (NYHA class III and IV), estimated glomerular filtration <30ml/min or
acute cardiovascular events in the previous 3 months were excluded, as were
women of reproductive age. 66 hypertensive patients (40 males, mean age
71.8 years) undergoing elective carotid endarterectomy for carotid stenosis
(> 70% of the lumen) were studied. Patients were divided into two group
according to optimal blood pressure control (PAc < 130/80 mmHg, n = 36)
or not (n = 30). This latter group of patients were already treated with two
drugs and were randomized into aliskiren 150 to 300 mg (n = 15) or lercani-
dipine 10 to 20 mg (n = 15) adjunctive treatment. Peripheral systolic (SBP)
and diastolic blood pressure (DBP), as well as central systolic (CSBP) and
diastolic blood pressure (CDBP) estimated with the Sphygmocor® device,
were taken at the time of the first visit, at 2 months and at 6 months follow-
up. Carotid endarterectomy was performed the day after the 2 months follow-up visit. Mini mental state examination (MMSE) was performed by
experienced personnel at 2 and 6 months follow-up. In both randomized
groups SBP, DBP and CSBP decreased from first visit to 2 months follow-
up. However, patients treated with aliskiren experienced a significant fur-
ther improvement of both SBP and CSBP also after endarterectomy between
2 and 6 months follow-up whereas, in lercanidine treated patients, SBP,
and CSBP remained unchanged. At 6 months patients treated with aliski-
ren had a larger reduction of SBP and CSBP compared to patients treated
with lercanidine (>20.9 vs -6.8 mmHg for SBP and -21.2 vs -4.8 mmHg;
all p < 0.0001). No significant differences were found in MMSE between 2
and 6 months follow up in the general population as well as in the three
subgroups and no significant episodes correlated to low BP were reported.
Aliskiren seems to have a more prolonged efficacy in lowering brachial and
central SBP levels when compared with lercanidine in patients undergo-
ing carotid endarterectomy.

**PP.19.119** THE ANKLE-BRACHIAL INDEX AS A PREDICTOR OF CORONARY ARTERY DISEASE
S. Kostic, D. Mijalkovic, I. Tasic. Institute of Therapy and Rehabilitation
Niska Banja, Niska Banja-Serbia,

The ankle-brachial index (ABI) also presents information about general cardio-
vascular health. An analysis of studies shows that a low index of ABI doubled the
chances of having a heart attack or stroke or dying of heart disease over a 10-year
period. The objective of this study was to examine the relation between ABI and
the extent of coronary atherosclerosis in a cohort study of men and women
who had coronary heart disease (CHD) and also, they had coronary angiography
performed.

**Methods:** 100 consecutive patients have been studied (45 women and 55 men,
mean age 59.7 ± 10 years) who had CHD and who also had ABI. This latter group of patients were already treated with two
drugs and were randomized into aliskiren 150 to 300 mg (n = 15) or lercani-
dipine 10 to 20 mg (n = 15) adjunctive treatment. Peripheral systolic (SBP)
and diastolic blood pressure (DBP), as well as central systolic (CSBP) and
diastolic blood pressure (CDBP) estimated with the Sphygmocor® device,
were taken at the time of the first visit, at 2 months and at 6 months follow-
up. Carotid endarterectomy was performed the day after the 2 months follow-up visit. Mini mental state examination (MMSE) was performed by
experienced personnel at 2 and 6 months follow-up. In both randomized
groups SBP, DBP and CSBP decreased from first visit to 2 months follow-
up. However, patients treated with aliskiren experienced a significant fur-
ther improvement of both SBP and CSBP also after endarterectomy between
2 and 6 months follow-up whereas, in lercanidine treated patients, SBP,
and CSBP remained unchanged. At 6 months patients treated with aliski-
ren had a larger reduction of SBP and CSBP compared to patients treated
with lercanidine (>20.9 vs -6.8 mmHg for SBP and -21.2 vs -4.8 mmHg;
all p < 0.0001). No significant differences were found in MMSE between 2
and 6 months follow up in the general population as well as in the three
subgroups and no significant episodes correlated to low BP were reported.
Aliskiren seems to have a more prolonged efficacy in lowering brachial and
central SBP levels when compared with lercanidine in patients undergo-
ing carotid endarterectomy.

**Results:** Average SCORE risk of our patients was 6.6 ± 2.5. Regarding the vascular risk factors tested in multiple regression analysis, only SCORE risk (p = 0.003) was related independently to ABI. The value of ABI in patients of average value 1.02 ± 0.21. In the experimental group 41 (41%) patients had reduced ABI value (< 0,9), and 18 (18.0%) of them had higher values (> 1,3). The extent of the coronary arteries was marked as 0, 1, 2, or 3 according to the number of
vascular cases with narrowing. In most patients, 42 (42.0%) had stenosis marked greater than 70% in one coronary vessel; 34 (34.0%) had narrowing in
two vessels; and in 18 pts (18.0%) narrowing was in three vessels. Those who had CHD and who also had ABI had the correct values.

**Conclusion:** ABI seems to be a more prolonged efficacy in lowering brachial and
central SBP levels when compared with lercanidine in patients undergo-
ing carotid endarterectomy.

**PP.19.120** CORRELATION BETWEEN INTIMA-MEDIA THICKNESS AND ESTIMATED CARBODOVASCULAR RISK IN THE GROUP OF HYPERTENSIVE PATIENTS
L. Wozniacka-Leskiewicz, A. Poszadzy-Malaizynska. University of Medical
Science, Poznan-Poland,

**Objectives:** Correlation between IMT and estimated cardiovascular risk accord-
ing to SCORE and Framingham scales in the group of hypertensive patients.

**Design & Methods:** We investigated 38 patients with HTN and 28 patients without
HTN. The average age of them was respectively 54.5 ± 10.9 yrs and 57.7 ±
10.6 yrs. We divided all patients in two groups—A- with SCORE < 5 and B-
with SCORE ≥ 5. Following measurements were taken: BMI, SBP, DBP, serum level of: HDL, LDL and total cholesterol, TG, fasting glucose, urea, creatinine, uric acid, eGFR. We also assessed IMT in the carotid ultrasound examina-
tion and cardiovascular risk according to SCORE and Framingham scales. The
t-student test was used for the statistical analysis, σ Spearman was taken to
analyze the correlation of statistically significant values.

**Results:** We revealed the statistically significant differences between the
means in groups A and B respectively: SBP[mmHg] 126; 134(*); IMT[mm]
0.76; 0.86(*); serum level of LDL[mmol/l] 3.64; 3.04(*); urea[mmo/l] 5.05;
6.14(*)\[p < 0.05\]. In the group of patients with HTN we revealed positive cor-
relation between IMT and cardiovascular risk according to SCORE scale (p = 0.0007). Moreover between IMT and cardiovascular risk according to Framingham scale (p = 0.0065).

**Conclusions:** 1) IMT significantly associated with estimated SCORE risk. 2) Metabolic (lipsid profile, urea, creatinine) and hemodynamic parameters (IMT) were significantly different in the group with higher SCORE risk although they have the correct values.
POSTER SESSION 20
GENETICS/MOLECULAR BIOLOGY

PP.20.121
DAILY BLOOD PRESSURE (DBP) PROFILES IN HYPERTENSIVE PATIENTS DEPENDING ON FIVE GENES POLYMORPHISM UNDER THE INFLUENCE OF PHARMACOGENETICALLY DETERMINED TREATMENT

J. Ursuliak1, L. Sydorchuk1, K. Amosova2, R. Sydorchuk1, A. Sydorchuk1

1 National State Medical University, Kyiv-Ukraine
2 National Medical University, Kyiv-Ukraine

Objective: To evaluate the influence of combo antihypertensive treatment during 9-12 months on daily BP profile depending on I/D polymorphism in ACE gene, A1166C in AGTR1 gene, T894G in eNOS gene, Pro12Ala in PPARγ2 gene and in patients with essential arterial hypertension (EAH).

Design/Methods: 249 patients (EAH I = 26.5%; EAH I/D = 45.8%; EAH II = 27.7%; women = 48.2%, men = 51.8%, mean age 50.5 ± 10.4 yrs) underwent combination therapy depending on genes’ polymorphism (hydrochlorothiazide (HCTZ) + angiotensin II receptor (ARB) blocker), HCTZ + β-blockers (BB), HCTZ + ACE inhibitors (ACEi), calcium antagonists (CA) + ARB, CA + BB, CA + ACEi). BP at baseline and after treatment was assessed with office (BPoffice) and 24 ambulatory monitoring (BP24h). Efficacy criteria – ESC/ESH 2007 recommendations.

Results: In D-allele carriers of ACE gene, CC-phenotype of AGTR1, T-allele of eNOS gene, Pro-allele of PPARγ2 gene and Arg-Arg-phenotype of PPARγ1 gene BP “dipper” profile appeared 1.2-2.1 times more rarely (p < .05-.001) than “non-dipper”. In TT-phenotype of eNOS gene BP 2.2 times more often “night-peaker” (p = .044) is registered. After pharmacogenetically determined treatment number of patients with “dipper” profile increased to 75.6% vs 65.5% before pharmacogenetic correction (p < .001); reliably in CC-phenotype carriers of AGTR1 gene (13.1%, p = .005), TT-phenotype of eNOS gene (12.3%, p < .001), Ala-Ala- and Pro-Pro-phenotypes of PPARγ2 gene (20.0%, p < .001 and 13.75%, p = .047, accordingly), Gly-Gly-phenotype of PPARγ1 gene (25.8%, p < .001). Number of patients with “non-dipper” BP profile significantly decreased to 19.9% vs 26.5% before pharmacogenetic correction (p < .01): reliably in D-allele of ACE gene (7.9%, p = .049 and 8.7%, p = .015, accordingly), CC-phenotype carriers of AGTR1 gene (6.7%, p < .01), T-allele of eNOS gene (9.8%, p < .001), Ala-allele of PPARγ2 gene (in 13.3%, p < .001), Gly-Gly-phenotype of PPARγ1 gene (6.4%, p < .01). Number of patients with “night-peaker” decreased to 4.0% vs 7.2% before pharmacogenetic correction (p = .016), but reliably only in TT-phenotype carriers of eNOS gene (p = .039).

Conclusions: Pharmacogenetically determined therapy caused reliable increase of normal “dipper” BP profile in EAH patients (p < .001) with significant advantage in D-allele ACE gene carriers of HCTZ + ARB combination, less HCTZ + BB, than HCTZ + ACEi (91.7%, 73.5% and 66.0%, accordingly, p < .001). In DD-phenotype carriers more effective were combinations of CA with BB, ARB and ACEi (73-70.4%).

PP.20.122
HAPTOGLOBIN POLYMORPHISMS IN WOMEN WITH PREECLAMPSIA IN ISRAEL

F. Nakhoul1, R. Samour2, R. Miller-Lotan3, N. Nakhoul3, R. Gonen2, G. Dragotaiou4

1 Poria Medical Center, Lower Galilee-Israel, 2 Department of Obstetrics and Gynecology, Ben-Zion Medical, Haifa-Israel, 3Vascular Medicine Lab, Rappaport Institute, and Faculty of Medicine, Haifa-Israel

Objective: To determine whether Hp1-1 has a protective role in the pathogenesis of preeclampsia, as manifested by its decreased prevalence in preeclamptic women compared to the healthy population.

Methods: Hp phenotype was compared in 240 healthy and 120 preeclamptic gravidas (matched by origin: Jewish/Arabs), delivered at the Bnai-Zion Medical Center, Haifa, Israel. Preeclampsia was defined as blood pressure exceeding 140/90 in repeat measurements, together with proteinuria of 1+ or more in dipstick or 300mg or more in 24 hour urine collection. Blood was collected upon arrival to the delivery room or maternity ward, centrifuged and frozen until analyzed by gel-electrophoresis to determine the Hp phenotype. Statistical analysis was performed using Chi square test.

Results: Two hundred and forty healthy women and 120 women with preeclampsia were included in this study. Demographic and obstetrical data are presented in Table 1. Among women with preeclampsia, 7 had the 1-1 phenotype, 62 had the 2-1 phenotype, and 51 had the 2-2 phenotype. In the control group, 30 women had the 1-1 phenotype, 109 had the 2-1 phenotype and 101 had the 2-2 phenotype. The difference between the Hp 1-1 phenotype (vs non-1-1 phenotype) prevalence in the two groups (e.g. preeclampsia and healthy) was statistically significant, with a p > 0.05. Among women with the 1-1 phenotype, 7/37 (18.9%) had preeclampsia and 30/37 (81.1%) were healthy, in women with the 2-2 phenotype, 51/152 (33.6%) had preeclampsia and 101/152 (66.4%) were healthy, and in women with the 2-1 phenotype, 62/171 (36.3%) had preeclampsia and 109/171 (63.7%) were healthy. There were 33 women with the severe disease who gave birth at or before 34 weeks, and 87 women with other preeclampsia. The differences were not statistically significant (p value > 0.05, 0.22 and 0.4 for the 1-1, 2-2 and 2-1 phenotypes, respectively). Additionally, no statistically significant difference was found when comparing women with early and severe preeclampsia to healthy women.

Conclusions: The prevalence of Hp1-1 is higher in healthy, compared to preeclamptic gravidas. This finding is compatible with a protective role of Hp1-1, in the pathogenesis of preeclampsia, possibly through its antioxidative properties.

PP.20.123
THE 936C/T POLYMORPHISM IN THE VASCULAR ENDOTHELIAL GROWTH FACTOR (VEGF) GENE ASSOCIATED WITH FREE PLASMA VEGF LEVELS AS A RISK FACTOR FOR PREECLAMPSIA IN ROMANIAN WOMEN. CORRELATION WITH THE DEGREE OF SERVITY OF PREECLAMPSIA

L. M. Procopciuc2, G. M. Hazi3, G. Caracostea1, G. Nemeti3, G. Dragotaiou4, I. Olteanu1, F. Stamatian3, L. M. Procopciuc1, F. Stamatian3, I. Olteanu1, F. Stamatian3

1 Department of Medical Biochemistry, University of Medicine and Pharmacy, Cluj-Napoca-Romania, 2 Clinic of Endocrinology, Laboratory, Cluj-Napoca-Romania, 3 Department of Gynecology Clinic I, University of Medicine and Pharmacy, Cluj-Napoca-Romania

Objective: To test whether the 936C/T polymorphism on the VEGF gene is associated with the risk of different types of PE; we want to establish an association between this polymorphism and free plasma VEGF levels in PE.

Design and Method: We investigated free plasma VEGF levels in 50 women with PE as compared to 50 women with normal pregnancies using ELISA R&D Systems kit. Genotyping of 936C/T polymorphism was carried out by PCR-RFLP analysis.

Results: 44 out of 64 pregnant women with low free VEGF levels had PE as compared to 6 out of 36 pregnant women with normal free VEGF levels who had PE. The risk to develop PE was 9.54(95%CI[3.45-26.39], p < .001). In D-allele carriers of ACE gene, CC-genotype of AGTR1 gene, T894G in eNOS gene, Pro-allele of PPARγ2 gene and Arg-Arg-phenotype of PPARγ1 gene BP “dipper” profile appeared 1.2-2.1 times more rarely (p < .05-.001) than “non-dipper”. In TT-phenotype of eNOS gene BP 2.2 times more often “night-peaker” (p = .044) is registered. After pharmacogenetically determined treatment number of patients with “dipper” profile increased to 75.6% vs 65.5% before pharmacogenetic correction (p < .001); reliably in CC-phenotype carriers of AGTR1 gene (13.1%, p = .005), TT-phenotype of eNOS gene (12.3%, p < .001), Ala-Ala- and Pro-Pro-phenotypes of PPARγ2 gene (20.0%, p < .001 and 13.75%, p = .047, accordingly), Gly-Gly-phenotype of PPARγ1 gene (25.8%, p < .001). Number of patients with “non-dipper” BP profile significantly decreased to 19.9% vs 26.5% before pharmacogenetic correction (p < .01): reliably in D-allele of ACE gene (7.9%, p = .049 and 8.7%, p = .015, accordingly), CC-phenotype carriers of AGTR1 gene (6.7%, p < .01), T-allele of eNOS gene (9.8%, p < .001), Ala-allele of PPARγ2 gene (in 13.3%, p < .001), Gly-Gly-phenotype of PPARγ1 gene (6.4%, p < .01). Number of patients with “night-peaker” decreased to 4.0% vs 7.2% before pharmacogenetic correction (p = .016), but reliably only in TT-phenotype carriers of eNOS gene (p = .039).

Conclusions: Pharmacogenetically determined therapy caused reliable increase of normal “dipper” BP profile in EAH patients (p < .001) with significant advantage in D-allele ACE gene carriers of HCTZ + ARB combination, less HCTZ + BB, than HCTZ + ACEi (91.7%, 73.5% and 66.0%, accordingly, p < .001). In DD-phenotype carriers more effective were combinations of CA with BB, ARB and ACEi (73-70.4%).

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0263-6352 2011 Wolters Kluwer Health | Lippincott Williams & Wilkins
PP.20.124 PLASMA LIPIDS DISPLAY INCREASED MEAN ALIPHATIC CHAIN LENGTH IN HUMAN HYPERTENSIVE HEART DISEASE

M. Berry1, F. Desmoulin1, F. Smith1, A. Turkieh1, B. Chamontin1, L. Perez1, P. Rouet1, M. Galiner1. 1University Hospital Rangueil, Toulouse-France, 2Inserm U1048, Toulouse-France

Purpose: In hypertension, left ventricle (LV) hypertrophy (LVH) is a potent prognostic factor to predict outcome. New techniques for analyzing blood metabolites profiles, such as high resolution Proton Nuclear Magnetic Resonance (1H NMR) spectroscopy, have emerged. 1H NMR has proved to be one of the most powerful technologies in metabolomics studies of biofluids. We investigated for plasma LVH biomarkers in human Hypertensive Heart Disease.

Methods: 96 hypertensive patients (48 LV remodeling vs. 48 normal LV size) were selected from 2007 to 2009 for plasma 1H NMR-based metabolomic profiling. A multivariate statistical analysis of the spectral data set was performed by using the Partial Least Squares Discriminant Analysis (PLS-DA).

Results: PLS-DA Scores plot of spectral data revealed sample clustering according to the clinical state. PLS-DA loading plot reveals the variables influencing that discrimination. Thus, discriminant variables were identified as signals coming from the methylene (-CH2) and methyl (-CH3) moieties of aliphatic chain from plasma lipids. Furthermore, the CH2/CH3 ratio which is representative of the length of aliphatic lipids chains in plasma was significantly higher in blood from patients with LV remodeling that would indicate metabolic consequences of LVH.

Discussion: CH2/CH3 ratio which is representative of the length of aliphatic lipids chains in plasma was significantly increased in blood from patients with LV remodeling that would indicate metabolic consequences of LVH.

Conclusion: In hypertension, LVH was significantly correlated to an increase of the mean length of aliphatic lipids chains in plasma.

PP.20.125 ASSOCIATION STUDY OF THE β2-ADRENERGIC RECEPTOR GENE POLYMORPHISMS AND HYPERTENSION IN THE NORTHERN HAN CHINESE

S. Wen1, Y. Lou1, J. Liu1, Y. Li1, Z. Wang1, K. Liu1, H. Wu2, Q. Niu1, W. Gu1, X. Zhi1. 1Beijing Anzhen Hospital, Capital Medical University, Beijing-China, 2Department of Cardiology, Peking University Third Hospital, Beijing-China

Background: The β2-adrenergic receptor (ADRB2) gene has been widely researched as a candidate gene for essential hypertension (EH), but no consensus has been reached in different ethnicities. The aim of the present study was to evaluate the possible association between the ADRB2 gene polymorphisms and the EH risk in the Northern Han Chinese population.

Methodology/Principal Findings: This study included 747 hypertensive subjects and 390 healthy volunteers as control subjects in the Northern Han Chinese. Genotyping was performed to identify the C-47T, A46G and C79G polymorphisms of the ADRB2 gene. G allelic frequency of A46G polymorphism was significantly higher in hypertensive subjects (p = 0.011, OR = 1.287, 95%CI [1.059-1.551]) than that in controls. Significant association could also be found in dominant genetic model (GG + AG vs. AA, p = 0.006, OR = 1.497, 95%CI [1.121-1.998]), in homozygote comparison (GG vs. AA, p = 0.025, OR = 1.568, 95%CI [1.059-2.322]), and in additive genetic model (GG vs. AG + AA, p = 0.012, OR = 1.292, 95%CI [1.056-1.553]). Subgroup analyses performed by gender suggested that this association could be found in males, but not in females. Stratification analyses by obesity showed that G46 allele was related to the prevalence of hypertension in the obese population (P < 0.001, OR = 1.657, 95%CI [1.269-2.165]). No significant association could be found between C-47T or C79G polymorphism and EH risk. Linkage disequilibrium was detected between the C-47T, A46G and C79G polymorphisms. Haplotype analyses observed that the T-47-A46-C79 haplotype was a protective haplotype for EH, while the T-47-C46-C79 haplotype increased the risk.

Conclusions/Significances: We revealed that the ADRB2 A46G polymorphism might increase the risk for EH in the Northern Han Chinese population.

PP.20.126 A-ADDCIN GLY460TRP POLYMORPHISM AND ESSENTIAL HYPERTENSION RISK IN CHINESE: A META-ANALYSIS

S. Wen1, K. Liu1, Y. Lou1, J. Liu1, Z. Wang1, Y. Lou2, Y. Huang2, Q. Niu1, W. Gu1, X. Zhi1. 1Beijing Anzhen Hospital, Capital Medical University, Beijing-China, 2School of Life Sciences, Fudan University, Shanghai-China

Objective: No clear consensus has been reached on the α-adreacin polymorphism (Gly460Trp) and essential hypertension (EH) risk in Chinese. We conducted a meta-analysis in an effort to systematically explore the possible association.

Design and Method: Case-control studies in Chinese and English performed with human subjects were identified by searching the MEDLINE, EMBASE, China Biological Medicine Database, China National Knowledge Infrastructure platform, Wanfang and VIP databases. The fixed-effects model and the random-effects model for dichotomous outcomes were applied to combine the results of the individual studies.

Results and Conclusions: We selected 20 studies that met the inclusion criteria, including a total of 5562 patients with hypertension and 4289 controls. Overall, our findings supported the hypothesis that the ADD1 Gly460Trp polymorphism is associated with EH in the Chinese population. A borderline association was found between the tryptophan (Trp) allele of the Gly460Trp variant and hypertension (P = 0.05, Odds ratio (OR) = 1.08, 95% confidence interval (CI) = 1.00–1.17 and Pheterogeneity = 0.02). Furthermore, in the subgroup analysis, our results support a positive association among Chinese Han individuals (P = 0.0009, OR = 1.24, 95% CI = 1.19–1.41 and Pheterogeneity = 0.04) as well as in the homozygote comparison (P = 0.006, OR = 1.25, 95% CI = 1.07-1.46 and Pheterogeneity = 0.03). Furthermore, in the subgroup analysis, our results support a positive association among Chinese Han individuals (P = 0.0001, OR = 1.25, 95% CI = 1.09–1.42, P heterogeneity = 0.08, recessive genetic model; P = 0.009, OR = 1.26, 95% CI = 1.06-1.50, Pheterogeneity = 0.03, homozygote comparison). No apparent association was identified in Kazakhs. Our meta-analysis suggests that the Gly460Trp polymorphism might increase the risk of hypertension in Chinese populations, especially in Han Chinese. Further studies investigating gene–gene, gene–environment and mutual interactions are needed to better understand the role of ADD1 in hypertension.

PP.20.127 BLOOD PRESSURE AND URINARY SODIUM EXCRETION IN RELATION TO 16 GENETIC POLYMORPHISMS IN THE NATRIURETIC PEPTIDE SYSTEM IN CHINESE

B. Hu. Rui Hospital, Shanghai-China

Objective: Recent studies have demonstrated that several single nucleotide polymorphisms (SNPs) in the natriuretic peptide precursor genes A-B region (NPPA-NPBB) were associated with circulating natriuretic peptides and blood pressure (BP) in White population. We therefore systematically investigated the association between these polymorphisms in the natriuretic peptide system (NPPA, NPBB, NPPC, NPRA, NPROC, and Corin genes) and blood pressure in a Chinese population.

Methods: The study population was recruited from a mountainous area 500 km north of Shanghai from 2003 to 2009. We first genotyped 951 subjects enrolled in 2005 for 16 SNPs using the ABI SNapShot method and then the remaining 1355 subjects as a validation study for 5 SNPs selected from the
primary study. Plasma proBNP was measured using Elecsys proBNP immunoassay in 1386 individuals enrolled from 2003 to 2005.

Results: Overall, the association of the studied genetic polymorphisms in relation to blood pressure and urinary excretion of cations was weak or non-significant. However, in the primary study, there was significant (P=0.003) interaction between rs198358 polymorphism and age in relation to DBP. After adjustment for covariates, DBP was significantly higher in G allele carriers than AA homozygotes in 176 subjects aged 60 years or older (77.8 ± 1.72 vs 73.9 ± 1.54 mmHg, P=0.001). In the primary combined with the validation studies, the interaction between the rs198358 polymorphism and age in relation to DBP remained statistically significant (P=0.02). The odds ratio of hypertension for carrying G allele versus AA homozygotes was 1.25 (95% CI: 1.03-1.52; P = 0.03), 1.33 (95% CI: 1.05-1.67; P = 0.02), and 1.45 (95% CI: 0.95-2.22; P = 0.08) in all subjects, the subjects aged ≥ 40 years, and the subjects aged ≥ 60 years, respectively. In addition, after adjustment for age, sex, and BMI, the minor alleles of 5 SNPs (rs198358, rs198375, rs6668352, rs198388, and rs198389) at NPPA-NPPB locus were significantly (P<0.03) associated with a higher plasma proBNP concentration.

Conclusion: Some of the genetic polymorphisms in the natriuretic peptide system might be associated with blood pressure. However, not only the size, but also the direction of the association may change with age.

PP.20.128 THE INTERACTION BETWEEN ENOS AND CAVEOLIN-1 GENE POLYMORPHISMS IN ESRD PATIENTS: A PROOF OF CONCEPT STUDY

A. Testa, MC. sanguedolce, B. Spoto, F. Mallamaci, L. Malatino, G. tripesi, C. zoccali. Cnr- Itim National Council of Research, Reggio Calabria-Italy

Appropriate localization of endothelial nitric oxide synthase (eNOS) in caveolae is fundamental for the activity this enzyme and this process is altered in individuals harbouring the Glu298Asp variant in the eNOS gene. Since the Glu298Asp variant is strongly associated with arterial remodelling in end stage renal disease (ESRD) patients, we tested the interaction between this variant and the rs4730751 polymorphism in the caveolin-1 gene as related to this outcome measure.

Methods: One hundred and thirty-three ethnically homogeneous ESRD patients underwent carotid US studies to measure Intima Media Thickness (IMT) and carotid cross-sectional area. Genotyping was performed by high-throughput allelic discrimination assays on Real-Time PCR.

Results: Both Caveolin-1 (TT: 12%; GT: 41%; GG: 45%) and eNOS (TT: 12%; GT: 43%; GG: 45%) genotypic distributions did not deviate from Hardy-Weinberg Equilibrium. Concomitant arterial remodelling was associated to the number of G alleles of Caveolin-1 polymorphism and GG homozygotes displayed IMT and a cross-sectional area that were, respectively, 16% and 21% higher than in patients without the risk allele (P<0.001). The odds ratio of DPIMT > 0.95 measured through allelic discrimination assays on Real-Time PCR.

Conclusion: The present study demonstrates that the CC variant of the 9p21 locus globally increases the risk of CAD. This risk can be further increased in the presence of elevated hs-CRP values, as shown by the additive and multiplicative interaction. This concept allows us to foresee the possibility of genetic risk factors management through the control of associated conditions, whenever possible.

PP.20.130 IDENTIFICATION OF THE INTEGRIN ITGA11 AS A NEW CANDIDATE GENE FOR ALBUMINURIA

A. Schulz1, A. Sietmann2, J. Hänsch1, M. Stoll2, R. Kreutz1. ‘Charité - Universitätsmedizin Berlin, Cem, Institute of Clinical Pharm, Berlin-Germany, ‘Leibniz-Institut Für Arterioskleroseforschung, Universität Münster, Münster, Münster-Germany

Objective: We previously confirmed in the polymorphic Munich Wistar Frömler (MWF) rat a functional role of two major quantitative trait loci (QTL) on rat chromosome (RNO)6 and RNO8 for albuminuria development in consomic rat strains. Here we performed chromosomal fine mapping for the RNO8-QTL and conducted genome-wide gene expression and pathway analysis to identify candidate genes for albuminuria.

Design and Method: We generate 4 congenic lines to dissect the RNO8-QTL. RNA was isolated from glomeruli of MWF, consomic MWF-6SHR and MWF-8SHR, and SHR rats at 4 and 8 weeks of age, respectively. In these samples genome-wide expression studies were performed by microarray analysis followed by confirmation of identified candidates genes by quantitative Realtime PCR.

Results: Phenotyping of the congenic lines covering the RNO8-QTL demonstrated that the albuminuria QTL was subdivided into at least two different informative loci, e.g. one major interval accounting for an albuminuria effect of about 10 mg/gCr and one accounting for about 4 mg/gCr. In the microarray analysis we identified integrin alpha 11 (Itga11), a collagen binding integral membrane protein, which mapped directly into the major interval of the RNO8-QTL. Albuminuria exhibits a marked and significant increase in MWF compared to the reference strain SHR at 4 and 8 weeks of age, respectively. In these samples genome-wide expression studies were performed by microarray analysis followed by confirmation of identified candidates genes by quantitative Realtime PCR.

Conclusion: The present study demonstrates that the CC variant of the 9p21 locus globally increases the risk of CAD. This risk can be further increased in the presence of elevated hs-CRP values, as shown by the additive and multiplicative interaction. This concept allows us to foresee the possibility of genetic risk factors management through the control of associated conditions, whenever possible.
**PP.20.131** SINGLE NUCLEOTIDE POLYMORPHISM INFLUENCE ON ARTERIAL STIFFNESS IN HYPERTENSION

F.Cesana1, S. Nava1, L. Boffi2, C. Menni3, M. Betelli1, A. Cereda1, M. Sydorchuk1.

1Division of Internal Medicine, Milano-Bicocca University and Osp. S. Gerardo, Monza-Italy.
2National State Medical University, Kyiv-Ukraine.
3Molecular Biology Center, Milano-Bicocca University, Monza-Italy.

**Objective:** Genome-wide association studies have provided evidence that region 21 on the chromosome 9p is associated with a greater susceptibility of subjects to coronary heart disease. Whether this can be ascribed to the fact that genes located on chromosome 9p may also regulate the patterns of arterial stiffness, i.e. one of the pathophysiologcal determinant of coronary disease and an independent predictor of cardiovascular morbidity and mortality, is largely unknown.

The present study was thus aimed at evaluating the influence of 384 SNPs on carotid-femoral Pulse Wave Velocity (cf-PWV) in a cohort of hypertensive subjects. We selected some SNPs on the MMP9, ELN and ENDRA genes and on the short arm of chromosome 9.

**Design and Method:** In 821 essential hypertensives (age 53.9 ± 13.7 yrs, mean ± SD) we assessed, along with body mass index (BMI), biochemical values, blood pressure (BP), echocardiographic and carotid ultrasound variables, cf-PWV via the Complex method. DNA was extracted from blood samples using Wizard Genomic DNA Purification kit (Promega). The 384 selected tag SNPs were screened with a custom-designed 384-plex VeraCode GoldenGate Genotyping assay on Illumina BeadXpress Reader platform. Quality checking included DNA quality, call rate and Hardy Weinberg equilibrium. Association analysis was done using PLINK considering cf-PWV as a quantitative trait (linear regression assuming an additive model) adjusting for sex, age, systolic blood pressure and BMI. We used False Discovery rate (FDR) to account for multiple testing.

**Results:** Although none of the 384 SNPs was significant after adjusting for multiple testing, a trend of association with cf-PWV was observed for rs300622 and rs2381640. The C allele of rs300622 was associated with a higher cf-PWV value (11.190 ± 2.95 m/sec vs 10.717 ± 2.68 m/sec, P = 0.003, FDR = 0.6); while the C allele of rs2381640 was associated with a higher cf-PWV value (2.81 ± 2.49 m/sec vs 2.522 ± 2.95 m/sec, P = 0.003, FDR = 0.6). In the same population sample rs300622 showed a significant association with IMTs.

**Conclusions:** The association signals for cf-PWV did not pass multiple testing correction, probably due to the small sample size of the study population. However, these data suggest that genes located on Chromosome 9p may be implicated in important regulatory mechanisms of arterial stiffness. Further research is needed to dissect whether individual susceptibility to coronary heart disease is influenced by genes located on the same chromosome and implicated in arterial stiffness regulation.

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**PP.20.132** EFFICACY OF COMBINED ANTIHYPERTENSIVE THERAPY AND BLOOD PRESSURE (BP) REDUCTION DYNAMICS RELATE WITH POLYMORPHISMS OF FIVE GENES

L. Sydorchuk1, K. Amosova1, A. Sydorchuk1, R. Sydorchuk1, J. Ursuliak1, I. Sydorchuk1.

1Bucovinan State Medical University, Chernivtsi-Ukraine.
2National State Medical University, Kyiv-Ukraine

**Objective:** To evaluate office and ambulatory BP changes in patients with essential arterial hypertension (EAH) under influence of different combination antihypertensive treatment (CAT) during 12 months depending on I/D polymorphism in ACE gene, A1166C in AGTR1 gene, T894G in eNOS gene, Pro12Ala in ADRbeta1 gene and AA-genotype of PPAR-gamma2 and Arg389Gly in ADRbeta1 gene.

**Design/Methods:** 249 patients (EAH I – 26.5%; EAH II – 45.8%; EAH III – 28.9%) before pharmacogenetic correction, p < 0.001. HCTZ + ARB caused target BPoffice/24h achievement in 88.3/91.7%: reliable in ACE gene’ II-genotype (p = .019), AGTR1 gene’ CC-genotype (p < .001), eNOS gene’ G-allele carriers (p = .002), PPAR-gamma2 gene’ Ala-allele and ADRbeta1 gene’ Gly-Gly-genotype (p < .001). Number of patients with target BPoffice/24h increased under HCTZ + ACE to 64.7/73.5%: reliable in AGTR1 gene’ AA-genotype (p = .018), eNOS gene’ T-allele, PPAR-gamma2 gene’ Ala/Ala and ADRbeta1 gene’ Gly-Gly-genotype (p<.016-.001). Number of patients with target BPoffice/24h increased under HCTZ + ACE to 64.7/73.5%: reliable in AGTR1 gene’ AA-genotype (p = .018), eNOS gene’ T-allele, PPAR-gamma2 gene’ Ala/Ala and ADRbeta1 gene’ Gly-Gly-genotype (p<.016-.001). Number of patients with target BPoffice/24h increased under HCTZ + ACE to 64.7/73.5%: reliable in AGTR1 gene’ AA-genotype (p = .018), eNOS gene’ T-allele, PPAR-gamma2 gene’ Ala/Ala and ADRbeta1 gene’ Gly-Gly-genotype (p<.016-.001). In the same population sample rs300622 showed a significant association with IMTs.

**Results:** Among studies mentioned, 2 point substitutions were characterized by significantly higher level of heteroplasmy in lymphocytes from patients with hypertension. These were mutations: C3256T in the gene MT-TL2 coding for subunit 2 of cytochrome c oxidase (fatty acid-oxygenating pathway) and C2288G in the gene MTHB (mitochondrial biogenesis) coding for heme oxygenase-1. The study was aimed to investigate the expression pattern of cytokine genes in hypertensive patients and possible association between these genes and cardiovascular disease, as well as to study hypothetical interactions between genes involved in the regulation of blood pressure. Study group included 355 EH patients and was divided into three subgroups: first included 219 patients with non-complicated EH, second – 95 hypertensive patients with myocardial infarction (MI), third – 41 hypertensive patients with ischemic stroke (IS). Control group consisted of 273 unrelated normotensive subjects.

**Conclusion:** It is possible, that some forms of the human hypertension have a mitochondria genome origin.

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**PP.20.133** ALKERPLASMIC MTDNA DEFECTS ASSOCIATED WITH HUMAN HYPERTENSION

A. Postnov1, I. Soberina1, M. Sazonova2, A. Orekhov3.
1Cardiology Research Complex, Moscow-Russia.
2Institute of General Pathology and Pathophysiology Rams, Moscow-Russia.
3Institute for Atherosclerosis Research, Moscow-Russia.

**Background and Aim:** Heteroplasmic mtDNA defects are considered to be an important cause of human diseases that primarily involve post-mitotic tissues. The majority of deleterious mtDNA point mutations are heteroplasmic, and their mutant load can vary significantly among different tissues, even in the same subject. Mutations of the human mitochondrial genome can be a possible determinant of human hypertension.

**Materials and Methods:** The difference in the level of heteroplasmacy between humans with (125) and without (67) arterial hypertension (192 patients). Studied mutations belonged to mitochondria genes MT-RRN1, MT-TL1, MT-TL2, MT-TW, MT-TN, MT-TC, MT-TK, MT-TE, MT-N1D, MT-N2D, MT-N5D, MT-N6D, MT-C01, MT-C03, MT-ATP6 and MT-CYB. The level of heteroplasmacy was determined by pyrosequencing method adopted for conditions where both mutant and normal allele were present in the same specimen.

**Results:** Among studies mentioned, 2 point substitutions were characterized by significantly higher level of heteroplasmacy in lymphocytes from patients with hypertension. These were mutations: C3256T in the gene MT-TL2 coding for subunit 2 of cytochrome c oxidase (fatty acid-oxygenating pathway) and C2288G in the gene MTHB (mitochondrial biogenesis) coding for heme oxygenase-1. The study was aimed to investigate the expression pattern of cytokine genes in hypertensive patients and possible association between these genes and cardiovascular disease, as well as to study hypothetical interactions between genes involved in the regulation of blood pressure. Study group included 355 EH patients and was divided into three subgroups: first included 219 patients with non-complicated EH, second – 95 hypertensive patients with myocardial infarction (MI), third – 41 hypertensive patients with ischemic stroke (IS). Control group consisted of 273 unrelated normotensive subjects.

**Conclusion:** It is possible, that some forms of the human hypertension have a mitochondria genome origin.

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**PP.20.134** ALTERED EXPRESSION PROFILE AND THE ASSOCIATION OF CYTOKINE GENES WITH ESSENTIAL HYPERTENSION

1Institute of Molecular And Cell Biology University of Tartu, Tartu-Estonia.
2Institute of Biochemistry And Genetics Ufa Science Centre Rus, Ufa-Russia.
3Chair of Cardiology Bashkir University of Medicine, Ufa-Russia.

**Objective:** To study the expression pattern of cytokine genes in hypertensive patients and possible association between these genes and cardiovascular disease, as well as to study hypothetical interactions between genes involved in the regulation of blood pressure. Study group included 355 EH patients and was divided into three subgroups: first included 219 patients with non-complicated EH, second – 95 hypertensive patients with myocardial infarction (MI), third – 41 hypertensive patients with ischemic stroke (IS). Control group consisted of 273 unrelated normotensive subjects.
healthy subjects. In the experiment, we used SNPs in 5 cytokine genes and 5 genes encoding for renin-angiotensin system (RAS) and endothelial relaxation factor (NO) polymorphism components, and performed an association study between both the SNPs and cytokine genes. We investigated the relation by collecting 207 objects. SNPs were associated with the cytokine gene polymorphism. We found that IL1B T511C (P = 0.029) and IL10 C37A (P = 0.016) SNPs were associated with the cytokine gene polymorphism. An association was detected between IL1B, IL6, IL10, IL12B, TNFA gene variants and cardiovascular complications of the patient group. Using the Wilcoxon-Mann-Whitney test, we performed multiple comparisons of mean dose levels among the different genotype groups. The mean warfarin dose was compared according to different genotypes. The analyses were carried out using SAS version 9.1 (SAS Institute, Cary, NC, USA).

**Results:** The frequencies of the VKORC1-1639 AA, AG, GG genotypes in the patient group were 84%, 15%, 1% respectively. The frequencies of the CYP2C9*3 AA, AC, CC genotypes in the patient group were 91%, 8%, 1% respectively. There is 1 carrier in CYP2C9*2 polymorphism. It was much lower in VKORC1-1639 AA genotype (2.44 + 0.57mg/day) than in AG genotype (3.55 + 1.03mg/day) and GG genotype (4.00 + 1.73mg/day). There is no indication that atrial fibrillation and heart valve replacement can impact on relationship between warfarin maintenance dosage and VKORC1 and CYP2C9 polymorphisms (P = 0.973).

**Conclusions:** Polymorphisms of VKORC1 and CYP2C9 is associated with warfarin maintenance dose in Chinese antiocoagulant patients, there is no difference between atrial fibrillation and heart valve replacement.

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### PP.20.135 RELATIONSHIP BETWEEN VKORC1-1639G/A, CYP2C9*2 AND *3 POLYMORPHISMS AND WARFARIN DOSAGE IN CHINESE

**Objective:** Polymorphisms in VKORC1 and CYP2C9 have been shown to be associated with warfarin dosage requirements. We investigated by collecting 207 patients with atrial fibrillation and/or heart valve replacement, analyzed their associated with warfarin dose requirements. We investigate it by collecting 207 patients with atrial fibrillation and/or heart valve replacement. Analyzed their associated with warfarin dose requirements. We investigated it by collecting 207 patients with atrial fibrillation and/or heart valve replacement. This study, we genotyped five functional SNPs of klotho at promoter and investigated the association of SNPs with serum cholesterol. In this study, we genotyped five functional SNPs of klotho at promoter and investigated the association of SNPs with serum cholesterol.

CYP2C9 polymorphisms (p = 0.973). Other SNPs were not associated with warfarin maintenance dose in Chinese anticoagulant patients. There is a significant genetic and environmental effects. SNPs are more prevalent in people of indigenous African origin. The epithelial sodium channel (ENaC) is an attractive candidate gene for salt sensitivity as it is the final regulator of sodium balance. The R563Q mutation of the ENaC is associated with low renin/low aldosterone hypertension in Black Africans and people of mixed ancestry, hypertension in a family study and severe early preclampsia. The purpose of the paper was to investigate the prevalence of the R563Q mutation in the multi-ethnic populations of South Africa, its association with hypertension and BP, and the response to amiloride in patients with the R563Q mutation with resistant hypertension.

Samples were obtained from hypertensives and normotensive controls attending hypertension clinics in Cape Town and Johannesburg, and unsellected San living in the Northern Cape and Namibia. Patient demographics were recorded and DNA was analyzed for the R563Q mutation. In Cape Town, patients with the R563Q mutation referred for resistant hypertension received amiloride 5-10mg daily and their response to treatment was monitored. The study was approved by the University of Cape Town Research Ethics Committee.

A total of 1,939 (1,486 hypertensives and 471 normotensive controls) unrelated subjects were assessed for the R563Q mutation in Cape Town and Johannesburg. Eighty seven (5.9%) of the hypertensives were R563Q positive vs. 8 (1.7%) of the normotensives controls (p < 0.0005 for association with hypertension). In the Namibian and Khomani San 19.5% and 18.8% of unsellected controls were R563Q positive, but there was no association with hypertension. Overall, the Hardy-Weinberg frequencies in the combined San groups reached borderline statistical significance. χ² = 2.7908 (p = 0.095). Sodium intake was significantly lower in the San compared to urban subjects (7.3 vs. 12.2 mmol/mmol, P = 0.016). Aldosterone levels were significantly lower in the R563Q positive group, 52 vs. 96 pmol/l (P = 0.035). Twenty two R563Q positive patients with resistant hypertension received amiloride 5-10 mg. The mean reduction in blood pressure was 36/17mmHg (p < 0.0001 for systolic and diastolic BP).

The R563Q mutation is strongly associated with hypertension in urban areas in South Africa. Given the high prevalence of the mutation in the San people this is likely the origin of the mutation, but it is not associated with hypertension, presumably due to their lower sodium intake. Screening patients with resistant hypertension in South Africa for the R563Q mutation provides feasible pharmacogenetic approach to treatment.
examined the prevalence of Ala379Val polymorphism on hypertensive patients, as well as its impact on inflammatory and thrombotic markers.

**Design and Method:** We enrolled 446 male subjects; 218 subjects with essential arterial hypertension and 228 age-matched controls. Genotyping for the Ala379Val variant was detected by PCR. In a subgroup of 125 hypertensive patients, we also examined the relationship between genotype distribution and inflammatory and thrombotic markers. Plasma levels of VCAM-1, IP-10, PAI-1 and fibrinogen were determined.

**Results:** The genotype distribution in the overall population was: Val/Val: 15 (3.4%), Ala/Val: 153 (34.3%), Ala/Ala: 278 (62.3%). Genotype distribution in the subgroup of 125 subjects was: Val/Val: 4 (3.2%), Ala/Val: 39 (31.2%), Ala/Ala: 82 (65.6%). Importantly, Valine carriers had significantly lower risk for arterial hypertension (OR = [95%CI]: 0.627[0.426-0.924], P = 0.018). Valine homozygotes had lower levels of fibrinogen compared to other genotypes (P = 0.041). The presence of valine variant was not associated with VCAM-1, IP-10 or PAI-1 (P = NS).

**Conclusions:** The presence of the 379Val variant of Lp-PLA2 is related to decreased risk for hypertension and lower fibrinogen levels, suggesting a positive association between this polymorphism and systemic inflammatory status. These findings suggest that this polymorphism significantly contributes to the process of inflammation in patients with essential hypertension.

**PP.20.139**  
**HERITABILITY OF STEROID SYNTHESIS IN THE SWISS KIDNEY PROJECT ON GENES IN HYPERTENSION**


**Objectives:** Genome wide association studies (GWAS) identified a robust association between elevated systolic blood pressure and a single nucleotide polymorphism at the 10q24 locus. This locus encodes also for the enzyme CYP17A1, that mediates steroid 17β-Hydroxylase and 17,20-Lyase activity, thus regulating steroid synthesis. So far, no data exist on the heritability of urinary steroid metabolites excretion. Variation in urinary excretion likely reflects differences in synthesis due to genetic polymorphisms encoding the corresponding enzymes.

**Design and Methods:** Excretion of steroid metabolites during day and night was measured in participants of the Swiss Kidney Project on Genes in Hypertension (SKiPOGH), a population-based study of hypertension in Swiss families. Heritability was estimated using the ASSOC software in the S.A.G.E. package. ASSOC uses a linear regression model in which the total residual variance is partitioned, after regressing on covariates, into the sum of a random additive polygenic component, a random sibship component, random nuclear family components, a random nuclear family component, a random marital component, and an individual-specific random component.

**Results:** The genotype distribution in the overall population was: Val/Val: 15 (3.4%), Ala/Val: 153 (34.3%), Ala/Ala: 278 (62.3%). Genotype distribution in the subgroup of 125 subjects was: Val/Val: 4 (3.2%), Ala/Val: 39 (31.2%), Ala/Ala: 82 (65.6%). Importantly, Valine carriers had significantly lower risk for arterial hypertension (OR = [95%CI]: 0.627[0.426-0.924], P = 0.018). Valine homozygotes had lower levels of fibrinogen compared to other genotypes (P = 0.041). The presence of valine variant was not associated with VCAM-1, IP-10 or PAI-1 (P = NS).

**Conclusions:** The presence of the 379Val variant of Lp-PLA2 is related to decreased risk for hypertension and lower fibrinogen levels, suggesting a positive association between this polymorphism and systemic inflammatory status. These findings suggest that this polymorphism significantly contributes to the process of inflammation in patients with essential hypertension.

**PP.20.140**  
**INCREASED MIGRATION OF MONOCYTES IN ESSENTIAL HYPERTENSION IS ASSOCIATED WITH INCREASED transient receptor potential channel canonical type 3 channels**

Z. Zhao, Z. Yan, Z. Luo, D. Liu, Z. Zhu. Third Military Medical University, Chongqing Institute Of Hypertension, Chongqing-China

**Objective:** In patients with hypertension an increased TRPC3 expression has been reported in several tissues including vascular smooth muscle cells and peripheral blood monocytes. It is well established that monocytes play a crucial role in atherogenesis by recruitment to the vessel wall. Increased activation of monocytes in hypertension may be due to increased change of cytosolic calcium. TRPC3 channels are non-selective cation channels mediating transplasma membrane calcium influx. However, the role of TRPC3 for regulating the migration of monocytes has not been investigated to date. In the present study we tested the hypothesis that increased TRPC3 channel expression causes increased migration of monocytes from patients with essential hypertension.

**Design and Method:** Monocytes were isolated from the peripheral blood of normotensive subjects and hypertensive patients. Monocyte migration assay was performed in a microchemotaxis chamber using chemotactrant formylated peptide Met-Leu-Phe (MLP) and tumor necrosis factor α (TNF-α). Proteins were identified by immunoblotting and quantitative in-cell Western assay. The effects of TRP channel-inhibitor 2–aminooethylphosphorylborane (2-APB) and small interfering RNA knockdown of TRPC3 were investigated.

**Results:** We observed an increased expression of TRPC3 protein in monocytes and an enhanced 2-APB-induced migration of monocytes from hypertensive patients compared with normotensive control subjects. In the presence of 2-APB or after specific siRNA knockdown of TRPC3, the 2-APB-induced monocyte migration was significantly blocked. Both 2-APB- and TNF-α-induced changes of cytosolic calcium were significantly increased in monocytes from hypertensive patients compared with normotensive control subjects. In the presence of inhibitors of tyrosine kinase and phosphoinositide 3-kinase (PI3K), the 2-APB-induced monocyte migration was significantly reduced and not different between patients with essential hypertension and normotensive control subjects. Furthermore, after siRNA transfection against TRPC3 the effects of inhibitors of tyrosine kinase and PI3K could not be observed any longer. Furthermore, we observed that 2-APB activates monocytes by an ERK- and Akt-dependent pathway. The 2-APB-induced phosphorylation of ERK and Akt was significantly increased in monocytes from patients with essential hypertension compared to normotensive control subjects. Both the inhibition of TRPC3 channels using 2-APB and down-regulation of TRPC3 by specific siRNA significantly reduced the 2-APB-induced phosphorylation of ERK and Akt. These findings underscore that the 2-APB-induced activation of monocytes is TRPC3-dependent.

**Conclusions:** We conclude that increased monocyte migration in hypertensive patients is associated with increased TRPC3 channels.

**PP.20.141**  
**EFFECT OF HYDROGEN SULFIDE ON MECHANISMS COUPLING EXCITATION OF SMOOTH MUSCLE CELLS GUINEA PIG URERET**


**Objectives:** Gasotransmitters species claim to the role of signaling molecules, especially towards the realization of oxidative stress. However, the methods and extent of their interaction with key intracellular signaling and effector systems of regulation of excitation-coupling in smooth muscle cells continue to actively explored. This study examines the effect of hydrogen sulfide (NaHS) in the potassium-dependent mechanisms of regulation by cyclic nucleotides and calcium signaling system of electrical and contractile activity of smooth muscle cells.

**Design and Methods:** The method of double sucrose bridge to study the effect of hydrogen sulfide (NaHS 10-1000 μM ) on electrical and contractile properties of smooth muscle cells of guinea pig ureter, caused by electric stimulus. To investigate the role of C-kinase branch of the calcium and cyclic nucleotides in the development of the action potential and contractile responses of smooth muscle using phenylephrine and forskolin, respectively.

**Results:** Found opposite effect of hydrogen sulfide (NaHS. 10 μM) and cyclic nucleotides on C-kinase branch of the regulation of excitation-coupling in smooth muscle cells to actively explored. This study examines the effect of hydrogen sulfide (NaHS) in the potassium-dependent mechanisms of regulation by cyclic nucleotides and calcium signaling system of electrical and contractile activity of smooth muscle cells.
MECHANISMS OF ACTION OF HYDROGEN SULFIDE ON CONTRACTILE ACTIVITY VASCULAR SMOOTH MUSCLE

M. Baskakov1, S. Gusakova1, A. Zheludeva1, L. Smagly1, I. Kovalyev1, M. Medvedev1, S. Orlov1, Siberian State Medical University, Tomsk-Russia.

Objective: to study the role of components of the potassium conductance of the membrane of vascular smooth muscle cells (VSMC) in the mechanisms of action of hydrogen sulfide on the contractile function of vascular smooth muscle.

Design and Methods: Endothelium-denuded VSMC were obtained from thoracic aorta of 11-13 week-old rats. Amplitude of contractions, recorded as isometric force tension, was measured as percentage of depolarisation-induced VSMC contraction in high-K+ (30 mM KCl) medium. Studied the effect of blockers calcium-activated, ATP-sensitive and voltage-dependent potassium channels: Tetraethylammonium (10 mM), Charybdotoxin (0.1 µM), Gilbenclamide (10 µM) and 4-Aminopyridine (1 mM) to hydrogen sulfide-induced changes in mechanical stress smooth muscle segments. Sodium hydrosulphide (NaHS) was used as a donor of H2S.

Results and conclusions: 1-50 µM NaHS increased contractions triggered by high-K+ + o-P445 and o–P445 were observed under the action of 50 µM (113.6 ± 3.5%, n = 6, p < 0.05). 100 µM NaHS caused a transient increase in mechanical stress to 124.0 ± 5.6%, followed by its decrease to 108.5 ± 4.3% (n = 5, p < 0.05), and 500 and 1000 µM NaHS led to a relaxation of segments to 66.1 ± 7.5% and 44.2 ± 5.5%, respectively (n = 6, p < 0.05). Tetraethylammonium reduced the magnitude of contractions to 103.8 ± 0.9%, 104.9 ± 1.7%, 108.5 ± 2.5% and 116.7 ± 3.7% and relaxing (106.4 ± 7.8% and 95.4 ± 7.1%) in 4% (n = 4, p < 0.05) of NaHS. Gilbenclamide eliminated the contractile effect of NaHS on the vascular segments, and increased the relaxing effect of NaHS to 135.4 ± 6.0%, and 25.8 ± 7.7% (n = 5, p < 0.05), respectively. 4-Aminopyridine did not influence the contractile effect of NaHS, but it weakens its relaxing effect to 80.4 ± 5.3% and 76.5 ± 1.2% (n = 4, p < 0.05) from control. Charybdotoxin reduced the magnitude of the contractile effect of NaHS. These data suggest the predominant involvement of voltage-dependent potassium channels in the mechanisms of relaxing action of hydrogen sulfide in vascular smooth muscle cells under the action high-K+ + medium. Constrictor mechanisms of influence of hydrogen sulfide can be attributed to the influence of hydrogen sulfide on other types of ion channels and/or ion-transporting systems as well as changes in the endogenous production of relaxing and constrictor factors and require further study. The study was supported by the Federal Program (contract No P445 and No 02.740.11.5031).

Influence of Magnetite Nanoparticles Cause of Pe-Induced Contractility of Smooth Muscles of a Pulmonary Artery of Guinea Pig

A. Nosarev, T. Zaytceva, A. Saveleva, L. Kapilevich, O. Nosareva. Siberian State Medical University, Tomsk-Russia.

Objective: During inhalatory exposure on the organism nanoparticles can penetrate the blood vessels and reach extrapulmonary organs. Mechanisms of nanosized particles translocation through the alveolar epithelium, as well as the possibility of their damaging effect on these structures, are currently not fully elucidated. In connection with the foregoing, it is necessary to study the effect of nanosized metal oxides, as the most frequently used, on the contractile properties of pulmonary artery smooth muscle.

Design and Method: To obtain the aerosol solution the magnetite (Fe3O4) was prepared in distilled water. Animals inhaled daily for 60 minutes (12 days) to study the effects of nanoparticles, received in vivo. Control animals were exposed to distilled water in similar conditions. Contractile effects of isolated smooth muscle segment of guinea pigs pulmonary artery was studied by mechanographic method.

Results: In this study we showed that the magnitude of the contractile response of the pulmonary artery smooth muscle segments in addition α-adrenomimetic phenylephrine (PE) in concentrations of 1 - 100 mM significantly increased in the group of animals exposed by inhalation exposure of magnetite nanoparticles. Increasing in the amplitude contraction was 62% (n = 13, p < 0.05), compared with those in the control group. At the same time, the direct addition of nanosized magnetite to segment of pulmonary artery resulted to significant decreasing the contractile response amplitude to PE by 19% (n = 11, p < 0.05).

Conclusion: From the above stated that inhalation of guinea pigs with nanoparticles of magnetite leads to a potentiation of alpha-adrenergic contractile responses of pulmonary artery smooth muscles. This may be due to both the formation of nonspecific inflammatory response to chronic influence of nanosized powders of magnetite and an increase the receptors sensitization to agonists under the direct influence of nanoparticles on smooth muscle cells of the pulmonary artery. Reduction in the magnitude of the phenylephrine induced contraction, on the direct injection of magnetite in the washing solution may be due to the interaction of nanoparticles with an agonist. This work was supported by the FCP, contract 1 02.740.11.0083 and RFFI 10-09-01424-c_e.
Methods: Sixteen (9 male, 7 female) HP mean age 56 ± 3 years and BMI 25 ± 2.5 kg/m² (group A) and 24 (13 male and 11 female) HON mean age 52 ± 2 years and BMI 24 ± 2.7 kg/m² (Group B) were studied. The two groups were matched for age, gender distribution and BMI. ELISA measured plasma leptin receptor number. Lys 109 Arg and Glu 223 Arg polymorphisms were determined by PCR-RFLP on leptin receptor gene. Blood samples were collected between 8.00 and 9.00h after 12 hours of fasting.

Results: The leptin receptor number was significantly lower in-group A compared to group B (21.8 ± 8.2 vs. 30.2 ± 0.4 IU/ml p = 0.007). The incidence of Lys 109 Arg allele was 37.5% in-group A vs. 43.75% in-group B (p = NS). The incidence of Glu 223 Arg allele was 34.1% in-group A vs. 47.9% in-group B (p = NS).

Conclusions: Our findings suggest that HP have significantly lower plasma leptin receptor number compared to NI. According to the incidence of the above-mentioned polymorphisms non-significant differences were observed between the two groups. The findings of the decreased HLR in the HP need further investigation in order to prevent future development of essential hypertension.

PP.20.146 MICE LACKING ATP2B1 GENE, THE NEW HYPERTENSION CANDIDATE GENE, IN VASCULAR SMOOTH MUSCLE SHOWS BLOOD PRESSURE ELEVATION

Y. Kobayashi1, N. Hirai1, M. Fujita1, N. Miyazaki1, A. Fujisawa1, Y. Yamamoto1, S. Yoshida2, S. Sakai3, H. Watanuki3, K. Yatsu4, Y. Toy4, G. Yasuda2, H. Ueshima5, T. Mik6, S. Umemura1, Yokohama City University, Yokohama-Japan, 2Shiga University of Medical Science, Otsu-Japan, 3Ehime University, Toon-Japan.

The ATP2B1 gene is one of the genes that we reported in Hypertension research in 2008 as a gene of the hypertension receptivity in large-scale Japanese population, which has been confirmed recently by three groups (Nature Genetics). ATP2B1 encodes the plasma membrane calcium ATPase isoform 1 and it removes bivalent calcium ions from eukaryotic cells against very large concentration gradients and plays a critical role in intracellular calcium homeostasis. In addition, our recent data have shown that ATP2B1 is expressed in vascular smooth muscle. Since, ATP2B1 KO mouse is reported to be embryo lethal, we generated mice with vascular smooth muscle cell (VSMC) specific knockout (KO) mice. The body weight, heart weight, kidney weight and food and water intakes of KO mice were similar to those of wild type littermates. However, KO mice had significantly increased basal blood pressure (BP, 15 mmHg higher) at the age of both mice.

The Body weight, heart weight, kidney weight and food and water intakes of KO mice. Also cultured VSMCs from aorta of KO mice showed further lower levels (5-10%) of ATP2B1 mRNA. However, there were no significant change of ATP2B1 mRNA in other tissue. Also cultured VSMCs from aorta of KO mice showed further lower levels (10-20%) of ATP2B1 mRNA in aorta homogenates, but there were no significant change of ATP2B1 mRNA in other tissue. Also cultured VSMCs from aorta of KO mice showed further lower levels (5-10%) of ATP2B1 mRNA. Furthermore, KO mice showed significantly increased basal blood pressure (BP, 15 mmHg higher) at the age of both mice.

PP.20.147 BLOCKADE OF ALPHAL1 ADRENERGIC RECEPTOR AMELIORATES INDOXYL SULFATE-INDUCED MONOCYTE CHEMOATTRACTANT PROTEIN-1 EXPRESSION IN HUMAN UMBILICAL VEIN ENDOTHELIAL CELLS BY INHIBITING NADPH OXIDASE- NF-κB PATHWAY


Objective: Chronic kidney disease (CKD) is recognized as an independent risk factor of cardiovascular disease (CVD). Indoxyl sulfate (IS), a uremic toxin derived from dietary protein, could cause vascular disorder, however, little is known about the mechanism involved.

Method and Results: IS increased expression of Nox 4, a subunit of NADPH oxidase, with an enhanced reactive oxygen species (ROS) production, determined with DHE staining, by human umbilical vein endothelial cells (HUVECs) and induced the expression of monocyte chemoattractant protein-1 (MCP-1). These changes were suppressed by apocynin, a specific inhibitor of NADPH oxidase. Furthermore, apocynin inhibited the ability of IS to stimulate MAPK phosphorylation as well as NF-κB. Interestingly, blockade of alpha1 adrenergic receptor with doxazosin inhibited IS-induced activation of NADPH oxidase, resulting in reduced MCP-1 expression. These results suggest that IS increases ROS production through activation of alpha1 adrenergic receptor/NADPH oxidase, which in turn, stimulates the MAPK/NF-κB pathway and leads to induction of MCP-1 expression in HUVECs.

Conclusions: These findings raise the possibility that IS plays an important pathophysiological role in the development of CVD in individuals with CKD, and that doxazosin is a good therapeutic tool against CKD-associated atherosclerotic disease.
**POSTER SESSION**

**POSTER SESSION 21**

**ENDOTHELIUM**

**PP.21.149**

**THE ROLE OF INFLAMMATION AND ENDOTHELIAL CELL ACTIVATION IN HYPERTENSIVE CHILDREN WITH ENDOTHELIAL DYSFUNCTION**


Vascular dysfunction, including endothelial function and increased inflammatory markers is detectable in hypertensive children especially if there are associated with other risk factors such as obesity, dyslipidemia and diabetes type 2.

The aim of the study is to find the easiest way to evaluate the hypertensive children and include them in a high risk patients for the future cardiovascular disease.

**Material and method:** We investigated 118 children (age between 8 and 18) with mild and moderate hypertension regarding the presence of endothelial dysfunction by measuring flow mediated vasodilation at the brachial artery diameter in response to brief arterial occlusion, and were included into the risk groups according to the association of obesity, dyslipidemia and diabetes type 2. In the patients with high risk (42 patients) we also measured proinflammatory markers (CRP, ICAM, VCAM and selectins), determined at admittance and 3 month after the hypertension was controlled with medication.

**Results:** As we expected, the FMD and proinflammatory markers were higher in the subjects with uncontrolled blood pressure even after 3 month of treatment (CRP adm/3m p = 0.044, ICAM adm/3m p = 0.0037, VCAM adm/3m p = 0.0078, selectins adm/3m p = 0.043), higher in the group with associated risk factors (CRP adm/3m p = 0.022, ICAM adm/3m p = 0.0012, VCAM adm/3m p = 0.032, selectins adm/3m p = 0.039). In the patients with other risk factors, the inflammatory factors remained high even if the blood pressure was controlled.

**Conclusions:** The inflammatory factors for endothelial dysfunction might be a marker for global control of vascular risk factors. It could indicate the efficient control of risk factors, which are important in children for the next cardiovascular disease development.

**PP.21.150**

**REDUCED NITRIC OXIDE AVAILABILITY IN SMALL ARTERIES FROM PATIENTS WITH PHEOCHROMOCYTOMA. ROLE OF COX-2-DERIVED CONTRACTING PROSTANOIDS.**

A. Virdis, E. Duranti, A. Bacca, D. Carrara, V. Tantardini, S. Taddei, G. Bermini. University of Pisa, Pisa-Italy

**Objective:** Previous reports documented an impaired endothelial function in small vessels from patients with pheochromocytoma (pheo). However, the mechanisms accounting for this alteration are not known. Therefore, in this study we assessed endothelial function in isolated small resistance arteries taken from the periaortic visceral fat from pheo patients (Pheo, n = 7, age 47.0 ± 17). A group of small vessels from normotensive subjects (NT, n = 7, age 49.0 ± 14) was used as controls.

**Methods:** Each subject underwent a biopsy of the visceral fat during a surgical laparoscopic procedure. Small arteries were dissected and investigated on a pressurized micromyograph. Endothelium-dependent vasodilation (VD) was assessed by acetylcholine (Ach, 0.001-100 μM)-induced relaxation, NO availability and ROS production were evaluated by repeating Ach under the NO synthase inhibitor L-NAMe (100μM) and the superoxide scavenger ascorbic acid (Vit C, 10 mM), respectively. Ach was also tested under SC-560 (1 μM, COX-1 inhibitor), DuP 697 (1 μM, COX-2 inhibitor) and SQ 29548 (1 μM, thromboxane receptor-TP antagonist).

**Results:** Pheo patients showed: BP 120 ± 81 mmHg; urinary metanephrine (uNM): 3826 ± 2405, urinary methamphetamine (uM): 1353 ± 970 μg/24h. NT showed: BP 120 ± 81 mmHg; uNM: 42 ± 11, uM: 34 ± 18 μg/24h. In NT, maximal VD to Ach (95.1 ± 1.8%) was blunted by L-NAME (61.2 ± 3.4%); inhibitory effect: 33.9 ± 2.1%; P < 0.001), and unmodified by SC-560 (94.0 ± 1.1%), DuP (94.9 ± 0.8%), SQ 29548 (94.1 ± 2.6%) or Vit C (95.6 ± 1.5%). In pheo, VD to Ach was blunted vs controls (53.8 ± 1.1%; P < 0.001), less sensitive to L-NAME (45.6 ± 0.6%; 8.9 ± 0.3% inhibition; P < 0.001 vs controls), not affected by SC-560 (53.9 ± 0.9%), enhanced (P < 0.01) by DuP (73.6 ± 2.1%), SQ 29548 (75.2 ± 1.6%) or their combination (75.0 ± 1.9%), and normalized by Vit C (92.6 ± 3.5%). Response to sodium nitroprusside was similar between the two groups.

**Conclusions:** Small resistance vessels from the visceral fat of patients with pheochromocytoma are characterized by a markedly blunted endothelium-dependent relaxation, an alteration caused by mechanisms involving a reduced NO availability, an oxidant excess generation. COX-2 participates on this alteration by producing prostanooids acting on TP receptors.

**PP.21.151**

**EFFECTS OF EXERCISE AEROBIC TRAINING ON ENDOTHELIAL REACTIVITY AND DNA METHYLATION IN HYPERTENSIVE PATIENTS**

M. Vicenzi1, V. Bollati2, V. Rossi1, F. Barretta1, A. Mercurio1, M. Guazzi1, P. Bertazzi2. 1Center of Arterial Hypertension, University of Milan, San Paolo Hospital, Milano-Italy, 2Center of Molecular and Genetic Epidemiology, Department of Environmental and Occupational Health, Milano-Italy

**Background:** Regular aerobic training (AT) is an established therapeutic intervention that significantly reduces cardiovascular risk by modulating elevated blood pressure levels and by improving endothelial function in hypertensive patients. Multiple molecular mechanisms are hypothesized as responsible for the observed cardiovascular protection. We tested the hypothesis that AT could improve endothelial function by modifying DNA methylation.

**Methods:** We followed up 32 grade 1 hypertensive subjects (average age 50 ± 10 years) and 10 controls (average age 45 ± 14 years), who underwent an in vivo evaluation of endothelial function by brachial artery flow-mediated dilatation (BAD) response and blood sampling for measuring the endothelial nitric oxide synthase (eNOS) and inducible nitric oxide synthase (iNOS) methylation before and after a 3 months period of programmed AT.

**Results:** Conclusions: AT promotes a significant reduction in blood pressure and improves endothelial vascular reactivity. As a new finding we documented a favorable AT activity on DNA methylation that may provide an intriguing background for acquisition future evidence in this field of research.

**PP.21.152**

**EFFECT OF FELODIPINE ON CIRCADIAN BLOOD PRESSURE RHYTHM AND ENDOTHELIAL DYSFUNCTION IN HYPERTENSIVE PATIENTS**

V.F. Mordovin, A.Yu. Falkovskaya. Research Institute of Cardiology, Tomsk-Russia

**Background:** Previous studies have shown that abnormalities in circadian blood pressure rhythm are associated with cardiovascular organ damage and may be partially attributed to endothelial dysfunction. The aim of this study was to elucidate possible relationship between the improvement in circadian blood pressure rhythm following antihypertensive treatment and endothelial function.

**Methods:** We studied 29 hypertensive pts without neurological deficit (16 men, aged 30 to 60 yo). Following parameters were estimated: 24-hours blood pres-
show that medicaments improvement of endothelial function may play important role in the normalization of the 24-hour rhythm.

**Conclusions:** These data demonstrate that antihypertensive therapy by felodipine in hypertensive patients had positive effect on circadian blood pressure rhythm that was related to improving of endothelial function. These data also show that medications improvement of endothelial function may play important role in the normalization of the 24-hour rhythm.

**PP.21.153**

**EFFECTS OF EXERCISE TRAINING ON ENDOTHELIAL FUNCTION IN OLDER HYPERTENSIVE PATIENTS**

S. Ilic1, M. Deljanin Ilic1, G. Kocic2, R. Pavlovic2.

**Objective:** To examine the reaction of endothelium, assess through changes of circulating blood markers of endothelial function: the stable end products of nitric oxide (NOx) and S – nitrosothiols (RSNO – reservoir for bioavailable nitric oxide), that promotes exercise training in hypertensive older vs. middle-aged male patients (pts).

**Design and Method:** Thirty-nine hypertensive pts after myocardial infarction: 19 middle-aged (40 to 55 years, M group) and 20 older sedentary (65 to 75 years, O group) pts were studied. In all pts office blood pressure was measured before and after short-term exercise training (over a period of three weeks at residential center), NOx and RSNO were evaluated. To elucidate the dynamic of nitric oxide metabolism in the circulation of older and middle-aged hypertensive pts subjected to physical training, NOx and RSNO concentration were determined according to the modified Saville-Griess method.

**Results:** Baseline value of NOx was higher in M than in O group (34.9 ± 10.5 vs 26.9 ± 13.5 μmol/l, P < 0.05). After three weeks of exercise training in middle-aged pts NOx increased significantly (from 34.9 ± 10.5 to 54.2 ± 16.9 μmol/l, P < 0.001, difference 55.3%). In O group value of NOx also increased after exercise training, and it was significantly higher compared to baseline values (47.9 ± 11.7 vs 26.9 ± 13.5 μmol/l, P < 0.001, difference 78%). Although baseline value of NOx was higher in M than in O group, after 3 weeks, value of NOx did not differ significantly between M and O group (54.2 ± 16.9 vs 47.9 ± 11.7 μmol/l, NS). Before exercise training, value of RSNO was higher in M than in O group (difference 22.2%, NS). In both group value of RSNO increased after 3 weeks of exercise training: in M group from 3.3 ± 1.4 to 5.6 ± 2.2 μmol/l (P < 0.001) and in O group from 2.7 ± 1.1 to 4.9 ± 2.4 μmol/l (P < 0.005). After 3 weeks of exercise training, increase in RSNO was slightly higher in O than in M group (81.4% vs 69.2%), compared to baseline values.

**Conclusion:** The way of endothelial response on exercise training was equal in older and in middle- aged hypertensive male patients. Residential 3 weeks exercise training in older as well as in middle- aged hypertensive pts after myocardial infarction induced favorable modification of endothelial function, expressed through significant increase of NOx and RSNO. Some percentage of NOx and RSNO increased in older suggests that they have more pronounced benefit of exercise training.

**PP.21.155**

**DOSE-DEPENDENT EFFICACY OF THERAPY WITH NONSELECTIVE ENDOTHELIN RECEPTOR ANTAGONIST BOSENTAN IN PATIENTS WITH IDIOPATHIC PULMONARY HYPERTENSION**

O. Arkhipova, E. Kobal, N. Danilov, T. Martynyuk, L. Samoilenko, I. Chazova. Russian Cardiology Research and Production Complex, Moscow-Russia

**Purpose:** To examine the reaction of endothelium, assess through changes of circulating blood markers of endothelial function: the stable end products of nitric oxide (NOx) and S – nitrosothiols (RSNO – reservoir for bioavailable nitric oxide), that promotes exercise training in hypertensive older vs. middle-aged male patients (pts).

**Design and Method:** Thirty-nine hypertensive pts after myocardial infarction: 19 middle-aged (40 to 55 years, M group) and 20 older sedentary (65 to 75 years, O group) pts were studied. In all pts office blood pressure was measured before and after short-term exercise training (over a period of three weeks at residential center), NOx and RSNO were evaluated. To elucidate the dynamic of nitric oxide metabolism in the circulation of older and middle-aged hypertensive pts subjected to physical training, NOx and RSNO concentration were determined according to the modified Saville-Griess method.

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**Conclusion:** The way of endothelial response on exercise training was equal in older and in middle- aged hypertensive male patients. Residential 3 weeks exercise training in older as well as in middle- aged hypertensive pts after myocardial infarction induced favorable modification of endothelial function, expressed through significant increase of NOx and RSNO. Some percentage of NOx and RSNO increased in older suggests that they have more pronounced benefit of exercise training.
Conclusions: In this set of HR patients, tadalafil did not result in any antihypertensive effects. The improvement in LVDD caused by tadalafil, associated with NO on calcium homeostasis and not related to BP changes or endothelial function, suggests a pivotal role for PDE5-NO pathway on myocardial relaxation in hypertensive patients. Due to its therapeutic potential, these original and relevant findings deserve further investigation.

**PP.21.156 DIETARY CALCIUM INTAKE AND ITS RELATIONSHIP WITH INTRACELLULAR CALCIUM, ADIPOSITY, METABOLIC PROFILE, BLOOD PRESSURE AND ENDOTHELIAL FUNCTION**

T. Ferreira1, M. Torres1, D. Valença1, M. Rodrigues1, S. Nascimento1, J. C. Nogueira Neto1, S. Argolo1, G. Lima1, M. Guedes1, A. Sanjuliani1, Rio de Janeiro State University, Discipline of Clinical and Experimental Pathophysiology - Clinex, Rio De Janeiro-Brazil, 1Rio De Janeiro State University, Rio De Janeiro-Brasil, 1Sergio Franco Laboratory, Rio De Janeiro-Brazil.

**Background:** Epidemiological studies consistently show an inverse association between calcium intake and adiposity and blood pressure. The main findings suggest that changes in intracellular calcium may mediate this phenomenon, but so far there are few studies evaluating the differences in intracellular calcium concentration in subjects with different levels of calcium intake.

**Objective:** This study aimed to evaluate the association of dietary calcium consumption with intracellular calcium, adiposity, metabolic profile, blood pressure and endothelial function.

**Methods:** Cross-sectional. 30 women, with mean age 30.91 ± 2.77 years, were submitted to evaluation of dietary intake, intracellular calcium, anthropometric parameters, % body fat, metabolic profile and blood pressures levels. Dietary intake was evaluated using a validated food frequency questionnaire and % body fat by bioimpedance. Intracellular calcium was determined by atomic absorption spectroscopy. Endothelial function was evaluated by peripheral arterial tonometry using Endo-PAT 2000® (Itamar Medical).

**Results:** Participants were classified into 2 groups, according to their mean dietary calcium intake (Group A < 870mg/day and Group B > 870mg/day). There were no significant differences between groups of calcium intake with respect to age, race, alcohol intake, weight, height, body mass index, waist circumference, waist-to-hip ratio, body fat, metabolic variables, CRP, US and blood pressure and endothelial function. The lack of significant difference between the groups remained even after adjusting for confounding factors. The average calcium intake was 740.60 ± 53.12 mg/day in group A and 973.17 ± 40.55 mg in group B. The assessment of endothelial function through the index of reactive hyperemia showed no difference between groups A and B (1.67 ± 0.1 vs. 1.99 ± 0.17). There were no significant differences in the concentrations of total serum calcium and serum ionized calcium between the two groups. Intracellular calcium was lower in group A compared to group B, however without reaching statistical significance (20.56 ± 2.97 vs 16.48 ± 2.55 mEq/L/Cel). There was no significant association between daily intake of calcium and intracellular calcium.

**Conclusion:** The findings of the present study suggest that the consumption of calcium is not associated with intracellular calcium, adiposity, metabolic profile, blood pressure and endothelial function.

**PP.21.157 ENDOTHELIAL DYSFUNCTION AND VASCULAR REACTIVITY IN HYPERTENSION**

K. Keramida1, E. Karpanou2, G. Vyssoulis2, 1Cardiology Clinic, Thriasio Hospital, Athens-Greece, 21St Cardiology Clinic, Onassis Cardiac Surgery Center, Athens-Greece, 3Hypertension Unit, 3St Cardiology Clinic Athens University, Hippokration Hospital, Athens-Greece.

It is generally accepted that endothelial dysfunction (ED) is the first step in the atherosclerosis procedure and it is also considered as an independent prognostic factor of cardiovascular disease, myocardial infarction and stroke. Consequently the early identification and regression of ED is an ideal target of primary prevention of atherosclerotic disease. Moreover, it has been shown that ED is related to increased arterial stiffness, independently of other risk factors, while its relationship to vascular reactivity has yet to be studied.

**Objective:** to study the relationship between endothelial dysfunction and vascular reactivity during the activation of sympathetic nervous system by cold pressor test (CPT) in hypertensive patients.

**Design and method:** The study sample comprised 102 hypertensive patients. Vascular reactivity was expressed as the change of carotid-femoral pulse wave velocity (c-IPWV) during CPT and endothelial dysfunction was studied using four newer indices which are included in routine laboratory tests of hypertensive patients in Greece: high-sensitivity CRP, fibrinogen, uric acid and homocysteine.

**Results:** The % changes of the hemodynamic parameters studied (systolic and diastolic blood pressure, heart rate and c-IPWV) were not related to hs-CRP, fibrinogen and homocysteine with the exception of uric acid, which was related to the % change of c-IPWV (p = 0.004) and to the % change of DBP (p = 0.038).

**Conclusion:** From the newer, indirect indices of ED, only uric acid is related to vascular reactivity in hypertensive patients during CPT and thus it is considered a useful marker of atherosclerosis and potentially a target of primary prevention of cardiovascular disease.

**PP.21.158 CORRELATION OF ERECTILE FUNCTION WITH ENDOTHELIAL FUNCTION**

M.V. Papavasileiou1, M. Douma1, A. Pittaras1, P. Arsenois1, I. Tsiantis1, C. Giannakopoulos1, S. Karas1, Sismanoglion General Hospital, Athens-Greece, 1Sismanoglion General Hospital, Athens-Greece, 2Hippokration General Hospital, Thessaloniki-Greece, 3Mediton Medical Center, Athens-Greece.

**Background:** Aim: To correlate the BNP with the erectile function (EF) of hypertensive males, as a parallel expression of cardiovascular system dysfunction

**Methods:** We monitored 39 un/or treated male hypertensives, mean age (A) 51.6 years, without apparent heart disease and clinical symptoms. We measured the levels of BNP, S/DDBP (systolic/diastolic BP office) and the BMI. All patients filled the EF questionnaire (IIEF-International Index of Erectile Function). The answers were evaluated according to the proportional gradation (up to 30) and correlated with the BNP levels, the A, the BMI and S/DDBP using the Pearson Correlation.

**Results:**

| Table 1: Correlation and Regression of EF gradation with BNP levels |
|------------------|------------------|------------------|------------------|
| BNP              | EF A             | BMI SBP0         | DBP0 Regression A |
|                  | r = 0.337        | r = -0.523       | NS               |
|                  | p = 0.039        | p = 0.001        | p = 0.050        |
|                  | NS               | r = 0.315        | p = 0.04         |

**Conclusion:** The BNP of hypertensives are inversely and significantly correlated to the levels of gradation of EF. The age is the most important factor. BPElevels do not affect the EF and are raising issue about the significance of cofactors to the condition of EF of hypertensives

**PP.21.159 MECHANISMS OF MICROVASCULAR PERMEABILITY MEDIATED BY NITRIC OXIDE**

F. Sánchez1, N. Marin1, D. Hirigoyen2, R. Carrasco1, P. Zamorano1, M. Boric2, W. Durán1, 1Immunology Department, Universidad Autoral De Chile, Valdivia-Chile, 2Physiology Department, Pontificia Universidad Catolica De Chile, Santiago-Chile, Physiology and Pharmacology Department, New Jersey Medical School, UMDNJ, Newark-USA

Nitric oxide (NO) derived from endothelial nitric oxide synthase (eNOS) is a key factor in the regulation of microvascular permeability. PAF is a pro-inflammatory agonist that increases microvascular permeability to macromolecules through activation of an eNOS-associated signaling cascade. The classic dogma in NO signaling establishes that all the actions of NO are mediated via soluble guanylate cyclase (sGC) and protein kinase G (PKG). However, increases in permeability have been described in some cellular models regardless of PKG activation but still requiring NO production. Recently, S-nitrosylation has emerged as an important NO-dependent posttranslational modification (independent of sGC/PKG pathway) of free-thiol cysteines that alters the function of proteins, affecting processes of intracellular trafficking. Because one of the mechanisms in the hyperpermeability is the change in traffic of proteins from the Adherens junction, we investigated the hypothesis that PAF causes S-nitrosylation of junctional membrane proteins to promote hyperpermeability. We measured S-nitrosylation of β-catenin, p120 and VE-cadherin in postcapillary venular endothelial cells (CVEC) and Eh HY923 cells using the bioton switch assay. PAF (5x10^-7M) caused S-nitrosylation of β-catenin, p120 and VE-cadherin, with a peak at 1 min after application. In vivo, using the hamster cheek pouch model we observed S-nitrosylation of VE-cadherin and β-catenin corroborating our in vitro observations. Coincidently the S-nitrosylation correlates to changes in traffic of these proteins, showing that all of them diminishing at the plasma membrane after PAF treatment. Since PAF stimulates hyperpermeability at this time point, we suggest that S-nitrosylation contributes to junctional membrane protein conformational changes that enhance permeability. (Supported by Fondecyt grant 1100569 and NIH grant SROI HL070634).

**Abstracts e339**
ENDOTHELIAL FUNCTION OF HYPERTEINIC PATIENTS


Objective: To look into the correlation of brain natriuretic peptide (BNP) with the 24-hour Urinary Nitrate Excretion (UAE) as an endothelial function indicator of hypertensive patients.

Methods: We monitored 100 hypertensive, treated and untreated patients (male 42.5%), mean age (MA) 64.8 years. We measured their BNP levels and UAE. All patients were underwent echocardiography M-mode, Doppler and tissue Doppler of the left ventricle in order to exclude any systolic or diastolic cardiac insufficiency (evaluating the index E/Ea < 9; The ratio of early diastolic LV flow velocity to lateral mitral annular velocity).

All the above rates were correlated with each other, with the age and the office systolic/diastolic blood pressure levels (S/DBPo) using the Pearson Correlation Method.

Results:

Table 1: Correlation of BNP, UAE, MA, S/DBPo of hypertensive patients

<table>
<thead>
<tr>
<th>BNP (pg/ml)</th>
<th>MA (age)</th>
<th>SBPo (mmHg)</th>
<th>DBPo (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>f = 315</td>
<td>r = 0.044 p = 0.000</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

BNP: brain natriuretic peptide, UAE: 24-hour Urinary Albumin Excretion, MA, mean age, S/DBPo: office systolic/diastolic blood pressure, E/Ea: The ratio of early diastolic LV flow velocity to lateral mitral annular velocity.

Conclusion: BNP is highly correlated to UAE and age of hypertensive patients without cardiac insufficient. This is not valid for blood pressure levels. The age consists the most significant factor to the endothelial function, which is indicated via the BNP levels.

ENDOTHelial DYSFUNCTION IN HEART TRANSPLANTATION

F. Margulis, D. Radlovichki, A. Ami, L. Ahualli. "Hospital Dr. Cosme Argerich, Buenos Aires-Argentina"

The purpose of our work was to evaluate the prevalence of endothelial dysfunction in patients with stable heart transplant (HT), by photoplethysmography.

Materials and Methods: The study population included 17 HT patients (16M/1F). Arterial stiffness and endothelial function were measured by analysis of digital volume pulse (DVP) waveform obtained by Pulse Trace System. To assess endothelium dependent arterial vasodilatation, 400 μg of salbutamol (Salb) was administered by nebulization. To assess endothelium independent arterial vasodilatation, 300 μg of nitroglycerin (NTG) was administered sublingually. The arterial vasodilatation, dependent on or independent of endothelial function, was defined as the maximum difference in ΔRI between baseline and the post-Salb or post-NTG period, respectively.

Results: The mean age of group HT was (49 ± 14 years). 12 patients had endothelial dysfunction (HTED), 5 did not (HTnED), these two groups were similar (49 ± 12 vs 48 ± 18 years). As regards number of months elapsed since transplant, the ratio was HTED 89 ± 41 vs HTnED 42 ± 28 < p < 0.02. In basal conditions there was not significant differences in ΔSI (9.9 ± 2 vs 8.4 ± 2 m/s between HTED e HTnED. ΔRI in HTED was higher than HTnED (66 ± 10 vs 55 ± 11% p = 0.04). After Salb SI and RI were higher in HTED than HTnED (9.7 ± 2 vs 7.5 ± 2 m/s p = 0.04 and 65.9 ± 24 vs 45 ± 13 p < 0.0001). The arterial vasodilatation, dependent on endothelial function, was significantly lower in group HTED than HTnED (ARI b/Salb 2 ± 5 vs 20 ± 9% < p < 0.0000). After NTG SI and RI were significantly higher in HTED than HTnED (7.2 ± 2 vs 5.5 ± 1 m/s p < 0.02 and 49 ± 13 ± 10 ± p < 0.0005 respectively). The arterial vasodilatation independent of endothelial function was normal in both groups but in HTED was lower than HTnED (25 ± 14 vs 62 ± 16% p < 0.0003). No statistical difference was shown in history of coronary heart disease. A different result was shown in hypertension and dyslipemia. Further studies should be carried out on a larger sample of patients.

ENDOTHELIAL FUNCTION IN MESENTERIC RESISTANCE ARTERIES FROM SPONTANEOUSLY HYPERTEINIC PATIENTS

H.T. Oliveira1, A.P. Davil2, F.E. Xavier3, L.V. Rossoni1. "University of Pernambuco, Recife-Brazil"

Ouabain (OUA) is a hormone associated with hypertension. In line with this idea, chronic OUA treatment of normotensive or spontaneously hypertensive rats (SHR) induces and increases hypertension, respectively. In addition, tail arteries from OUA-treated SHR present an increment in phenylephrine-induced contraction (Xavier et al., 2009). Thus, the hypothesis of the present study was that changes in vascular tonus of resistance arteries induced by OUA chronic treatment in SHR are important for regulating the increment in blood pressure (BP). Then, the aim of this study was evaluate whether chronic OUA treatment will be able to modify vascular reactivity in SHR mesenteric resistance arteries (MRA).

Methods: Male SHR with 45 days of age were treated for five weeks with: CT (CT ETEA: 4.43 ± 0.25 vs. OUA INDO: 3.09 ± 0.18 mmHg; CT FURE: 3.56 ± 0.23 vs. OUA FURE: 3.12 ± 0.12 mmHg; CT SQ: 3.65 ± 0.30 vs. OUA SQ: 3.43 ± 0.11 mmHg). The protein expression of eNOS (32%*) and nNOS (36%*) were reduced in OUA MRA as compared to CT. In conclusion, our results reinforce the idea that endothelial dysfunction induced by OUA in MRA is associated with the enhanced blood pressure in SHR. This endothelial dysfunction is due to a reduction in EDHF and NO modulation; and an increased COX1/2 product TXA, acting via TP receptor. Thus, our data provide further support that anti-inflammatory strategies are useful to treat endothelial dysfunction induced by OUA. Financial Support: CNPq and FAPESP.

CIRCULATING ENDOThelial PROGENITOR CELLS IN HYPERTEINIC PATIENTS WITH LEFT VENTRICULAR HYPERTROPHY

E. Karelkina, O. Moiseeva, V. Moroshkin, O. Irtuga, E. Shlyakhto. "National Federal Heart, Blood and Endocrinology Centre, Saint- Petersburg-Russia"

Background: Vascular repair and postnatal neuroangiogenesis by means of circulating endothelial progenitor cells (CEPCs) is important mechanism especially in patients with endothelial dysfunction. However the role of CEPCs in development of LV remodeling in pts with arterial hypertension (HT) is to be elucidated.

Methods: 36 HT pts with LV systolic dysfunction (mean age 55.7 ± 8.8 yrs, BMI 30.1 ± 5.9 kg/m²) and 18 untreated HT pts with LV hypertrophy (mean age 54.8 ± 15.7 yrs, BMI 28.2 ± 5.3 kg/m²) were enrolled. 19 non-smoking healthy volunteers were examined (40.8 ± 7.8 yrs, BMI 25.1 ± 2.7 kg/m²). TTE, carotid intima-media thickness, flow-mediated dilatation (FMD) of brachial artery, CRP, lipid test were done in all pts. The quantity of circulating CD34+ and CD133+ and CD34+CD133+VEGFR-2+ cells was assessed by flow cytometry. Proliferation ability of endothelial progenitor cells was evaluated by colony-forming units (CFU) with J.M.Hill’s method.

Results: There were no significant differences in number of circulating CD34+, CD133+ and CD34+CD133+VEGFR-2+ cells in HT pts with and without systolic dysfunction comparing with control group, but declining trend in number of CD34+CD133+VEGFR2+ in pts with systolic dysfunction was observed. Neither
the EPC number nor the EPC CFU was correlated with age, BMI and CRP level. Nevertheless negative correlation between CD34⁺CD133⁺VEGFR-2⁺ and LDL, cholesterol level (r = -0.401, p < 0.01), the systolic BP (r = -0.319, p < 0.05) were revealed. Decrease FMD of brachial artery was associated with reduction number of CD34⁺CD133⁺VEGFR-2⁺ (r = 0.333, p < 0.05). Decrease number of CD34⁺CD133⁺ (r = -0.325, p < 0.05) and EPC CFU (r = -0.326, p < 0.05) was observed in patients with low LV EF.

Conclusion: HT has a negative impact on the number of CEPC. Decrease of CEPCs may be considered one of predisposing factors for LV systolic dysfunction in HT pts.

<table>
<thead>
<tr>
<th></th>
<th>LV systolic dysfunction</th>
<th>LV hypertrophy</th>
<th>Normotensive controls</th>
<th>p value versus controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD34⁺CD133⁺VEGFR-2⁺/10⁶ MNC</td>
<td>96±73</td>
<td>91±52</td>
<td>121±160</td>
<td>p=0.76</td>
</tr>
<tr>
<td>CD34⁺D133⁺VEGFR-2⁺/10⁶ MNC</td>
<td>622±616</td>
<td>688±750</td>
<td>688±750</td>
<td>p=0.17</td>
</tr>
<tr>
<td>CFU, units/mm²</td>
<td>1.3±1.5</td>
<td>1.30±2.8</td>
<td>2.61±1.1</td>
<td>p=0.001</td>
</tr>
<tr>
<td>EF,%</td>
<td>0.32±0.07</td>
<td>0.64±0.63</td>
<td>0.70±0.06</td>
<td>p=0.001</td>
</tr>
<tr>
<td>CRP, mg/l</td>
<td>6.59±5.22</td>
<td>2.33±0.05</td>
<td>0.96±0.82</td>
<td>p=0.001</td>
</tr>
<tr>
<td>MMLV, g/m²</td>
<td>190.4±46.8</td>
<td>154.1±36.6</td>
<td>87.8±14.3</td>
<td>p=0.001</td>
</tr>
</tbody>
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Results: The average value of FMD was 8.8 (SE 0.25)%. The fraction of dilation deficit comprised 6.5 (0.30) % on the average. The mean level of NO metabolites was 13.0 (0.29) μmol/l. The level of NO metabolites was not associated with FMD or presence of carotid plaques in (unadjusted, age- or multivariable-adjusted fashion), while it was linearly related to carotid intima-media thickness (β=0.141, p = 0.015). The level of NO metabolites consistently decreased from 13.9 (0.60) μmol/l in the bottom quartile of FDD to 11.9 (0.58) μmol/l in the top quartile (p = 0.022). This association was not attenuated with multivariable adjustment (age, FMD, systolic blood pressure, antihypertensive treatment, body mass index, smoking, ischemic heart diseases, total cholesterol, alcohol), p = 0.004.

Conclusions: In studied male population sample NO metabolites level in blood was not related to FMD but was inversely associated with fraction of dilation deficit. Our findings suppose that FMD is related to more than one (NO) endothelial mediator, and also that impaired FMD might be caused by accelerated breakdown of NO. The novel index of fraction of dilation deficit likely may add to the elucidation of endothelial dysfunction. The study was supported by the Wellcome Trust(064947/Z/01/Z), the NIA(1R01 AG23522-01).

**PP.21.165 CYSTATIN C, ENDOTHELIAL DYSFUNCTION AND CAROTID INTIMA MEDIA THICKNESS**


Introduction: It is known that the decline of renal function is associated with an increased cardiovascular risk. Cystatin C is given as a new marker of glomerular filtration rate.

Objective: To evaluate in hypertensive patients with renal function from normal to moderate dysfunction (III NFK stage) the association and the predictive value of Cystatin C of cardiovascular organ damage.

Materials and Methods: We enrolled 73 patients with primary hypertension, mean age 50.3 years, mean arterial blood pressure of 143/88 mmHg, mean BMI of 28 ± 4.18 kg/m², mean creatinine of 1.16 ± 0.82 mg/dl, eGFR (MDRD) average of 76.5 ± 20.9 ml/min and plasma cystatin C levels average of 1.26 ± 0.46mg/ml. Endothelin-1 and e-Selectin (ET-1, E-Sel), microalbuminuria and echocardiograms were evaluated. Fifty of the 73 subjects performed the cardiac eco-color-doppler. Statistical analysis was performed both for all patients, analyzing the predictive value of Cystatin C for minimal media thickness, both comparing patients with IMT < 0.9 mm with those with IMT > 0.9 mm.

Results: The two subgroups of subjects showed a significant difference in Cystatin C (p = 0.05), eGFR-MDRD (p = 0.003), ET-1 (p = 0.026) and E-Sel (p = 0.06). In the whole group, Cystatin C correlated significantly with eGFR MDRD (r = -0.63, p = 0.0001), with ET-1, with E-Sel (p = 0.0004, p = 0.001 respectively). There was no correlation of Cystatin with microalbuminuria, and Left Ventricular mass (p = 0.39, p = 0.44 respectively). In the 50 patients in whom IMT was assessed, this latter was correlated with the Cystatin (p = 0.0006). The analysis of the predictive power of Cystatin by ROC curves, with respect to IMT showed a sensitivity of 93.75% and specificity of 52.94% (p = 0.0034).

Conclusions: These preliminary data show the value of Cystatin as an indicator of glomerular filtration rate, and confirm the predictive value of Cystatin for vascular damage characteristic of hypertensive patients with renal impairment.

**PP.21.166 THE NOVEL VASODILATION INDEX OF “FRACTION OF DILATION DEFICIT” AND NITRIC OXIDE METABOLITES**

S. Malyutina¹, M. Ryabikov¹, Y.U. Ragino¹, A. Ryabikov¹. Institute of Internal Medicine SB RAS, Novosibirsk-Russia, Novosibirsk State Medical University, Novosibirsk-Russia

Purpose: The generation of nitric oxide (NO) in response to shear stress appears to account for flow-mediated dilation (FMD). We aimed to investigate the relationship between FMD, the fraction of difference between FMD and nitroglycerin induced vasodilation and NO metabolites in general population.

Methods: The Russian HAPIEE cohort recruited 9,363 men and women aged 45-69 in Novosibirsk, Russia. In a random sub-sample of 410 men we measured FMD and peak vasodilation after nitroglycerin (NTG) administration by high-resolution ultrasound of the brachial artery. The index of “fraction of dilation deficit” (FDD) was developed and calculated as the ratio of diameter difference between 0.401 induced dilation and FMD to NTG-induced dilation. NO metabolites level in blood was assessed by photometric method. Additionally, we measured carotid intima-media thickness (IMT) and identified the plaques in carotid arteries. We applied ANOVA and linear regression models for association analysis (SPSS, v.13.0).

Results: The average value of FDD was 8.8 (SE 0.25)%. The fraction of dilation deficit comprised 6.5 (0.30) % on the average. The mean level of NO metabolites was 13.0 (0.29) μmol/l. The level of NO metabolites was not associated with FMD or presence of carotid plaques (in unadjusted, age- or multivariable-adjusted fashion), while it was linearly related to carotid intima-media thickness (β=0.141, p = 0.015). The level of NO metabolites consistently decreased from 13.9 (0.60) μmol/l in the bottom quartile of FDD to 11.9 (0.58) μmol/l in the top quartile (p = 0.022). This association was not attenuated with multivariable adjustment (age, FMD, systolic blood pressure, antihypertensive treatment, body mass index, smoking, ischemic heart diseases, total cholesterol, alcohol), p = 0.004.

Conclusions: In studied male population sample NO metabolites level in blood was not related to FMD but was inversely associated with fraction of dilation deficit. Our findings suppose that FMD is related to more than one (NO) endothelial mediator, and also that impaired FMD might be caused by accelerated breakdown of NO. The novel index of fraction of dilation deficit likely may add to the elucidation of endothelial dysfunction. The study was supported by the Wellcome Trust(064947/Z/01/Z), the NIA(1R01 AG23522-01).
Conclusions: Our results demonstrate an unfavourable effect of acute oral sodium intake on endothelial function and arterial pressure in hypertensive subjects. Conversely, for comparable changes in serum sodium concentration, no significant changes in the endothelial function and arterial blood pressure were observed in healthy controls. Although these results clearly point to a direct causal relationship between serum sodium concentration, endothelial dysfunction and hypertensive reaction, further confirming observations on larger samples are needed.

Methods: In healthy volunteers (22 ± 2 years old) the left PWVcr was measured (mechano-transducers) before (basal) and after (15 min, 30, 45 and 60 min after cuff release). Levels and rates of PWVcr changes were recorded at 15, 30, 45 and 60 seconds after cuff release. Right brachial pressure was measured.

Results: There were no changes in heart rate or blood pressure. Regardless of the occlusion length, TI resulted in PWVcr reduction (p < 0.05). The higher the basal PWVcr level, the major its change after TI. The groups showed a similar maximum PWVcr reduction. However, the immediate PWVcr changes differed: -4.9 ± 0.2%; -6.8 ± 0.3% and -8.3 ± 0.5% for 1, 3 and 5 minutes of TI, respectively (p < 0.05) (Figure). Thereafter, the differences diminished and a minute after TI the groups showed similar levels and mean rate of PWVcr reduction.

Conclusion: Similar maximum PWVcr responses can be obtained after 1, 3, or 5 minutes of TI. Immediate, but not later PWVcr changes, depend on the TI duration. The PWVcr changes after TI depend on the PWVcr basal levels.

The ENDOThelial FUNCTION and INTIMA-MEDIA THICKNESS in PATients WITH HTERTENSION UNDER the INFLuENCE of FIXED COMBINATION of AMLODipINE and Atorvastatin.

K. Yanovska. Institute of Cardiology, Kyiv-Ukraine

Aims: To learn the features of endothelial function and intima-media thickness (IMT) in patients with hypertension and with the metabolic syndrome (MS) due to using the fixed combination of amlopidine and atorvastatin versus using combination of lisinopril and atorvastatin.

Methods: 50 patients with hypertension, MS, which made four clinical groups: 1-st group (n-14) – men, who use the fixed combination (middle ages - 54.5 ± 2.9); 2-nd group (n-16) women, who use the fixed combination (middle ages - 54.5 ± 2.9); 3-d group (n-10) – men, who use combination lisinopril + atorvastatin (middle ages - 56.1 ± 2.4) and 4-th group (n-10) - women, who use combination lisinopril + atorvastatin (middle ages - 59.2 ± 2.6) were examined. All patient were determined: anthropometric data (growth, weight, body mass index), lipids profile in blood, measuring of IMT general carotid artery, endothelial function of brachial artery.

Summary: it was found that antihypertensive and lipid-lowering effects in both groups were comparable. But it was observed in the groups of amlopidine + atorvastatin normalization of endothelial vasodilatation 100% versus 85% in groups of lisinopril + atorvastatin and more significant impact on reducing the intima-media thickness of total carotid artery in groups, who received a fixed combination.
Methods and Design: Male and female Wistar rats were used. The procedures followed the FELASA/ICLAS for use of the laboratory animals (Guide for use of the laboratory animals, National Academy Press, Washington, D.C.1996). hPAH was induced by exposure to hypobaric hypoxia. Rats were housed in a hypobaric chamber at simulated altitude of 5000 m, 10 h a day, 2 wk. (O₂ concentration reduced to 10%). Age matched normoxic control animals were housed at ambient air. Right ventricular (RV) hypertrophy was calculated as RV weight/rat body weigh. Systolic arterial pressure (SAP) and heart rate (HR) were measured in the awake animals. Levels of plasma EG, testosterone (TR) and ET-1 were evaluated by ELISA.

Results: Two weeks after hypoxia exposure both male and female rats developed hPAH. However the degree of disease was different: the magnitude of RV hypertrophy was significantly greater in male rats than in female (26% vs.12%, p<0.05). Only male rats developed systemic hypertension in response to chronic hypoxia exposure. SAP was increased by 15% in male vs. 0.16% in female. Plasma level of estrogen in female rats was increased after hypoxia exposure on 55 % (24.71 ± 2.87 vs 38.35 ± 4.60 pmol/l, p < 0.05 n = 10). Plasma level of TR in hypertension male rats was not changed. Plasma level of ET-1 was changed only in female rats with hPH. It was decreased by 10% (n = 10).

Conclusions: Our data allow us to suggest that increase of EG production and reduction of ET-1 production in hPH female rats led to reduction in endothelial dysfunction and reduction in the degree of development hypoxic form of pulmonary hypertension in female rats compare to male rats.

Methods: With a Laser Doppler Imager, we measured skin blood flow response to local heating in 12 non smokers and 10 healthy smokers subjects. Thermal hyperaemic vasodilatation were obtained on skin territory pre-treated either by saline 0.9% or L-NAME 2% iontophoresis, to induce NO synthase inhibition.

Results: L-NAME iontophoresis decreased skin hyperaemic vasodilatation to local heating by a mean of 39.2% ± 2.5%. Coefficient of correlation and intraclass correlation coefficient were respectively 0.69 and 0.80 for site to site variation and 0.58 and 0.76 for day to day variation (all p < 0.01). Spatial reproducibility, as assessed by Bland and Altman representation, was -14.73 ± 186.39% whereas temporal reproducibility was -18.25 ± 222.72%. Compared to non-smokers, skin vasodilatation to local heating remained unchanged in smokers, whereas NO-mediated vasodilatation was increased from 224.6 ± 49 % to 395 ± 54.8 % (p < 0.05).

Conclusion: Combining study of both skin hyperaemic response to local heating and L-NAME iontophoresis appeared as a valid reproducible and non invasive method to qualitatively analyse NO pathway contribution to microvascular endothelial function. Recent history of smoking was associated with an enhancement of NO-mediated vasodilatation in young healthy subject.

PP21.172 OBESITY IS ASSOCIATED WITH IMPAIRED ENDOTHELIAL FUNCTION IN THE POSTPRANDIAL STATE

A. Jonk1, A. Houben1, N. Schaper1, P. De Leeuw1, E. Serné2, Y. Smulders2, C. Stehouwer1. 1Department of Internal Medicine, Maastricht University Medical Centre, Maastricht-The Netherlands, 2Department of Internal Medicine, VU Medical Center Amsterdam, Amsterdam-The Netherlands

Objective: Steady-state hyperinsulinemia during a hyperinsulinemic clamp stimulates endothelium-dependent vasodilatation and capillary recruitment, which contribute to increased glucose uptake. These phenomena have been shown to be blunted in obesity. The present study, in lean and obese individuals, investigated whether similar responses can be obtained after ingestion of a glucose load or a mixed meal.

Design and Method: We examined the effects of a glucose drink (75g glucose), a mixed meal drink, or a control drink (tap water) on skin capillary density (i.e. baseline capillary density, hyperemic capillary recruitment, and density during venous congestion) and skin endothelium-(in)dependent vasodilatation in 20 lean and 19 obese individuals, using capillaroscopy and laser-Doppler flowmetry with iontophoresis of acetylcholine and sodium nitroprusside.

Results: Compared to lean individuals, obese individuals were insulin-resistant and had a higher postprandial area under the glucose-time curve, after both the glucose (P < 0.05) and the mixed meal drink (P < 0.05). In lean individuals, neither the glucose nor the mixed meal drink induced a significant effect on capillary density or endothelium-(in)dependent vasodilatation. In obese individuals, the mixed meal drink, compared to the control drink, decreased baseline skin perfusion (P < 0.05) and acetylcholine-mediated vasodilatation (P < 0.05), while no effect of the drinks on capillary density was found.

Conclusions: In lean and obese individuals, neither an oral glucose load nor a mixed meal drink is associated with increases in skin capillary density or endothelium-(in)dependent vasodilatation. In obese individuals, a mixed meal drink was associated with decreased basal and acetylcholine-stimulated skin perfusion, which is consistent with impaired postprandial microvascular function.
POSTER SESSION 22
LARGE ARTERIES

**PP.22.173**

**THE PROGNOSTIC VALUE OF THE AUGMENTATION INDEX IN HYPERTENSIVE PATIENTS WITH RHEUMATOID ARTHRITIS**

E. Belu1, R. Musetescu1, A. E. Musetescu1, D.-D. Ionescu1, C. Bicfalvi1, C. Palombo1, M. Kozakova2, C. Morizzo3, G. Bini3, A. Corciu4, Am Sironi5, G. Dell’omo4, R. Pedrinelli4.

**Objectives:** Different data suggests that rheumatoid arthritis (RA) may be associated with an increased risk of cardiovascular disease. The vascular inflammation may impair arterial function and lead to an increase of the stiffness reflected by Augmentation Index (Aix) changes. However, it is unknown the degree of impairment of the arterial stiffness in hypertensive patients with RA and the relationship with the disease activity.

**Methods:** The purpose of this analysis was to evaluate the vascular status of hypertensive patients with RA using the arteriographic method and to evaluate the relationship with the disease activity. We include in our study 56 hypertensive patients with RA (mean age 48.5 ± 9.4 years), and 48 controls (mean age 47.6 ± 7.5 years). All patients underwent standard clinical and biological (CRP, ESR) evaluation, with disease activity quantification by DAS28,4v.

**Results:** The study revealed an increased augmentation index in hypertensive patients with RA especially in those with high disease activity scores.

**Conclusions:** The presence of RA is an independent predictor for Aix (R² = 0.685, p < 0.01), with a smaller reduction in the AC group: from 0.89 ± 0.19 to 0.58 ± 0.14 for PL and from 0.87 ± 0.19 to 0.67 ± 0.13 for AC (p = 0.055 PL vs AC at HA1). At HA2 SEVR was significantly lower in PL compared to AC (0.74 ± 0.17 vs 0.87 ± 0.15 p = 0.02). Acute exposure to HA significantly (p < 0.01) increased SBP, DBP, MAP and HR. Subjects in AC group, compared to PL group, showed however significantly lower values of SBP (115.7 ± 9.8 vs 108.3 ± 9.6 mmHg, p = 0.027), DBP (77.4 ± 6.8 vs 70.1 ± 5.3 mmHg, p < 0.001), MAP (92.7 ± 6.8 vs 85.3 ± 5.9 mmHg, p = 0.001) and HR (83.5 ± 10.4 vs 76.4 ± 8.8 bpm, p = 0.03) at HA1. DBP and MAP were significantly lower with AC also at HA2.

**Conclusions:** Our study shows for the first time that acute exposure to HA induces both a BP rise and changes in vascular function, whose magnitude is partly counteracted by treatment with AC, after accounting for BP changes. The effects of AC on the hemodynamic changes induced by hypobaric hypoxia may contribute to the beneficial role of this drug in subjects prone to mountain sickness.

**Design and Methods:** Thirty-eight never treated, non diabetic subjects free of chronic cardiovascular disease were recruited so far in a prospective study (according to JNC 7 categories: 18 with “optimal” casual BP (NL), and 20 with high-normal or mildly elevated BP (pre-HT)). Right CCA IMT and local stiffness were assessed by radio-frequency (RF) based real-time, automatic tracking of arterial wall (Q-IMT and Q-AS, respectively, MyLab70, Esaote, Italy).

**Objective:** The objective of this study is to evaluate the arterial wall changes in response to the increased pressure load. Aim of this study is to verify the presence and predictors of subclinical large artery involvement in early hypertension as compared to normotensive subjects.

**PP.22.174**

**EFFECTS OF ACETAZOLAMIDE ON BLOOD PRESSURE AND PULSE WAVEFORM CHANGES INDUCED BY HIGH ALTITUDE EXPOSURE**


**Objectives:** Our study shows for the first time that acute exposure to HA induces both a BP rise and changes in vascular function, whose magnitude is partly counteracted by treatment with AC, after accounting for BP changes. The effects of AC on the hemodynamic changes induced by hypobaric hypoxia may contribute to the beneficial role of this drug in subjects prone to mountain sickness.

**Background:** Exposure to high altitude (HA) may induce mountain sickness and increase blood pressure (BP) but little is known on the effects of this condition on arterial properties. Acetazolamide (AC), antagonizing chemoreflex activation effects, has been proposed to prevent and treat mountain sickness, but no information is available on its effects on cardiovascular parameters at HA. Aim of our study was to assess these issues in a group of healthy volunteers acutely exposed to very HA. Methods: 42 healthy normotensive volunteers (mean age 36.8 ± 8.9, 21Male) were randomized to receive AC 250 mg bid or placebo (PL) both at sea level (SL) and HA. A tonometric evaluation of arterial properties (PulsePen, DiaTecne, Milan) by assessing carotid-femoral and carotid-radial PWV (CF-PWV, CR-PWV) and pulse wave analysis (augmentation index, Aix and subendocardial viability ratio, SEVR, i.e. the ratio between diastolic and systolic area under the pulse pressure curve) was performed in the following conditions: at baseline (BAS), after 2 days’ of randomized treatment at SL, within 6 hours from arrival at Capanna Margherita (Mount Rosa, Italian-Swiss Alps, 4559 m, HA1); and on 3rd full day of exposure to HA (HA2). Systolic (S) and diastolic (D) BP were measured by a validated oscillometric device (AND UA 767-PC). Heart rate (HR) was derived from an ECG signal. Mean arterial pressure (MAP) was calculated by PulsePen software. Data are shown as means ± SD.

**Results:** In all subjects, during acute exposure to HA, CF-PWV did not change, while CR-PWV and Aix (adjusted for HR) showed a tendency to increase without difference between treatments. SEVR significantly decreased from SL to HA1 in both groups (P < 0.01), with a smaller reduction in the AC group: from 0.89 ± 0.19 to 0.58 ± 0.14 for PL and from 0.87 ± 0.19 to 0.67 ± 0.13 for AC (p = 0.055 PL vs AC at HA1). At HA2 SEVR was significantly lower in PL compared to AC (0.74 ± 0.17 vs 0.87 ± 0.15 p = 0.02). Acute exposure to HA significantly (p < 0.01) increased SBP, DBP, MAP and HR. Subjects in AC group, compared to PL group, showed however significantly lower values of SBP (115.7 ± 9.8 vs 108.3 ± 9.6 mmHg, p = 0.027), DBP (77.4 ± 6.8 vs 70.1 ± 5.3 mmHg, p < 0.001), MAP (92.7 ± 6.8 vs 85.3 ± 5.9 mmHg, p = 0.001) and HR (83.5 ± 10.4 vs 76.4 ± 8.8 bpm, p = 0.03) at HA1. DBP and MAP were significantly lower with AC also at HA2.

**Conclusions:** Our study shows for the first time that acute exposure to HA induces both a BP rise and changes in vascular function, whose magnitude is partly counteracted by treatment with AC, after accounting for BP changes. The effects of AC on the hemodynamic changes induced by hypobaric hypoxia may contribute to the beneficial role of this drug in subjects prone to mountain sickness. Based on these findings, also the possible clinical usefulness of AC in patients with diseases associated to hypoxemia might deserve to be re-assessed.

**The study was supported by a research grant of the Italian Ministry of Health.**

**PP.22.175**

**INCREASED CAROTID IMT IN EARLY HYPERTENSION REPRESENTS AN ADAPTIVE MECHANISM TO INCREASED PULSATILE LOAD**

C. Palombo1, M. Kozakova1, C. Morizzo2, G. Bini1, A. Corciu1, Am Sironi1, G. Dell’omo1, R. Pedrinelli1, University of Pisa, Department of Surgery, Pisa-Italy, Exaote, Genova-Italy, Department of Internal Medicine, University of Pisa, Pisa-Italy, University of Pisa, Cardio and Thoracic Department, Pisa-Italy, Cnr, Institute of Clinical Physiology, Pisa-Italy.

**Objectives:** An increased intima-media thickness (IMT) of common carotid artery (CCA) has been reported in early hypertension as a marker of subclinical atherosclerosis. However, large artery wall thickening may also develop as an adaptive response to the increased pressure load. Aim of this study is to verify the presence and predictors of subclinical large artery involvement in early hypertension as compared to normotensive subjects.

**Design and Methods:** Thirty-eight never treated, non diabetic subjects free of chronic cardiovascular disease were recruited so far in a prospective study (according to JNC 7 categories: 18 with “optimal” casual BP (NL), and 20 with high-normal or mildly elevated BP (pre-HT)). Right CCA IMT and local stiffness were assessed by radio-frequency (RF) based real-time, automatic tracking of arterial wall (Q-IMT and Q-AS, respectively, MyLab70, Esaote, Italy). CCA IMT was also measured off-line in digitized B-mode images. Carotid-femoral pulse wave velocity (CF-PWV, Comptor, Alum, France) was used as an estimate of aortic stiffness. Fasting glucose and lipid profile were also assessed.

**Results:** Groups were comparable for age (NL vs pre-HT: 47 ± 7 vs 50 ± 7 years), BMI (27 ± 6 vs 26 ± 3.2 Kg/m²) and gender distribution. Pre-HT had significantly higher systolic and diastolic BP and pulse pressure (PP: 59 ± 13 vs 46 ± 8 mmHg, p < 0.005), Q-IMT (643 ± 85 vs 560 ± 97 µm, p < 0.01), CCA diameter (7.94 ± 0.84 vs 7.22 ± 0.55 mm, p < 0.01) and Beta stiffness index (10.7 ± 4.0 vs 8.2 ± 1.89, p < 0.05). No significant differences between the groups were found for Q-AS CCA distension (352 ± 98 vs 358 ± 77 µm, relative wall thickening (Q-IMT/Vessel Radius: 0.16 ± 0.02 vs 0.15 ± 0.02), CCA tensile stress (118 ± 16 vs 109 ± 18 kPa), 2D derived IMT (746 ± 76 vs 694 ± 116 µm), CF-PWV (9.5 ± 1.2 vs 8.7 ± 1.5 m/s), fasting glucose and lipid profile. In the entire population, significant direct correlations were found for Q-IMT with age (r = 0.48, p < 0.005), SBP (r = 0.53, p < 0.001),
and CCA diameter ($r = 0.66$, $p < 0.0001$). Beta index was directly related to Q-IMT ($r = 0.36$, $p < 0.05$) and age ($r = 0.60$, $p < 0.001$). In multivariate analysis, adjusted for diagnosis, sex and smoking habit, independent predictions of Q-IMT were CCA diameter and PP (R square 0.66, $p < 0.0001$); the only independent predictor of Beta index was age (R square 0.39, $p < 0.001$).

Conclusions: RF-based high resolution US system (Q-IMT and Q-AS) is capable to detect subtle abnormalities in carotid structure and function in absence of changes in aortic stiffness. In subjects with early hypertension, increased Q-IMT appears an adaptive response to increased hemodynamic load, mainly pulsatile pressure, and is associated with an increased local stiffness.

PP.22.176  ENDOTHelial FUNCTION IS ASSOCIATED WITH PULSE PRESSURE AMPLIFICATION

U. Neissius, P. Higgins, J. Dawson, M. Walters, A. Dominiczak, C. Delles. University of Glasgow, Institute of Cardiovascular and Medical Sciences, Glasgow-United Kingdom

Objectives: Pulse pressure amplification (PPA), the ratio between brachial and central aortic pulse pressure (PP), quantifies the increase of the pulse amplitude as it travels distally. As PP and endothelial function in healthy individuals are inversely correlated, we hypothesized that PPA is associated with impaired endothelial function. We addressed this hypothesis by studying the relationship between reactive hyperemia peripheral arterial tonometry (RH-PAT) parameters and PPA.

Methods: Peripheral PP, the difference between brachial systolic and diastolic blood pressure, was measured with an automated sphygmomanometer. Central PP was derived from radial artery tonometry assessed by the SphygmoCor device. RH-PAT was measured at the right index finger using the Endo-PAT2000 device. Pulse wave amplitude (PWA) at baseline and following a 5-minute ischaemia phase were assessed and the reactive ischaemia index (RIH) was calculated.

Results: We investigated 133 participants (mean age, 61 ± 9 years) with high cardiovascular risk profile (29% with CAD, 40% with history of stroke). PPA was found to be associated with age ($r = -0.231, P = 0.007$), heart rate ($r = 0.495, P < 0.001$) and height ($r = 0.275, P = 0.015$). RIH was only correlated with age ($r = 0.255, P = 0.003$) but not with heart rate and height ($P = ns$). PPA was inversely correlated with RIH ($r = -0.247, P = 0.004$) and maximum PWA, post ischaemia ($r = -0.19$, $P = 0.022$) but not with baseline PWA ($P = ns$). In a linear regression model, age ($P = 0.006$) and PPA ($P = 0.011$) predicted RIH ($r = 0.358, P = 0.001$). In contrast, peripheral PP ($r = 0.128, P = 0.141$) was not significantly correlated with RIH.

Conclusion: PPA is associated with endothelial function as determined by RH-PAT. This association is independent of baseline PWA. PP at the level of resistance arteries, as estimated by PPA, might contribute to this finding.

PP.22.177  LEFT VENTRICULAR HYPERTROPHY AND ABDOMINAL AORTA SIZE IN ESSENTIAL HYPERTENSION

C. Cuspidi1, S. Meani2, F. Negri3, C. Sala4, G. Mancia1. 1 Dep of Clinical Medicine and Prevention University of Milano-Bicocca - Istituto Auxologico Italiano, Milano-Italy, 2Divisione Di Cardiologia, Ospedale Di Rho, Rho-Milano-Italy, 3Thoraco-Pulm & Cardiocirc Dept Fond Policlinico - Fisiot Clinica E Ipertensione University of Milano, Milano-Italy

Aim: We sought to investigate the association between subclinical organ damage (OD) and abdominal aortic (AA) diameter in a large cohort of uncomplicated essential hypertensive patients.

Methods: Subclinical markers of OD (i.e. left ventricular mass, carotid intima-media thickness and plaques, microalbuminuria and retinal changes) and AA diameter (ultrasonography) were assessed in 2430 (mean age 53 ± 13 yrs) untreated and treated hypertensives included in the Evaluation of Target Organ Damage in Hypertension (ETODIH) study.

Results: In the whole study population LV mass index was the most important determinant ($b = 0.418, P < 0.0001$) of the absolute AA diameter and, after age, ($b = 0.268, P < 0.0001$) of AA diameter indexed to body surface area (AAI). In a gender based-analysis, a stepwise increase in LV mass index as well as in prevalence of LV hypertrophy (LVH), carotid intima-media thickness and plaques occurred from the lower to the upper quartile of AAI in men but not in women. No correlations were found between AAI and microalbuminuria or retinal changes.

Conclusions: Our findings support a sex-specific relation between AA size and subclinical OD by showing that LVH in hypertensive men is a strong risk factor for enlarged AA. Based on these data diagnostic protocols for detecting subclinical alterations in the AA should be optimized.

PP.22.178  THE INFLUENCE OF ANTIHYPERTENSIVE TREATMENT ON ARTERIAL STIFFNESS AND ARTERIAL WALL SHEAR STRESS

M. Rajzer, W. Wojciechowska, M. Kloczek, K. Kawecka-Jaszcz. 1-St Department of Cardiology and Hypertension Jagiellonian University Medical College, Krakow-Poland

The aim of the study was to compare the effects of 5 drugs representing different antihypertensive classes on arterial wall shear stress and arterial stiffness in patients with essential arterial hypertension.

Material and Methods: 95 pts. with hypertension (stage 1 and 2) were divided into 5 groups, (N = 19 in each treatment group) and treated for 6 months by: quinapril 20-40 mg/d (group-1), amiodipine 5-10 mg/d (group-2), hydrochlorothiazide 12.5-25mg/d (group-3), losartan 50-100 mg/d (group-4), bisoprolol 5-10 mg/d (group-5). Before and then after 1.3 and 6 months of treatment wall shear stress in common carotid artery (CCA) was calculated using whole blood viscosity measured by Brookfield DV-III pro and maximal blood flow velocity measured ultrasonographically. As a reference visits carotid femoral femoral pulse wave velocity (PWV) was measured using 3 devices Complior®, SphygmoCor® and Arteriograph® office BP was measured using Omron M5-1 in standard conditions.

Results: At the baseline no differences between groups were observed in blood pressure, PWV, CCA- shear stress. ANOVA for repeated measurements revealed for all groups during treatment period significant decrease in systolic blood pressure (p < 0.001), diastolic blood pressure (p < 0.001) and PWV measured by three different devices (p < 0.001). CCA-shear stress increased significantly in all treatment groups (p < 0.001). No between treatment groups differences were observed in above mentioned effects. In multiple regression analysis decrease of arterial stiffness (APWV) was in significant relation to its baseline value (B = 0.567, p = 0.00032) and increase of CCA- wall shear stress (B = 0.232, p = 0.0074).

Conclusion: Antihypertensive treatment reduces arterial stiffness proportionally to its baseline value and independently of the used drug. This effect could be partially explained by increase of arterial wall shear stress.

PP.22.179  PULSE WAVE SEPARATION ANALYSIS – RELATIONSHIP TO HYPERTENSIVE END-ORGAN DAMAGE

T. Weber1, S. Wassertheurer2, M. Rammer2, B. Hametner3, C. Mayer2, B. Ebner1. 1Cardiology Department, Klinikum Wels-Grieskirchen, Wels-Austria, 2Health & Environment Department, Ait Austrian Institute of Technology, Vienna-Austria

Background: Quantification of wave reflection is largely based on Pulse Waveform Analysis (PWA), yielding Augmentation Index (AIX) and Pressure Augmentation (AP), composite measures sensitive to timing and magnitude of the reflected pressure waves. Decomposition of the arterial waveform into its forward and backward component (Wave Separation Analysis – WSA) may lead to further insights into blood-pressure related disease.

Methods: We recently developed a method for quantifying amplitudes of forward (PF) and backward (PB) waves, based on high-fidelity arterial waveforms and an estimated flow signal, and validated it against the standard wave separation technique, based on pressure and flow waves. In this study, we aimed to investigate the relationships between PF, PB, and cardiac, renal, and vascular end-organ damage in 632 patients undergoing invasive cardiologic assessment, and to compare the results with conventional AIX and AP.

Results: Both PF and PB showed significant positive associations with left ventricular (LV) mass (R = 0.31 ± 0.20; left atrial size (R = 0.30 ± 0.32), natriuretic peptide level (R = 0.34 and 0.37), systolic function (S') (R = -0.25 and -0.33), early diastolic function (E') (R = -0.30 ± 0.29), LV filling pressures (E/E') (R = 0.38 and 0.42), renal function (glomerular filtration rate) (R = 0.21 and -0.23), and aortic stiffness (aortic pulse wave velocity-PWV) (R = 0.45 and 0.42). All correlations were statistically significant at p < 0.001. Z- statistic revealed that WSA parameters (PF, PB) are more closely related to cardiac (LV mass) and aortic (PWV) end-organ damage than PWA parameters (AIX, AP) (p < 0.05 for all comparisons).

Conclusion: Wave separation parameters (PF, PB) are statistically significant related to hypertensive end-organ damage. The correlations with LV mass and aortic PWV are significantly better than those of PWA-measures (AIX or AP).
Comparative Study of Arterial Properties After an Ischemic Atherothrombotic Stroke or an Acute Coronary Syndrome

G Barone-Rochette, G Vanzetto, O Detante, M Hommel, J-M Mallion, J-P Baguet, University Hospital, Grenoble-France

Context: Atherothrombotic cardiovascular disease has both functional and anatomic components that can be assessed non-invasively.

Objective: To compare arterial properties after two different acute atherothrombotic events.

Design, setting, patients: Usual cardiovascular risk factors, carotid parameters, pulse wave velocity, brachial flow mediated dilatation and ambulatory blood pressure monitoring were assessed in a cohort of 100 patients who presented either acute coronary syndrome (Group 1, N = 50) or ischemic atherothrombotic stroke (Group 2, N = 50) matched for age and gender. Main outcome: Differences of arterial properties according to the type of acute vascular events.

Results: History of hypertension, diabetes, dyslipidemia, cardiovascular heredity, smoking and body mass index were similar in both groups. All blood pressure parameters (clinic and 24-hour ambulatory blood pressure monitoring) were higher in group 2 (p < 0.01). Metabolic abnormalities were more often experienced after an acute coronary syndrome, with higher prevalence in metabolic syndrome (28% vs. 10%, p = 0.02) and higher triglycerides (1.76 ± 0.91 vs. 1.36 ± 0.68 mmol/l, p = 0.02) and glucose levels (5.89 ± 2.16 vs. 4.92 ± 0.74 mmol/l, p = 0.003). Carotid intima-media thickness and carotid-to-femoral pulse wave velocity were significantly higher in group 2 than group 1 (769 ± 180 vs. 701 ± 136 um, p = 0.03; 12.5 ± 3.5 vs. 10.7 ± 2.4 m/s, p = 0.006). Prevalence of endothelial dysfunction and carotid plaques were similar in acute coronary syndrome and ischemic atherothrombotic stroke group (86% vs. 74%, p = NS and 80% vs. 78%, p = NS, respectively).

Conclusion: In stroke patients, aortic stiffness and carotid wall thickness were higher than in acute coronary syndrome patients. These structural and functional differences may have a direct involvement in the occurrence of the event.

The Influence of Antihypertensive Treatment on Arterial Stiffness and Selected Matrix Metalloproteinases Plasma Activity

M Rajer1, W Wojciechowska2, D Fedak2, M Klocek1, K Kawecka-Jaszcza1,1 'St Department of Cardiology and Hypertension Jagiellonian University Medical College, Krakow-Poland, 2Chair of Clinical Biochemistry and Diagnostics, Jagiellonian University Medical College, Krakow-Poland

The aim of the study was to compare the effects of 5 drugs representing different antihypertensive classes on arterial stiffness and selected matrix metalloproteinases (MMPs) plasma activity in patients with essential arterial hypertension.

Material and Methods: 95 pts. with hypertension stage 1 and 2 (N = 19 in each treatment group) were treated for 6 months by: quinapril 20-40 mg/d (group 1), losartan 50-100 mg/d (group 4), bisoprolol 5-10 mg/d (group-5). Before and then after 1 and 3 and 6 months of treatment office blood pressure BP was measured using Omron M5-I in standard conditions. Carotid femoral pulse wave velocity (PWV) was measured using 3 different devices Compilux®, Sphygmocor® and Arteriograph® at the same visits. Plasma concentrations of (MMPs): MMP1, MMP2, MMP3, MMP9 and MMPs tissue inhibitor (TIMP1) were measured twice i.e. before and after 6 months of treatment using immunoenzymatic micro- ELISA method and spectrophotometer (BIOTEK®INSTRUMENTS, Inc., USA).

Results: At the baseline no differences between groups were observed in blood pressure, PWV and MMPs activity. ANOVA for repeated measurements revealed for all groups during treatment period significant decrease in systolic blood pressure (p < 0.001), diastolic blood pressure (p < 0.001) and PWV measured by different devices (p < 0.001) as well as significant decrease of MMP2 (p < 0.05) and MMP3 (p < 0.001) plasma concentration. Plasma activity of TIMP1 increased significantly (p < 0.001). No between treatment groups differences were observed in above mentioned effects. In multiple regression the variables that remain in the equation also of age (b = 0.102, p < 0.01) and sex (b = 0.251, p = 0.232), the HOMA index (b = 0.142, p < 0.01), PCR high sensitivity (b = 0.771, p < 0.01) and HbA1c (b = 0.235, p < 0.05).

Conclusion: Pulse Wave velocity is determined by age, HOMA index, HbA1c and PCR high sensitivity without influence of fibrinogen and lipids.

Pulse Wave Velocity and Biological Cardiac Risk Factors


Objectives: To analyze the relationship between Pulse Wave Velocity and biological cardiovascular risk factors in patients with primary arterial hypertension.

Methods: A cross-sectional study was conducted in a primary care setting, with the inclusion of 373 hypertensive patients aged 30–80 years. Pulse Wave Velocity were measured with the Sphygmocor system. We performed multiple linear regression analysis by Stepwise method, using Pulse Wave Velocity (m/s) as dependent variable and HbA1c (%), Cholesterol total and HDL (mg/dl), uric acid (mg/dl), albumin/creatinine index(mg/g), PCR high sensitivity (mg/g), HOMA index and fibrinogen (mg/g) as independent variables, adjusted by sex and age.

Results: Mean age 55.13 (SD:11.85) years, men 227 (61%). We found positive correlation between Pulse Wave Velocity and age (r = 0.564), glucose (r = 0.299), uric acid (r = 0.144), HbA1c (r = 0.285), PCR high sensitivity (r = 0.155), insulinemia (r = 0.154) and HOMA index (r = 0.256). We found in multiple linear regression the variables that remain in the equation also of age (b = 0.102, p < 0.01) and sex (b = 0.251, p = 0.232), the HOMA index (b = 0.142, p < 0.01), PCR high sensitivity (b = 0.771, p < 0.01) and HbA1c (b = 0.235, p < 0.05).

Conclusion: Pulse Wave velocity is determined by age, HbA1c and PCR high sensitivity without influence of fibrinogen and lipids.
ms, PP augmentation index (A10@HR75 23.6 ± 9.4%), PP amplification 132.2 ± 13.9%, PWV 13.1 ± 3.7 m/s. There was significant correlation between PWV and left atrium diameter (LAD) (r = 0.49), aorta diameter (r = 0.60), right ventricle diameter (r = 0.71). Negative significant correlation between PP A10@HR75 (r = -0.34) and LAD (r = -0.33) was found. Reflection wave time significantly correlated with LVEF (r = 0.39), end systolic diameter (r = -0.45) and volume (r = -0.45), end diastolic diameter (r = 0.43) and volume (r = -0.40).

Conclusion: In patients with documented systolic heart failure the results indicate multiple significant correlations between arterial stiffness indices and reflection wave characteristics and systolic function and heart remodeling.

**PP.22.185 INCREASED ARTERIAL STIFFNESS ESTIMATED BY PULSE PRESSURE LEADS TO IMPAIRED MAXIMUM AEROBIC EXERCISE IN NEWLY DIAGNOSED HYPERTENSIVE PATIENTS**


Background: In essential hypertension increased arterial stiffness leads to subclinical left ventricular diastolic dysfunction which in turn is exaggerated during exercise. Office pulse pressure represents a non-invasive index of arterial stiffness. Cardiopulmonary exercise test (CPET) estimates peak oxygen consumption during aerobic exercise. The study tested the hypothesis that peak oxygen consumption is impaired in recently diagnosed hypertensive patients with increased arterial stiffness.

Methods: Seventy, non-diabetic, recently diagnosed hypertensive patients (mean age 50 ± 11 years, 47 men) underwent a ramp symptom-limited cardiopulmonary exercise test (CPET) on a bicycle ergometry one month after baseline evaluation which included two-dimensional (2-D), Doppler and TDI echocardiography. We evaluated peak oxygen consumption response [VO2 PEAK] at peak exercise.

Results: All patients completed successfully the exercise test without ECG signs or symptoms of myocardial ischemia. We found that VO2 PEAK was related with arterial stiffness (pulse pressure, $\sigma = -0.26$, $p < 0.05$), left ventricular diastolic dysfunction (E/A ratio of mitral valve flow, $\sigma = 0.52$, $p < 0.05$), left ventricular diastolic filling pressures (E/EA ratio of mitral valve flow, $r = 0.26$, $p < 0.05$) and left atrium diameter ($r = 0.28$, $p < 0.05$).

Conclusions: Increased arterial stiffness with subsequent left ventricular diastolic dysfunction, elevated left ventricular filling pressures and dilatation of left atrium leads to impaired peak oxygen consumption during exercise in recently diagnosed hypertensive patients. This mechanism, non-invasively, explains the shortness of breath which is referred by a group of hypertensive patients during exercise and guide antihypertensive treatment towards arterial stiffness decrease.

**PP.22.186 CAROTID INTIMA-MEDIA THICKNESS, ABDOMINAL AORTA, INTESTINAL DYSBIOSIS AND POLYMORPHISM OF ACE (I/D), AGTR1 (A1166C) GENES IN ARTERIAL HYPERTENSION**

L. Sydorchuk, O. Kushnir, J. Ursuliak, A. Sydorchuk, A. Sokolenko, R. Sydorchuk, I. Sydorchuk. Bukovinian State Medical University, Chernivtsi-Ukraine

Objective: To evaluate the connection of intima-media thickness (IMT) of carotid artery wall (CW) and abdominal part of aorta (APA) in patients with Arterial Hypertension (AH) depending on genetic polymorphism of ACE (I/D), AGTR1 (A1166C) and changes of intestinal microbiocenosis.

Design/Methods: 104 patients with AH I-III stages participated in the study: 48.1% (50) women and 51.9% (54) men, average age 53.2 ± 8.7 years. IMT and vessels circulation were studied with Doppler-ultrasound.

Results: In D-allele carriers of ACE gene more frequently were severe degrees of intestinal dysbiosis accompanied by more severe grades of AH: among D-allele carriers the AH of 2° and 3° grades were observed in 82.8% (24) and 76.8% (43) cases, accordingly, in 47.4% in "genotype patients (0.01). In NN-genotype carriers of AGTR1 gene the dysbiocenosis of 2° grade was more frequently diagnosed, than in A-allele carriers: 90% and 10% vs 51.1% (48) and 22.3% (21) (0.004). High risk groups patients of IMT of CW and APA enlargement became NN-genotype carriers of AGTR1 gene. Dependences of IMT changes from ACE gene genotypes were not revealed. An average daily Systolic and Diastolic Blood Pressure (SBP/DBP) reliably influenced on IMT of APA and CW ($r = 0.49$-$0.60$, $0 < 0.022$-$0.003$) in DD-carriers of ACE gene and NN-genotypes of AGTR1 gene. SBP24 correlated with severities of intestinal dysbiosis ($r = 0.44$-$0.65$, $0 < 0.024$-$0.007$) and patients' age not depending on gender ($r = 0.51$-$0.86$, $0 < 0.022$-$0.001$).

Conclusions: Polymorphism of analyzed genes influenced IMT in patients with EAH and associates with number of severe grades of intestinal dysbiosis.

**PP.22.187 PATIENTS WITH INFLAMMATORY BOWEL DISEASES HAVE INCREASED ARTERIAL STIFFNESS**

L. Zanoli,1 M. Canavari,2 S. Rastelli,1 L. Di Pino,1 I. Monti,2 G. Inserra,2 P. Castellino.1 Aphp, Université Paris Descartes, Inserm U970, Paris-France, 2University of Catania, Catania-Italy

The chronic inflammation may predispose to vascular remodelling and arterial stiffness in patients with inflammatory bowel diseases (IBD).

Aim: To evaluate early alterations of arterial function in patients with IBD.

Methods: 29 young patients with IBD without the classical cardiovascular risk factors and 10 controls were enrolled in this study. Sphygmocor (AtCor Medical) was used to a non-invasively estimation of (a) arterial stiffness [carotid-femoral pulse wave velocity (cf-PWV) and augmentation index adjusted for heart rate (AIx)], (b) myocardial perfusion [subendoocardial viability ratio (SEVR)] and (c) central systolic (central-SBP), diastolic (central-DBP), and pulse pressure (central-PP).

Results: Main clinical data of our population are reported in table 1. In young patients with IBD, in absence of conventional cardiovascular risk factors, the arterial stiffness is increased. Patients with IBD have higher central-PP, cf-PWV, cr-PWV and AIx and reduced myocardial perfusion and central-DBP than controls. In addition, in multivariate stepwise regression analysis, the use of steroid anti-inflammatory therapy ($R^2 = 0.16$, beta 0.09 m/s, 95%CI 0.01-0.16 m/s, $p < 0.05$) and the age ($R^2 = 0.27$, beta 0.08 m/s, 95%CI 0.004-0.13 m/s, $p < 0.05$) are positively associated with cr-PWV, an indicator of the muscular arteries stiffness.

<table>
<thead>
<tr>
<th></th>
<th>Controls</th>
<th>IBD</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>26.7±3.5</td>
<td>28.4±7.0</td>
<td>NS</td>
</tr>
<tr>
<td>Male gender (%)</td>
<td>60.0</td>
<td>55.2</td>
<td>NS</td>
</tr>
<tr>
<td>Weight (Kg)</td>
<td>66.9±13.5</td>
<td>67.1±16.6</td>
<td>NS</td>
</tr>
<tr>
<td>Height (m)</td>
<td>1.68±0.09</td>
<td>1.67±0.10</td>
<td>NS</td>
</tr>
<tr>
<td>Brachial SBP (mm Hg)</td>
<td>113.5±14.9</td>
<td>111.4±11.7</td>
<td>NS</td>
</tr>
<tr>
<td>Brachial DBP (mm Hg)</td>
<td>70.6±6.5</td>
<td>68.4±10.2</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Brachial PP (mm Hg)</td>
<td>42.9±13.5</td>
<td>50.1±10.1</td>
<td>NS</td>
</tr>
<tr>
<td>Heart rate</td>
<td>64.3±5.9</td>
<td>68.9±9.6</td>
<td>NS</td>
</tr>
<tr>
<td>cf-PWV (m/s)</td>
<td>5.5±0.4</td>
<td>6.5±1.3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>cr-PWV (m/s)</td>
<td>7.4±0.7</td>
<td>8.4±1.1</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>AIx (%)</td>
<td>-5.8±10.8</td>
<td>6.4±10.5</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Central SBP (mm Hg)</td>
<td>97.4±9.7</td>
<td>97.8±10.5</td>
<td>NS</td>
</tr>
<tr>
<td>Central DBP (mm Hg)</td>
<td>71.6±6.8</td>
<td>65.7±10.5</td>
<td>0.05</td>
</tr>
<tr>
<td>SEVR</td>
<td>25.8±7.6</td>
<td>32.1±6.5</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Steroidal anti-inflammatory therapy (%)</td>
<td>1.65±0.22</td>
<td>1.45±0.26</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

Conclusions: Early alterations of arterial function and myocardial perfusion were found in patients with IBD in absence of conventional cardiovascular risk factors. The steroid anti-inflammatory therapy, an indicator of the inflammatory state of the patient, was associated with the muscular arteries stiffness and explains 16% of the cr-PWV variability.
Objective: to determine AIX and cIMT relationship in patients at intermediate CV risk. Methods: eight-hundred and sixteen volunteers were included from an outpatient vascular medicine clinic. AIx was determined by peripheral artery tonometry (EndoPAT-2000) and the cIMT was measured by ultrasonography.

Results: The mean age was 52.9 years (12.2), 57.4% men. Mean cIMT was 0.79 mm (0.16), 0.76 in women and 0.80 in men (P = 0.001). The mean AIx was 11.7% (16.2), 13.7 in women and 10.2 in men (P = 0.003). We found a direct correlation between AIx and cIMTr (r = 0.32, P < 0.001). Those patients with hypertension (n = 364), dyslipidaemia (n = 543) or metabolic syndrome (n = 543) presented a positive correlation between AIx and cIMTr (r = 0.17 and P = 0.004, r = 0.21 and P = 0.001, r = 0.27 and P < 0.0001, respectively) while this was not observed in the type 2 DM group (r = 0.22). In the multivariate analysis, AIx was one of the main predictors of cIMTr (B = 0.016, P < 0.001) along with male gender, age, LDLC levels, and systolic blood pressure. In patients with hypertension or metabolic syndrome we found that age, male gender, hsCRP were the determinants, while in the dyslipidaemia group were age, male gender, AIx and LDLC levels.

Conclusion: The AIx and cIMT show a direct correlation in patients at increased CV risk. AIx result to be one of the main determinants of cIMT. AIx could be considered a marker of CVD beyond classical risk factors.

Methods: 48 coronary patients (36 after angioplasty, 5 after bypass and 7 under medical treatment) 57 years (36-75 yrs); 15% were compared with 16 volunteers 51 yrs. Patients were included in a 4-week ambulatory educational program consisted of a physical education with 22 meetings of cardiac rehabilitation (ergo cycle, carp- pet, segmentary muscular work, steps and balneotherapy), a therapeutic and dietetic education and drugs adaptation following European recommendations in secondary prevention. Patients and volunteers were examined at the beginning (Day 0 and 1), at the end of the program (M1) and 6 months after by the paramedical team. Brachial (average of 3 measurements by OMRON M4) and central BP pulse wave velocity (Sphygmocor), heart rate, total and LDL cholesterol, weight, smoking addiction and drugs intake were analysed by the same nurse. BP and PWV measurements at D1 were used as baseline values, D0 as measurements to familiarize patients. Percentage of variation for PWV between D1 and M1 for the volunteers was 6%.

Results: At M6 vs D1, patients risk factors were improved: total cholesterol < 5 mmol/l: 89 vs 50%, BP ≤ 140/90 mmHg: 96 vs 81%, smoking addiction: 12.5 vs 15%, obesity (BMI > 30): 15 vs 19%; diabetes: 6% and recommended treatment: 58% with beta blockers: 79%, Atorvastain: 100%, Statin: 96%, ACEI or sartan: 75%.

Heart rate did not change significantly during the study. The most important parameter to explain the decrease of patients PWV was central BP after multiple regression. Treatment did not significantly modify PWV, nor smoking addiction or total cholesterol control (Student t test).

Conclusion: The education and the follow-up of the patient in a health network improved CV risk factors and recommended treatment but improved also arterial rigidity in a few weeks. This improvement was maintained although BP increased at M6 and heart rate did not change during the study. This depends probably on an intrinsic improvement of arterial rigidity of these coronary patients.
**PP.22.192 INFLAMMATORY MARKERS AND RELATIONSHIP WITH ARTERIAL STIFFNESS IN UNTREATED PATIENTS WITH ESSENTIAL HYPERTENSION**

E. Gkaliagkousi, S. Douma, M. Doumas, K. Vogiatzis, P. Anyfanti, E. Gavrilaki, A. Triantafyllou, K. Petidis, C. Zamboulis. 2nd Prop. Department of Medicine, Aristotle University of Thessaloniki, Thessaloniki-Greece.

**Objective:** Systemic inflammation plays a central role in the pathogenesis of atherosclerosis and elevated plasma levels of inflammatory markers predict an increased cardiovascular risk. Moreover, inflammation has been associated with progressively increasing arterial stiffness and pulse wave velocity (PWV) in essential hypertension. The aim of the present study was to investigate the occurrence of systemic inflammation in patients with untreated, recently diagnosed essential hypertension, in the absence of clinical overt complications and right after the establishment of the diagnosis. Secondly we aimed to investigate if there is any correlation between arterial stiffness, as this is estimated by PWV, and the inflammatory markers.

**Design and method:** In total, a group of 82 subjects was investigated which was consisted of patients with untreated essential hypertension (UH, Blood Pressure, (BP): 142.7 ± 25.5/90.9 ± 12.8 mmHg) and 32 normotensive healthy volunteers (NT, BP: 117.7 ± 11.4/70.0 ± 9.4 mmHg). Levels of high sensitivity C-reactive protein (hsCRP), Interleukin-6 (IL-6) and Tumor Necrosis Factor alpha (TNF-a) were measured by Enzyme-Linked Immunosorbent Assay (ELISA) and PWV was assessed by applanation tonometry.

**Results:** hsCRP was significantly increased in the UH patients as compared to NT controls (2.16 ± 0.56 vs 0.6 ± 0.2 mg/l, p < 0.05), whereas IL-6 and TNF-a were found no different between the two groups (50.12 ± 20.02 vs 56.2 ± 37.8 pg/ml, p = NS). Furthermore, PWV correlated significantly with levels of hsCRP (rs = 0.473, p < 0.001) and traditional biochemical cardiovascular risk markers such as total cholesterol (rs = 0.446, p < 0.001), Low-Density Lipoprotein (LDL) (rs = 0.473, p < 0.001), plasma glucose (rs = 0.307, p = 0.13) and number of cigarettes/day (rs = 0.339, p = 0.003). By contrast no significant correlation was found between PWV and Body Mass Index and High-Density Lipoprotein (HDL). In the multiple regression model, PWV was independently associated only with hsCRP (rs = 0.279, p = 0.001) after correction for the other cardiovascular risk factors.

**Conclusion:** Patients with untreated essential hypertension, have increased inflammatory background as this is indicated by the elevated levels of hsCRP, even in the absence of clinical overt complications and right after the establishment of the diagnosis. Moreover, the increased arterial stiffness, which accompanies the disease, is independently and strongly associated only with the presence of inflammation and not with the other traditional biochemical cardiovascular risk factors. This finding may indicate that hsCRP is a more robust predictor of arterial stiffness in these patients.

**PP.22.189 ARTERIAL STIFFNESS IN WOMEN WITH MODERATE RISK OF CARDIOVASCULAR DISEASE AND POSTMENOPAUSAL OSTEOPOROSIS**

I. Barinova, E. Sereidenina F. Ageev. Russian Cardiology Research Center, Moscow-Russia.

**Objective:** to evaluate the arterial stiffness in women with moderate risk of cardiovascular disease (CVD) and different bone mineral density (BMD).

**Design and Methods:** in 89 postmenopausal women (56.5 ± 4.4 years) with moderate risk of CVD (SCORE < 5), no more than mild hypertension, normal function of thyroid gland, without coronary artery disease, diabetes mellitus and second causes of osteoporosis pulse wave velocity between brachial and ankle sites (baPWV, by volume spaghmography) and between carotid and femoral sites (cfPWV, by applanation tonometry), as well bone mineral density at lumbar spine and femoral neck (by dual-energy X-ray absorptiometry) were assessed.

**Results:** compared with patients with normal BMD (n = 24), patients with osteoporosis (n = 28) and osteopenia (n = 37) had higher both baPWV and cfPWV values (in both cases p < 0.05; ns between osteoporosis and osteopenia groups). In osteoporosis group there were greater years since menopause, less cfPWV values (in both cases p < 0.05; ns between osteoporosis and osteopenia groups). Between all three groups there were no significant differences in age, smoking status, visit blood pressure, lipid levels and medication. Both baPWV and cfPWV values were significantly positively correlated with age, years since menopause (all p < 0.05) and significantly negatively correlated with BMD at all measured bone sites (all p < 0.05).

**Conclusion:** women with moderate risk of CVD and postmenopausal osteoporosis have increased arterial stiffness that may be probably associated with higher cardiovascular risk.

**PP.22.194 STENT IMPLANTATION IN THE AORTIC ISTHMIC REGION IN AN ANIMAL MODEL**


**Background:** Balloon dilation with stent implantation is a novel technique for the treatment of aortic coarctation. Residual arterial hypertension is a frequent finding (50% of treated patients), leading to major cardiovascular events and reducing life expectancy, despite successful procedure. It had been hypothesized that aortic focal stiffness is responsible of residual hypertension.

**Aim of This Study:** to determine feasibility of stent implantation in the aortic isthmus of an ovine model to study pressor and hemodynamic changes induced in the growing animal.

**Materials and Methods:** Platinum-iridium stent was implanted in the aortic isthmus of 6 female sheep through vascular catheterization (STENT). Vascular catheterization and angiographic study was performed in 6 control sheep (SHAM). All subjects had direct aortic pressure measurement as well as echocardiographic and blood pressure measurements (through auricular artery catheterization) every 90 days. Twelve months after intervention the animals were sacrificed.

**Results:** Stent implantation did not affect growth or quality of life. Stent implantation acutely and transiently increased focal aortic stiffness: aortic pressure measurements performed during catheterization revealed pressure wave morphology compatible with acute augmentation index alteration after stent implantation. Stent implantation acutely increased pulse pressure (from 24 ± 4 to 31 ± 4 mmHg, p < 0.01), but after 12 month follow up blood pressure of STENT animals was similar to SHAM, both in the ascending and descending aorta. Auricular blood pressure did not differ among groups. One subject died after surgery for vascular access hemmorhage. Another subject died a few days after intervention and one developed aortic valve insufficiency after catheterization.

**Conclusions:** Stent implantation is feasible and tolerated. This animal model can be useful to study hemodynamic impact and aortic stiffness induced by stent implantation and their consequences on the left ventricle. Our data do not support the hypothesis that focal aortic stiffness may be a major cause of residual arterial hypertension in patients undergoing aortic surgical or endovascular deacoarctation.

**PP.22.195 THORACIC AORTIC DILATATION IN PATIENTS WITH OR WITHOUT ARTERIAL HYPERTENSION**


**Objective:** The association of thoracic aortic dilatation with arterial hypertension is disputed, and few data are available in population-based samples.

**Materials and Methods:** A retrospective analysis was performed of the standard TTE of 6345 pts. Diagnoses and distances in the aortic root region were measured.

**Results:** Aortic diameter over 40mm was revealed in 722 pts (11.4%), 55% of whom had a history of arterial hypertension. Average age was 65.3 ± 12.8 yrs, ratio m:f = 3.6:1. Following causes of aortic dilatation were discovered: 62% - atherosclerosis, 23% - acquired valvular heart disease (TAV), 12% - bicuspid aortic valve (BAV) and 3% - Marfan syndrome. But among patients with aortic diameter over 45 mm ratio aetiology was 4%, 2%, 19% and 3%, respectively. Mean aortic diameter in sinus of Valsalva was 49.7 ± 3.9 mm and in sinotubular junction was 49.9 ± 4.4 mm. The width of the aortic root was consistently larger in pts with atherosclerosis compared with other groups. Mean aortic root diameter was larger in hypertensives than normotensives patients. There was no statistically significant correlation between BP level and aortic diameter, which may be therapy realated.

**Conclusions:** Atherosclerosis is the most frequent causes of aortic dilatation. Hypertension contributes to dilatation of the ascending aorta is not only in patients with atherosclerotic disease.
Objective: Increased aortic PWV has been shown to predict cardiovascular, and in some cases all-cause, mortality in individuals with hypertension, diabetes mellitus, end stage renal failure. We aimed to study the distribution of aortic PWV values depending on blood pressure (BP) and to establish whether aortic PWV brings additional information about CV risk to the assessment based on conventional risk system.

Design and Method: In total 1007 subjects, aged 25-74, were examined in 2008/2009 in the Post-MONICA study. BP was measured three times in the sitting position on the right arm using standard mercury sphygmomanometer. Aortic PWV was measured by using the Sphygmocor device, with the patient in supine position in the aorta, i.e. between carotid and femoral arteries (aortic PWV). The cardiovascular risk by SCORE system was used. High PWV, defined by the 4th quartile, was done.

Results: In the group aged up to 55 years with optimal BP high PWV was measured in 9% of subjects. In the group with normal and high normal BP high PWV was found in 27.4%. In the group above 55 years with optimal BP high PWV was measured in 15.4%. In the group with normal and high normal BP high PWV was found in 26.3%. After dividing our sample into two groups according to cardiovascular risk SCORE system we found high PWV in 18.5% of subjects in group with low risk, aged up to 55 years. In the group above 55 years we found high PWV in 36.8% subjects with low SCORE risk.

Conclusions: Pathologic values of aortic PWV in relevant part of our sample, i.e. subjects with normal BP or low SCORE risk, were found. We found that aortic PWV measurement can improve the evaluation of cardiovascular disease risk, better than existing SCORE system.
Conclusions: Approximately one in every 7 patients with hypertension presents an altered ABI, and of these, two out of three are not diagnosed. Most have a degree of moderate to severe arterial disease. The variables inversely associated are BMI and age, smoking, diabetes, total cholesterol, preventing CV 2 meetings, presence of pain in calf, creatinine and the variables inversely associated are BMI and HDL cholesterol.

**PP.22.200** PULSE WAVE REFLECTION BUT NOT ENDOThelial FUNCTION IS POSITIVELY INFLUENCED BY AT1-RECEPTOR-ANTAGONISM IN PATIENTS WITH STAGE I AND II ARTERIAL HYPERTENSION

A. Mitchell1, U. Rushentsova1, S. Klebs2, H. Bruck1, A. Kribben1, Th. Philipp1

Objective: We investigated the effects of a 20-week therapy with the AT1-receptor antagonist Valsartan (VALS) versus the β-blocker Atenolol (ATL) combined with hydrochlorothiazide (HCT) on arterial function and on endothelial function in patients with stage I and II arterial hypertension.

Design and Methods: 27 patients (17 men, 10 women, age 52.4 ± 7.3 years) were included in a double blind, randomized, cross-over study. In two study periods patients received either VALS up titrated from 80 to 320 mg + HCT 12.5 mg or ATL 100 mg up titrated to ATL + HCT 25 mg. Arterial function was assessed by radial artery plethysmography (Sphygmocor, AtCor Medical, Australia) to calculate augmentation index (Aix, %). Aortic Pulse wave velocity (PWV) was obtained from simultaneous recordings of pressure waves from the carotid and femoral artery. We used a Laser Doppler imager and skin injections to assess changes in blood flow and endothelial function. We injected acetylcholine alone and combined with L-NMMA and sodium nitroprusside to evaluate endothelium-dependent and independent vasodilatation. Measurements were performed at baseline and at the end of each study period. Data were analyzed with t-test and ANOVA and are expressed as mean ± SD.

Results: Blood pressure reduction was similar between both treatments (delta SBP VALS -15 ± 13 mmHg vs. ATL -20 ± 14 mmHg, p > 0.05; delta DBP VALS -6 ± 7 mmHg vs. ATL -11 ± 8 mmHg, p > 0.05), with a tendency towards greater reductions under ATL + HCT. VALS but not ATL significantly lowered Aix vs. baseline (delta Aix -7.1 ± 13.4% vs. -1.5 ± 14.8%, p < 0.05 for VALS vs. baseline). Following treatment with VALS PWV remained unchanged, whereas it was slightly lowered by ATL (± 0.8 ms vs. -0.08 ms, p < 0.05). Neither drug changed endothelium-dependent or endothelium-independent vasodilatation.

Conclusion: In our study AT1-receptor antagonism led to a reduction in wave reflection but was not associated with an improvement of small vessel function.

**PP.22.201** CHRONIC PERINDOPRIL TREATMENT DECREASES AORTIC STIFFNESS AND CALCIFICATION IN AUTOSOMAL RECESSIVE POLYCYSTIC KIDNEY DISEASE RATS

K. Ng, C. Hildreth, J. Phillips, A. Avolio. Macquarie University, Sydney-Australia

Objective: The Lewis polycystic kidney disease rat (LPK) is a novel model of chronic kidney disease (CKD), a condition which is associated with increased arterial stiffness and calcification. This study aimed to assess the effect of hypertension and therapy by angiotensin converting enzyme (ACE) inhibitor (perindopril) on the structure and function of the aorta of the LPK rat.

Methods: At 6 weeks of age, Lewis and LPK were randomly allocated to treatment by perindopril (1mg/kg daily) or placebo (drinking water) (n = 6 in each group, total 24 rats) and pursued for 6 weeks. Tail-cuff blood pressure was recorded weekly; haemodynamic parameters and mean pressure (MAP) dependent pulse wave velocity (PWV) were recorded using invasive high fidelity pressure transducers under urethane anaesthesia (1.3 g/kg, ip) at the end of the treatment period. MAP was altered by phenylephrine (50 mg·min⁻¹) and sodium nitroprusside (10 μg·min⁻¹) and MAP(x)/PWV(y) curves were generated. Aortic media morphological parameters were calculated from histological staining and calcium content was determined from atomic spectrophotometry.

Results: Hypertension was associated with a shift of the PWV-MAP curve upward and to the right indicating a decrease in compliance of the arterial system. In conjunction with reduction of blood pressure by reducing peripheral resistance, ACE inhibition significantly reversed PWV, an in vivo marker of large artery stiffness. Aortic medial cross sectional area (MCsA) and elastic modulus per unit wall stress ratio (EMWS) were increased in hypertension. Parallel degradation of elastin and increase in collagen content and medial elas-tocalcification were observed.

Conclusion: In LPK rats, ACE inhibition by perindopril significantly reversed MCsA, preserved elastin from loss and retarded the increase in collagen content resulting in reduced aortic stiffness. Aortic calcification was also significantly reduced following treatment.

**PP.22.202** INCREASED TISSUE TRANGLUTAMINASE ACTIVITY IN THE RAT AORTA FOLLOWING SINGLE EXPOSURE WHOLE BODY GAMMA-IRRADIATION

Y-Y. Liu1, L. Santhanam2, D Berkowitz1, A. Avolio1. Macquarie University, Sydney-Australia, 2Johns Hopkins University, Baltimore-USA

Objective: The cardiovascular effects of ionizing radiation are mediated through inflammatory mechanisms affecting endothelial function and arterial extracellular matrix, leading to alteration of arterial stiffness and pulse wave velocity (PWV). Tissue transglutaminase 2 (TG2) has been implicated to be associated with arterial stiffness through the S-nitrosylation pathway which is altered with inflammation. This study aims to determine the effects of ionizing radiation on TG2 activity in the rat aorta and any associated effect on aortic stiffness as measured by PWV.

Methods: Ten, 12-week-old Sprague-Dawley male rats were exposed to a single whole-body cesium-137 gamma-irradiation at 0 (Control, n = 5) or 5 Gy (Irradiation, n = 5). Five days following irradiation, rats were anaesthetized (iso-fluran, 500cc/min 1.5 %) and beat-to-beat aortic PWV and mean arterial pressure (MAP) were measured invasively using a 1.6F high fidelity dual-pressure sensor. MAP was increased and decreased over the range of 60-150mmHg with intravenous infusion of phenylephrine (PE, 0.03mg/kg) and sodium nitroprusside (SNP, 0.005mg/kg). Rats were sacrificed at the end of experiments, aortas were excised and proteins were extracted for western blotting and activity analysis. TG2 activity was expressed in relative density units (RDU).

Results: TG2 activity in the irradiated aortae was significantly elevated 2.5 fold (Control: 0.93 ± 0.19 RDU; Irradiation: 2.29 ± 0.87 RDU; P < 0.05). For measurements taken at baseline MAP, there was a trend towards higher PWV in the irradiated group, (Control: MAP = 101.7 ± 6.7 mmHg; PWV = 3.45 ± 0.11 m/sec; Irradiation: MAP = 97.0 ± 9.2, PWV = 3.97 ± 0.96 m/sec). There was no significant difference in isobaric PWV over the MAP range obtained by PE and SNP infusions for control and irradiated groups.

Conclusion: A single exposure to 5Gy gamma radiation causes a significant elevation of TG2 activity in the rat aorta detected after 5 days. While a trend was observed in increase in PWV, this was not associated with a significant difference in pressure independent PWV.

**PP.22.203** INCREASED CENTRAL BLOOD PRESSURE IN BLACK YOUNG ADULTS IS ASSOCIATED WITH ELEVATED PERIPHERAL VASCULAR RESISTANCE BUT REDUCED LARGE ARTERY STIFFNESS

C. Mcnienry1, Y. Yasmin1, A. Garrett2, N. Baber2, J. Cockcroft3, I. Wilkinson1. 1University of Cambridge, Cambridge-United Kingdom, 2University of Hertfordshire, Hatfield-United Kingdom, 3Cardiff University, Cardiff-United Kingdom

The prevalence of hypertension is higher in black individuals compared with whites. However, the underlying hemodynamic mechanisms are not well understood.

Data from 306 young Afro-Caribbean adults (blacks, n = 306, mean age 22.5 years) and 400 randomly selected Caucasian controls (whites, n = 400, mean age 22.1 years) were available for the current analyses. All individuals were aged between 18-40 years and were free of cardiovascular disease and medication. Detailed demographic, biochemical and hemodynamic data including BP, cardiac output (CO), peripheral vascular resistance (PVR) and arterial stiffness were obtained in all individuals.

Compared with whites, blacks had an elevated BMI (P = 0.001) and an increased family history of hypertension (P = 0.02). Brachial systolic and diastolic BP and central systolic BP were also significantly higher in blacks (P < 0.05 for all comparisons). CO and cardiac index were significantly lower in blacks than whites (P < 0.001 for both) but PVR and PVR index were significantly elevated (P < 0.001 for both). While augmentation index was significantly elevated in blacks (P < 0.001), aortic pulse wave velocity was significantly lower (P < 0.001).

These data show that central blood pressure is increased in young black adults and that this may be related to abnormalities in the peripheral vasculature, rather than an increase in large artery stiffness.
Surgey for Abdominal Aortic Hypoplasia: Long-term Results of Single-center Experience


Introduction: Abdominal aortic hypoplasia (AAH) is a rare cause of hypertension (HT) in children. Involvement of abdominal aorta represents only about 1% of aortic coarctations. Such lesions are usually complex with poor suitability for endovascular approaches. The aim of this study is to present the long term results of a single center experience in patients with AAH treated by conventional surgery.

Methods: Over the last 30 years, ten patients (five male) were admitted in our unit for AAH. Mean age was 12 years (range 1-29). Symptoms were HT alone in seven cases, lower limb claudication and HT in two, lower limb claudication, HT and chronic intestinal ischemia in one. Preoperative mean number of anti-hypertensive drugs was 1.8 (range 1 to 4). One patient already had been treated by percutaneous angioplasty. Etiology was developmental, Takayasu disease, Williams Beuren disease, Arterio-venous malformation, Arterio-venous fistula, Arterial ischemic syndrome in five, three, one, and one patient, respectively.

Associated lesions of renal arteries were seen in six out of eight patients (five stenoses and one aneurysm). Stenosis of superior mesenteric artery or celiac trunk were diagnosed in five patients. Repair consisted in aortic tube bypass graft in nine cases. Renal arteries revascularization were performed in seven cases (four bypasses or reimplantations, three ex vivo repairs).

Reimplantation of superior mesenteric artery was performed in one case.

Results: There was no postoperative death. One patient developed transient rise of pancreatic enzymes. No patient developed renal failure. Hypertension was cured or improved in all except patients with Takayasu disease who remained unchanged. Post-operative mean number of antihypertensive drugs was 0.8 (range 0-3). During mean follow-up of 10.5 years (range 0.1-23), three patients had secondary surgery (one renal-hepatic bypass, one aortic bypass, one iliac false aneurysm repair).

Conclusion: Surgical treatment of aortic hypoplasia is feasible with low morbidity-mortality. Renal artery lesions are frequent and require associated revascularization. HT results are good except in patients with Takayasu disease.

Arterial Stiffness in Subtypes of Acute Ischemic Stroke

L. Gamvrili, S. Papakatsika, G. Karafillis, S. Goulopoulou, V. Kotisis. Aristotle University, Thessaloniki-Greece

Objectives: To study differences in arterial stiffness in patients diagnosed for subtypes of acute ischemic stroke.

Methods: 85 consecutive patients who hospitalized for acute ischemic stroke were examined. Patients were diagnosed for acute ischemic stroke from their onset of symptoms during the last 24h and the diagnosis was confirmed with CT scan or MRI. According to the TOAST criteria ischemic strokes were classified based on aetiopathogenic mechanisms into the following groups: large artery atherosclerosis (atherosclerotic stroke), cardioembolic stroke, small artery occlusion (lacunar stroke) and infarct of undetermined cause. Carotid-femoral pulse wave velocity (PWV) was associated with age (r = 0.31, p < 0.01), weight (r = 0.34, p = 0.01), height (r = 0.33, p < 0.01), waist circumference (r = 0.30, p < 0.01), diastolic blood pressure (r = 0.23, p = 0.01) and educational activities (r = 0.25, p < 0.01). PWV was associated with age (r = 0.31, p < 0.01), weight (r = 0.26, p < 0.01), height (r = 0.18, p < 0.05), waist circumference (r = 0.22, p < 0.05), diastolic blood pressure (r = 0.23, p = 0.01) and educational activities (r = 0.25, p < 0.01). In the subgroup of boys, no correlation was found regarding PWV. Carotid-femoral pulse wave velocity (PWV) was measured as an estimate of arterial stiffness using the Complior apparatus. Parents were asked for the hours their children spent in sport or educational activities (hours/week) as well as the consumption of chicken, fish, salad and fruits (times/week).

Results: No significant differences were found between boys and girls regarding age, weight, height, waist circumference, office systolic, diastolic blood pressure and pulse pressure and PWV, educational activities and food preference. However, boys had an increased BMI (21 vs. 19, p < 0.05) and spent more hours in sport activities (3.7 vs 3.2, p < 0.01) and leisure time. Total population, PWV was associated with age (r = 0.21, p < 0.05), height (r = 0.26, p < 0.01), weight (r = 0.18, p < 0.05), waist circumference (r = 0.22, p < 0.05), diastolic blood pressure (r = 0.23, p = 0.01) and educational activities (r = 0.25, p < 0.01). In the subgroup of boys, no correlation was found regarding PWV. In the subgroup of girls, PWV was associated with age (r = 0.31, p < 0.05), weight (r = 0.34, p = 0.01), height (r = 0.35, p = 0.01), waist circumference (r = 0.40, p < 0.01), diastolic blood pressure (r = 0.35, p = 0.01) and educational activities (r = 0.35, p = 0.01).

Conclusions: Arterial stiffness changes seem to follow children’s development. However, these changes in arterial stiffness look like sex-specific in children going to elementary school, maybe because puberty appears earlier in girls and hormonal changes occur. Obesity in pre-puberty girls is an independent predictor of increased arterial stiffness.
Introduction: We accepted that exists a close direct relationship between the pulse pressure (PP) and arterial stiffness, increasing risk for cardiovascular diseases in those with higher PP. However, there aren’t data about central pressure and physiological changes in hypertensive women (HW) respect to the menopause and perimenopause period. Objective: In this study, we evaluated the behavior of PP and central pressures in hypertensive pre and post menopause women.

Material and Methods: we studied 39 HW, who were divided in two groups according to their present situation respect to menopause: Group I 20 post menopause women (51 ± 4 years old) and group II: 19 HW in perimenopause period (45 ± 4 years old). All of them met criteria of good blood pressure control (< 140/90 at office), receiving the treatment ordered by their family doctor. In all of them, we measured systolic and diastolic central pressure (CSP, CDP), brachial and central pulse pressure (BPP, CPP) and augmentation index (AI).

Results: of the study were compared and shown as follows: CSP/CDP in the group I were 124 ± 3/84 ± 2 versus group II 96 ± 3/80 ± 2 (p < 0.001 for both of them), BPP was 49 ± 5 in the group, I while in group II was 47 ± 3 (p < 0.06). However, CPP was in group I 42 ± 2 in group I versus 21 ± 3 in group II (p < 0.001).

Conclusions: In post menopause hypertensive women there is not only higher central blood pressure indicating higher vascular risk but also increased central pulse pressure (with no differences in brachial pulse pressure) respect to HW in the perimenopause period with a similar offices brachial pressure suggesting that could be necessary to measure central parameters in these patients to know their real vascular risk and to establish the proper treatment.
POSTER SESSION

POSTER SESSION 23
HEART

PP.23.209
IMPACT OF AGE ON ELECTROCARDIOGRAPHIC CHANGES IN HYPERTENSIVE PATIENTS OVER 65 YEARS
V. Pallares-Carratala1, J. Castillo2, P. Morillas-Blasco2, L. Facila-Rubio2, V. Bertomeu-Maritinez2, J. Redon-Mas3, O. Unión De Mutuas, Burriana-Spain, 2Hospital Universitario San Juan, Alicante-Spain, 3Hospital Clinico Universitario, Valencia-Spain.

Introduction: The electrocardiogram (ECG) is a useful tool in the initial assessment of hypertensive patients, because it allows the detection of left ventricular hypertrophy (LVH), cardiac arrhythmias and other associated diseases. The aim is to determine the prevalence of those electrocardiographic changes in hypertensive population = 65 years assisted in the Valencian region and analyze its relationship with age.

Method: We perform a multicenter study to include prospective hypertensive patients older than 65 years during an inclusion period of 5 weeks. Key cardiovascular risk factors, medical history, laboratory and ECG were performed in all patients. ECG was reviewed by two independent cardiologists. To determine the impact of age on ECG findings we divided the population in 4 groups according to age: 65-69 years, 70-74 years, 75-79 years and = 80 years.

Results: A total of 61 researchers included 1,028 patients. The mean age was 72.8 years and 52.7% were women. The age group distribution was: 349 patients aged 65-69 years, 307 cases between 70-74 years, 263 patients aged 75-79 years and 109 patients aged = 80 years. The global prevalence of atrial fibrillation and LVH was 6.7% and 17.2%, respectively. We observed significant differences between groups in the prevalence of AF (3.2% in patients 65-69 years vs. 11.9% = 80 years, p = 0.001), LVH (12.9% in the 65-69 years group vs. 23.9% in = 80 years, p < 0.05) and bifascicular block (2.3% in the 65-69 years group vs. 10.1% = 80 years, p = 0.001). There were no differences in the prevalence of left bundle branch block or presence of Q waves.

Conclusions: The aging of the population with hypertension is associated with an increased prevalence of AF and LVH on ECG, and a further degeneration of specific conduction system. The prognosis impact of these findings in the oldest patient must be elucidated by future investigations.

PP.23.210
INDEXING CARDIAC PARAMETERS IN ECHOCARDIOGRAPHIC PRACTICE: DO ESTIMATES DEPEND ON HOW WEIGHT AND HEIGHT HAVE BEEN ASSESSED? A STUDY ON LEFT ATRIAL DILATATION

Aim: We examined the difference between self-reported and measured height and weight in detecting echocardiographic left atrial dilatation (LAD), as defined by LA diameter indexed to body size parameters in an outpatient population referred to echocardiographic laboratories for routine examination.

Methods: A total of 1943 subjects referred by their practitioners to 9 outpatients echocardiographic laboratories across Italy were included in the study. LAD was defined by two criteria: A) LA diameter indexed to height > 24 mm/m2; B) LA diameter indexed to body surface area > 33 mm/m2. Prevalence of LAD was calculated by indexing LA diameter to both self-reported and measured anthropometric values.

Results: In the whole population, LAD tended to be underestimated when LA diameter was indexed to self-reported compared to measured values, by 3.6% according to criterion A (26.4% versus 30.0%, p < 0.001) and by 0.6% according to criterion B (21.1% versus 21.6%, p = ns). The difference between LAD estimates was more pronounced in older than in younger patients, either by criterion A (6.4% vs 1.6%, p < 0.001) as by criterion B (2.1% vs 0.1%, p < 0.001).

Conclusions: In a sample of outpatients attending echocardiographic laboratories, LAD is misclassified when LA diameter is normalized to self-reported weight and height. The error is related to demographic characteristics of patients and is more pronounced when LA diameter is normalized to height.

PP.23.211
PREVALENCE AND CHARACTERISTICS OF ELECTROCARDIOGRAPHIC ALTERATIONS IN SUBJECTS WITH MASKED HYPERTENSION

Background: Masked hypertension has been related to the presence of target organ damage (TOD) in subjects considered normotensive by office blood pressure. Data about EKG alterations in such situation are scarce.

Objective: To determine if there is a greater prevalence of EKG alterations in subjects with masked hypertension (MH).

Methods: We have selected normotensive subjects, with at least two office blood pressure measurement < 140/90 mm Hg, that were relatives of first-degree from hypertensive outpatients, proceeding from hypertension units throughout Spain. All the subjects underwent an ambulatory blood pressure monitoring and anthropometric data, as blood and urine analysis, and an electrocardiogram were collected. Echocardiographic data were also collected if they were available. Masked nocturnal hypertension was defined when activity blood pressure on ABPM was > 135/85 mmHg.

Results: Data from 438 subjects were collected (50.9% men) with a mean age of 45.3 ± 10.9 years, MH prevalence was 30.2%. Subjects with MH were older (47, with a greater proportion of men, and with a greater body mass index, with higher office blood pressure levels, with a lower eGFR, higher Albumin to Creatinine ratio, worser lipid profile and a higher proportion of office BP > 130/80. In 411 subjects EKG was available and in them prevalence of MH was of 36%. Subjects with MH presented a higher R wave in aVL (6.19 ± 3.4 mm vs. 5.35 mm ± 3.2 mm; p = 0.02) tan those without MH that was statistically significant. In addition in subjects with MH had a higher R wave in V6 (11.48 ± 5.1 mm vs. 10.51 ± 4.2 mm; p = 0.06) and bigger Cornell Index (13.88 ± 6 mm vs. 12.76 ± 5.5 mm; p = 0.06) than those without MH, these differences were statistically only nearly significant.

Conclusions: In subjects with MH there are signs of myocardial TOD measured by EKG as a bigger R wave in aVL. These findings deserve new studies to be confirmed.

PP.23.212
SOME PREDICTORS OF ASYMMETRIC LEFT VENTRICULAR HYPERTROPHY FORMING IN ESSENTIAL HYPERTENSION
A. Barsukov, E. Pronina, S. Shoustov, M. Resvantzev. Military Medical Academy, Saint-Petersburg-Russia.

Background: In a result of analysis of 5714 patient’s cards (35-84 years old) with essential hypertension there were established that prevalence of asymmetric LV hypertrophy (ALVH) corresponds 0.91%.

Objective: The aim of the study is to reveal some important parameters, associated with a presence of ALVH in essential hypertension, using dispersion statistic analysis.

Methods and Design: 74 patients with essential 1-3 grade of blood pressure (BP) increase (ESC, 2003). 42 of them had ALVH (28 men and 14 women, mean age 56.3 ± 3.40) and 32 had symmetric LVH (SLVH) (20 men and 12 women, mean age 57.6 ± 4.21). AH anamnese duration and magnitudes of overnight systolic and diastolic BP (156 ± 6.42/93 ± 3.32 vs 153 ± 4.28/91 ± 1.83 mm
Hg) were comparable in patients with ALVH and SLVH. The criterion of LVH asymmetry was considered as magnitude of relation of interventricular septum (IVS) to LV posterior wall (PW) thickness equal to or greater than 1.3. The exclusion criteria were: LV outflow obstruction (gradient under resting condition and after Valsalva maneuver equal to or greater than 30 mm Hg); family history of hypertrophic cardiomyopathy and/or sudden cardiac death, relation IVS/PW more than 1.4; anamnesis of myocardial infarction; angina pectoris equal to or greater than 2 functional class. There were studied 24-h BP monitoring parameters, 12-channel traditional electrocardiogram LVH criteria, ultrasound heart parameters, 24-h catecholamines excretion, plasma levels of insulin, glucose, angiotensin and aldosterone. Researches were made from 9 to 11 a.m. Dispersion statistic analysis of hemodynamic and neurohumoral parameters totality was accomplished.

Results: Some signs and factors turned out associated certainly with asymmetry character of LVH (patients with ALVH vs patients with SLVH): greater magnitudes of average 24-h systolic BP time index (F-criterion 9.5; p = 0.007), greater level of insulin secretion (F-criterion 5.8; p = 0.004), higher level of angiotensin I secretion (F-criterion 3.2; p = 0.045).

Conclusions: The phenomenon of asymmetric LV hypertrophy in the least part of the hypertensive patients is associated with greater magnitudes of average 24-h BP load, higher levels of angiotensin I and insulin secretion in comparison with persons who have symmetric LVH.

PP.23.213 PREVALENCE OF DIASTOLIC DYSFUNCTION AND RISK FACTORS IN ELDERLY MALES FROM A RURAL COMMUNITY

W. Tsai, H. Hsiao, J. Chen, P. Liu, L. Tsai, C. Wu. National Cheng Kung University Hospital, Tainan-Taiwan

Results: There were 68 subjects excluded due to significant structure heart diseases. Echocardiographic diastolic dysfunction parameters including transmitral Doppler flow velocities, atrial filling pressures and pulmonary vein flow were measured. The prevalence of diastolic dysfunction (EDD) was defined as average mitral early to late diastolic flow velocity ratio (E/e') ≥ 13, possible diastolic dysfunction (PDD) was defined as E/e' between 8 and 13, and normal diastolic function (NDD) was defined as E/e' < 8. Performance was evaluated by time for 16 feet walking.

Conclusions: In this community study, we found that diastolic dysfunction was abnormal in 39.9% of elderly males. Major risk factors for abnormal diastolic function included age, systolic blood pressure, and duration of diabetes. Echocardiographic E/e' ratio was correlated to exercise performance in these subjects.

PP.23.214 RELATIONS OF LEFT VENTRICULAR STRUCTURE TO ENDOTHELIAL DYSFUNCTION IN HYPERTENSIVE SUBJECTS

V. Aursulesei, A. Cozma, M.D. Datcu. University of Medicine and Pharmacy Gr. T. Popa, Iasi-Romania

Results: Some signs and factors turned out associated certainly with asymmetry character of LVH (patients with ALVH vs patients with SLVH): greater magnitudes of average 24-h systolic BP time index (F-criterion 11.4; p = 0.007), greater level of insulin secretion (F-criterion 55.1; p = 0.000), greater magnitudes of average 24-h systolic BP (F-criterion 5.88; p = 0.004), higher level of angiotensin I secretion (F-criterion 3.21; p = 0.045).

Conclusions: The phenomenon of asymmetric LV hypertrophy in the least part of the hypertensive patients is associated with greater magnitudes of average 24-h BP load, higher levels of angiotensin I and insulin secretion in comparison with persons who have symmetric LVH.

PP.23.215 LEFT CARDIAC GEOMETRY AND FUNCTION IN ISOLATED SYSTOLIC HYPERTENSION: INFLUENCE OF GENDER

M. Picca, F. Aogozzino. P.O. Macedonio Melloni- A.O. Fatebenefratelli E Oftalmico, Milan-Italy

Background: Isolated systolic hypertension (ISH) is associated with an increased risk for cardio- and cerebrovascular diseases. Isolated systolic hypertension (LVH) hypertrophy and low myocardial contractility have been demonstrated to be powerful predictors of cardiovascular morbidity and mortality in arterial H. Purpose: This study was designed to assess the presence of gender differences in LV geometry and function in normoalbuminuric (N) pts with untreated ISH. Methods: 158 consecutive pts (88 males, 70 females) with newly diagnosed untreated grade 1-2 ISH (group 1) were enrolled. ISH was defined as SBP blood pressure (BP) ≥ 140 mmHg and DBP < 90 mmHg. All pts underwent to clinical examination and laboratory investigations with the dosage of microalbuminuria and plasma levels of creatinine, glucose and glycosylated haemoglobin (Gh). The presence of microalbuminuria was defined as an albumin excretion rate ≥ 30 g/24h. An echocardiographic and Doppler study was performed to determine LV mass index (MI), relative wall thickness (RWT) and geometric patterns. The relation is obvious for FMD (r = 0.42, p = 0.001) and is strongly influenced by age and duration of arterial hypertension (t-test). There are not significant correlations (p > 0.05) to central component of endothelial dysfunction (BRC-F and NR1C-F). BRC-F has significant differences with RWT (cut-off value 0.45, t-test) and is related only with concentric hypertrophy (r = 0.48, p = 0.002). Adjustment for other risk factors (ANCOVA) does not influence our results irrespective the moment of evaluation.

Conclusions: According to other studies, the relation between LVH and endothelial dysfunction is present only in male hypertensive patients, influenced by age and long standing arterial hypertension. Global LVH is better related to peripheral parameters of endothelial dysfunction, LV geometry to central endothelial component. So, endothelial dysfunction can be involved in LVH development or both dysfunctional endothelium and LVH are markers for severe hypertensive disease.

PP.23.216 COMPARISON OF THE EFFECTS OF MANIDIPINE AND AMLODIPINE IN HYPERTENSIVE PATIENTS WITH CONCENTRIC LEFT VENTRICULAR HYPERTROPHY

M. Picca1, F. Aogozzino. P.O. Macedonio Melloni- A.O. Fatebenefratelli E Oftalmico, Milan-Italy

Results: Some signs and factors turned out associated certainly with asymmetry character of LVH (patients with ALVH vs patients with SLVH): greater magnitudes of average 24-h systolic BP time index (F-criterion 11.4; p = 0.007), greater level of insulin secretion (F-criterion 55.1; p = 0.000), greater magnitudes of average 24-h systolic BP (F-criterion 5.88; p = 0.004), higher level of angiotensin I secretion (F-criterion 3.21; p = 0.045).

Conclusions: The phenomenon of asymmetric LV hypertrophy in the least part of the hypertensive patients is associated with greater magnitudes of average 24-h systolic BP time index (F-criterion 11.4; p = 0.007), greater level of insulin secretion (F-criterion 55.1; p = 0.000), greater magnitudes of average 24-h systolic BP (F-criterion 5.88; p = 0.004), higher level of angiotensin I secretion (F-criterion 3.21; p = 0.045).

Conclusions: According to other studies, the relation between LVH and endothelial dysfunction is present only in male hypertensive patients, influenced by age and long standing arterial hypertension. Global LVH is better related to peripheral parameters of endothelial dysfunction, LV geometry to central endothelial component. So, endothelial dysfunction can be involved in LVH development or both dysfunctional endothelium and LVH are markers for severe hypertensive disease.

PP.23.214 RELATIONS OF LEFT VENTRICULAR STRUCTURE TO ENDOTHELIAL DYSFUNCTION IN HYPERTENSIVE SUBJECTS

V. Aursulesei, A. Cozma, M.D. Datcu. University of Medicine and Pharmacy Gr. T. Popa, Iasi-Romania

Results: Some signs and factors turned out associated certainly with asymmetry character of LVH (patients with ALVH vs patients with SLVH): greater magnitudes of average 24-h systolic BP time index (F-criterion 11.4; p = 0.007), greater level of insulin secretion (F-criterion 55.1; p = 0.000), greater magnitudes of average 24-h systolic BP (F-criterion 5.88; p = 0.004), higher level of angiotensin I secretion (F-criterion 3.21; p = 0.045).

Conclusions: The phenomenon of asymmetric LV hypertrophy in the least part of the hypertensive patients is associated with greater magnitudes of average 24-h systolic BP time index (F-criterion 11.4; p = 0.007), greater level of insulin secretion (F-criterion 55.1; p = 0.000), greater magnitudes of average 24-h systolic BP (F-criterion 5.88; p = 0.004), higher level of angiotensin I secretion (F-criterion 3.21; p = 0.045).

PP.23.215 LEFT CARDIAC GEOMETRY AND FUNCTION IN ISOLATED SYSTOLIC HYPERTENSION: INFLUENCE OF GENDER

M. Picca, F. Aogozzino. P.O. Macedonio Melloni- A.O. Fatebenefratelli E Oftalmico, Milan-Italy

Results: Some signs and factors turned out associated certainly with asymmetry character of LVH (patients with ALVH vs patients with SLVH): greater magnitudes of average 24-h systolic BP time index (F-criterion 11.4; p = 0.007), greater level of insulin secretion (F-criterion 55.1; p = 0.000), greater magnitudes of average 24-h systolic BP (F-criterion 5.88; p = 0.004), higher level of angiotensin I secretion (F-criterion 3.21; p = 0.045).

Conclusions: The phenomenon of asymmetric LV hypertrophy in the least part of the hypertensive patients is associated with greater magnitudes of average 24-h systolic BP time index (F-criterion 11.4; p = 0.007), greater level of insulin secretion (F-criterion 55.1; p = 0.000), greater magnitudes of average 24-h systolic BP (F-criterion 5.88; p = 0.004), higher level of angiotensin I secretion (F-criterion 3.21; p = 0.045).

Conclusions: According to other studies, the relation between LVH and endothelial dysfunction is present only in male hypertensive patients, influenced by age and long standing arterial hypertension. Global LVH is better related to peripheral parameters of endothelial dysfunction, LV geometry to central endothelial component. So, endothelial dysfunction can be involved in LVH development or both dysfunctional endothelium and LVH are markers for severe hypertensive disease.
Background: Concentric left ventricular hypertrophy (CLVH), an increased LV mass (M) and low myocardial contractility have been considered prognostically significant cardiovascular abnormalities. Aim: Aim of this study was to compare the effect of manidipine (Ma) and amlopidine (Am) on LVM and function in patients (pts) with untreated essential hypertension (EH) and CLVH.

Design and Methods: 50 pts with newly diagnosed untreated, grade 1 or 2 EH were recruited. Of these a total of 24 pts (14 men and 10 women, mean age 52 ± 8 years) with the geometric pattern of CLVH (LVM index ≥ 51 g/m² ± relative wall thickness ≥ 0.44) on echocardiographic assessment were admitted to the study. Pts were randomly assigned to treatment groups in a double-blind fashion. 12 pts received Ma 10 to 20 mg/day and 12 received Am 5 to 10 mg/day. Doppler echo-cardiograms were obtained in each pt before treatment, at the time of initial blood pressure (BP) control (i.e. sitting BP <140/90 mmHg) and then after 6 months.

Results: In the Ma group, BP control was obtained with Ba 10 mg/day in 6/12 pts and with Ma 20 mg/day in 6/12 pts. In the Am group, BP control was achieved with Am 5 mg/day in 5/12 pts and with Am 10 mg/day in 7/12 pts. In the Ma-treated group, BP decreased from 157/94 mmHg to 133/78 mmHg (p < 0.001) after 6 months of treatment. In the Am-treated group, BP decreased from 157/94 ± 6.65 to 134/86 ± 6.87 (p < 0.001) after 6 months. A significant reduction (p < 0.01) in LVM index was observed in both the Ma group (from 54.6 ± 5.6 to 49.3 ± 4.9 g/m²) and the Am group (from 54.6 ± 5.6 to 50.4 ± 5.4 g/m²). The predicted midwall fractional shortening improved significantly in both the Ma group (from 85.1 ± 6 to 91 ± 7%, p < 0.05) and the Am group (from 83.8 ± 7 to 90 ± 8%, p < 0.05). Similarly the E/A ratio improved significantly in both the Ma (from 0.81 ± 0.7 to 0.86 ± 0.5, p < 0.05) and the Am group (from 0.80 ± 0.6 to 0.87 ± 0.5, p < 0.05).

Conclusions: These results indicate that Ma is as effective as Am in reducing LVM index in hypertensive pts with CLVH. This effect is associated with improvement in midwall systolic performance and LV diastolic function.

Conclusions: Only a few small studies have examined the effects of blocking the RAS in patients with aortic valve stenosis, a common condition in high-risk cardiovascular patients. However, these drugs are generally considered contraindicated in valvular stenosis, due to a proposed high risk of hypotensive complications. We examined the evidence in support of this view.

Design and Method: Structured systematic literature search up to January 7, 2010, including patients with aortic valve stenosis and systemic treatment with angiotensin converting enzyme (ACE) inhibitors or angiotensin receptor blockers.

Results: We identified 73 publications, of which 7 fulfilled the entry criteria. The studies examined ACE inhibitors only. In 2 studies, invasive hemodynamic monitoring during 40°CQ48h was also performed. Drug tolerability was high in all controlled and uncontrolled studies. Acute tolerability predicted long term tolerability. Marked systolic hypotension (< 100 mm Hg), in particular with severe aortic valve stenosis, depressed left ventricular systolic function, or advanced heart failure, predicted lower tolerability. Drug treatment improved hemodynamics (e.g. cardiac output, pulmonary capillary wedge pressure) in several studies. Clinical symptoms were unchanged or improved (e.g., New York Heart Association class 6 min walk test) in the studies where this was reported.
Conclusions: QT intervals, T wave variables and ventricular arrhythmia risk are higher in aging compared to adult hypertensive patients.

**PP.23.221** THE ANTIHYPERTENSIVE TREATMENT-MEDIATED IMPROVEMENT OF LEFT VENTRICULAR DIASTOLIC FUNCTION IS RELECTED IN EXERCISE ELECTROCARDIOGRAM AS REDUCED PREVALENCE OF HUMP SIGN AND OF FALSE POSITIVE RESULTS

C. Liakos1, A. Michailidou1, G. Vysoulis1, E. Chatzistamatiou1, A. Syntos1, A. Tsokanis1, I. Giatroulakos1, A. Bratsas1, M. Markou1, C. Stefanadis1. 11th Cardiology Department, Athens University Medical School, Hippokration Hospital, N1521, Athens-Greece. 11th Department of Internal Medicine, 417 Va Hospital (Nimts), 11521, Athens-Greece.

Objective: Exercise electrocardiographic hump sign (Figure A) has been associated with uncontrolled arterial hypertension (AH), left ventricular (LV) diastolic dysfunction and false positive exercise tests (ET). The aim of this study was to evaluate the antihypertensive treatment effect on hump sign and on exercise pseudo-ischemic ST depression and potential correlations to LV diastolic function and mass changes.

Results: Prevalence of hump was reduced from 69.5 to 23.7% and false positive ETs from 35.6 to 18.6% (p = 0.01). Calcium blockers were more effective than angiotensin receptor blockers (disappearance of hump in 69.2 vs. 42.5% and of ST depression in 30.8 vs. 22.5% of patients respectively - p < 0.05). Significant (p < 0.05) improvement was found in E/A’ (from 0.68 to 0.84), E/ E’ (from 9.3 to 7.9) and LVMi (from 109.2 to 99.8 g/m²). Changes in hump were related to ST depression changes (r = 0.632, p < 0.001) and to LV diastolic indices changes: patients with hump only at 1st ET (54.2%) improved E/A and E/A’ while patients with hump only at 2nd ET (85.5%) worsened diastolic indices with similar changes in LVMi.

Conclusions: Antihypertensive treatment reduces the prevalence of hump sign and exercise pseudo-ischemic ST depression through an improvement in LV diastolic function.

**PP.23.222** BLOOD FLOW VELOCITIES IN THE DISTAL SEGMENT OF THE LEFT ANTERIOR DESCENDING CORONARY ARTERY IN ARTERIAL HYPERTENSION PATIENTS WITH LEFT VENTRICULAR HYPERTROPHY

E. Pavlyukova, R. Karpov. Institute of Cardiology, Tomsk-Russia

The aim of the study was to assess the velocities of blood flow in proximal and in distal segment of left anterior descending (LAD) coronary artery in arterial hypertension (AH) patients with left ventricular hypertrophy (LVH).

Material and Methods: The study was performed in 56 AH patients with concentric LVH. Twenty eight patients had angiographically normal coronary arteries (22 men, aged 51.4 ± 8.9 years, left ventricular mass (LVM) 359.8 ± 91.4 g and blood pressure level 166.2 ± 2.4/98.2 ± 2.1 mm Hg). Twenty eight patients had stenosis greater than ≥ 50% of proximal segment of LAD coronary artery (25 men, aged 55.8 ± 4.7 years, LVM 389.2 ± 4.2 g and BP level 178.2 ± 4.4/102.4 ± 5.1 mm Hg). Two weeks prior to the study the patients did not receive any antihypertensive therapy except clonidine or captopril (25 mg) when necessary. Coronary flow velocities in proximal and distal segments of LAD artery were assessed by transonic method on Vivid 7 Dimension (GE Healthcare). Proximal and distal segments of LAD coronary artery visualized in a modified apical position. Velocity time integral (VTI), maximal velocity (Vmax), mean velocity (Vmean) of blood flows during systole and diastole, velocity ratio during diastole to velocity ratio during systole were calculated (Vmax dias/Vmax syst Vmean dias/ Vmean syst).

Results: Statistically significant differences of VTI, Vmax, Vmean in diastole and in systole in the proximal segment of LAD coronary artery between LVH patients with normal coronary arteries and patients with significant stenosis of LAD artery were not revealed. Peak and mean velocities of blood flow during systole of distal LAD coronary artery were higher in patients with significant stenosis of LAD artery as compared to patients with normal LAD coronary artery (Vmax: 19.8 ± 6.7 cm/s vs 12.4 ± 2.1 cm/s; p = 0.01; Vmean: 15.5 ± 5.6 cm/s vs 9.1 ± 1.84 cm/s; p = 0.02). In LHV patients who had coronary artery disease the ratio Vmax dias/Vmax syst in distal segment of LAD artery is less then 2.0, and the ratio Vmin dias/Vmin syst is less then 1.8. Sensitivity, specificity and diagnostic accuracy of the ratio Vmax dias/Vmax syst < 2.0 in the distal segment of LAD artery were 70.83%, 100% and 81.81% correspondingly, and for Vmin dias/Vmin syst < 1.8 – 82.61%, 100% and 90.62% correspondingly for detection the presence of angiography normal LAD coronary arteries.

Conclusions: Trans Hawthorn Doppler Echocardiography is a useful noninvasive method to detect presence or absence of significant LAD stenosis in AH patients with concentric LVH.

**PP.23.223** EXTERNAL COUNTERPULSATION IN ARTERIAL HYPERTENSION COMBINED WITH ST ELEVATION MYOCARDIAL INFARCTION

A. Vasilev, V. Ryabov, V. Markov, R. Karpov. Institution of Ram of Scientific Research Institute of Cardiology, Tomsk-Russia

Aim: To estimate the influence of combined use of external counterpulsation (ECCP) and accelerated method of thrombolytic therapy (TLT) in patients with arterial hypertension (AH) and ST elevation myocardial infarction (STEMI).

Design and Methods: In open comparative randomized prospective study 51 patients with STEMI were included during the first 12 hours after the onset of STEMI. All patients received TLT by intravenous infusion of streptokinase 750000 IU during 10 minutes. The patients were randomized in 2 groups. The patients of the 1st group (n = 26) received 30-minute session of ECCP and TLT. The patients of the 2nd group (n = 25) received only TLT. In the absence of indirect signs of myocardial reperfusion of infarct-related artery (IRA) for 90 minutes rescue angioplasty (PCI) of IRA was performed. All patients received standard treatment of STEMI and AH.

Results: Both groups were comparable in terms of clinical and anamnestic characteristics. The median age of the patients of the 1st group was 58.2 ± 8.8 years old and 56.9 ± 10.1 years old for the patients of the 2nd group (p = 0.62). Recanalization of IRA was obtained in all patients (100%) of the 1st group and in 18 patients (72%) of the 2nd group (p = 0.003). The time of reperfusion in the 1st group (35.7 ± 24.7 min) was less than in the 2nd group (81.6 ± 20 min) (p = 0.000001). There were 22 patients with AH in the 1st group (84.6%) and 22 patients in the 2nd group (88%) (p = 0.72). Calcium channel blockers (CCBs) in the first week after STEMI were used in 5 patients of the 1st group (19.2%) and in 2 patients of the 2nd group (8%) (p = 0.24), angiotensin converting enzyme (ACE) inhibitors were administered to 20 patients of the 1st group (76.9%) and 18 patients the 2nd group (72%) (p = 0.68). CCBs in the 2nd week after STEMI were used in 7 patients of the 1st group (26.9%) and in 2 patients of the 2nd group (9%) (p = 0.11), ACE inhibitors were administered to 22 patients of the 1st group (84.6%) and 16 patients the 2nd group (72%) (p = 0.31). Beta-blockers were used on the 1st and 2nd week after STEMI in the 1st (25 patients (96.1%)) and in the 2nd (18 patients (72%) (p = 0.01). Frequency of arterial hypotension during TLT was 23% (6 patients) in the 1st group and 64% (16 patients) in the 2nd group (p = 0.003). Analysis of endpoints showed no deaths in the 1st group and 3 deaths (12%) in the 2nd group (p = 0.06). Hemorrhagic stroke developed in 1 case (4%) only in the 2nd group (p = 0.3). Ischemic strokes were absent in both groups.

Conclusion: Combination of ECCP and TLT is effective and safe method of reperfusion in patients with STEMI and AH which accelerates the time of reperfusion of IRA and decreases frequency of development of arterial hypotension during TLT.

**PP.23.224** CHANGES OF APPROPRIATENESS OF LEFT VENTRICULAR MASS DURING ANTIHYPERTENSIVE TREATMENT

S. Villevalde, A. Safarova, M. Vorobyeva, Z. Kobalava. Russian Peoples Friendship University, Moscow-Russia

Objective: Inappropriately high left ventricular mass (LVM) is the value of LVM exceeding individual needs to compensate hemodynamic load. Changes in the appropriateness of LVM from baseline to follow-up during treatment have a prognostic value; predict the risk of cardiovascular events in essential hypertensive patients regardless of the criteria for left ventricular hypertrophy.
phy (LVH). The aim of the study was to evaluate changes in appropriateness of LVM during antihypertensive treatment in uncomplicated hypertensive patients.

**Methods:** In 201 hypertensive pts without established cardiovascular or renal disease (90 male, 57.6 ± 5.9 years (M ± SD), BMI 29.9 ± 4.4 kg/m², 28% smokers, 11% diabetic, office BP 133 ± 7/87 ± 6 mmHg, LVM 217.3 ± 6.1 g, LVMI 113.3 ± 4.4 g/m²) LVH and appropriateness of LVM were assessed after 21 year of antihypertensive treatment with achieved BP target (< 140/90 < 130/80 mmHg in diabetic pts). Echo-LVH was defined as LVM index > 125 g/m² in men and > 110 g/m² in women. The appropriateness of LVM was calculated by the ratio of observed LVM to the value predicted for individual sex, height and stroke work at rest. The observed to predicted LVM ratio (appropriateness ratio - AR) was expressed as a percentage and inappropriate LVM was defined as AR > 128%.

**Results:** Analysis of only LVH criteria without taking into account appropriateness of LVM revealed regression of LVH in 102 (50.7%) pts. Echo-LVH persisted in 99 (49.3%) pts in spite of target BP achievement. Patients with persistent LVH (LVMI higher than LVH diagnostic criteria) were divided in 2 groups according to the appropriateness of LVM: 81 (40.3%) pts with true persistence of LVH (AR > 128%) and 18 (9.0%) pts with LVH and appropriate LVM (AR < 128%). Patients with regression of LVH (LVMI less than LVH diagnostic criteria) were also divided in 2 groups: 30 (14.9%) pts with true regression of LVH (AR > 128%) and 72 (35.8%) pts with inappropriately high LV (AR < 128%).

**Conclusions:** The hypertensive patients with inappropriately high LVM in spite of Echo-LVH regression during antihypertensive treatment should be considered as pts with residual cardiac damage. Assessment of observed to predicted LVM ratio identified 35.8% pts with residual cardiac damage in addition to pts with persistent LVH, thus increasing the proportion of pts with high cardiovascular risk. Appropriateness of LVM can be criterion of efficacy of antihypertensive treatment.

**PP.23.225**

**THE CORRELATION WITH THE RESPONSIVENESS OF THE PULSE WAVE VELOCITY relative to ACUTE BLOOD PRESSURE REDUCTION and LEFT VENTRICULAR DIASTOLIC FUNCTION**

J.K. Park1, J.H. Shin1, S.H. Kim2, Y.H. Lim1, J.H. Shin1, J.U. Lee2, K.H. Kim1, S.K. Kim, J.H. Kim1, H.K. Lim1, Hanyang University Medical Center, Seoul-South Korea, 2Hanyang University Guri Hospital, Guri-South Korea

**Objective:** There are some studies using pulse wave velocity (PWV) to detect the relationship between arterial stiffness and left ventricular diastolic function. However, pulse wave velocity is quite affected by blood pressure (BP) and it is more in patient with stiffer artery. Therefore, the responsiveness of pulse wave velocity relative to acute blood pressure reduction (ΔPWV/ΔBP) may be also available parameter. The aim of this study is to know the correlation between ΔPWV/ΔBP and left ventricular diastolic function using brachial-ankle pulse wave velocity (baPWV) and sublingual administration of nitroglycerin (NTG).

**Design and Methods:** Thirty-five consecutive male patients with risk factor of coronary artery disease, admitted to Hanyang University Medical Center between July 2010 and September 2010, were included. We measured the changes of BP and baPWV before and after the administration of NTG and performed transthoracic echocardiogram. We analyzed the correlation between initial baPWV, ΔbaPWV/ΔBP and left ventricular diastolic parameters.

**Results:** After administration of sublingual NTG, BP, heart rate and PWV were significantly changed (ΔSBP, ΔMBP, ADBP, ΔHR and ΔbaPWV, 9.77 ± 6.49, 11.74 ± 5.28, 9.99 ± 5.41 mmHg, 5.94 ± 5.44 beats/min and 323.97 ± 159.87 cm/sec, respectively, p < 0.001). But, PP was not (ΔPP = 0.21 ± 5.86 mmHg, p = 0.830). The ΔbaPWV was significantly correlated with ΔSBP and ΔMBP (r = 0.527, p < 0.001 and r = 0.639, p < 0.001), but not with ADBP, ΔHR and ΔPP (r = 0.276, r = 0.329 and r = 0.109, p = 0.048 and p = 0.535, respectively). The ΔbaPWV/ΔMBP was positively correlated with ΔE/E’ ratio (r = 0.391, p < 0.05), but not with regional wall thickness (RWT), left ventricular mass index (LVMI), iso- volumetric relaxation time (IVR), deceleration time (DT), E wave velocity (E), A wave velocity (A), E/A ratio and E’ wave velocity (r = 0.214, 0.097, 0.094, 0.164, 0.240, 0.103 and -0.270, p = 0.61, 0.27, 0.62, 0.63, 0.40, 0.21, 0.60 and 0.16, respectively). Initial baPWV was negatively correlated with E wave velocity (r = -0.617, p < 0.01), but not with RWT, LVMI, IVRT, DT, E, A, E/A ratio and E/E’ ratio (r = 0.255, 0.183, 0.181, -0.104, 0.284, -0.233, -0.341 and 0.199, p = 0.17, 0.35, 0.36, 0.60, 0.14, 0.22, 0.07 and 0.30, respectively).

**Conclusion:** The responsiveness of baPWV relative to acute BP reduction (ΔbaPWV/ΔBP) was correlated with tissue Doppler imaging-detected left ventricular diastolic function. The ΔbaPWV/ΔBP was more correlated with E/E’ ratio than baPWV itself, but not with E- wave velocity in male.

**PP.23.226**

**PREDICTORS OF 90 DAY MORTALITY IN PATIENTS WITH HYPERTENSION WHO PRESENT WITH ST-SEGMENT ELEVATION MYOCARDIAL INFARCTION**


**Background:** Hypertensive patients who present with acute ST-elevation myocardial infarction (STEMI) are known to have poorer clinical outcomes. However there is limited data in the Asian population.

**Aim:** To compare the 90-day mortality of STEMI patients with and without hypertension undergoing primary PCI.

**Methods:** Retrospective analysis based on single centre STEMI registry from 2006-2009. Baseline characteristics and clinical course during hospitalisation and 90 day mortality data of 942 patients were collected and analysed.

**Results:** Total of 461 (48.9%) patients with STEMI had a history of hypertension in our registry. There were statistically significant differences between the 2 groups. Hypertensive patients had higher prevalence of Diabetes Mellitus (42.3% vs 24.7%, p < 0.001), chronic renal impairment (4.3% vs 0.6%, p < 0.001), presented with higher Killip class (p = 0.001) and were more likely to have triple vessel disease (TVD) (28.0% vs 19.5%, P = 0.02). They have higher inpatient mortality (8.5% vs 4.8%, P = 0.023) and higher 90-day mortality (9.5% vs 5.0%, p = 0.009). After logistic regression model analysis underlying TVD, Killip class and Left Ventricular Ejection Fraction (LVEF) below 40% and hyperlipidaemia were strong independent predictors of 90-day mortality.

**Conclusions:** In our multicultural Asian population who presented with STEMI, hypertension is associated with worse clinical outcomes. Presence of TVD, poor Killip class, LVEF below 40% and hyperlipidaemia on presentation were independent predictors of mortality at 90days.

**PP.23.227**

**EVALUATION CONTRACTILE RESERVE FREE WALL OF THE LEFT VENTRICLE USING Postural TEST IN SELECTION OF PATIENTS FOR CARDIAC RESYNCHRONIZATION THERAPY**

M. Zlobina1, E. Kaygoriesova2. 1. Research Institute of Cardiology, Tomsk-Russia, 2Siberian State Medical University, Tomsk-Russia

**Aim:** of the study was to explore the possibility of antioorthostatic load test to assess the contractile reserve of the free wall of the left ventricle in patients with congestive heart failure.

**Materials and Methods:** The study included 24 people in the age of 54 ± 10.2 years. All patients had heart failure functional class III NYHA; 11 person group included dilated cardiomyopathy (DCM), 13 people - a group of ischemic cardiomyopathy (ICMP). All patients should have coronary angiography for verification of ischemic heart disease. The results of the effectiveness of CRT was evaluated after 5-7 days and 12 months after implantation of biventricular stimulator. As a test, with a passive load volume using a modified version of AOT (lifting the legs to 45° for 5 minutes). Local contractile reserve was studied by assessing the dynamics of systolic myocardial velocity (SMV) by pulsed-wave tissue Doppler. In the initial state and at the peak of the study also estimated all of the standard echocardiographic indices. Before and after biventricular stimulation was determined by exercise tolerance with the use of standard test with a 6-minute walk.

**Results:** Initially the group ICMP and DCMP significantly differed anterior-posterior size of the right ventricle to the rest of the studied echocardiographic parameters significant differences were found. During AOT patients DCMP end-diastolic left ventricular volume (LVV) were not significantly altered in patients ICMP EDV tended to increase, rates of contractile and pump function of left ventricle (LV) was not significantly changed; SMV free wall of LV tended to increase in both groups, there was a statistically significant increase in LV contractile state in the form of higher index of contractility. We divided the patients with DCMP and ICMP into 2 subgroups: with positive - Group A and a negative inotropic response - group B. The main criterion for separating patients on inotropic response been a significant increase of LV contractility index, the increase

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in SMV free wall of LV during a test with a passive load capacity. In group B had higher value end-diastolic pressure of LV (p = 0.004), lowest SMV of free wall. This group is characterized by a low contractility index 1 ± 0.5, while in group A, 1.8 ± 0.6, respectively. Groups A and B differed significantly in systolic velocity of the tricuspid valve annulus (SRV). There was a high correlation between SMV free wall LV and SRV r = 0.7 (p = 0.01). In patients of group A was observed most marked improvement in hemodynamic parameters after CRT, the ejection fraction EF increased by 42%, end systolic volume of LV (ESV) decreased by 25%, SMV free wall increased by 40%, a distance of 6-minute walk increased from 240 ± 110 to 328 ± 105 m in group B against CRT EF increased by 17%. ESV has decreased only by 9%, SMV free wall increased by 18%, a distance of 6-minute walk increased from 225 ± 110 to 265 ± 105m. The effect of CRT was significantly proved for patients with dilated cardiomyopathy, and for patients with ischemic myocardial damage (p = 0.05). However, the group ICMP noted less pronounced increase in LVEF in the background of the CRT. It should be noted the significance rate of LV contractility index, which can be independent if a dynamic study of left ventricular function.

**Conclusions:**
1. Passive load capacity during the AOT is gentle and quite informative method for assessing the functional reserves of the left ventricle in patients with DCMP and the ICMP. 2. The positive isotropic response to a passive load up to CRT in the form of increased SMV free wall and increase the contractility index LV, can be an indicator of relatively rapid improvement in hemodynamic parameters after CRT. 3. Reducing SRV less than 11cm/s may serve as indirect signs of exhaustion contractile reserve of left ventricular free wall.

### PP23.228 RELATIONSHIP BETWEEN THE REPOLARIZATION DISPERSION AND LEFT VENTRICULAR MUSCLE MASS IN ELITE ATHLETES AND IN SEDENTARY HEALTHY MEN


**Objective:** Sudden death in young athletes is a rare but tragic event. Most of these sudden deaths are due to underlying and undiagnosed cardiac dysfunction. The measurement of repolarization dispersion in the surface electrocardiogram is frequently mentioned as a prognostic factor and as a predictor of cardiac abnormalities. The aim of this study was to analyze the repolarization dispersion (QT dispersion and transmural dispersion: Tpeak-Tend) in elite men athletes and in sedentary, healthy young men.

**Design and Methods:** We studied 34 athletes (18 elite triathlonist and 16 professional ball-game players) and 15 healthy non-athletes. The echocardiogram were performed according to the recommendation of the American Society of Echocardiography. Left ventricular measurements from the two-dimensionally guided M-mode were made from 5 consecutive heart cycles and we calculated the left ventricular mass. We calculated the LVM for BSA3/2. Statistical guided M-mode were made from 5 consecutive heart cycles and we calculated the LVM for BSA3/2.

**Results:**
- **Endurance athletes:**
  - LV mass: 184±30 g
  - SRV: 1.1±0.2 m/s
  - LVH: 24%
- **Healthy sedentary athletes:**
  - LV mass: 130±20 g
  - SRV: 1.3±0.2 m/s
  - LVH: 6%

**Conclusions:** In patients with hypertension, electrocardiographic abnormalities are most commonly associated with CVD, underscoring the Atrial fibrillation and left ventricular hypertrophy (LVH). The measurement of QT dispersion may be an informative method for assessing the functional reserves of the left ventricle and can be independent if a dynamic study of left ventricular function.

### PP23.230 ASSESSMENT OF LEFT VENTRICULAR PRESSURE-VOLUME RELATIONSHIP IN EXTREME ENVIRONMENT: VALIDATION OF A NEW NON INVASIVE TOOL

F. Faita1, S. Rimoldi2, E. Rexpoëj1, D. Hutter2, E. Bianchini1, V. Gemignani1, T. Bombardini1, U. Scherrer3, C. Sartori1, L. Pratali1. 1 Institute of Clinical Physiology - Italian National Research Council, Pisa, Italy; 2University Hospital of Bern, Cardiology, Bern-Switzerland; 3Department of Internal Medicine and Bommar Center for Clinical Research, Lausanne-Switzerland

**Background:** The pressure-volume relationship (PVR) is an useful method for evaluating left ventricular myocardial contractility and 2-D stress echo-ecardiography can be considered a non invasive approach in this assessment. However, this method requires high quality ultrasound equipment that could be a limiting factor in logistically hostile environments. Aim of this study was to evaluate the feasibility of the PVR measurement by an accelerometer sensor (Institute of Clinical Physiology, Pisa, Italy), and to compare its results against exercise stress echo in extreme environments.

**Methods:** 14 male healthy volunteers (C) (mean age 48 ± 7 yrs) and 24 male subjects with chronic mountain sickness (CMS) (mean age 54 ± 9 yrs) born and permanently living in La Paz (3600-4000 m) were enrolled in the study. They underwent a mild semi-supine bicycle exercise (up to 50 watts), 2D echo left ventricular end-systolic volumes (ESV) together with systolic cuff pressure (SP) were measured at rest and peak of stress. PVR was defined as the SP/ESV index.
differences between rest and peak. The amplitude of the vibration due to isovolumic myocardium contraction was then obtained with the new sensor recording systolic force (SF) for each cardiac beat. The curve of force variation as a function of time was finally computed. The relationship between SF and SP/ESV index ratio as delta % rest-peak values was evaluated.

Results: During the mild exercise the double product was not different in the two groups (C 163±9 vs 1278±6 mmHg*pm vs CMS pts 1777±8 3954±6 mmHg*pm, p = ns) There are no differences in SP/ESV between C and CMS at rest and peak of stress (rest C 4.33 ± 0.68 mmHg/ml vs CMS pts 4.26 ± 1.57 mmHg/ml, p = ns; peak C 5.94 ± 1.20 mmHg/ml vs CMS pts 5.94 ± 1.23 mmHg/ml, p = ns). An overall good correlation (R = 0.397, p = 0.002) has been obtained between maximal delta % rest-peak SF and SP/ESV, respectively.

Conclusions: The new proposed system, based on accelerometer sensor, allows a reliable and simple assessment of PVR even in extreme environment and should be considered a valid alternative to stress echo.

EISOPROTERENOL-INDUCED CARDIAC HYPERTROPHY IS PRECEDED BY AN OVEREXPRESSION OF CARDIOMYOCYTE GROWTH FACTORS IN VIVO

P. Krenek, L. Pavickova, H.Cermacka, K. Turcikova, M. Olvedy, J. Klimes, P. Ochondnicky, B. Gajdavcova, A. Adamova, J. Kyselovic. Faculty of Pharmacy, Comenius University, Bratislava-Slovak Republic.

Objective: Catecholamines can increase the expression of growth factors in several cardiac cell types in vitro. We tested the hypothesis that growth factors could mediate isoproterenol-induced cardiac hypertrophy in vivo.

Design and Methods: Adult male Wistar rats were administered isoproterenol (5 mg/kg, i.p., n = 7 per group). Control group received no treatment. Rats were sacrificed 0.1, 1, 2, 4, and 24 h after isoproterenol administration.

Total RNA isolated from left ventricles, reverse-transcribed and subjected to real-time PCR analysis using gene-specific primers for cardiomycocyte growth factors endothelin-1 (ET-1), transforming growth factor beta1 (TGF-β1), interleukin-6 (IL-6), cardioprotein-1 (CT-1). Atrial natriuretic peptide was used as a marker of cardiac hypertrophy.

Results: Relative left ventricular weight increased by 13% within 24 hours after isoproterenol administration (P < 0.05). In the left ventricle, interleukin-6 mRNA was upregulated 20-fold already after 30 minutes, peaking after 2 hours (1200-fold) and remaining elevated 9-fold 24 hours after stimulation (P < 0.05). Levels of ET-1 mRNA increased threefold after 4 hours (P < 0.05) and declined to control levels within 24 h. TGF-β1 mRNA levels began to rise after 4 hours and were upregulated over twofold after 24 hours (P < 0.05). CT-1 mRNA levels did not change at any time examined. A clear, 20-fold upregulation of ANF accompanied the increased left ventricular weight after 24 hours.

Conclusions: Isoproterenol increased left ventricular mass already after 24 hours, and this was associated with an overexpression of the cardiac hypertrophy marker ANP. Interleukin-6, endothelin-1, transforming growth factor b–1, but not cardioprotein-1 could contribute to the rapid onset of isoproterenol-induced cardiac hypertrophy in the rat in vivo. The project was supported by: VEGA 1/0357/09, 1/0377/09, 1/0707/09, 1/1090/08.

EISOPROTERENOL-INDUCED CARDIAC HYPERTROPHY IS PRECEDED BY AN OVEREXPRESSION OF CARDIOMYOCYTE GROWTH FACTORS IN VIVO


Objective: Catecholamines can increase the expression of growth factors in several cardiac cell types in vitro. We tested the hypothesis that growth factors could mediate isoproterenol-induced cardiac hypertrophy in vivo.

Design and Methods: Adult male Wistar rats were administered isoproterenol (5 mg/kg, i.p., n = 7 per group). Control group received no treatment. Rats were sacrificed 0.1, 1, 2, 4, and 24 h after isoproterenol administration.

Total RNA isolated from left ventricles, reverse-transcribed and subjected to real-time PCR analysis using gene-specific primers for cardiomycocyte growth factors endothelin-1 (ET-1), transforming growth factor beta1 (TGF-β1), interleukin-6 (IL-6), cardioprotein-1 (CT-1). Atrial natriuretic peptide was used as a marker of cardiac hypertrophy.

Results: Relative left ventricular weight increased by 13% within 24 hours after isoproterenol administration (P < 0.05). In the left ventricle, interleukin-6 mRNA was upregulated 20-fold already after 30 minutes, peaking after 2 hours (1200-fold) and remaining elevated 9-fold 24 hours after stimulation (P < 0.05). Levels of ET-1 mRNA increased threefold after 4 hours (P < 0.05) and declined to control levels within 24 h. TGF-β1 mRNA levels began to rise after 4 hours and were upregulated over twofold after 24 hours (P < 0.05). CT-1 mRNA levels did not change at any time examined. A clear, 20-fold upregulation of ANF accompanied the increased left ventricular weight after 24 hours.

Conclusions: Isoproterenol increased left ventricular mass already after 24 hours, and this was associated with an overexpression of the cardiac hypertrophy marker ANP. Interleukin-6, endothelin-1, transforming growth factor b–1, but not cardioprotein-1 could contribute to the rapid onset of isoproterenol-induced cardiac hypertrophy in the rat in vivo. The project was supported by: VEGA 1/0357/09, 1/0377/09, 1/0707/09, 1/1090/08.
Results: Dipper blood pressure pattern was found in 63 (55%) MS subjects, while non-dipper pattern was present in 52 (45%) MS subjects. The E/e’ ratio was higher in non-dippers (14.58 ± 4.58 vs. 11.02 ± 3.23, p < 0.001), as well as the LV Tei index (0.69 ± 0.18 vs. 0.51 ± 0.13 vs < 0.001), and LV mass index (46.91 ± 8.91 vs. 42.12 ± 6.72 g/m², p = 0.001). Multiple logistic regression showed that non-dipper pattern (OR 4.12, 95% CI:1.66-9.45, p < 0.001), higher glucose level (OR 2.67, 95% CI:1.19-6.87, p = 0.009) and abdominal obesity (OR 1.87, 95% CI:1.02-7.16, p = 0.037) were independent predictors of LV diastolic dysfunction (E/e’ > 15) in MS. Same analysis revealed that non-dipper pattern (OR 6.28, 95% CI:2.03-10.05, p < 0.001) and abdominal obesity (OR 2.91, 95% CI:1.32-5.61, p = 0.004) were independent predictors of LVH in MS subjects.

Conclusions: Non-dipper blood pressure pattern significantly deteriorates LV structure, diastolic and global function in subject with MS, and represents one of independent predictors of LV diastolic dysfunction and hypertrophy.

PP.23.235 | LEFT VENTRICULAR HYPERTROPHY INHIBITION IN EXPERIMENTAL HYPERTENSION

H. Gómez Llambr*, D. Suárez, G. Ottaviano, A. Müller, N. Paglia, M. Otero Losada, J. Milei. Instituto De Investigaciones Cardiológicas (Inicina) Uba-Conicet, Buenos Aires-Argentina

Left ventricular hypertrophy (LVH) has been regarded as a protective physiological mechanism in experimental hypertension.

Objective: To evaluate if LVH could be inhibited by chronic antihypertensive treatment.

Design and Method: Male spontaneously hypertensive rats (SHR) were treated with either losartan 30mg/kg (L), hydralazine 11mg/kg (H), rosuvastatin 10 mg/kg (R) (n = 18 each group) or carvedilol 20 mg/kg (C, n = 16) for 16 months per os. Untreated hypertensive (SHR) and normotensive (Wistar Kyoto, WKY) groups (n = 18 each) were included as respective controls for treatment and hypertensive Measures (awake animals). 1). Systolic blood pressure (SBP) was periodically measured by tail plethysmography. 2). Echocardiograms (Aloka 550, 7.5 Mhz transducer) were obtained at basal and at 6, 12 and 16 months of treatment. Diastolic (DD) and systolic diameters (SD), shortening fraction (SF), septal diastolic thickness (ST), posterior dia- stolic thickness, heart rate (HR), left ventricular mass (LVM), LVM corrected for body weight (LVM/BW), systolic volume (SV), left ventricular diastolic and systolic volumes (LVDV, LVSV respectively), cardiac output (CO) and ejection fraction (EF) were recorded. Euthanasia was practiced at the end of month 16. Left ventricular weights (LVMW) were obtained and they were cor- rected for BW (LVMW/BW).

Results: Groups were indistinguishable according with BW. SBP values were (mmHg): 154 ± 3 (L), 157 ± 1 (H), 190 ± 3 (R*), 206 ± 3 (SHR*), 183 ± 1 (C*), 141 ± 1 (WKY). Cardiac contractile parameters were depressed in SHR and R compared to L, H and WKY groups. Surprisingly high SBP values were (C)

Conclusions: Carvedilol successfully prevented LVH in SHR. Factors other than hypertension are suggested to participate in the development of LVH in SHR. Blockade of catecholamines receptors may be suggested as the main mechanism, while the antioxidant and other properties of carvedilol deserve further studies.

PP.23.236 | CORRELATIONS BETWEEN P-HIRES AND ECHOCARDIOGRAPHIC PARAMETERS OF FILLING PRESSURE IN HYPERTENSIVE PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

D. Toader, E. Belu, R. Radu, M. Popescu, R. Musetescu, D.-D. Ionescu. Craiova Cardiology Center, Craiova-Romania

Purpose: Late atrial potentials (LAP) were correlated with the risk of reentrant arrhythmias. P wave high resolution electrocardiography (P-HRes) is a method identical to ventricular SAECG, for atrial fibrillation risk evaluation: it also uses Frank leads X, Y, Z. This method reveals low amplitude potentials (qV) – LAP, which are present at the end of P wave representing late depolarization of atrial myocardium (areas with slow conduction) were reentrant arrhythmias can start. P-HRes parameters are: signal averaged P wave duration – SAPWD, root mean square – RMS40, integral of P wave. An increased filling pressure during acute phase of myocardial infarction may lead to damage of left atrium and reentry arrhythmias. Aim of the study was to find a correlation between an increased filling pressure during acute phase of myocardial infarction and reentry arrhythmias

Methods: A number of 98 hypertensive patients (56 males and 43 females), admitted with acute myocardial infarction with ST-segment elevation were evaluated during the first week of hospitalization by: clinical examination, 12 lead standard ECG, mitral inflow and pulmonary venous inflow measure- ment using Doppler echocardiography, tissue Doppler echocardiography at lateral and medial corner of mitral annulus, color Mmode echocardiography. E/E’ ratio, E/vp ratio and ar-A duration were calculated. For P-HRes measurements we used a Helwet Packard device; criterias for late atrial potentials were: SAPWD > 140ms, RMS40 > 3,5μV, integral of Prwave > 800μV, number of aver- aged beats: 250, filters: 25-40 MHz, noise level < 0,1 μV (target). The second evaluation was made after one year.

Results: using chi squared (CS), odd ratio (OR) and relative risk (RR) statisti- cally significant correlations were found between the presence of LAP and: E/E’ > 14, E/vp > 1,5, ar-A duration > 25ms during the first week after acute myocardial infarction and at the second evaluation, after one year.

Conclusions: 1. P-HRes parameters of LAP were correlated with echocar- diographic parameters of filling pressure during acute phase of myocardial infarction and after one year in hypertensive patients. 2. This may reveal a link between an increased filling pressure and damage of left atrium which may lead to reentry arrhythmias in hypertensive patients with myocardial infarction.

Objective: Aortic valve calcification (AVC) is a marker of aging and valvular dysfunction. This study aims to evaluate hypertension as a predictor of aortic valve calcification in patients (P) without significant aortic stenosis.

Design and Methods: Retrospective study of 144 consecutive P who underwent cardiac MDCT (Phillips Brilliance, 16-slices): 37.5% men, 62 ± 13 years, 23.6% diabetics, 79.2% hypertensive, 52.1% with dyslipidemia and 41% with chronic kidney failure. Aortic valve calcium score (AC) was measured with a workstation (Aquarius 3D, TeraRecon) using the same method as for coronary calcium score. P were divided into 2 groups: Group AC (+) (AC≥1.21, 61.1%) and Group AC- (AC = 0.38%, 98.9%), and were then compared regarding demographics, cardiovascular risk factors (CRF) and analytical parameters.

Results: P from AC + were older (68 ± 10 vs 53 ± 11 years, p < 0.001), presented higher systolic blood pressure (SBP: 144 ± 22 vs 133 ± 22mmHg, p = 0.005), pulse pressure (PP: 71 ± 23 vs 55 ± 18mmHg, p < 0.001) and prevalence of renal impairment (Stages: I - 30.5% vs 56.1%, II – 49.2% vs 38.8%, p = 0.005), pulse pressure (PP: 71 ± 23 vs 55 ± 18mmHg, p < 0.001) and prevalence of renal impairment (Stages: I - 30.5% vs 56.1%, II – 49.2% vs 38.8%, p = 0.005), pulse pressure (PP: 71.1± 23 vs 55.1 ± 18mmHg, p < 0.001) and prevalence of renal impairment (Stages: I - 30.5% vs 56.1%, II – 49.2% vs 38.8%, p = 0.005) were independent predictors of AVC. No differences were found concerning demographics, cardiovascular risk factors (CRF) and analytical parameters.

Conclusions: In this sample, PP and SBP were strongly associated with AVC, highlighting their major value in its pathogenesis. Age and GFR were the only independent predictors of AVC which emphasizes the main importance of the renal protection, along with blood pressure control in AVC prevention, especially when considering older P.
Background: 2D Strain Imaging (2D-SI) is a novel, angle independent technique to evaluate left ventricular strain at both the endocardial and the epicardial level. Previous studies with cardiac MRI have shown that the left ventricle contraction is non-uniform through the cardiac wall, resulting into significant contractile gradient developing from the epicardium to the endocardium. The consequence of this gradient is a deformation (i.e. shear) of the myocardium during systole which can analyzed by the combination of the different strains (longitudinal, circumferential and radial). The aim of the present study was to describe the presence of an epicardial to endocardial gradient in normal individuals and to develop a mathematical model to measure LV shear by echocardiography.

Methods: 100 normal individuals (66% women, 40 ± 12 years, age range 18-74) free of prevalent cardiovascular events, valvular disease and/or cardiac rhythm abnormality, were studied by standard echocardiography using commercially available machines. 2D-SI was obtained on all three planes (circumferential, radial and longitudinal) at both the endocardial and the epicardial level, using commercially available software (Tomtec Corporation, Germany). Left ventricular contractile gradient was obtained comparing endocardial to epicardial peak strain and expressed as percent strain. Left ventricular shear was defined as the change in angle developed by the deformation in myocardial segments caused by the interaction of systolic strains from different planes and expressed in radians (figure).

Results: Endocardial strain was higher than the epicardial strain in both the circumferential (31.0% vs 12.6%) and the longitudinal (20.8% vs 18.3%) plane. Accordingly a significant epicardial to endocardial systolic gradient could be identified in both circumferential (19.0 ± 5.6%) and in longitudinal strain (2.4 ± 1.2%). Circumferential and longitudinal gradients were significantly correlated with each other (r = 0.316; p < 0.05), and also with heart rate (r = 0.331; p < 0.05) and relative wall thickness (r = -0.303; p < 0.05). Surprisingly there was no significant difference when comparing transmural systolic gradients at the basal, mid or apical level (p = ns). Estimate of LV shear demonstrated a mean longitudinal-radial shear of 5.34 ± 0.96 rad and a mean circumferential-radial shear of 8.62 ± 0.16 rad.

Conclusions: A significant transmural gradient can be identified during systolic contraction of the normal heart characterized by higher strain at the level of the endocardium. This gradient is increases with increasing heart rate and decreases with increasing diastolic LV wall thickness. Combination of transmural gradients from different planes can be used to derive echocardiographic estimates of left ventricular shears.
POSTER SESSION

POSTER SESSION 24
RENAI AL ASPECTS

**PP.24.243**

**EFFECT OF POTASSIUM SUPPLEMENTATION ON RENAL TUBULAR FUNCTION, AMBULATORY BLOOD PRESSURE AND PULSE WAVE VELOCITY IN HEALTHY CONTROL SUBJECTS IN A RANDOMIZED, PLACEBO-CONTROLLED, CROSSOVER STUDY**

S.K. Matthesen, P.H. Gjorup, T. Larsen, T.G. Lauridsen, K.M. Nykjaer, H. Vase, E.B. Pedersen. Holstebro Hospital and Aarhus University, Holstebro-Denmark

**Background:** Potassium is the main intracellular cation ion, contributes to keeping the intracellular membrane potential slightly negative and elicits contraction of smooth, skeletal and cardiac muscle. Changes in potassium intake modify the intracellular membrane potential slightly negative and elicits contraction of smooth, skeletal and cardiac muscle. Changes in potassium intake modify both cardiovascular and renal tubular function.

**Purpose:** The purpose of the study was to investigate the effect of dietary potassium supplementation, 100 mmol daily on cardiovascular and renal tubular function in a randomized, placebo-controlled, crossover study of healthy participants during two periods of four weeks duration. The subjects received a standardized diet regarding energy requirement and sodium and water intake.

**Methods:** Ambulatory blood pressure (ABP) and applanation tonometry were used to determine the participants’ blood pressure, pulse wave velocity (PWV), augmentation index (AI) and central blood pressure (CBP). Radioimmunoassays were used for measurements of plasma concentrations of vasoactive hormones: renin (PRC), angiotensin II (Ang II), aldosterone (Aldo), atrial natriuretic peptide (ANP), vasopressin (AVP), brain natriuretic peptide (BNP) and endothelin (Endo), and urinary excretions of aquaporin 2 (AQP2), the β - fraction of the epithelial sodium channel (ENAC-β).

**Results:** AQP2 excretion and free water clearance were increased during potassium supplementation. The changes in urinary potassium excretion and urinary AQP2 excretion were significantly and positively correlated. PRC and Aldo increased. GFR, e-ENAC-β, Ang II, ANP, BNP, Endo, blood pressure, AI and PWV were not significantly changed by potassium supplementation.

**Conclusions:** Potassium supplement changed renal tubular function with increased water absorption in the distal part of the nephron. Changes in urinary potassium excretion correlated positively with changes in aquaporin 2 excretion. In spite of an increase in renin and aldosterone in plasma, blood pressure was unchanged during potassium supplement. It is hypothesized that the renal effect of potassium can be attributed to changes in the activity of WNK-kinases in the renal tubules, and the lack of blood pressure changes during potassium supplement could be explained by an antagonizing effect of increased NO production both in the vascular bed and the tubular absorption of sodium.

**PP.24.244**

**LOSARTAN DECREASES RENAL VASCULAR RESISTANCE AND INCREASES HIGH-DENSITY LIPOPROTEINS (HDL) LEVEL IN SPONTANEOUSLY HYPERTENSIVE RATS (SHR) WITH ACUTE RENAL FAILURE (ARF)**

M. Ivanov, Z. Miloradovic, N. Mihailovic-Stanojevic, J. Grujic Milanovic, D.J. Ilovic. Institute For Medical Research, Belgrade-Serbia

**Objective:** ARF and hypertension as comorbid disorders can be found frequently in intensive care unit patients. The aim of our study was to investigate effects of angiotensin II type-1 receptor blocker (ARB) losartan, on course of ARF in SHR. The attention was especially focused on renal haemodynamic and HDL level, assuming renal vasoconstriction as the main pathophysiological mechanism of ARF, and HDL protective potential in organ injury.

**Design and Method:** Experiment was performed in anesthetized, adult six-month-old male SHR. The right kidney was removed and the renal ischemia was performed by clamping the left renal artery for 40 minutes. SHR were randomly selected in three experimental groups: sham operated group (SHAM; n = 7); ARF control group (ARF; n = 9); and ARF group with losartan treatment (ARF + LOS; n = 9). Losartan (10mg/kg/bw.) was given by infusion during the period of three hours after reperfusion. Mean arterial pressure (MAP), renal blood flow (RBF), plasma creatinine (PCr) and HDL were measured 24h after reperfusion. Renal vascular resistance (RVR) was calculated dividing MAP by RBF and expressed as mmHg.min.kg./ml.

**Results:**

<table>
<thead>
<tr>
<th></th>
<th>MAP (mmHg)</th>
<th>RBF (ml/min/kg)</th>
<th>RVR (mm.Hg.min.kg./ml)</th>
<th>PCr μmol/l</th>
<th>HDL (mmol/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHAM (n=7)</td>
<td>147.1±4.54</td>
<td>20.5±4.14</td>
<td>11.32±1.92</td>
<td>32.7±3.84</td>
<td>0.6±0.03</td>
</tr>
<tr>
<td>ARF (n=9)</td>
<td>110.3±3.67</td>
<td>8.3±1.94</td>
<td>19.9±2.55</td>
<td>24.1±6.28</td>
<td>0.57±0.05</td>
</tr>
<tr>
<td>ARF + LOS (n=9)</td>
<td>52.2±4.39</td>
<td>19.3±3.29</td>
<td>8.3±1.21</td>
<td>9.9±1.55</td>
<td>0.75±0.30</td>
</tr>
</tbody>
</table>

* p < 0.05 vs. SHAM, βp < 0.05 vs. ARF, n-number of animals

**Conclusion:** Our results suggest that losartan improves renal haemodynamic and increases HDL level in ARF + LOS vs. ARF group. This implies that standard ARB treatment may have beneficial effects on renal vasconstriction, and potential protective effect in postischemic hypertensive kidney.

**PP.24.245**

**PREVALENCE AND AGREEMENT OF CLINICAL DIAGNOSIS IN RENAL DISEASE AND ITS EVALUATION BY ESTIMATED GLOMERULAR FILTRATION RATE IN HYPERTENSIVE PATIENTS**


**Objectives:** To evaluate prevalence, clinical profile and agreement between clinical diagnosis of renal disease and estimated glomerular filtration rate (eGFR) according to MDRD (Modification of diet in renal disease) in hypertensive patients.

**Design and Method:** Cross-sectional study of all hypertensive patients undergoing pharmacological treatment who visited primary care within 6th Sanitary District of Madrid during 2008. The variables were: age, sex, blood pressure (BP) and goals ( < 140/90 ), coronary heart disease (CHD), heart failure (HF), atrial fibrillation (AF), peripheral arterial disease (PAD), stroke, identified renal disease (RD), eGFR considering low if < 60 ml/min/1.73m² and normal if > 90 ml/min/1.73m² (The National Kidney Foundation-Kidney Disease Outcome Quality Initiative).

**Results:** 46.370 patients were included, 55.5% females, mean age 66.5 ± 13.8 years, 19.8% were diabetics, 38.8% dyslipidemia, 41.3% obese and 57.2% had BP controlled. The prevalence of CHD was 8.3%, HF 3.4%, AF 6.5%, stroke 5.4%, PAD 1.8% and RD 3.9%. Age, diabetes and associated clinical conditions were in group with eGFR low (p < 0.05). The low eGFR proportion was 14% (11.4% male/16.6% females) (p < 0.05). The low eGFR proportion was 14% (11.4% male/16.6% females) (p < 0.05). The low eGFR proportion was 14% (11.4% male/16.6% females) (p < 0.05). The low eGFR proportion was 14% (11.4% male/16.6% females) (p < 0.05). The low eGFR proportion was 14% (11.4% male/16.6% females) (p < 0.05).

**Conclusions:** There was infra-diagnosis of 10.4% (6.3% males/13.6% females) in relation to identified RD of 3.9% (5.1% in males/3.0% in females) (p < 0.05). The 77.5% with identified RD had eGFR low (91.9% males/85.5% females). The agreement between the clinical diagnosis of renal disease and the eGFR was fair, being better in males (Kappa 0.41/0.21).

**Conclusions:** There is a low prevalence of RD either by clinical diagnosis or by eGFR in relation to previous studies. There are gender differences between the clinical and eGFR diagnosis of RD, males are more diagnosed by clinical and females by MDRD. We must investigate whether there is a true infra-diagnosis or if there is an over-diagnosis in females by MDRD as the female factor has a lot of weight in the formula.
**Objective:** Recently, uric acid levels were described as a strong vasocostricter released from endothelial cells after stimulation with mechanical stress. In this study, we isolated and identified Up4A from kidney tissue, and we characterized the essential effects on Up4A on the afferent and efferent arterioles.

**Methods:** Porcine and human kidney tissue was fractionated by size-exclusion chromatography affinity-chromatography, anion-exchange chromatography, and reverse phase-chromatography in fractions purified to homogeneity. Up4A was identified by matrix assisted laser desorption/ionisation mass-spectrometry (MALDI-TOF-TOF-MS), retention-time comparison, and enzymatic cleavage analysis. We analysed the release of Up4A from cultivated renal proximal tubule cells after stimulation of protein kinase C with OAG. Up4A was identified in renal tissue, and the effect of Up4A on the vascular tone of isolated perfused afferent and efferent arterioles was tested.

**Results:** Stimulation of tubule cells with OAG increased the release-rate of Up4A from tubule cells about ten fold. Up4A acts as a strong vasocostricter mediator on afferent arterioles, but has no significant effect on the tone of efferent arterioles, suggesting a functional role of Up4A as an autocrine hormone for glomerular perfusion. Because of the predominant effect of the Up4A on afferent arterioles, we assume that Up4A may decrease glomerular perfusion, intraglomerular pressure, and hence glomerular filtration rate. The release of Up4A from renal tubular cells may be an additional mechanism whereby tubular cells could affect renal perfusion. Up4A release may further contribute to renal vascular autoregulation mechanisms.

**Conclusion:** As Up4A occurs in renal tissue and has marked effects on afferent but not efferent arterioles, Up4A may play a role in renal hemodynamics and blood pressure regulation.

**Objective:** Chronic kidney disease (CKD) has been recognized as a risk factor for cardiovascular disease as well as end-stage renal disease and, consequently, identifying those individuals at increased risk of developing CKD has become an important public health problem. Increased uric acid levels might have a pathogenic role in the development and progression of both CKD and cardiovascular disease, and thereby underlie the proposed cardio-renal connection. Thus, we tested the hypothesis that the uric acid level predicts future development of CKD in the general population.

**Methods:** Apparently healthy subjects who visited our hospital for a yearly checkup were screened for the eligibility for the present study. The physical check-up (routine physical examination, chest X-ray, electrocardiography, and laboratory assessment of cardiovascular risk factors) revealed that 7,078 participants (age, 53 ± 11 years; female, 36%) had normal estimated glomerular filtration rates (eGFR, 60 mL/min/1.73m²), and they were enrolled and followed up for the median of 1,694 days with the endpoint being the development of CKD (eGFR < 60 mL/min/1.73m²). Impacts of uric acid and other cardiovascular risk factors at baseline on the future development of CKD were assessed.

**Results:** During the follow-up period, CKD developed in 568 participants (8%) with a higher incidence in male (9.2%) than in female participants (6.0%). A significant correlation between the new onset of CKD and age, male gender, body mass index, blood pressure, fasting plasma glucose, dyslipidemia, and uric acid was observed in univariate logistic regression analysis. Multivariate logistic regression analysis revealed that new onset of CKD was independently correlated with the baseline uric acid level after adjustment for possible factors. Subanalysis showed similar results in subjects with normal uric acid levels.

**Conclusions:** Uric acid level is an independent predictor of CKD onset and individuals with an elevated risk of developing CKD could be identified from the general population by a simple screening program. Such an approach is quite attractive to complement the prevention of cardiovascular disease as well as end-stage renal disease.

**Objective:** Low normal range of estimated glomerular filtration rate and microalbuminuria are independently associated with increased arterial stiffness in never treated hypertensives.

**Methods:** Subjects with normal eGFR (≥60 mL/min/1.73 m²) and normo- or microalbuminuria, the value of combined estimation of eGFR and urine microalbumin for the risk assessment has never been reported. We evaluated the association between arterial stiffness and combined estimation of eGFR and urine microalbumin.

**Material and Methods:** Subjects with never treated hypertension and normal eGFR were evaluated (n = 496, 305 men, 50 ± 10 years). Subjects with microalbuminuria, secondary hypertension, angina pectoris, myocardial infarction, heart failure, stroke, and significant arrhythmia were excluded. eGFR was calculated by the simplified Modification If Diet in Renal Disease formula. Urinary albumin-creatinine rate was calculated by log-transformed for analysis (logUACR). Arterial stiffness was assessed with heart-femoral pulse wave velocity (hfPWV). All subjects were divided in four groups: group 1, eGFR<60 (high normal) and normal albuminuria; group 2, eGFR<60 (low normal) and microalbuminuria; group 3, high normal eGFR and microalbuminuria; group 4, low normal eGFR and microalbuminuria.

**Results:** Group 1 showed lowest hfPWV (964 ± 145; group 2, 1013 ± 169; group 3, 1056 ± 236; group 4, 1090 ± 164 cm/sec). Analysis adjusting age, sex, body mass index, heart rate and mean arterial pressure showed significantly lower hfPWV of group 1 compared to group 2 (p = 0.031) and 3 (p = 0.009). Multiple regression analysis showed significant association of hfPWV with logUACR (beta = 12.83, 95% CI 2.061–23.603, p = 0.02) and eGFR (beta = 0.589, 95% CI -1.178–0.001, p = 0.05). The association was not changed by multiple adjustment with eGFR and logUACR. In patients with microalbuminuria, eGFR showed significant correlation with hfPWV (beta = -0.787, 95% CI -1.408–0.165, p = 0.011). In patients with high eGFR, logUACR was significantly correlated with hfPWV (beta = 0.022, 95% CI 0.850–35.192, p = 0.001).

**Conclusion:** The present study showed that the presence of low normal eGFR or microalbuminuria is independently associated with increased arterial stiffness, indicating greater CVD risk. Thus, combined measurement of eGFR and urine microalbumin is needed in the risk assessment of hypertensive patients, although they have normal eGFR or normoalbuminuria.
emire and preserving renal function. These data confirm the safety of this thera-
peutic alternative in patients with advanced CKD.

**PP.24.250** THE CKD-EPI’S NEW GLOMERULAR FILTRATE RATE EQUATION COULD AFFECT THE CLASSIFICATION OF CHRONIC KIDNEY DISEASE RESPECT OF THE MDRD’S EQUATION

J. M. Elorza-Ricart1, A. Oliveras-Puig1, A. Dalfó-Baqué2, E. Hermosilla-Pérez3, F. Fina-Avilés1, E. Gibert-Llorach1, N. Campodon-Tuneu1, J. Ros-Baró1, 'Cap Gòtic, Sap Litoral, Institut Català De La Salut, Barcelona-Spain, 1Sidiap, Fundació Jordi Gol I Gurina, Barcelona-Spain, 2Sidiap, Institut Català De La Salut, Barcelona-Spain

**Study’s Objectives:** To compare glomerular filtrate rate (GFR) using the equa-
tion of Modification of Diet in Renal Disease Study (MDRD-4) and the equa-
tion of the Chronic Kidney Disease Epidemiology Collaboration group (CKD-EPI) in general population, and how these equations classify patients into Chronic Kidney Diseases (CKD) levels.

**Methodology:** Cross-sectional study. We selected patients assigned to family doctors in primary care centres in the city of Barcelona, being 20 to 99 years old, with an analytic determination of plasmatic creatinine (PC) between the 1st of July in 2008 and the 30th of June in 2010. Sociodemographic variables, registered diagnosis and PC values were got from Clinical History: GFR was estimated using CKD-EPI and MDRD-4 equations. We use Access and SPSS software for data analysis.

**Results:** The 38.3% (447,410) of all assigned patients had a determination of PC. 58.6% were females, 56.6 (SD 18.8) years old. 32.5% had registered hyper-
tension, 11.0% diabetes, 9.3% cardiovascular associated diseases. The mean values of PC was 0.89 (0.28) mg/dL [78.7 (24.8) μmol/L], being GFR by MDRD-4 of 80.59 (21.04) mL/min/1.73m² and by CKD-EPI of 85.03 (21.13) mL/min/1.73m². The CKD classification by CKD-EPI’s GFR comparing to MDRD-4’s is shown in the table: CKD-EPI classify in less advanced stages than MDRD-4 in older patients. The differences in the classification of GFR and the classification of CKD. CKD-EPI classify in more advanced stages than MDRD-4 in younger patients. In patients younger than 70, 2.6%, 97.4% and 0%, respectively. For patients 70 and older, 1.5%, 95.5% and 2.9%.

**Conclusions:** Using CKD-EPI or MDRD-4 equations can vary the estimation of GFR and the classification of CKD. CKD-EPI classify in more advanced stages than MDRD-4 in older patients. The differences in the classification could change the management of these patients, and the medical attention in the primary and the secondary care.

**PP.24.251** IF WE USE GLOMERULAR FILTRATE RATE EQUATIONS, THE NUMBER OF PATIENTS WITH THE DIAGNOSIS OF CHRONIC KIDNEY INSUFFICIENCY COULD BE FOUR-FOLDED

J. M. Elorza-Ricart1, A. Oliveras-Puig1, F. Fina-Avilés1, E. Hermosilla-Pérez3, E. Gibert-Llorach1, S. Bonveh'-Nadeu1, E. Bol’var-Puigoriol1, A. Dalfó-Baqué1, ‘Cap Gòtic, Sap Litoral, Institut Català De La Salut, Barcelona-Spain, 1Sidiap, Fundació Jordi Gol I Gurina, Barcelona-Spain, 2Sidiap, Institut Català De La Salut, Barcelona-Spain

**Objectives:** To calculate glomerular filtrate rate (GFR) using the equation of Modification of Diet in Renal Disease Study (MDRD-4) and the equation of Chronic Kidney Disease Epidemiology Collaboration Investigation group (CKD-EPI) in general population, and to detect the number of patients without having registered the diagnose of Chronic Renal Insufficiency (CRI) who could be diagnosed by GFR estimations.

**Methodology:** Cross-sectional analysis. We selected patients assigned to family doctors in primary care centres of Institut Català de la Salut in the city of Barcelona, being 20 to 99 years old, with two continuous analytical determina-
tion of plasmatic creatinine (PC) with 3 months to 2 years between them, and the last one done before the 1st of July in 2008. Sociodemographic variables, registered diagnosis and PC values were got through Computerized Clinical History. GFR was estimated through CKD-EPI and MDRD-4 equations. We considered CRI by CKI if the two estimations of GFR were < 60 mL/min. Data Analysis was done using Access and SPSS software.

**Results:** The 23.5% (274,902) of all assigned patients had two determinations of PC. 60.6% were females, 62.0 (SD 17.2) years old. The 42.9% had registered the diagnosis of hypertension, 15.0% diabetes, 12.3% any associated cardiovas-
cular disease, and 3.7% (10,087) had registered CRI. The mean values for the first PC determination was 0.91 (SD 0.27) mg/dL [80.5 (23.9) μmol/L], being the GFR estimation by MDRD-4 of 77.21 (20.01) mL/min, and 80.82 (20.67) mL/min by CKD-EPI. In the second determination, PC 0.90 (0.28) mg/dL [79.5 (24.8) μmol/L], 78.07 (21.00) mL/min by MDRD-4 and 81.01 (20.67) mL/min by CKD-EPI. Among patients without CRI registered, the 9.9% (26,119) by CKD-EPI and the 11.1% (29,405) by MDRD-4 had criteria of CRI, increasing 3.6 times by CKD-EPI and 3.9 times by MDRD-4 the number of patients with the diagnose of CRI.

**Conclusions:** Using CKD-EPI or MDRD-4 equation could vary the estimation of GFR and the patients who could be diagnosed of CRI. Taking into account criteria of CRI by calculated GFR, the number of registered patients with CRI could be nearly four-folded. It is important to insist in the CRI registration in the clinical history. The management of the patients could change.

**PP.24.252** PLASMA RENIN ACTIVITY AND URINARY ALBUMIN EXCRETION INDEPENDENTLY PREDICTS RENAL OUTCOME IN ESSENTIAL HYPERTENSIVE PATIENTS WITH DIABETIC NEPHROPATHY

R. Sanchez, M.J. Sanchez, A.J. Ramirez, Hospital Universitario, Fundación Favaloro, Ciudad Autónoma De Buenos Aires-Argentina

**Introduction:** Diabetic nephropathy is one of the main causes of end-stage renal disease, particularly when associated with arterial hypertension.

**Aims:** To evaluate renal outcome of antihypertensive treatment in a follow-up of 10 years.

**Methods:** We studied 116 essential hypertensives with diabetes type 2 and renal nephropathy, followed for 10 years. Initially, according to the urinary albumin excretion (UAEx) levels, corrected for creatinine, the patients were classified in three different groups: A (n = 50) UAEx: 0-500μg/mgCr; B (n = 31) UAEx: 500-1000μg/mgCr, and C (n = 26) UAEx: > 1000μg/mgCr. All groups received antihy-
tensive therapy including ARB or ACEi to reach BP values <140/90mmHg and conventional antidiabetic therapy for glycemic control with a target HbA1c< 7%. The primary endpoint was: doubling creatinine plasma levels, dialysis or death. The absolute risk (95% CI) for endpoints was calculated (AR(CI)).

**Results:** Plasma renin activity (PRA) in A was 1.8 ± 0.7ng.ml.h, in B: 3.2 ± 0.5ng.
l.h and C: 4.8 ± 0.3ng.ml.h. After 10 years, BP was similarly reduced in the 3 groups studied: A 154 ± 10/104 ± 7 to 134 ± 8/64 ± 5mmHg, B: 152 ± 12/101± 8 to 140 ± 6/66 ± 4mmHg and C (155 ± 9/102 ± 6 to 138 ± 78/8 ± 5mmHg). UAE was significantly reduced in the 3 groups studied, being more pronounced in GA: 68% than in B: 53% or C: 50% (p < 0.001). Basal UAE values significantly correlated with PRA only in groups B (r = 0.81, p < 0.001) and C (r = 0.87, p < 0.01). Glomerular filtration rate was unchanged in A (89 ± 86ml/min) while it was significantly reduced (p < 0.001) in (B) in 88 (50ml/min) and C (84 to 40ml. min). The basal UAE values correlated significantly with final GFR values only in groups B (p = 0.60, p < 0.002) and C (p = 0.64, p < 0.001). The AR(CI) for each group was: A (1.60 [1.20–2.00], B: (2.60 [1.80–3.20] and C: 4.80[2.80–5.80].

**Conclusions:** PRA and UAEx seems to be the important predictors of kidney out-
come in diabetic nephropathy. In our study the progression to end renal stage was lesser influenced by BP lowering and UAE reduction. The renal prote-
ction provided by current treatments of hypertension is only partial, and many patients still have progressive disease. This suggests that a more effective therapeu-
tic approach is needed.

**PP.24.253** RENAL HEMODYNAMIC STATUS AND AGING - USEFULNESS OF THE RESISTIVE INDEX IN RENAL DOPPLER ULTRASONOGRAPHY AS AN INDICATOR OF VASCULAR DAMAGE

T. Kawai, K. Kamide, M. Onishi, K. Hongyo, I. Shimaoka, Y. Takeya, M. Ohishi, H. Rakugi. Osaka University Graduate School of Medicine, Suita-Japan

**Objective:** The resistive index (RI) in renal doppler ultrasonography (DUS) is thought to be a good indicator of renal vascular resistance caused by arterial ages-
rosis. In this study, we investigated whether RI could be used to evaluate the
pathogenesis of renal damage, and investigated the mechanisms of renal func-
tional impairment. Hypertension was graded as mild (diastolic 95-99 mmHg),
moderate (100-114 mmHg) or severe (>115 mmHg). Impaired renal func-
tion (creatininemia >1.4 mg/dl) was graded as mild (1.4-2.5 mg/dl), moderate
(2.5-5.5 mg/dl), or severe (>5 mg/dl). The prevalence of hypertension was 41%.
There were 14 hypertensives and 20 normotensives. The incidence of renal
impairment was greater in the hypertensives, 45% vs 16.5% (p<0.05). Mean
serum creatinine was also higher in this group (p<0.05). Hypertension at the
onset of lupus nephritis was strongly associated with differences in the time
to severe impaired renal function. The presence of hypertensive renal vascular
lesions identified a high-risk subgroup who had a higher incidence of renal
functional impairment and worse renal function than the hypertensive group as
a whole. Even at an early stage, hypertension and hypertensive renal vascular
lesions correlated well with renal functional impairment. Aggressive treatment
of hypertension is therefore essential in early lupus nephritis in order to prevent
further deterioration of renal function as the disease evolves.

PP24.254 
HYPERTENSION IS RELATED WITH RENAL STRUCTURE IN AUTOSOMAL DOMINANT POLYCYSTIC KIDNEY DISEASE
A. Idrizi, M. Barbullushi, A. Koroshi, N. Spahia, V. Bajrami, X.H. Xhaferri, S. Kodra, N. Therska. UHC Mother Teresa, Tirana-Albania

Introduction: Hypertension is a common complication of autosomal dominant polycystic kidney disease (ADPKD). It has been reported to occur in 13% to 81% of ADPKD patients (pts) and plays a major role in the progression of renal failure in these pts. Renal structure (kidney size and cystic renal volumes) has been shown to play an important role on the pathogenesis of hypertension in ADPKD and on the renal function. We have evaluated the frequency of hypertension and the role of renal cystic enlargement in initiating hypertension in 200 ADPKD pts.

Patients and Methods: 200 ADPKD pts were divided in two groups: first group of 92 pts with normal renal function, and second group of 108 pts with chronic renal failure (serum creatinine level >1.5 mg/dl). Renal volume was calculated using the following formula for a modified ellipse: 4/3 + (anterior-posterior diameter/4 + width/4). Differences were considered significant at the p<0.05 levels.

Results: Hypertension was observed in 140 ADPKD pts (70%) [the mean age was 46 ± 4.6 years (range 18-70 years)]; 56 pts of first group, with normal renal function (61%) and 98 pts of second group, with chronic renal failure (79%), and in 88 males and 52 females. The kidney size (longitudinal diameter) was significantly greater in the hypertensive pts compared with those normotensive (16.56 ± 1.9 cm vs. 12.9 ± 1.06 cm, p<0.039). Systolic and diastolic blood pressure correlated with kidney size (r = 0.55; r = 0.63). Also, mean renal volume was significantly greater in the hypertensive pts vs the normotensive pts (590 ± 43 cm³ vs. 365 ± 45 cm³, p<0.005).

Conclusions: Hypertension is associated with greater renal structural abnormalities. Specifically, the hypertensive ADPKD pts have greater renal volumes and cystic involvement than well-matched normotensive ADPKD pts. This supports the hypothesis that cyst decompression would be associated with a decrease in blood pressure and an improvement of renal function.

PP24.255 
THE IMPORTANCE OF ARTERIAL HYPERTENSION AT THE ONSET OF CLINICAL LUPUS NEPHRITIS
T. Backa, A. Idrizi, M. Barbullushi, A. Koroshi, X.H. Xhaferri. UHC Mother Teresa, Tirana-Albania

The prognostic importance of hypertension at the onset of clinical lupus nephri-
tis is not well established. We studied retrospectively 34 patients with lupus nephritis in order to ascertain the prevalence of hypertension at presentation and to investigate a possible association between hypertension and renal func-
tional impairment. Hypertension was graded as mild (diastolic 95-99 mmHg), moderate (100-114 mmHg) or severe (>115 mmHg). Impaired renal func-
tion (creatininemia >1.4 mg/dl) was graded as mild (1.4-2.5 mg/dl), moderate
(2.5-5.5 mg/dl), or severe (>5 mg/dl). The prevalence of hypertension was 41%.
the baroreflex arc activity (or baroreflex sensitivity, BRS), defined as the ratio between variations in the carotid distension rate and variations in R-R interval in the low-frequency (LF) range between 0.06 and 0.12 Hz for a period of at least 205 seconds. The CV risk was estimated according to the Framingham risk score. A cutoff for 10 years coronary heart disease (CHD) risk (≥13%) was considered as high risk in this report.

Results: We studied 1961 patients with GFR > 60 ml/min/1.73m² and 124 patients with GFR 30-60 ml/min/1.73m², respectively. The prevalence of 10 years CHD risk ≥13% was significantly higher in patients with moderate renal dysfunction than in those with normal renal function (65.6% and 51.1%, respectively). In both groups, BRS was significantly reduced in patients with 10 years CHD risk ≥13%. Multivariate logistic regression analysis detected that the increase of intra-media thickness and the reduction of carotid cross-sectional distensibility and BRS were independently associated with 10 years CHD risk ≥13% in patients with normal renal function (area under the ROC curve 0.70) and in those with moderate renal dysfunction (area under the ROC curve 0.76).

Conclusions: For the first time, we demonstrate in a large cohort that the arterial wall properties and the BRS, estimated by high resolution echotracking device coupled with fast Fourier transformation, is significantly associated with CV risk in patients with normal renal function and in those with moderate renal dysfunction.

PP.24.258 IMPAIRED CORONARY FLOW RESERVE IS ASSOCIATED WITH INCREASED ALBUMINURIA LEVELS IN UNTREATED HYPERTENSIVES

D. Tsiachris, C. Tsoulis, K. Dimitriadis, D. Syrscouids, A. Kasiakogias, I. Bafakis, D. Roussos, C. Stefanadis. First Cardiology Clinic, University of Athens, Hippokration Hospital, Athens-Greece

Background: Coronary flow reserve (CFR) is impaired in patients with essential hypertension. Our aim was to investigate the associations between CFR and cardiac and renal damage in untreated hypertensives.

Design and Methods: For this purpose, we studied 21 hypertensive patients (aged 58.2 years, 8 males, office BP 150/95mmHg) with clinical indications of myocardial ischemia and normal coronary arteries in coronary angiography. CFR was calculated by a 0.014 in. Doppler flow wire (Flowire, Volcano) in the left anterior descending artery in response to bolus intracoronary administration of adenosine (60ug) as the ratio of hyperemic to basal average peak velocity of the distal vessel. All the participants underwent complete echocardiographic study including left ventricular diastolic function evaluation by means of transmural flow (E, A, E/A ratio) and tissue Doppler imaging (Em, Am) and determination of albumin to creatinine ratio (ACR) on two non-consecutive morning spot urine samples.

Results: Based on a cut-off value of 2.5 for CFR, patients were classified into those with high (n = 9) and low (n = 12) CFR. Hypertensives with low CFR compared to those with high CFR decreased transmural E/A (0.85 vs. 1.12, p = 0.045) and Em/Am (0.7 vs. 0.95, p = 0.047), as well as increased heart rate (79.2 vs 69.3 bpm, p = 0.032) and aortic pulse pressure measured during catheterization (76.5 vs. 58.8 mmHg, p = 0.003). ACR values were increased in patients with low compared to those with high CFR (1.12, p = 0.043) and tissue Doppler imaging (Em, Am) and determination of albumin to creatinine ratio (ACR) on two non-consecutive morning spot urine samples.

Conclusions: Untreated hypertensives with impaired CFR are characterized by increased urine albumin excretion rate. These findings further support the concept for a parallel diffuse microcirculatory dysfunction in hypertension.

PP.24.259 VASCULAR DYSFUNCTION AND REMODELING OCCURRED IN ACCORDANCE WITH RENAL IMPAIRMENT IN NEPHRECTOMIZED RATS


Objective: Although several cardiovascular risk factors reside in chronic kidney disease (CKD), recent reports suggest that renal dysfunction itself contributes increased risk for cardiovascular events. To clarify whether renal impairment per se induced vascular dysfunction, we investigated the functional and histological changes in vasculature in rats with various degrees of CKD.

Design and Methods: CKD was induced by five-sixths (5/6Nx) or seven-eightheenths nephrectomy (17/18Nx), and cuff was placed around femoral artery. Blood pressure was measured and urine and blood were collected. 2 weeks after renal ablation, aorta and femoral artery were excised. Immunohistochemistry was performed to detect macrophages and osteopontin, and superoxide production was measured by luminescence assay. Femoral artery was stained with hematoxylin-eosin. Blood was transfused to normalize anemia.

Results: Creatinine clearance was decreased and proteinuria was increased in accordance with the degree of nephrectomy. Vasodilatory response was blunted in 5/6Nx and 17/18Nx. Macrophage infiltration, osteopontin expression and NADPH oxidase-dependent superoxide production were increased in nephrectomized rats. Renal ablation increased cuff-induced vascular hyperplasia. These changes are correlated with the degree of renal dysfunction. Decreased –NO3 (NO3- + NO2-) levels and increased osteopontin and ACE activity in nephrectomized rat plasma were recovered by blood transfusion. Normalization of anemia partially improved vasodilatory response and vascular inflammation, but had no effect on cuff-induced hyperplasia or superoxide production.

Conclusions: Renal impairment itself was associated with vascular dysfunction. Not only anemia but also other factors would be involved as underlying mechanisms.

PP.24.260 PREVALENCE OF CHRONIC KIDNEY DISEASE IN HYPERTENSIVE PATIENTS WITH AND WITHOUT TYPE 2 DIABETES MELLITUS

J. Pigareva, S. Avdoshina, M. Efremovsvea, Z. Kobalava. Russian Peoples Friendship University, Moscow-Russia

Objective: The aim of the study was to evaluate the prevalence of chronic kidney disease (CKD) among in-patients with poorly controlled arterial hypertension (AH).

Design and Method: 211 patients (mean age 70 ± 12.9) with AH (mean systolic BP 148 ± 25.6; mean diastolic BP 85.1 ± 12), hospitalized in therapeutic department during 3 months, were enrolled into the study. Patients were divided in 2 groups: 1st - with isolated AH (n = 163) and 2nd - with AH and T2DM (n = 48). The groups were comparable in age, gender, duration of hypertension, treatment regimes and co-morbidities except diabetes mellitus in the 2d group. CKD was diagnosed and staged according to KDOQI criteria (anamnesis of renal disease, urinary tests abnormalities, changes detected with imaging methods, decrease of estimated glomerular filtration rate (GFR) calculated with MDRD Study equation) persisting 3 or more months.

Results: Prevalence of CKD in general group (n = 211) was 57.5%. In the 1st group CKD was diagnosed in 56% of patients (n = 163), most of them had stage 3 (24.1%) and 2 (22.8%) with equal frequency, less common was stage 1 (7.9%), stage 4 was detected only in 1.2% of patients. 44% of patients in this group were free from CKD, although half of them had decreased GFR (60–90 ml/min/1.73m²) without features of renal injury. In the 2d group CKD was detected in 62.2% of patients (n = 48), prevalence of stage 3 (29.1%) and 2 (27%) was practically equal, stage 4 rate was present in 2%, and stage 1 had 4.1% of patients. 37.8% did not met the criteria of CKD but 20.8% of them had decreased GFR (60–90 ml/min/1.73m²) without renal injury.

Conclusions: Prevalence of CKD in patients with poor control of hypertension is much higher then in general population and in hypertensive patients. We found no significant difference of CKD frequency between groups with isolated AH and...
Fetal Zinc Deficiency: Influence on Renal Nitric Oxide and Oxidative Stress


Moderate and marginal zinc deficiency during pregnancy is a nutritional insult to fetal and postnatal development. We have demonstrated that moderate zinc deficiency in rats during intrauterine and postnatal growth is also a model of fetal programming of hypertension and renal diseases in adult life. At weaning, fetal and lactation zinc deficiency induced a reduction in glomeruli number and a compensatory hypertrophy in the remaining nephrons. 

Objective: To evaluate renal nitric oxide system and oxidative stress at 21 days of life, in order to determine if there are sex differences in response to fetal and lactation zinc deficiency.

Methods: Wistar rats were exposed from the beginning of pregnancy up to adulthood: low (L, 8 ppm) or control (C, 30 ppm) zinc diet. At day 21, male (m) and female (f) offspring of each group of mothers (Cm, Lm, Cf and Lf) were sacrificed to determine nitric renal ornithine synthase (NOS) activity with L-(14C)-arginine (pennomalognous tissue) and eNOS and iNOS protein abundance by western blot (% density/β-actin). Renal oxidative stress was evaluated measuring thiobarbituric acid-reactive substances (TBARS), glutathione concentration (GLUT), superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase activity (GPx).

Results: NOS activity was decreased in Bm (237 ± 3 and Cf 7.5 ± 0.9 †) compared with Cm (302 ± 0.5 and Cf 7.5 ± 0.9 †) respectively. eNOS content was lower in Bm (43 ± 2) than Cm (30 ± 2), but in Bf (42 ± 4) and Cf (36 ± 1) was similar. iNOS content showed no differences between groups (Cm: 32 ± 4: Bm: 39 ± 1: Cf: 39 ± 3: Bf: 32 ± 3 *). p < 0.01 vs Cf. n = 6 for each group. 2 way ANOVA followed by Bonferroni’s post-hoc test.

Conclusions: Zinc is essential for all stages of early development. Kidney morphological alterations observed in this model may be associated with nitric oxide system and oxidative stress alterations. The lower renal NOS activity observed in zinc-deficient rats is not due to a decrease in NOS, ENOS and iNOS proteins expression. So we suggest that other mechanisms may be involved, like the alteration in NOS zinc cluster and the cofactors of the NOS or the increase in zinc deficient rats is not due to a decrease in eNOS and iNOS protein abundance by western blot (% density/β-actin). Renal oxidative stress was evaluated measuring thiobarbituric acid-reactive substances (TBARS), glutathione concentration (GLUT), superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase activity (GPx).

Treatment of Hypertension in Predialysis Chronic Renal Failure Patients

I. Prcakic. Merkur University Hospital, Zagreb-Croatia

Objective: Arterial hypertension is seen in the majority of patients with chronic renal failure (CRF). Hypertension (H) is one of the most important complications resulting from CRF, and is a serious complication that may lead to end-stage renal disease in a short period of time. Guidelines recommend a reduction in blood pressure below 130/80 mm Hg in all patients with renal failure and at least below 120/80 mm Hg particularly when proteinuria is superior to 1 g/24 h. The aim of present observation study was to investigate the prevalence of H in CRF predialysis pts and the use of antihypertensive drugs.

Design and Method: During one year total of 63 (mean age 56 ± 11 for male; 58 ± 9 for female) nondiabetic pts were included in study. Age, sex, systolic and diastolic blood pressure were recorded, as well as antihypertensive drugs used: angiotensin-converting enzyme inhibitors (ACEI), angiotensin II-receptor blockers (ARB), beta-blockers (BB), central acting drugs (CAD),calcium channel blockers (CCB) and diuretics (D).

Results: Hypertension was defined as blood pressure > 130/90 mm Hg. Arterial hypertension was observed in 94% of patients. The average blood pressure was 132.5 ± 12.2 systolic and 80.2 ± 9.6 mmHg diastolic. The most often used antihypertensive drugs were CCB (lerekaniprine 10-20mg) in 32 (52%), that D (HCTZ 12.5mg) in 31 (49%), CAD (moxonidine in max.dose of 0.6 mg) in 26 (41%), ACEI (ramipril 5mg, trandolapril 2mg) in 23 (36%), BB (nebivolol 5 mg) in 14 (22%), ARB (losartan 100 mg) in 11(17%) of pts. Drug combinations of three or more drugs (CCB,D,CAD and ACEI) were used.
in majority of pts. Moxonidine causes a better decrease in blood pressure than other adding drugs.

**Conclusion:** The prevalence of arterial hypertension is very high in predialysis pts. Management of hypertensive pts is still a challenge for nephrologist. It is obvious that multidrug regimen is necessary. CAD-morbidin in maximum daily dose of 0.6 mg is save, very well tolerant drug, without worsening of renal function in CRF predialysis pts.

**PP.24.265 MICROALBUMINURIA IS THE MOST INTEGRATED SIGN OF TARGET ORGAN DAMAGE IN HYPERTENSIVE PATIENTS**

S. Villevalde, E. Tsykhmenev, A. Klimenko, Z. Kobalava. **Russian Peoples Friendship University, Moscow-Russia**

**Objective:** Microalbuminuria (MAU) and glomerular filtration rate (GFR) are the signs of subclinical kidney damage and independent predictors of cardiovascular morbidity and mortality. ESH-ESC guidelines (2007) list MAU as obligatory assessment in hypertensive patients independently of diabetes mellitus presence. The aim of the study was to investigate the relative role of MAU, cardiac and vascular ultrasonography and carotid-femoral pulse wave velocity (PWV) for the detection of hypertensive target organ damage and risk stratification.

**Methods:** In 576 non-diabetic hypertensive pts without established cardiovascular or renal disease (291 male, 53.0 ± 10.1 years (M ± SD), BMI 29.4 ± 4.4 kg/m², 38% smokers, BP 156 ± 139/9 ± 8 mmHg, serum creatinine 94.3 ± 17.4 μmol/l) MAU by albumin/creatinine ratio, GFR by MDRD formula, left ventricular mass index (LVMI), carotid intima-media thickness (CIMT), carotid-femoral PWV were assessed. Spearman and multiple regression analysis were performed. P < 0.05 was considered statistically significant.

**Results:** Prevalence of subclinical kidney damage, Echo left ventricular hypertrophy (LVH), CIMT > 0.9 mm and/or plaque, carotid-femoral PWV > 12 m/s was 37.5%, 46.3%, 23.6% and 25.7%, respectively. There was negative correlation between GFR and LVMI (r = -0.28, p < 0.001), end-diastolic relative wall thickness (RWT) (r = -0.22, p = 0.02), CIMT (r = -0.19, p = 0.04) and PWV (r = -0.07, p > 0.05). There was positive correlation between albumin/creatinine ratio and LVMI (r = 0.46, p < 0.001), RWT (r = 0.31, p < 0.01), CIMT (r = 0.38, p < 0.001), PWV (r = 0.34, p < 0.001). Different signs of subclinical organ damage only partly cluster in the same group of patients. The odds ratio (OR) of a microalbuminuric patient having LVH and/or vascular damage is 19.5 (95% CI 5-82); the OR of a patient with LVH having MAU and/or vascular damage is 7.25 (95% CI 3-16); the OR of a patient with LVH and/or vascular damage is 19.5 (95% CI 5-82); the OR of a patient having LVH and/or vascular damage is 7.25 (95% CI 3-16).

**Conclusions:** Microalbuminuria was the most integrated sign of subclinical organ damage in uncomplicated hypertensive patients. Due availability, low cost and high predictive value combined assessment of GFR by MDRD formula and MAU should be the first step in detection of subclinical organ damage for cardiovascular risk assessment. Cardiac and vascular ultrasonography for assessment of LVMI and CIMT should be performed in pts without signs of subclinical kidney damage.

**PP.24.266 RENOPROTECTIVE EFFECT OF PERINDOPRIL IN PATIENTS WITH HYPERTENSIVE CHRONIC KIDNEY DISEASE**

V. Radchenko, L. Mishchenko, V. Bezdroyi, O. Matova. M.D. Strazhesko Institute of Cardiology, Kyiv-Ukraine.

**Objective:** To evaluate the effect of 3-month perindopril treatment on glomerular filtration rate and microalbuminuria in essential hypertensive (EH) patients (pts) with renal function decline.

**Materials and Methods:** 33 EH pts with II or III stage of hypertensive chronic kidney disease were examined after 10-days of wash-out period and after 3 months of treatment with 10 mg perindopril once a day. Ambulatory blood pressure (BP) monitoring was performed with ABPM-04 “Meditech” (Hungary) according to standard protocol. Glomerular filtration rate (GFR) was evaluated by creatinine clearance according to direct Reberg method. Microalbuminuria was estimated by turbidimetric method from 24-hour sample. Statistical analysis was done with SPSS-13.

**Results:** 24-hour average systolic and diastolic BP decline under perindopril treatment from 145 ± 2.1 to 132 ± 1.9 mmHg (p < 0.02) and from 94 ± 1.1 to 85 ± 1.0 mmHg (p < 0.05) correspondently. Perindopril improved 24-hour index: the proportion of “non-dipper” pts changed from 56% before treatment to 31% at the end of treatment. Perindopril therapy elevated on 21.8% GFR (from 57.3 ± 1.9 to 73.5 ± 2.1 m/min, p < 0.001) and decreased microalbuminuria on 32.4% (from 87.3 ± 2.1 to 57.3 ± 1.8 mg/day, p < 0.001). Renoprotective effect was more expressed in “non-dippers” pts in compare with “dippers” pts: GFR elevated on 24.1 ± 3.4% (p < 0.001) and on 17.2 ± 1.9% (p < 0.001) correspondently; MA decreased on 28.3 ± 2.2% (p < 0.001) and on 34.2 ± 3.3% (p < 0.001) correspondently.

**Conclusions:** ACE inhibitor perindopril leads to lowering BP and improving renal function in patients with hypertensive chronic kidney disease. Renoprotective effect of perindopril was more expressed in “non-dippers” than in “dippers” essential hypertensive patients.

**PP.24.267 THE RENAL DOPAMINERGIC SYSTEM AND AMINO ACID TRANSPORTER EXPRESSION IN AGED W KY AND SHR RATS**

V. Pinto, Mj. Pinho, J. Amaral, E. Silva, S. Simão, Mp. Serrão, J. Alonso, P. Gomes, P. Soares-Da-Silva. **Institute of Pharmacology & Therapeutics, Faculty of Medicine, Porto- Portugal**

**Objective:** This study examined age-related changes in renal dopamnergic activity and expression of LAT1, LAT2, 4F2hc and ASCT2, amino acid transporters potentially involved in renal tubular uptake of L-DOPA in Wistar Kyoto (WKY) and spontaneously hypertensive rats (SHR).

**Design and Method:** Thirteen-week old male WKY and SHR were obtained from Harlan-Interfauna Ibéria. Animals were used at this age for the evaluations of interest or carefully maintained and monitored until 91 weeks of age. Urinary L-DOPA, dopamine, DOPAC, noradrenaline and plasma L-DOPA and aldosterone were measured. Abundance of protein expression was evaluated by Western blot.

**Results:** Aging was accompanied by increases in the sum of urinary dopamine and DOPAC and in the urinary dopamine/DOPA ratio, in SHR but not in WKY rats. The urinary dopamine/renal delivery of L-DOPA ratio was increased in aged WKY and SHR rats. The renal delivery of L-DOPA (plasma L-DOPA x creatinine clearance) decreased with age in WKY and SHR rats, although the difference did not reach statistical significance in WKY rats. The protein abundance of amino acid transporters was age dependent and differently regulated in WKY and SHR rats. Although renal cortical LAT1 abundance was downregulated in aged WKY and SHR, LAT2 expression was increased in both rat strains. Trafficking of LAT1 and LAT2 to the plasma membrane is dependent on their association with 4F2hc. The expression of 4F2hc was markedly elevated in aged SHR but not in aged WKY rats. ASC2 was upregulated in both aged WKY and SHR. Plasma aldosterone levels and urinary noradrenaline levels were increased in aged WKY and SHR although levels were more enhanced in aged SHR rats.

**Conclusions:** The results suggest that an enhanced ability to take up (or decarboxylate) filtered L-DOPA is accompanied by the upregulation of LAT1/4F2hc and ASC2 in aged SHR rats. This may result as a compensatory mechanism activated by stimuli leading to sodium reabsorption.

**PP.24.268 THE EFFECT OF ANTIHYPERTENSIVE DRUGS ON ESTIMATED GLOMERULAR FILTRATION RATE OF HYPERTENSIVE PATIENTS OVER THE COURSE OF THEIR TREATMENT**

A. Pinopoulou1, I. Tzolios1, M. Piklidou1, B.H. Stricker2, P. Zebekakis1, A. Lasaridis1. **St Department of Medicine, Ahepa University Hospital, Thessaloniki-Greece, 2Department of Epidemiology, Erasmus Medical Center, Rotterdam-The Netherlands**

**Objective:** The aim of the present study was to investigate longitudinally the effect of antihypertensive drugs on estimated glomerular filtration rate (eGFR) in a hypertensive population.

**Design and Method:** This retrospective population study consisted of 431 hypertensive adult patients (122 males) of an outpatient hypertensive clinic that were followed up for three to seventeen years (median = 7 years). Age, body mass index (BMI), systolic and diastolic blood pressure (SBP and DBP respectively) and drug usage were recorded for each patient at each visit. Other laboratory tests, including hematocrit, glucose, uric acid and lipid profile, were also measured and included as covariates in the model. Patients with diabetes were excluded from the study. Estimated GFR values were calculated using the simplified Modification of Diet in Renal Disease (MDRD) formula. Repeated measures analysis using a multilevel model was applied in order to investigate the continuous effect of drug usage on eGFR within and between patients. A mixed effects model was used, in order to account for the differences in duration of follow-up among patients.
Results: The rate of decline in eGFR (cGFR slope in ml/min/1.73m$^2$/year) was the primary outcome measure in this study and was evaluated after adjustment for SBP, age, laboratory tests and dose of each drug used. The analysis revealed that seven drugs were significant independent predictors of cGFR. These included carvedilol (β coefficient = 18.5, 95% CI 4.42 to 32.57), benazepril (β = 2.15, 95% CI 0.88 to 4.23), hydrochlorothiazide (β = 1.92, 95% CI 0.48 to 3.35), dilzem (β = 1.00, 95% CI 0.02 to 1.99), verapamil (β = -1.37, 95% CI -2.71 to -0.03), enalapril (β = -2.51, 95% CI -4.64 to -0.38) and captopril (β = -5.19, 95% CI -9.08 to -1.29).

Conclusions: From a pool of 49 antihypertensive substances, seven drugs, a diuretic, three angiotensin converting enzyme inhibitors, a β-blocker and two non-dihydropiridine calcium channel blockers, were found to have a more potent effect on renal function in hypertensive patients. The effect of these drugs was beyond blood pressure control.

PP24.269

**renal function progression in patients with renal artery stenosis undergoing intensive medical therapy**

K. Flores, E. Espinel, I. Gil, A. Marin, E. Fatem, I. Torres, J.L. Tovar, D. Seron. Hospital Universitario Valle De Hebron Barcelona, Barcelona-Spain

Introduction and Aims: Clinical trials have shown that the outcome of revascularization and medical treatment are not superior to medical treatment alone. We have studied 49 patients with renal arteries stenosis treated only with intensive medical therapy with the aim of evaluating their long-term renal function progression and the associated rate of cardiovascular risk.

Methods: We analysed 49 patients: 33 male and 16 females with a mean age of 76.95(SD,3) with significant renal artery stenosis ( > 50%). Comorbidities included: ischemic cardiopathy 53,1%; Stroke 57,1%,peripheral vasculopathy 55.1%,carotid atheromatosis 44,9 %, heart failure 9,8%, Left ventricular hypertrophy 63,3% and diabetes 51%.42 patients had e-GFR MDRD < 60 ml/min. Medical therapy included statins to reach LDL-C levels below 100 mg/dl, antiproteinase drugs, blood pressure control and ACE inhibitors or ARA II when tolerated.

Results: Patients were controlled for a mean of 4.01 years (SD,2.1) (range 1–8.01 years). Mean initial creatinine was 1.64 mg/dl (SD, 0.48) (0.6–2.96;mean initial creatinine was 1.95 mg/dl (SD, 1.34) (0.75–6.2); (p < 0.05). The e-GF (MDRD)-4 at the beginning was 45.2 ml/min, and at the end was 40.04 ml/min. Initial LDL cholesterol was higher than the final (121.29/35.35) (p < 0.05).At evolution 2 patients suffered CV death, 5 non cardiovascular death and 3 patients entered dialysis and we registered 15 CV events. We had a group of 27 patients in whom CT angiography or renogram showed that none of the stenotic kidneys had suffered thrombosis. There was no difference in renal function progression among all patients when compared to the subgroup of 27 patients. We did not observe differences between diabetic and non diabetic or in renal function progression, or in number of CV events during follow-up.

Conclusions: During a 4 years mean time follow-up study, an intensive medical therapy for the management of renal artery stenosis provided stable renal function. The e-GF (MDRD-4) at the beginning was 45.2 ml/min, and at the end was 40.04 ml/min. This loss in renal function is quite similar to the physiological loss observed in healthy individuals of the same age. Mortality and cardiovascular events were not different between groups. We found no significant difference in renal function progression, or mortality between diabetic and non diabetic patients. This supports the idea that chronic renal insufficiency could be a vascular risk factor as important as diabetes. Further studies are required to determine whether there are fewer cardiovascular events in patients undergoing medical therapy or in those with revascularization.

PP24.270

**high salt induced glomerular damage is associated with local down-regulation of ACE2**


Objective: ACE2 (Angiotensin converting enzyme 2) is a carboxypeptidase generating Ang 1-7 from Ang II, and therefore opposing the action of Ang II. ACE2 deficiency is associated with increased circulating and tissue levels of Ang II. High-salt diet has recently been shown to modulate ACE2 gene expression within the hearts. In the present study we aimed to evaluate the impact of a high-salt diet onto the glomerular renin angiotensin system, focusing on the novel mediators of this system.

Design and Methods: To evaluate the effects of increasing doses of salt in the diet, 27 male Wistar rats were uninephrectomized and then randomly allocated into 3 groups: Control (0.2% salt diet); 1.2% salt diet; 8.2% salt diet. All the animals were followed for 4 weeks and at the end of the study general parameters, blood pressure were measured, blood, urines and kidneys were collected. GFR, glomerular albumin permeability, albuminuria, glomerular morphological and immunohistochemical features were analyzed and glomerular gene expression was performed. To evaluate the significance of ACE2 reduction /deficiency on the kidney, 9 male C57B16 and ACE2 KO mice 12 weeks old were also studied.

Results: High-salt diet increased blood pressure and led to glomerular albumin permeability defect, microalbuminuria, glomerular hypertrophy and glomerulosclerosis. Glomerular ACE2 gene and protein expression was significantly decreased proportionally with higher dietary content of salt (< 0.05 vs Control) whereas ACE gene and protein expression increased. A significant increase in glomerular oxidative stress due to up-regulation of iNOS (inducible nitric oxide synthase) and NFX4 (NADPH oxidase 4), down-regulation of SOD1 (superoxide dismutase 1) and to a significant increase of glomerular nitrotyrosine was also observed proportionally with higher doses of salt (< 0.05 vs Control). Similarly, ACE2-KO mice displayed a significant increase in glomerular oxidative stress at both a gene and a protein level (< 0.001 vs Control).

Conclusions: High-salt diet modifies the glomerular ratio between ACE and ACE2, which appears to be critical for oxidative stress generation, and ultimately for the renal damage due to it.

PP24.271

**Effect of 2-Chloroadenosine on Renal Blood Flow Status in Diabetic Wistar and Spontaneously Hypertensive Rats**

M. Morato, D. Patinha, J. Afonso, T. Sousa, A. Albino-Teixeira. 1Ipt and Laboratory of Pharmacology, Requime-Farma, Department of Drug Sciences, Flup, Up, Porto-Portugal, 2Institute of Pharmacology and Therapeutics (Ipt), Fmup and Iftp, Up, Porto-Portugal

Objective: To investigate the effect of 2-chloroadenosine (CADO) on renal redox status of diabetic Wistar and spontaneously hypertensive (SHR) rats.

Design and Methods: male Wistar (240-300g) and SHR (12 weeks) rats were i.p. injected with streptozotocin (65mg/Kg; STZ) or vehicle (SHAM). After 14 days, CADO was continuously i.p. infused (5mg/Kg/d) for 7 days with osmotic mini-pumps. Catheters were implanted for systolic blood pressure (SBP) measurement. Plasma and kidney samples were collected. Glucose and hydrogen peroxide (H$_2$O$_2$) were quantified with commercial kits. Catalase (Cat) activity was measured by a spectrophotometric assay. Superoxide dismutase 1 (SOD1) protein expression was evaluated by Western blot. Statistical comparisons were made by Student t-test.

Results: Results are summarized in the table below. Diabetes increased plasma glucose 3 times in both strains. 2CADO attenuated this increase in Wistar (30%) and SHR rats (10%). Diabetes increased both Cat activity and H$_2$O$_2$ production in the medulla of Wistar rats and treatment with 2CADO attenuated this increase. In SHR rats, medullary production of H$_2$O$_2$ was decreased after induction of diabetes and even further after 2-CADO administration. Diabetes was associated with a marked decrease in renal medullary expression of SOD1. Treatment with 2CADO increased the expression of SOD1 in both strains. SBP decreased in SHR rats (203.5 ± 3.4 vs 152.8 ± 8.5 mmHg; p < 0.05) after diabetes induction and CADO further decreased it (110.6 ± 3.6 mmHg).


Table: Renal cortex (C) and medula (M) Cat activity (U cat/mg/prot) and H$_2$O$_2$ production (mmol/mgprot) and SOD1 expression (AU), from SHAM, STZ and CADO groups.

<table>
<thead>
<tr>
<th></th>
<th>Wistar</th>
<th>SHAM</th>
<th>SHR</th>
<th>Wistar STZ</th>
<th>SHR STZ</th>
<th>Wistar CADO</th>
<th>SHR CADO</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-Cat</td>
<td>32.8±2.1</td>
<td>38.0±4.4</td>
<td>27.9±1.3</td>
<td>29.7±1.8</td>
<td>36.2±7.3</td>
<td>43.5±6.7</td>
<td></td>
</tr>
<tr>
<td>M-Cat</td>
<td>99.4±14.1</td>
<td>70.9±7.6</td>
<td>256.8±37.6</td>
<td>47.9±5.4</td>
<td>80.3±19.4</td>
<td>48.2±18.4</td>
<td></td>
</tr>
<tr>
<td>C-H$_2$O$_2$</td>
<td>0.8±0.0</td>
<td>1.0±0.1</td>
<td>0.3±0.0</td>
<td>0.7±0.1</td>
<td>0.2±0.0</td>
<td>0.4±0.1</td>
<td></td>
</tr>
<tr>
<td>M-H$_2$O$_2$</td>
<td>0.3±0.0</td>
<td>0.3±0.1</td>
<td>1.1±0.1</td>
<td>0.4±0.1</td>
<td>0.6±0.1</td>
<td>0.6±0.1</td>
<td></td>
</tr>
<tr>
<td>SOD1</td>
<td>51.7±17.5</td>
<td>23.8±13.6</td>
<td>0.7±0.1</td>
<td>0.7±0.2</td>
<td>2.5±0.7</td>
<td>3.1±1.0</td>
<td></td>
</tr>
</tbody>
</table>

Means ± s.e.m.; *p<0.05 vs correspondent; **p<0.05 vs correspondent STZ; n=4-10.
**PP.24.272** PREVALENCE AND MANAGEMENT OF CHRONIC KIDNEY DISEASE USING MDRD-4 AND CKD-EPI FORMULA IN PRIMARY CARE


Objective: 20% of patients attended in primary care setting have chronic kidney disease (CKD) defined as a glomerular filtration rate (GFR) less than 60 ml/min per 1.73m². The prevalence of CKD was studied in its at-risk populations.

Design And Method: We conducted a cross-sectional study involving 6 primary care centers randomly selecting patients that were attended and had defined CKD or at least one of the following risk factors for CKD: age > 60 years, hypertension, diabetes or cardiovascular disease (CVD), from 1/06/09 to 31/08/09. We estimated GFR with last year’s serum creatinine, using MDRD-4 formula. We examined multivariable associations, and MDRD-4 and CKD-EPI correlations.

Results: 860 patients studied. 239 patients (27.8%) had CKD after calculating GFR. Only 18% of the latter had their GFR registered previously, in their medical records. However, 92% of all had serum creatinine registered. We found occult kidney disease (OKD), defined as a GFR < 60 and levels of serum creatinine < 1.2 mg/dl, in 45.2% of patients with CKD. 98.1% of patients with OKD were women and 32.4% had received non-steroidal anti-inflammatory medications (NSAIDs) prescriptions compared to 36.2% and 27.7% of patients with CKD and high levels of serum creatinine, respectively. The following differences were observed between patients with or without CKD through regression analysis, respectively: hypertension, 83.3% to 67.5% (p = 0.001); diabetes, 28% to 22.7% (p = 0.027); CVD, 25.9% to 16.6% (p = 0.002); mean age, 75.91 to 76.46 (p = 0.001). We also studied CKD patients by gender: women were 64.4%, had mean GFR of 49.5 ml/min; 85.1% had hypertension; 21.4%, diabetes; 22.1%, CVD; 34.6%, NSAIDs prescriptions; mean serum creatinine of 1.18 mg/dl, compared to 50.23 ml/min, 78.5%, 39.2% (p = 0.004), 34.2% (p = 0.04), 24.1% and 1.15 mg/dl in men with CKD, respectively. There were no differences in mean age, blood pressure, or LDL-cholesterol levels between men and women. CKD-EPI detected 242 patients (28.1%) with CKD. Intraclass correlation coefficient between MDRD-4 and CKD-EPI in patients with CKD detected previously by MDRD-4 was 0.956 (95% CI: 0.944-0.966); there was a concordance rate of 85.1% in stage 3a (26 patients from them were classified as 3b using CKD-EPI), 95.2% in 3b, 90.9% in 4. Kappa index was 0.928.

Conclusions: Usage of MDRD-4 and CKD-EPI formula should be applied to patients at risk of CKD, with similar results.

**PP.24.273** FACTORS ASSOCIATED WITH ARTERIAL HYPERTENSION IN THE EARLY POST TRANSPLANT PERIOD

A. Laucute, M. Miglinas. Nephrology Center, Vilnius University Hospital Santariskiu Klinikos, Vilnius-Lithuania

Posttransplant hypertension is a thorny issue that is closely associated with deterioration of transplanted kidney function. It also increases the incidence of chronic graft loss, promotes target- organ damage. It was determined that some risk factors are connected with arterial hypertension after kidney transplantation.

Objective: The aim of this study was to establish the factors associated with arterial hypertension in the early posttransplant period (within 3 months after transplantation).

Methods: This study was accomplished in the General Nephrology Unit at the Vilnius University hospital “Santariskiu klinikos”. 62 patients (36 males, 26 females) who underwent the kidney transplantation (Tx) during 1 year period participated in this research. Clinical data were collected within 3 months follow-up. 3 months after Tx 66.1% (n = 41) of patients had controlled or no hypertension and patients with uncontrolled hypertension according to recipient/donor age, donor type, gender, duration of underlying disease, number of implanted, ischaemia time, HLA mismatches, ambulatory blood pressure before Tx, proteinuria, creatinine, cyclosporine plasma levels 3 months after Tx. There was one case of transplanted renal artery stenosis. We have detected that posttransplant hypertension correlates with deceased donor type (r = 0.24, p < 0.05). Higher systolic BP (≥140 mmHg) was significantly associated with plasma cyclosporine level (r = 0.68, p < 0.05); higher diastolic BP (≥90 mmHg) was associated with recipient age (21-50 years) (Cramer’s ϕ = 0.76, p < 0.05). Systolic BP ≥140 mmHg was associated with shorter ischaemia time (r = 0.36; p < 0.05). Recipient gender (male) (OR 2.07) was significant risk factors for hypertension 3 months after Tx.

Conclusion: The risk factors that are associated with early posttransplant hypertension are donor type (deceased), recipient gender (male), plasma cyclosporine level.

**PP.24.274** N-DOMAIN ANGIOTENSIN-I CONVERTING ENZYME (ACE) WITH 90 KDA EXPRESSION IN RENAL TRANSPLANT MODEL

Cleber Aparecido Leite1, Tatiana Sousa Cunha1, Maria Claudina Camargo De Andrade1, Fernanda Aparecida Ronch1, Danielle Yuri Arri1, Fernanda Klein1, Fernanda Barrinha Fernandes1, Adriana Barrinha Fernandes1, Ingrid Kazue Mizuno1, Aurélia Alves Leita1, Dulce Elena Casarini1. 1Federal University of Sao Paulo, Sao Paulo-Brazil, 2Campinas University, Campinas-Brazil

Objective: Post-transplantation hypertension is one of the most important factors which has a negative influence on survival of a graft and a patient. The aim of this study was to evaluate if this marker for hypertension after transplant can migrate from cells present on the graft kidney from SHR transplanted to normotensive Wistar rat to other tissues, including native kidney (kidney not manipulated from Wistar rat).

Design and Methods: The rats were divided into five groups: Sham-control group (Sham-C), Wistar rats who were previously manipulated, the kidneys were removed and re-transplanted in the same compartment. Transplanted-group, Wistar rats who received a kidney from SHR were sacrificed at 15 and 30 days (T-15 and T-30); Transplanted-group treated after surgery with cyclosporine (CsA) for 15 and 30 days (TCA-15 and TCSA -30). At the end of treatment, animals were sacrificed and tissues were excised to analyze the activity and expression of ACE isoforms by Western Blotting and amino-acid sequencing of expressed ACE band. In 24-hour urine collection, ACE activity using Z-Phe-His-Leu as substrate were quantified and expression was also analyzed using Western Blotting.

Results: The ACE isoforms with 65 and 130 kDa were expressed in urine of all groups, but the 80/90 kDa N-domain ACE were detected in all transplanted groups treated or not with CsA, except in Sham-C group. In analysis by Western Blotting of native kidney, transplanted kidney, adrenal and lung tissues it was possible to detect the expression of 80/90 kDa ACE on transplant-group treated or not with CsA, whereas it was not detected in tissues from Sham-C group. Tissue ACE activity and blood pressure were increased in T group, when compared with animals from TCSA and Sham-C group. Amino-acid sequencing of the band correspondent to 80/90 kDa ACE isoform from kidney and lung of T-30 showed 73-95% homology with rat, human, mice and bovine ACE. Results suggest that transplanted kidney from SHR to Wistar transplanted-group increased the expression of 80/90 kDa ACE isoform both in urine and in tissues. The amino-acid sequencing of the 80/90 kDa proteic band showed a homology with ACE.

Conclusions: Blood pressure and ACE activity were increased on native kidney and lungs from T-30 treated with CsA, suggesting that kidney transplant from hypertensive to normotensive animals transfers the genetic message via a phenomenon called microchimerism. The presence of 80/90 kDa ACE in the different tissues of transplanted Wistar suggests that this enzyme could be associated with the development of hypertension. (Supported by Fapemop no 04/10063:0 and 02/13290-2).

**PP.24.275** BLOOD RHEOLOGY AND RENAL TRANSPLANTATION: AN INTRIGUING RELATIONSHIP FOR ASSESSING CARDIOVASCULAR RISK

M. Zanazzi, R. Mannini, R. Abbate. Azienda Ospedaliero-Universitaria Careggi, Firenze-Italy

Renal transplant recipients (RTRs) are at increased risk of cardiovascular complications. An altered hemorheological profile may determine both cardiovascular complications and progression of renal failure in RTRs. Transplanted-group. This preliminary study provides evidence of an altered hemorheological profile in RTRs.
The aim of this study was to assess the impact of decreasing single bolus dose of low molecular weight heparin (LMWH) nadroparin on blood pressure among HD patients ≥65 and < 65 years of age.

Methods: Forty patients (25 patients ≥65, mean age 72.88 ± 5.26 years; and 15 patients < 65, mean age 51.67 ± 8.68 years) undergoing intermittent HD for 52.60 ± 51.50, and 76.67 ± 56.39 months (respectively) were included in this 12-weeks long prospective study. The recommended nadroparin bolus dose was decreased by 25% after 4 weeks, again by 25% after 8 weeks, and maintained 50% lower dose for 4 weeks. The blood pressure was measured at the beginning of each HD. The efficacy and safety of LMWH were assessed by dialysis system clotting and the dose of LMWH was respectively changed.

Results: Overall, there were significant differences between the first and the last LMWH doses in both groups. There were no differences between the first and the last predialysis blood pressure parameters in patients ≥65 years of age. In the group of patients < 65 years of age the differences in the first and the last predialysis systolic, mean and pulse pressure were found (Table 1.).

### Table 1. Differences among patients < 65 years of age (Student’s t test for dependent data), *p < 0.005

<table>
<thead>
<tr>
<th></th>
<th>first HD</th>
<th>last HD</th>
<th>significance</th>
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<tbody>
<tr>
<td></td>
<td>arithmetic mean ± standard</td>
<td>arithmetic mean ± standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td>mean on</td>
<td>mean on</td>
<td><strong>&lt; 0.001</strong></td>
</tr>
<tr>
<td>nadroparin (IU/kg/HD)</td>
<td>59.91 ± 19.69</td>
<td>38.64 ± 12.88</td>
<td></td>
</tr>
<tr>
<td></td>
<td>devia on</td>
<td>devia on</td>
<td></td>
</tr>
<tr>
<td>preHD systolic blood pressure (mmHg)</td>
<td>136.15 ± 27.09</td>
<td>121.92 ± 25.21</td>
<td><strong>&lt; 0.018</strong></td>
</tr>
<tr>
<td>preHD diastolic blood pressure (mmHg)</td>
<td>79.23 ± 13.67</td>
<td>74.62 ± 9.46</td>
<td>0.120</td>
</tr>
<tr>
<td>preHD mean arterial pressure (mmHg)</td>
<td>98.21 ± 16.51</td>
<td>90.38 ± 13.07</td>
<td><strong>&lt; 0.036</strong></td>
</tr>
<tr>
<td>preHD pulse pressure (mmHg)</td>
<td>56.92 ± 20.87</td>
<td>47.31 ± 21.27</td>
<td><strong>&lt; 0.040</strong></td>
</tr>
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</table>

Conclusions: This trial demonstrated the influence of lowering nadroparin dose on blood pressure in HD patients ≥65 and < 65 years of age. The significant decreasing of LMWH level led to paradoxically decreasing in systolic, mean arterial and pulse pressure only in patients < 65 years of age on chronic hemodialysis. Elderly patients (≥65 years) didn’t differ in blood pressure values during study period.
PP.25.276  
C-TYPE NATRIURETIC PEPTIDE EFFECTS ON VASCULAR ACTIVITY IN HYPERTENSION. PARTICIPATION OF NITRIC OXIDE SYSTEM  
In previous studies we demonstrated that C-type natriuretic peptide (CNP) acute infusion reduces blood pressure and increases nitric oxide (NO) synthase (NOS) activity in spontaneously hypertensive rats (SHR). The aim was to study the participation of NO in the mechanisms involved in vascular relaxation induced by CNP in SHR.  
Methods: Aorta thoracic segments of 3-5 mm from Wistar (W) and SHR, were suspended in Krebs solution at 37ºC and gassed (95% O 2 - 5% CO 2, pH:7.4). The aortic rings were allowed to equilibrate for 60 min. and readjusted to basal tension 1 g. Isometric tension (g) was recorded by a force-transducer, in presence of: phenylephrine (PE, 10 -8 -10 -4 M), CNP (10 -10-10 -4 M) and L-NAME (NOS inhibitor, 10 -5 M). Endothelium integrity was verified with acetylcholine (ACH, 10 -10-10 -5 M). Aortic NO activity (pmol 14C-L-citrulline/g tissue.min) was determined.  
Results: Basal NOS activity was higher in SHR and CNP increased this activity in both groups (W Basal: 208 ± 12, W CNP: 311 ± 10; SHR Basal: 366 ± 21ª; SHR CNP: 429 ± 25ª). The increase of NOS activity induced by CNP in SHR was lower compared with W (W ΔCNP- Basal):103 ± 11; SHR Δ(CNP- Basal):65 ± 7ª). *p < 0.01 vs Basal W; #p < 0.01 vs Basal SHR; ^p < 0.01 vs ΔW, n = 8.  
Table: Maximal relaxation (Rmax) and concentration of the CNP (expressed as negative log molar) producing 50% of maximum relaxation (pEC50)  
<table>
<thead>
<tr>
<th>W CNP</th>
<th>W L-NAME + CNP</th>
<th>SHR CNP</th>
<th>SHR L-NAME + CNP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rmax (%)</td>
<td>103.3 ± 5.3</td>
<td>64.5 ± 6.9</td>
<td>72.5 ± 1.9</td>
</tr>
<tr>
<td>pEC50</td>
<td>9.6 ± 0.9</td>
<td>6.4 ± 1.2</td>
<td>6.8 ± 1.2</td>
</tr>
</tbody>
</table>

* p < 0.01 vs W CNP, n = 6.  
Statistical analysis: ANOVA followed by Bonferroni’s post-hoc test. Wistar rings have enhanced response to CNP compared with SHR. In normotensive ones, pre-treatment with L-NAME attenuated relaxant effects to CNP, indicating that NO would participate in CNP vasodilatory response in PE pre-constricted rings. In aorta rings of SHR, that have less maximal response to CNP, NOS inhibition with L-NAME had no significant effect on the relaxation induced by CNP.  
Conclusions: In normotensive rats, NO system would participate in arterial relaxation induced by CNP. The diminished vascular relaxation to CNP in SHR is probably due to an impaired response of NO-system.

PP.25.279  
PRE-PUBERTAL BLOCKADE OF ANGIOTENSIN II TYPE 1 RECEPTOR EXERTS LONG-TERM THERAPEUTIC EFFECTS THROUGH SUSTAINED ENHANCEMENT OF RENAL ATRAP EXPRESSION IN DAHL SALT-SENSITIVE HYPERTENSIVE RATS  
Backgrounds: Activation of angiotensin II type 1 receptor signaling plays a pivotal role in the pathogenesis of hypertension and renal injury. We cloned a novel molecule interacting with angiotensin II type 1 receptor, which we named ATRAP (for angiotensin II type 1 receptor-associated protein). Previous studies showed that ATRAP promotes constitutive internalization of angiotensin II type 1 receptor and further attenuates angiotensin II type 1 receptor-mediated pathological responses. Objective: In this study we examined whether the regulation of renal ATRAP expression in vivo is related to the development of hypertension and renal injury and therapeutic effects of angiotensin II type 1 receptor blocker (ARB) olmesartan in salt-sensitive hypertension.  
Methods: Dahl salt-sensitive hypertensive rats (DS rats, 3 wks of age) were divided into three groups for oral administration of vehicle (vehicle group) or olmesartan (8 mg/kg/day) for 16 wks of age (continuous ARB group) or transiently from weaning to puberty (3 to 10 wks of age, pre-pubertal ARB group) and fed high salt diet (8% NaCl) from 6 to 16 wks of age. DS rats fed a normal salt diet (0.3% NaCl) were used as controls (control group).  
Results: Not only continuous ARB treatment (SBP 149 ± 9 mmHg) but also pre-pubertal ARB treatment (SBP 142 ± 7 mmHg) significantly improved hypertension at 16 wks of age with reduction of urinary protein excretion, as compared to vehicle group (SBP 199 ± 15 mmHg). With respect to the regulation of ATRAP expression in the kidney, the renal ATRAP expression was significantly suppressed in vehicle group compared with control group on immunohistochemistry and western blot analysis (relative ATRAP protein level, 100 vs 80%, P < 0.05), concomitant with up-regulation of renal oxidative stress-related marker such as p22phox protein expression (100 vs 150%, P < 0.05). However, pre-pubertal ARB treatment as well as continuous ARB treatment significantly and comparably recovered the suppressed renal ATRAP expression and inhibited the renal p22phox activation at 16 wks of age.  
Conclusion: These results indicate that pre-pubertal transient blockade of angiotensin II type 1 receptor signaling exerts a long-term therapeutic effect on salt-induced hypertension and renal injury in DS rats, at least partly through a sustained enhancement of renal ATRAP expression, thereby suggesting ATRAP as a novel molecular target in salt-induced hypertension and renal injury.
Conclusion: Systemic inhibition of NO synthesis caused a significant dose-dependent suppression of both PRC and angII in healthy males, which is in good agreement with the role of NO as a stimulator of renin secretion. The decrease in FENa was dose-independent suggesting that regulatory mechanisms involved in NO synthesis are different in the renal and the systemic circulations.

Methods: We measured plasma levels of BNP, collagen degradation marker (MMP–1, TIMP-1 and ICTP) and collagen synthesis marker (propeptide of type I, II and III procollagen: PINP or PIIINP) in 86 patients with newly developed HTN (onset = 1month, without prior medication). LV hypertrophy (LVH) and LV dilatation (LVD) was defined by echocardiography. Normal controls were volunteer participants from ACEI group and four from CCB group terminating the trial due to side effects. The concentrations of plasma angiotension II AngII and aldosterone were significantly different among groups (17 ± 2, 22, 31, 146 ± 29, 4, 167 ± 28, p < 0.05). BNP were significant differences among groups (17 ± 11, 24 ± 32, 58 ± 39, 198 ± 108 pg/ml, p < 0.05). 2. MMP–1, TIMP-1, MMP-1/TIMP-1 ratio and ICTP were significant increased in group II, III and group IV than group I (p < 0.05, respectively) and in patients with LVH, MMP-1/TIMP-1 ratio and ICTP were significant increased than in LVH group. PINP and PIIINP were no significant difference between LVH and LVD group (p > 0.05). 3. Only BNP level was significant difference between group II and group III (p < 0.05). The optimal cut-off points for the diagnosis of LVH were 43 pg/ml for BNP (sensitivity 69%, specificity 74%) and 38 ng/l for PINP (sensitivity 59%, specificity 71%). Only 1of 38 patients with values of BNP and PINP less than the optimal cut-off point had echocardiographic LVH, resulting in a high negative predictive value of 97% for the 2 blood tests combined to exclude LVH. In LVD, the accuracy using a cut-off value were 0.83 at BNP 121 pg/ml (p = 0.001) and LVD had a significant correlation with MMP–1 (r = 0.312, p < 0.05), MMP–1/TIMP-1 (r = 0.362, p < 0.05) and ICTP (r = 0.309, p < 0.05).

Conclusion: Our results suggest that BNP and serum markers of collagen degradation may act as LV remodeling process. In hypertensive heart disease, especially, LVH can be excluded on the basis of blood sample for the determination of BNP and PINP.

Conclusion: Neither the basic line nor reduction of blood pressure exhibited significant difference between ACEI and CCB groups. In ACEI group, with particular AGT A-6G genotypes or CYP11B2 T-344C genotypes, AGT GG genotype showed higher levels of AngII and ALD than AGT AG and AA genotypes(P = 0.046, P = 0.037, respectively), while CYP11B2 TT higher than CYP11B2 CC and CT (P = 0.042, P = 0.047, respectively). AGT GG genotype and CYP11B2 TT genotype were more likely to show a trend for decreasing DBP response than AGT AG and AA genotypes, and CYP11B2 CC and CT genotypes, respectively (76.3 ± 5.4 mmHg in GG, 83.5 ± 7.6 mmHg in AG and 84.4± 7.2 mmHg in AA genotype). We proposed that AGT GG genotype and CYP11B2 TT genotype have potential value to predict the effects of ACEI and CCB.

Conclusion: The continuous apoptosis of endothelium of blood vessel caused by allograft vasculopathy (AV) and even restenosis has been indicated. The paracrine factors released from apoptotic endothelial cells of serum free condition. The increasing transcriptional activity of AGT was downregulated to 30% level in serum free medium compared with in normal medium. In contrast, both AGT and ACE gene expression of A7R5 cells was increased by 4 folds higher after exposed to serum free medium at 24h. However, both genes were downregulated in serum free medium in HUVEC cells. In summary, the continuous source of local angiotensin II inducing the pathogenesis of atheromatous diseases.

Conclusion: The continuous source of local angiotensin II inducing the pathogenesis of atheromatous diseases.

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Background & Objective: Angiotensin converting enzyme-inhibitors (ACE-Is) have been reported to decrease hemoglobin level in patients with impaired renal function. However, data on hemoglobin in general hypertensive population is limited. The aim of our study, therefore, was to assess the shortterm effect of ACE-I on hemoglobin and erythropoietin level during the first 4-months period after initiation of the drugs.

Methods: The present study was conducted at the out-patients departments of Bhumibol Adulyadej hospital during October 2009 to November 2010. Hypertensive patients who were not previously prescribed renin angiotensin system blockade were participated in this study. Major exclusion criteria were estimated GFR < 60 ml/min/1.73m², transferrin saturation < 15% and positive for stool occult blood. After given informed consent, patients began treatment with enalapril 5 mg twice daily. Investigators could increase the enalapril dose, if necessary, to attain a target blood pressure of less than 140/90 mm Hg (or 130/80 mmHg for diabetic patients). Hemoglobin and erythropoietin levels were monitored during the 4 months period.

Results: A total of 30 hypertensive patients (13 males, 17 females), aged 62.4 ± 12.9 years were enrolled in this study. Mean hemoglobin level was significantly decrease at 1 month compared to baseline (13.17 ± 1.13 vs 13.61 ± 1.13 g/dl, p = 0.001). Reduction in hemoglobin was less significant at 4 months period (13.37 ± 1.26 vs 13.61 ± 1.13 g/dl, p = 0.038) and 5 patients (16.6%) were found to have hemoglobin reduction more than 1 g/dl. Correlation analysis did not show the association between reduction in hemoglobin level and changes in erythropoietin level or eGFR. Furthermore, erythropoietin level was not significantly change from the baseline at 4 months (13.42 ± 5.69 vs 13.56 ± 6.17 mU/ml, P = 0.891).

Conclusions: Data from our study confirms that ACE-I can decrease hemoglobin level in hypertensive patients within the first month after initiation. This effect was less significant after 4 months period. Mechanisms of which could not be explained from the reduction of erythropoietin or eGFR level.

PP25.285 ASSOCIATION OF BIRTH WEIGHT, BLOOD PRESSURE LEVELS AND ANGIOTENSIN- CONVERTING ENZYME ACTIVITY IN CHILDHOOD

A. Ajala, M. Rangel, A. Febba, Mw. Strufaldi, R. Sesso, De. Casarini, M. Franco. Federal University of São Paulo, São Paulo-Brazil

Objectives: There have been only a few reports on the renin-angiotensin systems in children with history of low birth weight. Our purpose was to investigate plasma levels of angiotensin- converting enzyme (ACE) activity in 6- to 12-year-old children and to determine if there are correlations between this enzyme with both birth weight and blood pressure levels.

Methods: This clinical study included 216 children (102 boys and 114 girls) in two groups: those born at term with normal birth weight (NBW, n = 144) and those born at term with low birth weight (LBW, n = 72). Blood pressure levels and plasma ACE activity were determined.

Results: Plasma ACE activity were significantly elevated in SGA children compared to those with normal birth weight (P < 0.001). There was a significant association of the circulating levels of both ACE activity and blood pressure with birth weight in our population. In addition, ACE activity was correlated with systolic blood pressure (r = 0.201, P = 0.003), pulse pressure (r = 0.226, P = 0.001) and uric acid (r = 0.217, P = 0.001).

Conclusion: Although the underlying mechanisms that link restricted fetal growth with later cardiovascular events are not fully understood, the present findings support the link between low birth weight and overactivity of renin-angiotensin systems into later childhood. Financial Support: FAPESP and CNPq/Capes.

PP25.286 THE RENIN INHIBITOR VTP-27999 BLOCKS STORED RENIN MORE POTENTLY THAN ALISKIREN


Objective: The blood pressure-lowering effect of the renin inhibitor (RI) aliskiren lasts much longer than expected based upon its plasma half life, suggesting that it accumulates at tissue sites, e.g. in the kidney. VTP-27999 is a new RI with an IC50 in the nanomolar range, comparable to aliskiren. Here we compared the capacity of the 2 RIs to accumulate in renin-synthesizing cells, and to bind to renin in storage sites, i.e., before its release.

Design and Methods: Human mast cells (HMC-1), which, like juxtaglomerular cells, store and release renin and prorenin (Krop et al., Hypertension 2008), were cultured in Iscove’s modified Dulbecco’s medium, supplemented with 2% fetal calf serum in the absence or the presence of aliskiren or VTP-27999 (0.1 nM - 1 μM). After 5 days, medium and cells were collected. Renin and prorenin data in general hypertensive population were measured with renin- and prorenin-specific assays, and renin activity was measured by enzyme-kinetic assay.

Results: Without RI, the medium contained predominantly prorenin (306 ± 73 ng/L vs. 57 ± 5 ng/L renin), and the cells exclusively stored renin (396 ± 67 ng/ mg protein). Aliskiren (n = 7) dose-dependently bound to renin in the medium and to intracellular renin, thereby maximally increasing the half life of renin +6-fold. Its IC50 for blocking renin in the medium was 3 ± 1 μM. Blockade of total intracellular renin activity ranged from 8 ± 9% at 1 nM to 72 ± 5% at 1 μM, with 50% blockade occurring at an aliskiren concentration of 171 ± 41 nM in the medium. VTP-27999 (n = 3) dose-dependently bound to renin in the medium and in the cells, thereby maximally increasing the half life of renin +3-6 fold. Its IC50 for blocking renin in the medium (2 ± 1 nM) was identical to that for aliskiren. Blockade of intracellular renin activity ranged from 2 ± 8% at 0.1 nM to 96 ± 1% at 1 μM, with 50% blockade occurring at a VTP-27999 concentration of 24 ± 11 nM in the medium (P <0.02 vs. aliskiren).

Conclusions: VTP-27999 potently binds renin, and is, like aliskiren, capable of accumulating in renin-synthesizing cells. Such intracellular accumulation allows RI to bind to stored renin, and thus to block renin already before its release, thereby explaining the long-lasting effects of RI. For VTP-27999 this phenomenon was maximal at >10-fold lower extracellular concentrations than for aliskiren.

PP25.287 GALECTIN-3 IS A POTENTIAL MEDIATOR OF ALDOSTERONE EFFECTS IN VASCULAR REMODELING

L. Calvien1, B. Martin-Fernández2, V. Lahera2, F. Zannadi2, V. Cachefoére3, P. Lacolley1, P. Rossignol1, N. Lopez-Andrés2, 1Inserm U967, Nancy-France, 2Universidad Complutense De Madrid, Madrid-Spain, 3Inserm Clinical Investigation Center, Cie 9501, Nancy-France

Background: Increased aldosterone (Aldo) levels induce inflammatory communications, vascular remodeling and heart failure (HF), but details of this mechanism remained unclear. In this context, we focused on Galectin-3 (Gal-3), a β-galactoside-binding lectin, known to play an important role in inflammation and HF. We investigated whether Aldo induces Gal-3 expression in vascular smooth muscle cells (VSMCs) in vitro and in vivo.

Methods: For the in vitro studies, primary cultures of VSMCs were stimulated for 24h with Aldo (10-10 M) with or without protein and RNA synthesis inhibitors or mineralocorticoid receptor (MR) antagonist. Gal-3 expression was quantified by RT-PCR. Western Blot and immunostaining. For the in vivo studies, Wistar rats received Aldo (1mg/kg/day) + salt or Aldo + salt + spironolactone (200mg/kg/day) for 3 weeks. Gal-3 and extracellular matrix proteins (collagen, elastin and fibronectin) were quantified by Western Blot and immunohistochemistry, and metalloproteinases (MMP) activities by zymography.

Results: In vitro, VSMCs spontaneously expressed Gal-3. Aldo increased Gal-3 expression in a dose-dependent manner. This effect was abolished by MR antagonists and by RNA and protein synthesis inhibitors. In Aldo-salt hypertensive rats, Gal-3 aortic expression, extracellular matrix proteins (collagen type I and III, fibronectin and elastin) and MMPs activities were enhanced. Spironolactone treatment reversed all the above effects. Aortic Gal-3 expression was positively correlated with collagen type I, elastin, MMP-2 and MMP-13 activity.

Conclusions: VSMCs spontaneously expressed Gal-3 and this expression was increased by Aldo via MR activation. In our experimental hyperaldosteronism model, the increase in Gal-3 expression was associated with aortic extracellular matrix alterations, suggesting a key role for Gal-3 in vascular remodeling.

PP25.288 UREPRESSION OF RENIN ANGIOTENSIN SYSTEM IN TYPE 1 DIABETES MELLITUS ASSOCIATED WITH HYPERTENSION

L. Morais, I. Watanabe, M. Franco, D. Arita, M. Gabbay, D. Casarini, S. Dib. Federal University of São Paulo, São Paulo-Brazil

The aim of this study was to assess the correlation between the activity of renin-angiotensin system (RAS), hypertension and hormonal responses in type 1 diabetes mellitus. A total of 82 diabetic patients were divided into 2 groups according to presence or absence of hypertension. Baseline values of the studied variables (e.g., age, diabetes duration, BMI, abdominal circumference, creatinine levels were to presence or absence of hypertension. Baseline values of the studied variables as age, diabetes duration, BMI, abdominal circumference, creatinine levels were significantly higher in the hypertensive group, indicating the development of metabolic syndrome and kidney failure. The similar levels of urinary angiotensin-
converting enzyme (ACE) activity and the high plasmatic levels of angiotensins in the hypertensive group indicates that the etiology of hypertension is a systemic atherosclerotic disease caused by the uncontrolled elevation of glomerular levels evidenced by HbA1c levels. The expected lower plasmatic levels of angiotensin II (Ang II) were not observed, even with lower ACE activity, indicating the activation of alternative Ang II-generating pathways. The high levels of angiotensin I-7 and the decreased ACE activity indicate that the ACE-inhibition therapy is partially effective, but not enough to successfully control blood pressure (BP). The exacerbation of the systemic RAS and the high levels of creatinine highlight the necessity of an aggressive treatment aiming to control the glucose and BP levels. The outcomes of RAS blockade may be visible only through evaluation of RAS levels, and the unsuccessful long-term results of the therapy could be partially explained by the unknown high levels of angiotensins.

**PP.25.289 IMPACT OF ANGIOTENSIN-CONVERTING ENZYME INSERTION/DELETION POLYMORPHISM ON BLOOD PRESSURE AND PROTEIN EXCRETION IN PATIENTS WITH OVERT PROTEINURIA**

M. Zrko1, R. Kukovac1, K. Galasc1.1 General Hospital Virovitica, Virovitica-Croatia, 1University Hospital Dubrava, Zagreb-Croatia

**Objective**: Proteinuria is the hallmark of renal disease. In essential hypertension the onset of de novo proteinuria is associated with faster rate of progression of disease. Observations on the association between the ACE gene polymorphism and hypertension have been inconsistent, which might be due to ethnic and geographical variations. It may also have different effects on the excretion of proteinuria by ACE inhibitors in patients with proteinuria. In this study was to investigate the relationship between ACE gene polymorphism and antiproteinuric effect of ACE inhibitors (ramipril) and to evaluate the possible association between I/D polymorphism and hypertension.

**Design and Methods**: We recruited 66 hypertensive patients (male 42, female 24) with overt proteinuria (urinary protein excretion over 500 mg/day). Patients were classified into three groups in accordance with ACE genotypes (17 DD; 35 ID; 14 II). They were treated with ramipril and prospectively followed up for one year. Various clinical parameters including age, body mass index (BMI), 24-h urine protein, creatinine, creatinine clearance (Ccr), systolic and diastolic blood pressure (SBP and DBP), mean arterial pressure (MAP) were measured in the pre- and post-treatment periods. The ACE gene insertion/deletion(I/D) polymorphisms in intron 16 were determined by PCR.

**Results**: There were no significant differences in the clinical parameters such as age, gender, serum creatinine, Cr, SBP, DBP, MAP, and daily urinary excretion of protein among three groups (P > 0.05). I/D genotype patients were found to have lower BMI (p = 0.031). The majority of patients had glomerulo-nephritis (GN): focal segmental glomerulosclerosis in 27%, membranous GN in 21%, IgA nephropathy in 19.7%, crescentic GN in 3%, minimal change nephritis (GN): focal segmental glomerulosclerosis in 27%, membranous GN found to have lower BMI (p = 0.031). The majority of patients had glomerulo-

**Conclusions**: D allele in the ACE genotype could be a useful genetic marker with important clinical, therapeutic and prognostic implications in recognizing patients with proteinuria that are at greater risk of renal damage.

**PP.25.290 RENAL ENHANCEMENT OF AT1 RECEPTOR-ASSOCIATED PROTEIN PREVENTS SALT-INDUCED HYPERTENSION**

K. Tamura, H. Waku, Y. Tsurumi-Ikeda, T. Dejima, A. Maeda, M. Ohawa, T. Kanaoka, J. Oshikawa, Y. Kobayashi, S. Minegishi, S. Yoshida, S. Masuda, K. Azuma, T. Ishigami, S. Umemura. 1The Department of Cardiorenal Medicine, Yokohama City University Graduate School of Medicine, Yokohama-Japan

The intrarenal rennin-angiotensin system plays a critical role in the regulation of renal hemodynamics and the maintenance of water electrolyte balance, and is also involved in the pathophysiology of hypertension and target organ damages. We previously identified a novel interacting molecule with angiotensin II type 1 receptor and named ATRAP (for angiotensin II type 1 receptor-associated protein). Previous studies showed that ATRAP promotes constitutive internalization of angiotensin II type 1 receptor to inhibit its downstream signaling. The present study was designed to investigate the putative functional role of ATRAP in the regulation of blood pressure by high-salt loading in vivo. We generated transgenic mice expressing ATRAP dominantly in renal distal tubules. In renal ATRAP transgenic mice, the development of high blood pressure on radiol-lemetry in response to high-salt loading was suppressed (from 120±2.2 to 126.3±2.8 mmHg in wild type mice, P < 0.01; from 120.5±2.5 to 122.4±2.9 mmHg in ATRAP transgenic mice, NS), concomitant with a significant increase in urinary sodium excretion, as compared to wild type mice. Furthermore, the mRNA level and plasma membrane protein expression of α-subunit of epithelial sodium channel were significantly decreased in the real ATRAP transgenic mice, compared with wild type mice. Theses results demonstrate that renal distal tubule-dominant overexpression of ATRAP in vivo suppresses the salt sensitive hypertension provoked by high salt loading, hereby suggesting ATRAP to be an interesting target in hypertension.

**PP.25.291 DIFFERENCES AMONG RENIN-ANGIOTENSIN SYSTEM BLOCKADES FOR THE TARGET ORGAN DAMAGE IN THE MODEL OF SODIUM SENSITIVE HYPERTENSION**

T. Ishigami, S. Minegishi, N. Araki, M. Umemura, H. Ushio, K. Abe, K. Uchino, S. Umemura. Yokohama City University Graduate School of Medicine, Yokohama-Japan

**Objectives**: Expression and transcription of voltage gated sodium channel, SCN5A, and its unique ubiquitinizing enzyme, Nedd4L, in cardiomyocytes are regulated by not only through angiotensin type 1 receptors but also type II receptors and mineralocorticoid receptors (MR). Minegishi, Ishigami et al. ESH2010. Currently our aim of study is to explore differences of the protection from myocardial target organ damages in the model of sodium sensitive hypertension by three different RA blocking agents such as perindopril (ACEI), olmesartan (ARB) and eplerenone (SAB) in terms of electrical remodeling and oxidative stresses.

**Materials and Methods**: Total twenty male 10 weeks old C57Bl6j mice were divided into five groups according to following interventions: normal salt diet, high salt (8% NaCl) diet, high salt diet with perindopril (ACEI, 2mg/kg/day, po), high salt diet with olmesartan (ARB, 3mg/kg/day, po), and high salt diet with eplerenone (SAB, 1.25g/kg chew), respectively. We measured the volume of drinking water, body weight and blood pressure by tail cuff methods for two weeks. At day 14, mice were sacrificed. Hearts were removed for subsequent protein, total RNA and histological analyses for SCN5A, Nedd4L and MR. Blood samples were collected by cardiac puncture for measurements of plasma aldosterone concentration. Immunohistochemistry for oxidative stress using anti-8-OHdG monoclonal antibodies were quantitatively examined by Image Pro Plus (MediaCybernetic Inc).

**Results**: Quantitative pc analyses revealed that the expressions of SCN5A and MR gene were enhanced according to high salt diet and suppressed significantly by ACEI and SAB, but not by ARB. Expressions of 8-OHdG in cardiomyocytes were also enhanced according to high sodium diet and suppressed significantly by SA, but not by ACEI and ARB.

**Conclusions**: In the cardiomyocytes for the developing model of sodium sensitive hypertension mouse, significant enhancements of SCN5A-MR gene expression and oxidative stress were observed. The effects of the blockade of rennin angiotensin systems by ACEI, ARB and SAB are significantly different, suggesting that selective combinations such as ACEI and SAB are more effective for the protection of target organ damages in the model of sodium sensitive hypertension.

**PP.25.292 THE EFFICACY OF ADDING EPLERENONE, A SELECTIVE MINERALOCORTICOID RECEPTOR ANTAGONIST, ON THE PATIENTS WITH RESISTANT HYPERTENSION - SUBGROUP ANALYSIS ON DIFFERENT LEVELS OF PLASMA RENIN ACTIVITY**

Fumitoshi Satoh, Ryo Morimoto, Yoshitugu Ikawaka, Yoshikyo Ono, Masataka Kudo, Sadayoshi Ito. Tohoku University Hospital, Sendai-Japan

**Introduction**: Eplerenone, a selective mineralocorticoid receptor antagonist, has become clinically available for the treatment of resistant hypertension in Japan since 2007. Eplerenone has been reported to have a potential antihyper-tensive ability with ± much fewer adverse effects than spironolactone, suggest-ing that it may become a first-line treatment for hypertension. This subgroup analysis on different plasma renin activity (PRA) levels assessed the effects of
addition of eplerenone to previous antihypertensive therapy in Japanese patients with resistant hypertension.

Methods: 233 patients had 25 to 100 mg of eplerenone once daily added to the treatment of hypertension that was uncontrolled despite previous treatment with three classes and more of antihypertensive drugs. Eplerenone was discontinued in two cases because of nausea. 231 cases (male/female = 103/128) were included in the following analysis. The population was 56.4 ± 9.4 year old and 27% had chronic kidney disease (CKD), which was defined as estimated GFR (eGFR) below 60 ml/min/1.73m². Mean blood pressure (BP) before the addition of eplerenone was 141.6/79.4 mmHg. The effects on BP was estimated by office measurements together with serum potassium, eGFR, PRA and other biomarkers. The data were analyzed on three levels of baseline PRA (PRA < 1), 1 < PRA < 4 (n = 82), 4 < PRA (n = 38) ng/ml/h respectively.

Results: At six months later after the addition of eplerenone, BP was significantly decreased by an average of 18.1/7.0 (PRA < 1), 18.6/4.5 (1 < PRA < 4) and 24.8/10 (4 < PRA) mmHg (all p < 0.01) in three groups of different levels of PRA respectively. There were no significant differences among these BP decreases of the three groups. There were no significant correlations between baseline PRA levels and BP decreases after eplerenone treatment. The serum potassium levels showed no significant change during treatment in any groups. Eplerenone was continued in all of 231 cases because of no adverse effects even in CKD patients.

Conclusions: Eplerenone has highly beneficial antihypertensive effects in Japanese patients with resistant hypertension without clinically critical adverse events. These effects of eplerenone did not depend on baseline PRA levels.

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**PP.25.293**

### OPPOSITE CHANGES OF PLASMA RENIN ACTIVITY AND ALDOSTERONE INDUCED BY SUNITINIB TREATMENT IN NEOPLASTIC PATIENTS

M. Rescaldani¹, D. Gambini², L. Turolo¹, G. Bolla¹, M. Tomirotti², F. Magrini¹, C. Sala¹.¹ Heart and Lung Department and Centro Fisiologia Clinica E Ipertensione. Università Di Milano, Milan-Italy.² Medical Oncology Unit, Fondazione Ospedale Maggiore Policlinico Di Milano, Milan-Italy

**Background:** Hypertension is a frequent adverse effect of treatment with angiotensinogen inhibitors in malignancies. To evaluate the role of the renin-aldosterone system in the blood pressure (BP) increase, we assessed plasma renin activity (PRA) and aldosterone (Aldo) before and after treatment with sunitinib (S), a blocker of vascular endothelial growth factor (VEGF)-mediating, in patients with metastatic renal cell carcinoma.

**Methods:** In 5 patients (age 56 ± 2 yrs, M/F 3/2, BMI 29 ± 2 kg/m², estimated creatinine clearance = 64 ± 7 ml/min/1.73 m²), 24 hour BP and heart rate (HR) were monitored, supine PRA and Aldo were measured and Aldo to renin ratio (ARR) was calculated at baseline, after the first cycle of sunitinib (50 mg/day for 4 weeks) and after 2 weeks recovery.

**Table shows means ± sem; *p < 0.05 vs baseline**

<table>
<thead>
<tr>
<th>BP</th>
<th>PRA</th>
<th>Aldo</th>
<th>ARR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>1150±664</td>
<td>72±4</td>
<td>4.7±0.4</td>
</tr>
<tr>
<td>Supine</td>
<td>1410±696</td>
<td>78±3</td>
<td>4.4±0.2</td>
</tr>
<tr>
<td>Recovery</td>
<td>1255±626</td>
<td>81±3</td>
<td>4.5±0.2</td>
</tr>
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</table>

**Results:** Renal function was unchanged during treatment. Overall, ARR was related to systolic and diastolic BP values (r = 0.68 and 0.60, respectively, p < 0.05).

**Conclusions:** Hypertension induced by chronic S treatment in neoplastic patients is associated with increased ARR; this humoral pattern of primary aldosteronism is reversed after S withdrawal.

### PP.25.294

### HYPERKALEMIA WITH ANGIOTENSIN RECEPTOR BLOCKERS MONOTHERAPY IN ESSENTIAL HYPERTENSION. A META-ANALYSIS


**Objective:** Angiotensin-receptor blockers are widely used in the treatment of hypertension and provide several benefits to patients with cardiovascular disease. Although major trials such as ONTARGET have shown an overall incidence of hyperkalemia of 3.3%, there is still a major concern for the risk of hyperkalemia that prevents physicians from using it as a standard of care in this setting.

**Design and Methods:** A PubMed and Cochrane search from randomized clinical trials was done from 1960 to November 2010. We pooled all the randomized clinical trials in which the incidence of hyperkalemia was compared head to head among any angiotensin receptor blocker to another antihypertensive drug class in patients with hypertension. Studies were excluded if additional antihypertensive were added. Effect estimates were pooled across studies using random-effects meta-analysis and heterogeneity was assessed using I² statistics. (RevMan 5).

**Results:** 5 studies with a total patient population of 2705 (mean age of 60 ± 7, 62% males, follow up of 7 weeks ± 3) were included in the analysis; 2 studies with Valsartan (160-320mg), 1 study with Irbesartan (300mg), Candesartan (16-32mg) and Olmesartan 10-40mg. The control groups included Placebo (7), Amlodipine and Hydrochlorothiazide. Hypertension was defined as a serum potassium concentration above 5.5 mEq/L. 48 patients out of 1196 (4.01%) had hyperkalemia on ARB compared to 53 out of 1509 patients (3.51%) on control/placebo, RR: 1.08 [0.63, 1.88], (p = 0.78) (Figure 1). Similarly, the patient withdrawal rate due to hyperkalemia was not statistically significant (p = 0.9).

**Conclusions:** The incidence of hyperkalaemia is very low and similar to controls when angiotensin receptor blockers are administered at different doses as a monotherapy in hypertensive patients with normal renal function.

### PP.25.295

### EFFECTS OF EXERCISE ON PLASMA RENIN ACTIVITY AND BLOOD PRESSURE: DIFFERENTIAL EFFECTS OF DIRECT RENIN INHIBITION (ALISKIREN) VERSUS ANGIOTENSIN RECEPTOR BLOCKER (VALSARTAN)

B. Williams¹, F. Baschiera², P.S. Lacy¹, M.F. Prescott¹, I. Botha², P. Brunel³. ¹Department of Cardiovascular Sciences, University of Leicester, Leicester-United Kingdom. ²Novartis Pharma AG, Basel-Switzerland. ³Novartis Pharmaceuticals Corporation, East Hanover-USA

**Objective:** Exercise-related rises in systolic blood pressure (SBP) predict cardiovascular risk. The role of renin-angiotensin system (RAS) activation and plasma renin activity (PRA) in mediating exercise-induced SBP changes has been poorly defined. This analysis assessed the effects of the direct renin inhibitor aliskiren and the angiotensin receptor blocker valsartan on PRA and SBP during exercise after 8 weeks' treatment and following a missed dose.

**Design and Method:** Patients with hypertension were randomly assigned to aliskiren 300 mg (n = 33) or valsartan 320 mg (n = 35). Treadmill exercise testing was performed to 85% of predicted maximum heart rate at baseline, after 8 weeks' treatment and 24 h after a missed dose. SBP and PRA were measured at rest, peak exercise and during recovery.

**Results:** Exercise increased SBP and PRA in both groups (Table). Aliskiren inhibited PRA during exercise and recovery by > 80% versus placebo. PRA inhibition was maintained 24 h post-missed dose. In contrast, valsartan markedly increased PRA at rest (+ 286% versus pre-treatment) and more so during exercise (+ 437%). This effect diminished by more than half 24 h post-missed dose. Despite divergent PRA responses, both treatments similarly reduced SBP at rest and during exercise.

**Conclusions:** Exercise is a potent stimulus of the RAS; it is a sensitive tool to interrogate differential drug effects and their duration of action. The SBP response to exercise is only partially attenuated by RAS blockade despite almost complete inhibition of PRA with aliskiren. The clinical significance beyond BP of exercise-induced increases in PRA and the divergent responses to two different RAS blockade strategies warrants further investigation.
Objective: Obesity is a health problem associated with hypertension and a high risk factor for cardiovascular disease. The obesity could be a situation when the organ lost the control of the physiological responses once one pathway of the system control the generation of Ang (1-7) an antihypertensive hormone acting to limit the cardiovascular target organ damage such as the heart, the vascular wall and the kidney. Supported by CNpq 142110/2007-8 and FAPESP 02/13290-2.

PP.25.296 PROSPECTIVE STUDY TO INVESTIGATE THE PREVALENCE OF THE 90 KDA ISOFORM OF ANGIOTENSIN CONVERTING ENZYME IN VITORIA - BRAZIL - PRELIMINARY RESULTS.

Andrea Cristina Da Silva Febba1, Fernanda Barrinha Fernandes1, Danielle Sanches Aragao1, Ricardo De Castro Cintra Sesso1, Jose Geraldo Mill2, Maria Do Carmo Franco1, Dulce Elena Casarini1. Federal University of Sao Paulo, Sao Paulo-Brazil, 2Federal University of Espirito Santo, Biomedical Center. Vitoria-Brazil

Objectives: Essential hypertension is a multifactorial and polygenic disorder, considered a public health problem. The renin angiotensin system have been implicated in the genesis of essential hypertension. We aimed to investigate the prevalence of the urinary 90 kDa N-domain ACE in a cohort of the population from Vitoria, Southeast region of Brazil and to verify its association with essential hypertension.

Design and Methods: A prospective study was performed in the Vitoria urban population to verify the presence of the urinary 90 kDa N-domain ACE, using the Western Blotting technique. The blood pressure was measured through an auscultatory method with column of mercury. The first phase of research had evaluated 1150 volunteers and the second evaluation was attended by 682 individuals (59%) of the sample.

Results: The urine of some of these subjects were analyzed and compared to the first phase: 96.8% had 90kDa ACE isoform. We observed that 10% of subjects, the 190kDa isoform disappeared, keeping only the 90 and 65kDa isoforms leading to the development of hypertension: 23.3% of those with the isoforms of 90 and 65kDa in the first phase were hypertensive showed the same profile in the second evaluation. Volunteers from the first phase that were normotensive presenting the isoforms of 190, 90 and 65kDa developed the same profile in both phases evaluation. Subjects with the three isoforms demonstrated the same profile in both phases of research and only 3.3% were normotensive and not express the 90kDa isoform.

Conclusions: This preliminary analysis indicated that 90% of subjects had 90kDa N-domain ACE in their urine samples and among those, only 33% had blood pressure levels within normal limits. 3.3% of normotensive subjects with the three ACE isoforms became hypertensive in the second phase. These data suggest a relationship between hypertension and the presence of 90 kDa ACE. Supported by Cnpq Process Number 141907/2008-8 and FAPESP02/13290-2.

PP.25.297 CIRCULATING RENIN ANGIOTENSIN SYSTEM PROFILE IN OBESE ADOLESCENTS.

Fernanda Barrinha Fernandes1, Adriana Barrinha Fernandes1, Andrea Cristina Da Silva Febba1, Cleber Aparecido Leite1, Maria Sylvia De Souza Vital1, Flavia Fernandes Jung1, Dulce Elena Casarini1. Federal University of Sao Paulo, Sao Paulo-Brazil, 1Department of Pediatrics, Georgetown University, Washington, D.C.-USA

Objective: Obesity and hypertension are two closely related conditions associated with high cardiovascular risk. The aim of the present study was to evaluate the relationship between obesity and circulating components of the renin angiotensin (RAS) and kallikrein kinin (KKS) systems.

Design and Methods: Subjects (n = 104) were divided as follow: 43 normal weight, 14 overweight, 37 obese and 10 morbid obese. The biochemical, anthropometric profiles were performed including the biochemical profile as height, weight, blood pressure (BP) and skinfolds. The Angiotensins [Ang I, Ang II, (1-7) and 2] and Bradykinin (BK) plasmatic levels have been measured by high-performance liquid chromatography (HPLC). Angiotensin converting Enzyme (ACE) activity was measured spectrophotometrically using Z-Phe-His-Leu (Z-PheHL) as substrate.

Results: All morbid obese subjects showed overt hypertension. This result is in agreement with the positive correlation between body mass index (BMI) with Systolic Blood Pressure (SBP) and Diastolic (DBP) in obese adolescents. Plasma Ang (1-7) levels were lower in morbid obese and obese compared with subjects with normal weight (0.06 ± 0.04; 0.24 ± 0.17 and 0.52 ± 0.21 respectively, p < 0.05). Ang (1-7) levels were inversely correlated with weight (r = -0.5 p < 0.01; BMI r = 0.6 p < 0.01; percentile of BMI (r = 0.6 p < 0.01) PAD (r = -0.21 p < 0.05) PAS (r = -0.23 p < 0.05); BK and Ang (1-7) were inversely correlated with skinfolds, waist hip ratio (WHR) and arm circumference (p < 0.05). Plasma Ang I levels were higher in morbid obese and obese compared with subjects with normal weight (0.06 ± 0.03; 0.04 ± 0.02 and 0.03 ± 0.02 respectively, p < 0.05). However plasma Ang II levels and ACE activity were not different between groups.

Conclusions: Obesity is a health problem associated with hypertension and a high risk factor for cardiovascular disease. The obesity could be a situation when the organ lost the control of the physiological responses once one pathway of the system control the generation of Ang (1-7) an antihypertensive hormone acting to limit the cardiovascular target organ damage such as the heart, the vascular wall and the kidney. Supported by CNpq 142110/2007-8 and FAPESP 02/13290-2.

PP.25.298 A PROXIMAL DIRECT REPEAT MOTIF CHARACTERIZED AS A NEGATIVE REGULATORY ELEMENT IN THE HUMAN RENIN GENE

T. Konoishi, S. Mizzu, Y. Makino, S. Wakahara, K. Arakawa, I. Inoki, I. Miyamori. Fuku University School of Medicine, Ehime-Japan

The regulation of renin gene expression is thought to be fundamentally to regulation of the total renin-angiotensin system. The human renin gene contains a direct repeat (DR) motif AGGGTCAC-AGGGCCA in the proximal region (-259/-245 bp), which contains similar sequence for nuclear receptor superfamily binding core motif, AGGTCA, and is the most similar to COUP-TFI consensus. The DR motif was evaluated as a functional cis-element with renal cortex and choio-decidual cells by footprint assay, electromobility shift assay (EMSA) and reporter assay. The DR motif site was protected by footprint analysis with a clear hypersensitive and a minor hypersensitive region in good accordance with the DR of the consensus. One of the binding proteins was strongly suspected to be COUP-TFI consensus-specific by EMSA. The DNA/protein complexes obtained with nuclear extract of renin producing cells could be completely blocked by homologous competitor and strongly blocked by the second-half mutant oligonucleotide of the DR motif but not by the first-half mutant oligonucleotide. Finally, the transcriptional activity of second-half mutant construct is slightly elevated and that first-half mutant construct is significantly stronger by 2-fold compared with wild type construct in reporter assay. This findings suggest that the DR motif site of the human renin gene functions as a negative regulatory element involved in a 2-fold repression of transcription and that member (s) of nuclear receptor superfamily bind the site and play important roles in the human renin gene expression with a possibility that one of the binding protein is COUP-TFI.

PP.25.299 HYPERKALEMIA AND COUGH WITH ANGIOTENSIN-CONVERTING ENZYME INHIBITORS MONOTHERAPY IN ESSENTIAL HYPERTENSION: A META-ANALYSIS

J. Romero, J. Kahan, W. Gonzalez. St. Luke's Roosevelt Hospital, New York, USA

Objective: Angiotensin-converting enzyme inhibitors (ACEs) are widely used in hypertension treatment and provide several benefits to patients. Although
trials such as ONTARGET have shown an overall incidence of hyperkalemia and cough to be 3.3% and 4.2% respectively, there is still concern for the risk of hyperkalemia that prevents physicians from using it as a standard of care and significant withdrawal rates occur due to dry cough.

Design and Methods: A PubMed and Cochrane search from randomized clinical trials was done from 1960 to January 2011. We pooled all randomized clinical trials in which the incidence of hyperkalemia and cough was compared among any ACEi to another antihypertensive drug class in patients with hypertension. Studies were excluded if additional antihypertensive were added. Effect estimates were pooled across studies using random-effects meta-analysis and heterogeneity was assessed using I2 statistics. (RevMan 5).

Results: 59 studies with a total patient population of 15701 (mean age of 56 ± 7.64% males, follow up of 13 weeks ± 4) were included in the analysis; ACEi was compared to Beta-blockers (9 studies), Calcium channel blockers (16 studies), Angiotensin-receptor blockers (13 studies), diuretics (11 studies), and placebo (6 studies). Hyperkalemia was defined as a serum potassium concentration above 5.5 meq/L and cough as a new dry cough after starting ACEi. 569 patients out of 10398 (5.47%) had dry cough on ACEi compared to 122 out of 5303 patients (2.3%) on controls/placebo, RR: 3.08 [2.15, 4.42], (p < 0.00001) (Figure 1). Nine patients out of 10398 (0.09%) had hyperkalemia on ACEi compared to 7 out of 5303 patients (1.3%) on controls, RR: 1.43 [0.20, 10.39], (p < 0.07), although withdrawal rates were not significant (p = 0.9).

Conclusions: The incidence of ACEi-associated cough seems to be higher than previously reported and might lead to poor compliance, whereas the incidence of hyperkalemia is very low and similar to controls.

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**PP.25.301 MODULATION OF EXTRACELLULAR MATRIX AND MAPK BY SUBPRESSOR DOSE OF ANGIOTENSIN II AND AT1 RECEPTOR BLOCKADE**


1Institute of Biomedical Sciences, University of Sao Paulo, Sao Paulo-Brazil, 2Heart Institute, University of Sao Paulo Medicine School, Sao Paulo-Brazil

**Introduction:** Angiotensin II (ANGII) has trophic effect leading to the development and progression of vascular lesions, mainly due to the modulation of extracellular matrix components and MAPK pathway. We evaluate the action of ANG II and AT1 receptor blockade on the matrix remodeling of the heart arteries and the profile of intracellular signaling independent of hemodynamic effects.

**Methodology:** male mice were treated for 7 and 14 days with a subpressor dose of ANGII (100 ng/kg/min), AT1-blocker losartan (LOS, 20 mg/kg), LOS + ANGII, or saline (CONT = Control). Were measured blood pressure and heart rate by tail plethysmography. Arteries were stained by picrosirius for perivascular collagen deposition, and studied by immunohistochemistry for collagen (COL) IV and VII, and fibronectin (FBN), and western blot was made for protein expression of MAPK pathway. Analysis of IHC was made by staining score (0 = none to 4 = intense). The results were compared by ANOVA, using p = 0.05 as significant.

**Results:** perivascular COL did not showed difference between treatment 7d; moreover, after 14d, ANGII increased thick collagen fibers (ANGII = 3.290 ± 0.76 arbitrary units) and these were reduced in LOS (1.50 ± 0.58 arbitrary units). ANGII increased score for COL IV after 7d (+100%) and 14d (+166%), but LOS + ANGII did not reverse this action after 7d (+166%) and 14d (+125%). ANGII increased COL VII after 7d (125%) and 14d (100%), when this increase was inhibited in LOS + ANGII. However, the concomitant treatment with LOS + ANGII increased the score for FBN. ANGII activated ERK and p38 ways in 7d and 14d, and LOS + ANGII seems to disable these pathways.

**Conclusions:** ANGII, independent of hemodynamic factors, may modulate vascular COL I, III, VII through AT1 receptor, COL IV and FBN through AT2 receptor, and activate ERK (cell proliferation and survival) and p38 (inflammation and apoptosis) leading to remodeling of perivascular extracellular matrix.

**Financial support:** FAPESP

**PP.25.302 RENIN-ANGIOTENSIN SYSTEM PARTICIPATION IN REMODELING OF CARDIAC ARTERIES OF CHRONIC SODIUM-OVERLOADED MICE**

C.T. Lima, J.C.S. Silva, T.C. Souza, K.A.S. Vegias, S. Lacchini. Institute of Biomedical Sciences, University of Sao Paulo, Sao Paulo-Brazil

To study the effect of chronic sodium overload upon artery wall structure in mice as well as the participation of renin-angiotensin system. Male C57Bl mice were divided into 3 groups: control (n = 7), treated with 1% saline for 2 weeks (13 weeks old mice, salt–2: n = 8) or 12 weeks (after weaning, salt–12, n = 9). Body weight was measured at weeks 4, 6, 8, 10 and 12, and at the end of the study were also measured pulse blood pressure (BP) and heart rate (HR) by tail plethysmography. Then, the hearts were collected, prepared for histological analysis, and sections were stained by Verhoeff-Van Giesen for analysis of arterial thickening and by picrosirius for analysis of perivascular collagen deposition. Immunohistochemistry evaluation of angiotensin I-converting enzyme (ACE), and angiotensin II was made by a semi-quantitative score (from 0 to 4, no staining to strong staining). The results were compared by ANOVA, using p = 0.05 as significant. At the end of the experiment, we did not observe differences in body weight, BP and HR. Also, vascular wall thickening was not different. On the other hand, perivascular collagen deposition reduced in treated groups (cont: 75.8 ± 28; salt–2: 38.5 ± 20; salt–12: 29 ± 30.4 μm). Concomitant with the alteration of collagen deposition, there were observed in arteries of sodium-treated mice increase in ACE protein (Cont: 0.25 ± 0.12; salt–2: 2.8 ± 0.28; salt–12: 2.52 ± 0.32 arbitrary units) and angiotensin II peptide (Cont: 1.07 ± 0.55, salt–2: 2.3 ± 0.8, salt–12: 3.27 ± 0.64 arbitrary units). The lack of change in BP and HR suggest that the structural changes observed are due to non-hemodynamic mechanisms. The reduction of ratio of perivascular collagen deposition and artery diameter suggest an important remodeling of the extracellular matrix, which can be determined by the increase in vascular ACE and angiotensin II in mice subjected to sodium overload. [Supported by FAPESP, CNPq].

**PP.25.300 RENIN AND ALDOSTERONE IN NEVER-TREATED HYPERTENSIVES WITH ERECTILE DYSFUNCTION**

D. Terentes-Preziosos, C. Vlachopoulos, G. Vyssoulis, N. Isokemidis, A. Aggelis, A. Sametzas, P. Potiria, N. Alexopoulos, K. Arnaoudis, P. Xaplanteris, C. Stefanadis. 1St Cardiology Department, Hippokration Hospital, Athens Medical School, Athens-Greece

**Objective:** Aldosterone is a steroid hormone that controls blood pressure and plays a role in salt and water homeostasis in the kidney. Dysregulation of the mineralocorticoid system is associated with various diseases such as hypertension, atherosclerosis and heart failure, which in turn are closely related with erectile dysfunction. We assessed the effects of the mineralocorticoid system on never-treated hypertensives with erectile dysfunction (ED).

**Design and Method:** We enrolled 80 hypertensive men with erectile dysfunction and 110 hypertensive men with normal erectile function, matched for age, and 110 hypertensive men with normal erectile function, matched for age, blood-pressure, sodium and potassium levels and plasma renin activity are increased in never-treated hypertensives with erectile dysfunction. These results provide further insights in the role of the mineralocorticoid system in the pathophysiology of erectile dysfunction in hypertension.

**Results:** of perivascular collagen deposition and artery diameter suggest an important remodeling of the extracellular matrix, which can be determined by the increase in vascular ACE and angiotensin II in mice subjected to sodium overload. [Supported by FAPESP, CNPq].

**PP.25.300 RENIN AND ALDOSTERONE IN NEVER-TREATED HYPERTENSIVES WITH ERECTILE DYSFUNCTION**

D. Terentes-Pratziotis, C. Vlachopoulos, G. Vyssoulis, N. Isokemidis, A. Aggelis, A. Sametzas, P. Potiria, N. Alexopoulos, K. Arnaoudis, P. Xaplanteris, C. Stefanadis. 1St Cardiology Department, Hippokration Hospital, Athens Medical School, Athens-Greece

**Objective:** Aldosterone is a steroid hormone that controls blood pressure and plays a role in salt and water homeostasis in the kidney. Dysregulation of the mineralocorticoid system is associated with various diseases such as hypertension, atherosclerosis and heart failure, which in turn are closely related with erectile dysfunction. We assessed the effects of the mineralocorticoid system on never-treated hypertensives with erectile dysfunction (ED).

**Design and Method:** We enrolled 80 hypertensive men with erectile dysfunction and 110 hypertensive men with normal erectile function, matched for age, body-mass index and blood pressure. ED was diagnosed according to comprehensive medical and sexual history, physical examination, score of the 5-item form of the International Index of Erectile Function, the Sexual Health Inventory for Men (SHIM score, < 21 indicates ED). Blood levels of aldosterone, plasma renin activity, sodium and potassium were measured in venous samples using standard techniques. Urine levels of aldosterone, creatinine, albumin, sodium and potassium were measured in 24h urine samples using standard techniques.

**Results:** Hypertensive patients with erectile dysfunction had higher urine aldosterone (19.33 ± 15.67 vs. 14.58 ± 7.81 ng/24h, P = 0.0007), plasma renin activity (2.11 ± 2.15 vs. 1.54 ± 1.52 ng/ml/h, P = 0.034, Figure) and urine albumin (41.2 ± 32.5 vs. 19.1 ± 118.9 mg/24h, P = 0.05). There were no significant differences in blood aldosterone, sodium, potassium levels and urine creatinine, sodium and potassium levels between the 2 groups (all P > 0.05). In the erectile dysfunction group, there were no significant relationships between the severity of erectile dysfunction (as expressed by SHIM score) and the abovementioned markers (all P > 0.05).

**Conclusions:** In conclusion, this study shows for the first time, that aldosterone levels and plasma renin activity are increased in never-treated hypertensives with erectile dysfunction. This results provide further insights in the role of the mineralocorticoid system in the pathophysiology of erectile dysfunction in hypertension.
Conclusions: ICAM-1 by acting on AT1 receptor. Also, AT2 blockade increased IL-1β.

When compared with AngII treatment, AT1 blockade decreased TGF-β, IL-1β, IL-6 and IL-10 serum levels and TNF-α plasma level, independently of hemodynamic alterations, at 24h after subpressor dose injection of AngII.

Aims: To evaluate the effect of subpressor angiotensin II (AngII) on expression of inflammatory markers in cardiac vessels.

Methods and Results: Used C57Bl/6j male mice, treated with subpressor dose of AngII (30ng/kg IP), and blockers. Subpressor dose was confirmed by arterial pressure measure after 10, 30, 60min, and 2 and 6h of AngII injection (n = 5/saline; n = 5/AngII). Temporal curve for expression of inflammatory markers was evaluated locally in cardiac vessels (TGF-beta, IL-1beta, IL-6, TNF-alpha and ICAM-1) by immunohistochemistry, and systemically in plasma (TNF-alpha and IL-6) by ELISA, after 30min and 60min, 2 and 6h, and 48h (n = 5/group).

It was observed an increase of local TGFbeta and IL-6 after 30min, and IL-1beta and ICAM-1 after 12h, and systemic IL-6 after 60min. However, TNF-alpha did not changed both locally and systemically. AT1 and AT2 receptors were blocked (isosartan, 20mg/kg, and PD123.319, 15mg/kg); saline, AngII, losartan, and AngII + losartan, PD123.319, and AngII + PD123.319 (n = 5/group). TGF-beta and IL-6 were evaluated after 30 minutes, and IL-1beta and ICAM-1 after 12 hours. Blockers combination with AngII showed that AngII increases TGF-beta, IL-1beta, IL-6 and ICAM-1 by acting on AT1 receptor. Also, AT2 blockage increased IL-1beta.

Conclusions: The results strongly suggests that, independently on hemodynamic influences, AngII leads to expression of inflammatory markers in cardiac vessels by AT1 receptor, and AT2 present antagonistic related to IL-1beta. [Supported by CAPES and FAPESP].

Influence of C-Reactive Protein and Serum Uric Acid on Subclinical Damage Arteries in the Essential Hypertensive Patients

E. Oschepkova, V. Dmitriev, O. Gushchina, V. Titov, A. Rogoza. Russian Cardiology Research and Production Complex, Moscow-Russia

Objective: To evaluate the aim of our study in previously investigated associations between C-reactive protein (CRP) and serum uric acid (SUA) with brachial-ankle pulse wave velocity (baPWV), ankle brachial index (ABI) and flow-mediated dilation (FMD) in the essential hypertension patients (EH pts) grade I.

Design and Methods: 65 EH pts (44 M, 21 F) grade I, av. age 44.3 ± 1.5 years, without antihypertensive therapy for 2 weeks before study. All pts had short duration of EH. Patients with acute inflammatory diseases, not earlier than 2 months were included in study. High-sensitivity CRP was defined by a turbidimetry method, SUA was defined by a UF method on the uricase specific analyzer. baPWV, ABI and FMD was measured by VaSera VS-1500, Fukuda Denshi. 24-hour blood pressure monitoring (24-h BPM) was carried out by Meditech ABPM-04 (Hungary). The statistical analysis was carried out by nonparametric methods of Spearman with STATISTICA 6. The data is presented as M ± m.

Results: 24-h SBP were 133.3 ± 1.3 mm Hg, 24-h DBP were 80.8 ± 1.3 mm Hg. In the EH patients CRP levels were 5.5 ± 1.8 mg/L, increase of CRP (> 3 mg/L) was found in 22 patients (33%). Increase in age adjusted baPWV was found in 25 (38%) EH pts. In the whole group of EH pts was found significant association CRP and 24-h SBP (r = 0.27; p < 0.05) and SUA (r = 0.40; p < 0.01). Also, in all EH pts was found significant positive association CRP and baPWV (r = 0.37; p < 0.05), ABI (r = 0.41; p < 0.05) and negative association CRP with FMD (r = -0.42; p < 0.05). Similar associations SUA with subclinical damage arterial wall in the EH pts grade I was not demonstrated.

Conclusion: We found significant association of CRP, but not SUA, with subclinical damage arteries in the hypertensive grade I. Our results suggest influence of subclinical inflammation processes on the subclinical damage arteries in the hypertensive patients.

Red Cell Distribution Width, Methylyglyoxal and Total Antioxidant Activity in the Essential Hypertensive Patients

V. Dmitriev, E. Oschepkova, V. Titov, A. Rogoza. T. Polevaya. Russian Cardiology Research and Production Complex, Moscow-Russia

Objective: The aim of our study was to compare red cell distribution width (RDW) level, prooxidant and antioxidant properties depending on Essential hypertension grade.

Design and Methods: 93 EH pts (60 M, 33 F) grade I or II, without diabetes mellitus, av. age 45.0 ± 1.2 years, without antihypertensive therapy for 2 weeks before study. All pts had short duration of EH. Patients with acute inflammatory diseases, not earlier than 2 months were included in study. MG level was defined by liquid chromatography (normal level is 12.1-29.8 nmol/mL). High-sensitivity C-reactive protein (CRP) was defined by a turbidimetry method. Total antioxidative activity (AOA) blood serum was determined by liquid chromatography with electrochemical detection. Malondialdehyde (MDA) production was assessed by a modified thiobarbituric acid assay. RDW was calculated as (Standard deviation of MCV = mean MCV) x 100%. 24-hour blood pressure monitoring (24-h BPM) was carried out by Meditech ABPM-04 (Hungary). The statistical analysis was carried out by nonparametric methods of Mann-Whitney with STATISTICA 6. The data is presented as M ± m.

Results: The average levels of RDW, Mg, total AOA were considerably higher in the EH grade I group compared to EH grade II group, MDA levels was not different (Table).

Conclusion: Our study revealed positive association RDW level and grade of EH in the hypertensive pts without antihypertensive therapy and acute inflammatory...
concentric type of LVH was reliably higher with healthy persons. In the same time there were no differences in IGF-1 blood concentrations between healthy persons and patients with eccentric type of LVH.

**Conclusions:** The relationship between TGF-β1 and IGF-1 in patients with concentric and eccentric types of LV hypertrophy (LVH) correspondingly.

The work is aimed to study the influence of transforming growth factor-β1 (TGF-β1) and insulin like growth factor-1 (IGF-1) on the left ventricle (LV) remodeling in patients with essential hypertension (EH) and type 2 diabetes mellitus (DM).

Materials and Methods: 68 patients with EH and type 2 DM were examined. 20 healthy persons were included to control group. Structural and functional heart values were obtained by echocardiography in B- and M- regimens with a standard method using LOGIQ-5 device. Concentrations of growth factors were determined by immuno enzyme assay. For TGF-β1 and IGF-1 determination were used reagents of DRG (Germany) and DSL (USA) and production correspondingly.

**Results:** TGF-β1 blood level in hypertensive types LV of remodeling was significantly higher compared with healthy persons (6.8 ± 1.14) ng/ml. No differences in blood TGF-β1 concentrations were revealed between the patients with concentric and eccentric types of LV hypertrophy (LVH) correspondingly (17.2 ± 2.1) mg/ml and (15.8 ± 1.16) mg/ml; p > 0.05. The data obtained show that the investigated growth factors are involved in the process of pathological heart remodeling in patients with EH and type 2 DM. Concentric type of LVH is characterized by elevated synthesis of TGF-β1. IGF-1 level was revealed to be increased in patients with EH and type 2 DM compared with healthy persons (124.6 ± 10.0) ng/ml and (95.3 ± 2.7) ng/ml correspondingly, p < 0.05. There was a relationship between the type of LVH and IGF-1 level. The patients with concentric LVH had significantly higher level of IGF-1 (158.2 ± 11.3) ng/ml compared with the patients who had eccentric type of LVH (91.2 ± 10.2) ng/ml. In this case blood concentration of IGF-1 in patients with concentric type of LVH was reliably higher with healthy persons. In the same time there were no differences in IGF-1 blood concentrations between healthy persons and patients with eccentric type of LVH.

**Conclusion:** The relationship between TGF-β1 and IGF-1 and left ventricle remodeling in patients with EH and type 2 DM was established in this work. The essential pathogenetic role of IGF-1 deficit in the progress of LVH with LV dilatation in LVH of patients was revealed. The activation of TGF-β1 synthesis in patients with EH and type 2 DM is probably oppressed IGF-1 secretion.

**Reference:**

1. O. Gushchina, E. Oschepkova, V. Dmitriev, V. Titov, N. Lazareva, A. Rogoza. *Russian Cardiology Research and Production Complex, Moscow, Russia*

**Purpose:** Hyperuricaemia is a risk factor for the development of essential hypertension. Hyperuricaemia is the earliest sign of kidney damage in hypertensive patients. The aim of our study was to investigate the influence of losartan on the level of uric acid in serum, urine and renal function in hypertensive patients.

**Materials and Methods:** 20 EH pts (15-M, 5-F) grade 1 or 2, duration of hypertension (5.7 ± 0.76 years), av. Age 42.9 ± 2.6 years, without antihypertensive therapy for 2 weeks before study. Pts were examined before and after 6-8 weeks therapy of losartan (45-100 mg/d). Serum uric acid (SUA) and uric acid in urine (UAU) (1.48-4.43 mmol/day) were defined by a UF method. Uric albumin excretion (UAE) was defined by a turbidimetry method. Clearance of creatinine (Ccr) was calculated by the formula: Ccr = (173 x weight (kg)) / (24-h urine by Cocroft-Gault). 24-h blood pressure monitoring was performed by Meditech (Hungary). The statistical analysis was carried out by nonparametric methods with STATISTICA 6.

**Results:** Significant association between SUA and Ccr (r = 0.61, p < 0.05) was found before the therapy. All pts had normal renal function and increased level of UAU before treatment. The av. levels of SUA, UAE decreased significantly during the therapy. The level of UAE decreased but not significantly. Blood pressure was lowered significantly. Ccr didn’t change significantly.

**Conclusion:** 6-8 weeks losartan therapy leads to decrease levels of serum uric acid and malondialdehyde that may reduce level of oxidative stress in hypertensive patients.

**Reference:**

1. O. Gushchina, V. Dmitriev, V. Titov, N. Lazareva, A. Rogoza. *Russian Cardiology Research and Production Complex, Moscow, Russia*

**Purpose:** The study objective was to test the serum resistin and leptin levels and to evaluate influence of moxonidine on serum resistin and leptin concentrations in hypertensive postmenopausal women with metabolic syndrome.

**Materials and Methods:** 26 hypertensive (AH grades 1-2) postmenopausal women with MS 52.5 ± 0.4 years old and 23 normotensive PW without MS. MS was diagnosed according to ESC-ESH (2007) criteria. Patients were treated with moxonidine (400-600 mcg/day orally) during 12 weeks. Serum resistin and leptin levels were determined by ELISA. Statistical analyses were performed using SPSS 17.0 for Windows (SPSS, Inc., Chicago, IL, USA).

**Results:** The Moxonidine treatment resulted in significant decreasing of systolic and diastolic blood pressure: 145.5 ± 1.2/88.3 ± 1.2 mm Hg vs 140.7 ± 1.2/80.6 ± 1.7 mm Hg (p < 0.05 for both). The leptin levels were significantly increased (p < 0.05), whereas resistin levels were decreased (p < 0.05) during the therapy. The level of UAU decreased significantly. Blood pressure was lowered significantly. Ccr didn’t change significantly.

**Conclusion:** 6-8 weeks losartan therapy leads to decrease levels of serum uric acid and malondialdehyde that may reduce level of oxidative stress in hypertensive patients.

**Reference:**

1. E. Oschepkova, O.Gushchina, V. Dmitriev, V. Titov, N. Lazareva, A. Rogoza. *Russian Cardiology Research and Production Complex, Moscow, Russia*
129.5 ± 0.9/79.9 ± 1.2 mm Hg (p < 0.001). Serum leptin concentration in postmenopausal hypertensive women with MS was high in comparison with normotensive PW without MS (107.2 ± 12.0 and 27.9 ± 2.8 ng/ml; p < 0.0001). Serum resistin level in both groups did not differ (4.03 ± 0.28 and 3.84 ± 0.29 ng/ml; p = 0.97). Moxonidine therapy did not influence serum leptin level: 107.2 ± 12.0 ng/ml vs 101.4 ± 11.7 ng/ml (p = 0.06), serum resistin level also did not differ: 4.03 ± 0.28 ng/ml vs 3.99 ± 0.24 ng/ml (p = 0.90). We revealed positive correlations between serum leptin concentration and body mass index, serum leptin and waist circumference (r = 0.52 and 0.51, accordingly; p = 0.007 and 0.01 accordingly). Correlations between serum resistin and insulin, serum resistin and triglycerides, serum resistin and insulin resistance index HOMA-IR were revealed (r = 0.44; -0.42; 0.41, accordingly; p = 0.04; 0.05 and 0.05 accordingly).

**Conclusion:** Hypertensive postmenopausal women with metabolic syndrome had high serum leptin concentration, moxonidine therapy did not significantly changed serum leptin and resistin level.
POSTER SESSION

OBESITY

PP.26.311  RENAL DENERVATION REDUCES CENTRAL SYMPATHETIC DRIVE AND IMPROVES INSULIN SENSITIVITY IN PCOS

M. Schlaich¹, N. Straznicky¹, M. Grima¹, C. Ika Sari¹, E. Lambert¹, R. Chopra¹, G. Lambert¹, F. Mahfoud², M. Boehm², M. Esler². ¹Baker IDI Heart and Diabetes Institute, Melbourne-Australia; ²Department of Medicine III/Cardiology, University of Homburg/Saar, Homburg/Saar-Germany

Objective: Polycystic ovary syndrome (PCOS) is associated with sympathetic nervous system activation, insulin resistance and blood pressure elevation. Renal nerve ablation has been demonstrated to reduce sympathetic outflow and improve blood pressure control. Here we report on the effects of renal denervation on hemodynamic, metabolic and renal parameters in two obese PCOS patients with hypertension.

Methods: Sympathetic nerve activity was assessed at baseline using micro-neurography and NE spillover measurements. Insulin sensitivity was assessed by euglycaemic hyperinsulinaemic clamp. Measurements of cystatin-C, creatinine-clearance and urinary albumin-creatinine ratio were also obtained. All measurements were repeated 3 months after bilateral renal denervation achieved via percutaneous endovascular radiofrequency ablation.

Results: Muscle sympathetic nerve activity (MSNA) and whole body NE spillover were substantially elevated at baseline in both patients by −25.3 fold. Bilateral renal nerve ablation reduced both indices of sympathetic nerve activity. This was associated with moderate reductions in blood pressure and a substantial improvement in insulin sensitivity by −17.5% in the absence of weight changes at 3 months follow up. Glomerular hyperfiltration and urinary albumin excretion were also reduced.

Conclusions: These findings corroborate the relevance of sympathetic activation in PCOS and suggest that renal denervation not only exerts beneficial effects on blood pressure control but also on insulin sensitivity, renal, and endocrine abnormalities characteristic of PCOS.

PP.26.312  AMBULATORY BLOOD PRESSURE MONITORING IN PATIENTS WITH NON-ALCOHOLIC FATTY LIVER DISEASE AND METABOLIC SYNDROME

O. Korneeva¹, O. Drapkina¹, N. Korneev², V. Ivashkin¹. ¹I.M. Sechenov First Moscow State Medical University, Moscow-Russia; ²N.N.Burdenko Central Military Clinical Hospital, Moscow-Russia

Background: Non-alcoholic fatty liver disease (NAFLD) is a common condition associated with Metabolic Syndrome (MS). At the same time Arterial hypertension (AH) is one of the criteria of the MS. Our aim was to investigate the characteristics of arterial hypertension (AH) in patients with NAFLD and MS by ABPM.

Methods: Were enrolled 60 MS patients with clinic, laboratory, ultrasound and histological proven NAFLD (36 men, age 48 ± 13 years, BMI 33 ± 5 kg/m², waist circumference men 114 ± 11 cm, women 109 ± 10 cm, Non-alcoholic steatohepatitis (NASH) in 42% (n = 25) and 20 AH lean subjects. All NAFLD patients were insulin resistant HOMA-IR 5.8 ± 3.6. In the NASH group AST levels were 87.2 ± 46.5 IU/L, ALT 77.9 ± 34.4 IU/L. AH diagnosed in 88.3% (n = 53) patients with NAFLD. Non-dipping was defined as a less than 10% fall in systolic BP from day to night. BP variability was evaluated as the standard deviation day and nighttime ABP.

Results: The characteristics of AH in NAFLD patients by ABPM were systolodiastolic hypertension daytime, systolic hypertension nighttime, high pulse pressure (PP), high “pressure-time index” (PTI) day and nighttime and prevalence of non-dipping status. AH patients with NAFLD compared with control group had higher systolic ABP daytime (p = 0.028); higher PP (p = 0.0005); higher systolic PTI daytime (p = 0.006) and nighttime (p = 0.028); higher BP variability of systolic, diastolic day and nighttime ABP; impaired dipping status with 56% prevalence of non-dippers in hypertensive and normotensive patients with NAFLD (p < 0.012).

Conclusions: Our study have shown special characteristics of the ABPM in patients with NAFLD that included high systolic ABP daytime, high PP, high systolic PTI, BP variability and prevalence of non-dippers. These results demonstrated the mal role of insulin resistant in both pathological conditions – AH and NAFLD.

PP.26.313  HEMODYNAMIC CHARACTERISTICS OF HYPERTENSION IN METABOLIC SYNDROME

E. Praskurnichiy³, N. Pozdnyakova³. ³Russian Academy for Postgraduate Medical Education, Moscow-Russia, ²National Research Center for Preventive Medicine, Moscow-Russia

Objective: To clarify the contribution of the metabolic syndrome in the hemodynamic disorders development in patients with hypertension.

Design and Method: 101 patients with hypertension stage I-II were included and divided into 2 groups: with the metabolic syndrome (n = 58) and without it (n = 43). Both groups were comparable in age, sex, major risk factors, hypertension severity and hypertension history duration. 24-hour ambulatory blood pressure (BP) monitoring and bicycle stress test were carried out. Mean diurnal, nocturnal and 24-hour BP, BP variability, magnitude and speed of morning BP surge and BP increase under load were calculated. We also studied heart rate variability parameters, such as SDNN, pNN50%, RMSSD, TR and LF/HF ratio.

Results: Mean diurnal, nocturnal and 24-hour systolic, diastolic and pulse BP values in patients with and without metabolic syndrome were the same. However, the significantly higher systolic BP variability (18.2 ± 0.6 vs. 16.4 ± 0.2 mmHg; p < 0.05) and the magnitude and speed of morning systolic BP surge (58.0 ± 2.3 vs. 44.0 ± 4.3 mmHg and 17.4 ± 3.8 vs. 12.0 ± 1.2 mmHg/ hour respectively; p < 0.05) were reported in patients with metabolic syndrome. During bicycle stress test all patients demonstrated hypertensive type reaction. In addition, systolic BP increase was significantly higher in group with metabolic syndrome compare to patients without clinical and laboratory metabolic syndrome signs (66.0 ± 1.9 vs. 60.3 ± 1.4 mmHg; p < 0.05). The heart rate variability analysis found a general tendency to reduce variability of heart rate which is typically for hypertension. In addition, SDNN, RMSSD and pNN50% were significantly lower in the group with metabolic syndrome that indicates a greater reduction in parasympathetic activity of the autonomic nervous system in these patients.

Conclusions: Arterial hypertension associated with metabolic syndrome is characterized by the exacerbation of prognostically adverse hemodynamic disorders, in particular the greater systolic BP variability, systolic BP surge in the early morning hours and more significant systolic BP increase in stress test. Probably severe autonomic nervous system imbalance inherent in hypertension and metabolic syndrome is the pathogenetic basis of these features.


I. Chulaevska, V. Romanov, T. Belayieva, O. Mitchenko. Institution of Cardiology, Kyiv-Ukraine

Objective: New criterion of metabolic syndrome (MS) according to IDF for determination of patients with high-risk of diabetes and cardio-vascular diseases is not determined. Therefore we lead the comparative analysis of revealing MS by ATP III and IDF for verification of the patients with the factors of cardiovascular risk.

Design and Methods: 100 patients, among of them 42 women (mean age 54.2 ± 2.1) and 58 men (mean age 51.1 ± 1.9 years) were examined. The patients included in clinical groups depending on a gender and waist circumferences (WC). The women: 1 group (n = 10) with WC < 80 sm, II gr. (n = 10) with
WC 80-88 sm, III gr. (n = 22) with WC > 88. At the men: I gr. (n = 14) with WC < 94 sm, II gr. (n = 20) with WC 94-102sm, III gr. (n = 24) WC > 102 sm. Were determined: body mass index (BMI), blood pressure monitoring lipids, glucose, insulin fasting levels with definition of an index HOMA. At an index HOMA > 2.77 defined insulin resistance (IR).

Results: Among all women, according to ATP III, MS was found at 75.0%, and by IDF – at 84.0%. In the II gr. the greater revealing of MS by ATP III than by IDF, 83.3% against 33.3%. At the same time the using of IDF criteria among women of the II gr. has increased the revealing of IR up to 30.0% and patients with dyslipidemia up to 20.0%. At the men, according to ATP III criteria, the MS was revealed at 50.0% and by IDF criteria at 62.0%. In the II gr. the greatest difference was marked in detecting MS, from 14.3% by ATP to 43.0% by IDF. The progressing of abdominal obesity at men was also associated with increasing of lipids and carbohydrates disorders. Beginning from the II gr. of men with abdominal obesity by IDF not only increase of IR, but appearance of 14.3% of patients with D and 30% of patients with dyslipidemia is observed.

Conclusions: Using a new consensus on metabolic syndrome increases the detection of patients at high risk of cardiovascular disease on average by 9% in women and 12% in men. The progressing of abdominal obesity, beginning from 80 sm at women and 94 sm at men, was accompanied by increasing of lipids carbohydrates disorders and as a result by quantity increase of patients with IR symptoms in the both groups and by appearance of D among men. Verification of the metabolic syndrome for a new consensus (2009) is more optimal for detecting patients with pre-diabetes as the patients with high cardiovascular risk.

**PP.26.315** LEPTIN CONCENTRATIONS IN HYPERTENSIVE WOMEN WITH METABOLIC DISORDERS IN MENOPAUSE

N. Pytetska, on behalf of Department of Internal Medicine. Kharkiv National Medical University, Kharkiv-Ukraine

Background: There is a growing evidence that hyperleptinemia is an additional independent component of metabolic syndrome (MS) and also an independent risk factor of antheroclesis development. Nevertheless the effect of menopause on leptin serum concentrations in women with metabolic disorders remains unclear.

Objective: to determine leptin concentrations in dependence on hormone status in women with MS.

Design and Methods: 150 hypertensive women with MS according to IDF guidelines (2005) were observed and included into 3 groups. The 1st group consisted of 50 premenopausal women, the 2nd group – of 83 women being in physiological menopause, the 3rd group – of 17 women with surgical menopause. All the patients underwent the Oral Glucose Tolerance Test with identification of glucose and insulin concentrations, calculation of HOMA index, determination of atherogenic markers of lipid metabolism (triglycerids, low density lipoproteins, high density lipoproteins), leptin and progesterone levels.

Results: it was determined that progesterone levels in women with surgical menopause (5.45 ± 0.80 nmol/l) were lower than those in women with physiological menopause (7.22 ± 0.76 nmol/l, p > 0.05) and were significantly lower compared to women in premenopause (7.68 ± 0.74 nmol/l, p < 0.05). Progesterone deficiency was associated with glucose and lipid metabolism disorders in women of the 2nd group and especially the 3rd one in comparison with the 1st group. Basal insulin concentration, triglycerids, low density lipoprotein ranges were significantly higher and high density lipoprotein levels were considerably lower in the 3rd group compared to the 1st group (p < 0.01, p < 0.05, p < 0.05 respectively). Analyzing leptin concentrations, no significant difference between groups was detected, but leptin levels were minimal in the 1st group (13.15 ± 1.90 ng/ml) and maximal - in the 3rd group (17.09 ± 2.26 ng/ml).

Conclusions: It was estimated the tendency to elevation of leptin levels in postmenopausal women, especially in those with surgical menopause. The tendency was associated with significant changes of atherogenic markers of lipid metabolism and hyperinsulinemia.

**PP.26.316** PHYSICIAN’S EXPECTATIONS ABOUT NON-PHARMACOLOGICAL TREATMENTS FOR THE PREVENTION OF OBESITY: THE HYPERTENSION 2020 PROJECT

A. Coca1, J. Ampudia2, E. Lopez De Sa3, P. Aranda3, P. Couthe4, B. Llisterri5. 1Hospital Clinic, Barcelona-Spain, 2Hospital Clinico Universitario, Valencia-Spain, 3Hospital La Paz, Madrid-Spain, 4Hospital Carlos Haya, Malaga-Spain, 5Hospital Gregorio Maranon, Madrid-Spain, Centro Ingeniero Bentloech, Valencia-Spain

Introduction: Although it is known that the promotion of physical exercise produces favourable effects on traditional cardiovascular risk factors, improves the lipid profile, lowers blood pressure and prevents the onset of adult diabetes, there is controversy about the best way to achieve this. This study analyses the expectations of physicians on non-pharmacological measures to control obesity, particularly diet and physical activity, based on data from the Hypertension 2020 survey.

Methods: The Hypertension 2020 Project analyzed the opinions of Spanish physicians about expectations on cardiovascular risk in the near future, with special reference to hypertension, through an analysis of data from a survey on perceptions on the future application of future non-pharmacological measures to control obesity and overweight in patients with hypertension. We carried out a quantitative study using self-completed online questionnaires administered to 109 physicians between 30 and 65 years of age from departments of Internal Medicine, Nephrology, Cardiology, Endocrinology and Primary Care throughout Spain in 2010.

Results: The NAOS Strategy (Strategy for Nutrition, Physical Activity and Obesity Prevention), promoted by the Spanish Ministry of Health and based on EU guidelines was considered an appropriate form of encouraging correct lifestyles through healthy eating and regular physical activity. Respondents considered that although the cardiovascular benefits of the Mediterranean diet have been demonstrated, the current pace and style of life in Europe may hinder the pursuit of a healthy diet. As for the future, promoting physical activity is seen as important in controlling the growing obesity epidemic. Respondents recommended that work directives should be drawn up to facilitate access to physical activity, supplemented by information strategies. As suggested by the International Federation of Sports Medicine, a regular program of aerobic exercise, such as walking, running, swimming or cycling, in 3-5 sessions of 30-60 minutes per week may be sufficient. Both Companies and Unions should modify labour regulations to promote and facilitate the implementation of these strategies in working hours.

Conclusions: The promotion of physical education programs in primary schools, the development of active healthy habits within the family and regular physical activity in adults, are considered as some of the most important measures for the prevention of obesity. Aerobic activities are the most highly recommended. The choice of activity for each subject will depend on factors such as interest and tastes, access to sports facilities, age, working hours and fitness. New labour regulations are required for companies and unions to promote and facilitate these strategies.

**PP.26.317** EFFECT OF PROTEIN DIET IN PATIENTS WITH METABOLIC SYNDROME

Nieves Escribano, Pilar Zafriola, Jose Anton Gomez, Jose Abellan, Juana Mulero, Ucam, Murcia-Spain

Purpose of the study: To evaluate the effect of a protein diet in patients with metabolic syndrome.

Material and Methods: We conducted a descriptive study, in which the sample population included 50 individuals of both sexes (24% male and 76% female), aged between 18 and 68 years old. All patients included in the study signed the consent, in accordance with international recommendations on Clinical Investigation of the Declaration of Helsinki. The study was performed in Murcia (south-east Spain). 30% of the selected patients suffered from metabolic syndrome, diagnosed according to the NCEP criteria (National Cholesterol Education Program), defined in 2001 in the ATP (Adult Treatment Panel III). Patients with kidney, liver or heart failure, type 1 diabetes mellitus, cancer, alcoholism or other addictions, pregnancy, lactation and bulimia were excluded from the study. The patients were subjected to a protein diet for 4 months with examinations performed every 15 days during the active phase, in which their physical state (current weight, changes in their eating habits, entry or expansion of physical exercise) and dietary reeducation were recorded. The protein diet is structured in a full range of preparations based on proteins of high biological value, in accordance with current legislation (EC Directive 96/8 of 1996) and low glycemic load vegetables. During the period in which this diet is performed it is necessary to provide micronutrient supplements (potassium, calcium, magnesium, vitamins and trace elements) in order to avoid nutritional deficiencies (protein supplies). The average caloric intake of this type of diet is 750 Kcal/day and aims to achieve weight loss, which is maintained by food re-education and physical activity. Data were processed using SPSS v. 15.0.
Results: After 4 months of protein diet the prevalence of metabolic syndrome was reduced by 30% to 4%. The mean weight loss of the sample population was 9.0 ± 3.8 kg (men 11.0 ± 20.2 kg and women 6.6 ± 13.9 kg) (p ≤ 0.05). After the diet the average weight in the sample population decreased 17.6 ± 7.9 kg. A greater weight reduction was observed in males than in females (23.7 ± 8.8 Kg and 15.9 ± 6.7 Kg respectively) (p ≤ 0.05). There was an average final weight of 73.4 ± 7.4 Kg in men and 68.6 ± 9.2 Kg in women (p ≤ 0.05). Mean BMI decreased 0.4 ± 0.2 kg/m² for men and 6.1 ± 2.9 Kg/m² for women (p ≤ 0.05).

Conclusions: The protein diet is effective in weight loss in a short lapse of time and it also decreases the metabolic syndrome, improving associated cardiovascular risk factors.


Blood pressure is strictly related to biological maturity and acceleration of biological maturation expressed as difference between bone age and chronological age (BA-CA) closely correlates with blood pressure status.

Design and Methods: The study aimed to determine relation of BA-CA (assessed using dual energy x-ray absorptiometry) with markers of subclinical target damage (TOD), metabolic abnormalities, oxidative stress and immune activity in 54 hypertensive children and 54 BMI-, age- and sex-matched healthy, normotensive children. In all patients anthropometrical measurements including body mass index (BMI), waist circumference (WC), waist-to-hip ratio (WHR), waist-to-height ratio (WHHR), blood pressure, carotid (cIMT), and femoral superficial artery intima-media thickness (iMT), left ventricular mass index (LVMI), albumin excretion, oral glucose tolerance test, insulin, blood lipids, homocysteine, uric acid, C reactive protein (hsCRP) and serum adiponectin and leptin levels were assessed. Fat tissue distribution (deep (dSAT), superficial scutaneous fat (sSAT), omental (oSAT) and total visceral fat (VAT)) was assessed by magnetic resonance imaging (MRI).

Results: Hypertensive children had significantly greater BA-CA than normotensive children (1.8yrs P ≤ 0.9 vs. 0.4yrs P ≤ 0.7, P = 0.0001). There were no correlations between BA-CA and WC. Increased BA-CA correlated with VAT (R = 0.239, P = 0.03) and with oSAT (R = 0.223, P = 0.03), but did not correlate with sSAT and dSAT. BA-CA correlated with serum uric acid level (R = 0.388, P = 0.0001). hsCRP (R = 0.233, P = 0.01), homocysteine (R = 0.222, P = 0.02) concentration, and with a number of metabolic syndrome criteria (R = 0.448, P = 0.0001). The magnitude of acceleration of biological maturation correlated also with markers of oxidative stress expressed as oxyLDL (R = 0.658, P = 0.0001) and ADMA concentration (R = 0.543, P = 0.0001). Both cIMT (R = 0.257, P = 0.001) and LVMI (R = 0.309, P = 0.004) were significantly increased in children with accelerated tempo of maturity.

Conclusions: The process of biological maturation appeared as significantly accelerated in hypertensive children and the magnitude of acceleration of biological maturation correlated with VAT and oSAT. Moreover, the severity of both metabolic and target organ damage abnormalities correlated with the rate of acceleration of biological maturation.

J. Coulson, J.Cockroft. Cardiff University, Cardiff-United Kingdom

Objective: Obesity is associated with an increased risk of cardiovascular disease. The mechanisms underlying this relationship are not well described. Factors including increased inflammation, insulin resistance and excess sympathetic nervous system activation. We characterised the haemodynamic and catecholamine response to forearm isometric contraction (FIC) in obese and non-obese young adults.

Design and Methods: 12 healthy volunteers (6 female), performed isometric forearm contraction at rest and at 40% of maximum grip for 5 minutes. Plasma catecholamines were measured at baseline and after effort. Haemodynamics were recorded at 60 minute intervals by a non-invasive, oscillatory, arm-cuff (Omron). Peripheral alpha and beta adrenoreceptor sensitivity and baroreceptor sensitivity were calculated by measuring haemodynamic response to infused isoprenaline (β1-agonist, 0-2 mg) and phenylephrine (α-agonist, 0-200 mg).

Results: Baseline catecholamine concentrations were similar between the groups. Plasma norepinephrine increased to a greater extend in the high BMI group following FIC, P < 0.001. Post-FIC plasma norepinephrine concentration correlated with BMI, P < 0.01. There was no difference in plasma epinephrine concentration post-FIC between the groups. Mean arterial pressure (MAP) was greater in the high BMI group, P = 0.03. Baseline MAP also correlated with BMI, P < 0.01, but not with the % increase in MAP post-FIC. The increase in MAP during FIC was slightly greater in the high BMI group, P = 0.01, but not with the % increase in MAP post-FIC.

Conclusion: The greater increase in plasma norepinephrine, but not in plasma epinephrine, following FIC suggests an exaggerated sympathetic response in the high BMI group. This is further supported by the correlation between
baseline MAP and BMI. Further, larger, studies are now planned to investigate this apparent association between BMI and increased sympathetic activity.

**PP.26.321** INSULIN-LIKE GROWTH FACTOR BINDING PROTEIN-2 IN THE PATHOGENESIS OF HYPERTENSION AND METABOLIC SYNDROME IN PERIMENOPAUSAL WOMEN

A. Olszanecka1, A. Posnik-Urbanska1, K. Kawecka-Jaszcz1, D. Czarnecka1, D. Fedak1, 1Department of Cardiology and Hypertension, Jagiellonian University Medical College, Krakow-Poland, 2Chair of Clinical Biochemistry and Diagnostics, Jagiellonian University Medical College, Krakow-Poland

In the pathogenesis of hypertension after menopause, metabolic disturbances play an important role. Insulin-like growth factor-I (IGF-I) is a potent mitogen and important stimulus for adipocyte differentiation. The biological action of IGFs is closely regulated by a family of IGF binding proteins (IGFBPs). IGFBP-2 is a principal binding protein secreted by differentiating white pre-adipocytes, suggesting a potential role in the development of obesity. During the transition from premenopause to postmenopause, many women experience weight gain and central fat deposition, hence we hypothesized that IGFBP-2 can play a role in the pathogenesis of hypertension and metabolic syndrome in perimenopausal women.

The study included 192 women aged 40 to 60 years (mean age 51.7 ± 1.82 years, 152 with mild and moderate essential hypertension and 40 normotensive age-matched controls. In all subjects anthropometrical measurements and 24-h ABPM were performed. Serum levels of IGFBP-2, IGFBP-3 and IGF-I were measured using an immunochromatologocal assay. Fasting blood samples were taken for glucose, insulin and serum lipids concentration.

**Results:** Postmenopausal women (n = 93) did not differ from premenopausal women (n = 99) in respect to mean arterial pressure (normotensive 85.2 ± 5.6 vs 84.4 ± 4.9 mmHg; hypertensive 99.5 ± 5.9 vs 98.4 ± 5.3 mmHg). Menopause did not influence parameters of glucose metabolism. Diagnostic criteria of metabolic syndrome fulfilled 32% hypertensive women compared to 5% of normotensive (p < 0.01). Hypertensive women had significantly lower IGFBP-2 level than normotensive (162 ± 83 vs 273 ± 101 µg/l, p < 0.01). Multiple regression analysis explained a rather small proportion of BP variation (R = 0.32). However significant correlation with BP was found for BMI (r = 0.28, p = 0.01) and IGFBP-2 (r = -0.35, p = 0.02). IGF-I and IGFBP3 levels did not differ between groups.

**Conclusions:** In hypertensive perimenopausal women decreased IGFBP2 level may play a role in the pathogenesis of hypertension and metabolic syndrome. Menopause per se does not influence blood pressure. Further studies are needed to elucidate the role of IGFBPs in the assessment of cardiovascular risk.

**PP.26.322** THICKNESS OF EPICARDIAL FAT AS A POSSIBLE MARKER OF METABOLIC SYNDROME

G. Chumakova1, N Veselovskaya2, A Kozarenko2, O Gritsenko1. 1Outpatient Hypertension Clinic, Hospital Dr. Negrin, las Palmas de Gran Canaria-Spain, 2Endocrinology Dept, Hospital Dr. Negrin, las Palmas de Gran Canaria-Spain

**Objective:** To define efficiency of medicinal preparation of Vildagliptin, influence on visceral obesity, indexes of carbohydrate, lipid exchange and circadian blood pressure profile for patients with metabolic syndrome, hypertension, 1 stage and impaired glucose tolerance (IGT).

**Materials and Methods:** The study included 20 patients aged from 18 to 60 years of which 12 men and 8 women had impaired glucose tolerance in combination with visceral obesity, hypertension 1 stage. The dose was not changed at patients with previous antihypertensive therapy. All patients performed the 12-week treatment with vildagliptin 50 mg daily.

**Results:** Both combinations were well tolerated and effectively reduced blood pressure and albuminuria in a similar fashion. The olmesartan/amiodipine combination significantly reduced 8-PEGF2 alpha by 22.2% at 13 weeks (P < 0.01), whereas 8-PEGF2 alpha was reduced by 19.3 - 25.6, p < 0.001) at 26 weeks; and ADMA by 18.8% at 13 weeks (12.9 - 27.4, p = 0.022) and by 26.3% (18.4 -37.6, p = 0.009) at 26 weeks. The olmesartan/hydrochlorothiazide combination reduced 8-PEGF2 alpha by 4.7% at 13 weeks and 5.2% at 26 weeks; and ADMA by 3.9% at 13 weeks and by 3.8 at 26 weeks (all non-significant).

**Conclusions:** Both olmesartan-based combinations were safe and effective, but the amiodipine combination improved the studied markers of oxidative stress and endothelial dysfunction and may have advantages over the hydrochlorothiazide combination beyond blood pressure reduction, besides the already known amelioration of inflammatory and metabolic markers.

**PP.26.324** THE EFFECTIVENESS OF THERAPY VILDAGLIPTIN IN THE TREATMENT OF PATIENTS WITH ARTERIAL HYPERTENSION, METABOLIC SYNDROME AND IMPAIRED GLUCOSE TOLERANCE

V. Mychka, K. Ivanov, V. Masenko. Russian Cardiology Research and Production Center, Moscow-Russia

**Aim:** To define efficacy of medicinal preparation of Vildagliptin, influence on visceral obesity, indexes of carbohydrate, lipid exchange and circadian blood pressure profile for patients with metabolic syndrome, hypertension, 1 stage and impaired glucose tolerance (IGT).

**Materials and Methods:** The study included 20 patients aged from 18 to 60 years, of which 12 men and 8 women had impaired glucose tolerance in combination with visceral obesity, hypertension 1 stage. The dose was not changed at patients with previous antihypertensive therapy. All patients performed the
identification and comparative assessment of carbohydrate metabolism (fast-
ing glucose, postprandial blood glucose), lipids (total cholesterol, triglycer-
ides, high density lipoprotein cholesterol, low density lipoprotein cholesterol),
circadian blood pressure, body mass at baseline and on the background of a 24-
week treatment Vildagliptin.

Results: After the background of Vildagliptin treatment a 24-week patients
achieved a significant reduction in body weight from 98.12 ± 18.5 kg
93.9 ± 18.74 kg (p < 0.001); waist circumference from 110.9 ± 12.17 to
104.8 ± 12.39 cm (p < 0.0001). Also as a result of the therapy in patients
there was a significant reduction in postprandial glucose from 9.19 ± 0.99
to 7.65 ± 1.03 mmol/l (p < 0.0006), fasting glucose from 6.16 ± 0.28 to
5.88 ± 0.26 mmol/l (p < 0.0067); total cholesterol level from 5.96 ± 0.75 to
5.21 ± 1.03 mmol/l (p < 0.0001), by reducing the level of low density lipo-
proteins from 3.8 ± 0.69 to 3.14 ± 0.97 mmol/l (p < 0.0031). Indicators of
high density lipoprotein were not significantly changed. According to the daily
blood pressure readings there was indicated a persistent decline in systolic
blood pressure from 136.0 ± 7.29 mmHg (P < 0.0001), dia-
stolic blood pressure from 85.6 ± 7.58 to 76.6 ± 5.62 mmHg (p < 0.0001).
According to the analysis of clinical and biochemical indicators hypoglycemia
was not observed.

Conclusion: The results of the therapy Vildagliptin achieved weight loss,
wast circumference, and significantly reduced carbohydrate and lipid metabo-
lism and met the target blood pressure values. Episodes of hypo-
glycemia are not registered.

PP.26.325  GENE-SPECIFIC DISRUPTION OF ANGIOTENSIN II TYPE 1 RECEPTOR-ASSOCIATED PROTEIN REVEALS A NOVEL ROLE IN THE PATHOGENESIS OF METABOLIC SYNDROME

A. Maeda, K. Tamura, H. Waku, T. Tejima, M. Ohsawa, T. Kanaoka, S. Hako, S. Masuda, K. Azuma, M. Matsuda, Y. Toya, S. Umemura. Yokohama City University Graduate School of Medicine, Yokohama: Japan

Objective: A pathological activation of renin-angiotensin system (RAS) in
adipose tissue has recently been implicated in the development of meta-
abolic syndrome. However, the molecular mechanisms involved still should
be determined. We previously cloned a novel molecule that specifically
interacts with angiotensin II type 1 receptor (AT1R) to exert a functionally
selective inhibition of AT1R signaling, and we named the molecule ATRAP/
Agtrap. In this study, we generated ATRAP deficient mice (Agtrap<sup>−/−</sup> mice) to elucidate the physiological role of ATRAP in the pathogenesis of metabolic syndrome.

Design and Methods: We designed a targeting vector that replaces exons
3, 4, and 5 of the Agtrap gene with the neomycin cassette. This vector was
linearized and electroporated into ES cells, and G418-resistant clones were
analyzed by Southern blotting for proper homologous recombination. A total
3, 4, and 5 of the Agtrap gene with the neomycin cassette. This vector was
analyzed by Southern blot analysis. Mice were fed either a standard diet
and wild type littermates at baseline. When fed a high fat diet, however, epi-
thyroid fat weight of Agtrap<sup>−/−</sup> mice was significantly increased compared with
wild type littermates (125 ± 11.2 g, p < 0.05).

Results: After 6 weeks of feeding, systolic blood pressure was measured noninvasively
by increased accumulation of fat pad and hypertension, when fed a high fat
diet. These results suggest that ATRAP plays a protective role against meta-
bolic syndrome.

Conclusions: Metabolic syndrome is much more frequent in men than in
women in young adults. The most frequent criteria were hyperglycemia and
hypo-HDL-mia. Elevated glucose serum levels and hypertension were less fre-
quent and type 2 diabetes was rare.

PP.26.326  METABOLIC SYNDROME IN YOUNG ADULTS: A RISK FACTOR FOR CARDIOVASCULAR DISEASES

A. C. Pacurar<sup>1</sup>, L. Radu<sup>1</sup>, A. Narita<sup>1</sup>, C. Serban<sup>1</sup>, L. Susan<sup>1</sup>, S. Gotta<sup>1</sup>, I. Romosan<sup>1</sup>, I. T. Medical Clinic University of Medicine and Pharmacy

Victor Babes, Timisoara-Romania, 2Department of Physiotherapy University
of Medicine and Pharmacy Victor Babes, Timisoara-Romania, 3Department of
Physiology University of Medicine and Pharmacy Victor Babes, Timisoara-Romania

Objectives: The prevalence of metabolic syndrome is increasing worldwide.
Hypertension, dyslipidemia, insulin resistance and obesity characterize the met-
abolic syndrome. The aim of this study is to evaluate the prevalence of metabolic
syndrome in young adults, university graduates with a sedentary lifestyle.

Design and Methods: The study was carried out in an ambulatory medical
service on a group of 68 young patients diagnosed with metabolic syndrome
according to the IDF criteria. Systolic and diastolic blood pressure, waist cir-
ference, glucose, HDL- cholesterol, triglycerides blood levels were mea-
sured. The mean age of the patients was 30.3 ± 10.5 years. All the patients were
graduates from a university and work 8-10 hours/day on a desk.

Results: From the patients 80.9% were men and 19.1% were women.
Hypertension was present in 16.2% of the patients, hypertriglyceridemia was
present in 52.9% of patients, hypo- HDL-mia was present in 41.2% of patients,
type 2 diabetes was present in 2 patients, glucose serum level higher than 100
mg/dl was present in 13.2% of patients. The waist circumference was higher
than 80 cm in women and 94 cm in men (IDF criteria). From the patients 39.7%
of the patients had non-alcoholic fatty liver disease.

Conclusions: Metabolic syndrome is much more frequent in men than in
women in young adults. The most frequent criteria were hyperglycemia and
hypo-HDL-mia. Elevated glucose serum levels and hypertension were less fre-
quent and type 2 diabetes was rare.

PP.26.327  BLOOD PRESSURE, URINARY OUTPUT AND SODIUM EXCRETION RESPONSE TO LOWER BODY NEGATIVE PRESSURE IN OBESE PATIENTS

G. Wuerzner, N. Glatz, V. Forni, S. Trehblay, C. Zweiacker, B. Vogt,
M. Burnier. Chur, Lausanne-Switzerland

Background: Obesity has been associated with increased sympathetic nervous
system (SNS) activity. Whether this increased activity affects renal function, a
key factor in blood pressure regulation, has been poorly studied in humans.
Lower body negative pressure (LBNP) has been shown to induce reflex renal
SNS stimulation.

Objective: To compare the effect of LBNP on systemic hemodynamics (SH),
urinary output (UV) and sodium excretion (UNaV) in obese patients with or
without hypertension and healthy controls.

Methods: SH, UV and UNaV were measured before and during one hour
-30mbar LBPN. In each group baseline period was compared to LBNP period
using a paired t-test. Antihypertensive drugs if any, were stopped > 7 days
before the study day in treated patients.

Results: 6 obese participants without hypertension (OBNTN), 4 obese partici-
pants with hypertension (OBHTN) and 4 healthy normotensive controls were
included in the study. Mean age ± SD was respectively 31.2 ± 5.5, 44.8 ± 7.4
and 28 ± 11.8 years. Mean body mass index ± SD was respectively 34.7 ± 4.4,
36.5 ± 4.2 and 21.7 ± 0.8 kg/m². Table 1. Systemic hemodynamic, UV and
Sodium excretion response to LBNP in healthy volunteers and hypertensive
patients.

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<th>Mean BP (mmHg)</th>
<th>Heart rate (bpm)</th>
<th>UV (ml/min)</th>
<th>UNaV (μmol/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>LBNP</td>
<td>Baseline</td>
<td>LBNP</td>
<td>Baseline</td>
</tr>
<tr>
<td>OBNTN</td>
<td>134±6.9</td>
<td>95±4.11</td>
<td>68±6.8</td>
<td>65±5.3</td>
</tr>
<tr>
<td>OBHTN</td>
<td>138±6.4</td>
<td>94±5.3</td>
<td>65±4.8</td>
<td>5.5±3.7</td>
</tr>
</tbody>
</table>

Data are mean±SD, *P<0.05 vs baseline period

Conclusions: One hour LBNP induces a more pronounced decrease in UV
and UNaV in obese normotensive and hypertensive patients. This finding
suggests an increased sensitivity of renal function to SNS stimulation in
obesity. This might play a role in the pathophysiology of obesity-related
hypertension.
PP.26.328  EFFECT OF Q192R POLYMORPHISM OF PAROXONASE-1 GENE (PON1) ON METABOLIC SYNDROME COMPONENTS

Olga Bolshakova1, Olga Belyaeva2, Valentina Larionova3, Vladimir Timoshin3.

Abstract: Aims: To investigate the association of Q192R polymorphism of PON1 gene with metabolic syndrome (MS) in the children born small for gestational age (SGA). Method: We studied 60 subjects with MS according to IDF criteria (36 males, mean age 48 ± 1.0 years were enrolled. Birth parameters were obtained from medical records. SGA was defined as birth weight (BW) under 10th percentile for gestational age and obesity as BMI ≥ 25 kg/m². According to the presence or absence of obesity and BW the subjects were divided into four groups: (1) non-obese with normal BW (N = 50), (2) obese with normal BW (N = 40), (3) non-obese SGA (N = 67), (4) obese SGA (N = 28). BP was measured using oscillometric manometer (Omron M6) and Spacelab 90207 BW (N = 40), (3) non-obese SGA (N = 67), (4) obese SGA (N = 28). BP was measured using oscillometric manometer (Omron M6) and Spacelab 90207 BW (N = 40). Results: BP levels were associated with hip circumference related with both systolic and diastolic BP levels: r = 0.35, p = 0.0000, r = 0.29, p = 0.0005 and r = 0.21, p = 0.0016, r = 0.24 p = 0.0005 and r = 0.21, p = 0.0016, r = 0.22 p = 0.0013, accordingly. PP.26.329  OBESITY IS AN IMPORTANT DETERMINANT OF SYSTOLIC BLOOD PRESSURE IN YOUNG MEN BORN SMALL FOR GESTATION AGE


Abstract: Background: Recent reports have shown that concurrent obesity influences blood pressure (BP) phenotype in children born small for gestational age (SGA). Our study have shown special characteristics of the ABPM in patients with MS that included high systolic ABP daytime, high PP, high “pressure-time index” (PTI) day and nighttime ABP. Results: In 136 (61.8%) patients with MS arterial hypertension (HTN) was revealed in 192 (86.9%) patients of SGA group. In patients SGA hypotension was found in 40 (18%) patients we detected impaired glucose tolerance. Q192R genotype of PON1 gene was found in 109 (50.9%) patients, QR variant - in 86 (40.2%), and RR genotype – in 19 (8.9%) patients with MS. HTN was seen in 79% of patients with RR genotype and in 55.6% of patients with QQ polymorphism, in QR polymorphism HTN rate was 64.7%, as well between the obese SGA compared to the obese subjects had higher systolic ABP daytime (p = 0.028); higher PP (p = 0.00005) and higher systolic PTI daytime (p = 0.006) and nighttime (p = 0.028); higher BP variability of systolic, diastolic day and nighttime ABP; impaired dipping status with 58% prevalence of non-dippers in hypertensive and normotensive patients with MS (p < 0.012). These results demonstrated possible links between insulin resistant and hypertension. Conclusion: In addition to birth weight and shorter pregnancy duration obesity concurrently and significantly determines systolic BP in young normotensive men and may contribute to the early vascular ageing. Our findings are in agreement with the results obtained in children and point to a need for aggressive implementation of healthy lifestyle as early as possible in the population subset particularly prone to develop hypertension.

PP.26.330  RAMIPRIL IN TREATED PATIENTS WITH METABOLIC SYNDROME AND DIASTOLIC DYSFUNCTION

O. Drapkina, V. Ivashkin. Moscow Medical University, Moscow-Russia

Purpose: To investigate ramipril efficiency beyond of its antihypertensive action in the treatment of extremely high risk (SCORE ≥ 15%) patients with combination of Metabolic Syndrome (MS) and diastolic dysfunction (DD).

Method: randomized controlled open-label prospective clinical study has been conducted. Thirty patients with confirmed MS and moderate-to-severe DD were subsequently enrolled in the study and than randomized for conventional therapy including dihydralazine calcium-channel blockers (CCB) and beta-blockers (BB) + ramipril 10 mg o.d. Results: Clinicaly, ramipril use was associated with more significant reduc- tion in daytime ABP variability and pulse pressure.

Conclusion: Ramipril on the top of CCB and BB was effective in DD, EF and life quality improvement in extremely high risk patients with HHD, DD and MS. Interestingly, atrial conduction time was accelerated only in ramipril group that might enclose important mechanism of ACE protection against atrial fibrillation.

Objective: Lipid tetrad index (LTI) and lipid pentad index (LPI) incorporate several lipids, lipoproteins, including LDL- (LPI) and apolipoproteins into their calculation schemes. The purpose of this study was to evaluate the role of these conventional lipid profile parameters in evaluation of the atherogenic risk in hypertensive patients with metabolic syndrome.

Design and Method: Our prospective study comprised 92 consecutive hypertensive patients that were divided in two groups after the presence of NCEP criteria of metabolic syndrome: first group comprised 44 hypertensive patients without atherogenic dyslipidemia (HTN-DYS group) and the second group comprised 48 patients that met the NCEP criteria for metabolic syndrome (HTN + MS group). The patients were similar in terms of sex, smoking status and family history of CAD. The concentrations of lipids, lipoproteins, and apolipoproteins were measured by standard laboratory methods. Lipid Tetrad Index (LTI) and lipid pentad index (LPI) were calculated.

Results: We found a significant increase in mean levels of Lp(a), Apo B, Total cholesterol (TC), Low Density Lipoprotein-Cholesterol (LDL-C) and Triglyceride (TG) in HTN + MS group than HTN-DYS group. Apo A-I and High Density Lipoprotein-Cholesterol (HDL-C) values decreased in HTN + MS compared to HTN-DYS group. LTI was significantly higher in HTN + MS group (median = 69.2 [0.58-19.14], mean = 7.91 ± 5.15) than in HTN-DYS group (median = 1.37 [0.28-10.77], mean = 3.11 ± 3.01; p < 0.001). LPI was significantly higher in HTN + MS group (median = 52.54 [4.41-124.47], mean = 55.62 ± 3.89) than in HTN-DYS group (median = 4.62 [0.94-53.35], mean = 10.66 ± 12.17; p < 0.001).

Conclusions: The daily use of novel bioindexes in clinical practice could enable a more precise evaluation of the atherogenic risk in hypertensive patients with metabolic syndrome.

F. D’Amico1, T. Pipicella2. 1Department of Geriatrics Hospital of Patti-School of Medicine University of Messina, Messina-Italy, 2Department of Geriatrics Hospital of Patti, Messina-Italy

Objective: This study assessed the prevalence of risk of fall in elderly people affected by metabolic syndrome (MS). Falls are frequent in the eldest and therefore lead to a high risk for morbidity and mortality causing death in 72% of all deceases due to falls among all the people. The metabolic syndrome was assessed through the NCEP ATP III standards: 1) obesity (waist > 88 cm for women; > 102 cm for men); 2) high values of triglyceride (>150 mg/dl); 3) high levels of triglyceride (>150 mg/dl); 3) low values of HDL cholesterol (< 40 mg/dl for men and 50 mg/dl for women); 4) high levels of blood pressure (> 130/85 mmHg) or antihypertensive treatment; 5) high glycemia at awakening (110-126 mg/dl).

Methods: We studied 13 women (mean age 76 ± 7) and 10 men (mean age 75 ± 6) affected by MS already under treatment. They were compared with a control group 15 women (mean age 74 ± 6), 9 men (mean age 76 ± 5) non affected by MS. The patients entered both the day-hospital and outpatients care unit of our geriatric department and have been assessed in the Laboratory of Kinesiology. Design included: 1) Tinetti balance and gait scale; 2) grip force measure. The Tinetti scale is a predictive risk of fall index; its scores are: <1 severely impaired mobility subject; between 2 and 19 ambulant but with high risk of fall subject; > 20 low risk of fall subjects. The measure of grip force resulted from 3 separate measurements employing specific meters for 500 mg weights. The cognitive function was assessed through the MMSE related to age and education. We also inspected records concerning BMI and comorbidity.

Results: 5 women and 5 men affected by MS had a 24 ± 4 mean Tinetti score showing a low risk of fall, while 8 women and 6 men had a 14 ± 5 mean score indicating a high risk of fall. In the control group 6 women and 2 men had a 25 ± 3 mean score showing a low risk of fall, while 3 women and 2 men had a 16 ± 3 mean score related to a high risk of fall. The mean grip force score was Kg 17.5 in elderly people affected by MS and Kg. 21.0 in the control group. In those patients affected by MS and with a Tinetti score showing a high risk of fall we detected significant relations between the risk of fall and the grip force score (p < 0.05). In those subjects belonging to the control group the same relation was not significant. We also found out that a minor grip force was directly linked to a higher risk of fall (p < 0.01). Actually 89% of patients affected by MS had a grip force score < Kg 16 and a Tinetti score = 12 predictive of risk of fall (p = 0.5).

Conclusion: This study detected the incidence of fall of and of a reduced muscular strength in elderly people affected by MS and also in subjects non-affected by MS. Thus we established a relation between risk of fall and reduction of muscular strength.
associated with MetS. Cut-off values for identification of subjects with MetS, derived from ROC curve analysis, were 0.88 for SIRT1, 1.1 for p60cic and 1.09 for FoxO3, with APTII definition and 0.88 for SIRT1, 0.98 for p60cic and 1.10 for FoxO3, with IDF definition, respectively. The combination of SIRT1 and FoxO3 expression had a specificity and sensitivity of 82% and 95%, respectively, with APTII criteria and of 78% and 81% respectively, with IDF criteria.

Conclusions: Longevity genes may be considered as molecular markers for better identifying subjects at risk of MetS and reduced lifespan.

**PP.26.336** DECREASED INSULIN SENSITIVITY BUT COMPARABLE PLASMA LEPTIN AND ADIPOGENIC CONCENTRATIONS IN YOUNG LEAN HYPERTENSION MEN

A. Penesova1, Z. Radikova1, V. Belan2, E. Cizmarova1, M. Vlcek1, R. Imrich1. 1Institute of Experimental Endocrinology Sas, Bratislava-Slovak Republic, 2Radiology Clinic of Faculty Hospital, Bratislava-Slovak Republic.

Objective: Preferential abdominal visceral adipose tissue (VAT) deposition has been associated with the presence of insulin resistance in obese and/or hypertensive patients. We investigated the association of parameters of insulin sensitivity with the amount of VAT in young, lean, non-treated males with recently hypertensive patients. We investigated the association of parameters of insulin sensitivity with the amount of VAT in young, lean, non-treated males with recently hypertensive patients.

Design and method: Twenty-one males with high normal blood pressure or hypertension grade 1 (HT).

Results: HT patients had higher IR HOMA (2.4 ± 0.4 vs. 1.2 ± 0.1, p = 0.007) and lower ISI CED and ISMAT (58 ± 3 vs. 77 ± 4, p = 0.0001 and 51 ± 0.6 vs. 90 ± 0.8, p = 0.001, respectively) than NT subjects. The two study groups did not differ in plasma levels of leptin and adiponectin, and fasting and post load concentrations of glucose and insulin were measured in plasma. Indices of insulin sensitivity Cederholm (ISICED), Matsuda (ISMAT) and insulin resistance (IR HOMA) were also estimated. Abdominal VAT and subcutaneous fat depot were measured by MRI (transverse scan in the space between L4 and L5).

Conclusions: These results demonstrate that already lean subjects with recently established higher blood pressure and with normal fasting and post load glucose levels display signs of insulin resistance. These changes were not accompanied with higher amount of abdominal fat or higher levels of adipocytokines.

**PP.26.337** DISORDERS OF BLOOD FIBRINOLOGY ACTIVITY IN PATIENTS WITH METABOLIC SYNDROME AND HYPERURICEMIA


Aim: To estimate correlation of uric acid level with intensity of clinical and biochemical disorders in patients with metabolic syndrome (MS).

Design and Methods: 57 patients with metabolic syndrome and overweight/obesity (BMI more than 25 kg/m2) were included into investigation. Among them 19 men and 38 women, mean age 39.3 ± 15.4 years. For MS verification IDF criteria [2005] we used. All patients had overweight or obesity, dyslipidemia, and hyperuricemia. 40 patients had hypertension with average systolic blood pressure level 155 ± 10 mm Hg, diastolic blood pressure 85 ± 5 mm. The control group consisted of 20 practically healthy persons comparable to the investigated group by an age and gender. In all patients we performed anthropometry, physical examination. Blood lipids and PAI-1 measurement were made on biochemical analyzer "Immunoochemistry Systems" (produced by "Beckman Coulter" with "Human" (lipids) and "Teknokrome" (PAI-1) reagents. Data were processed with Statistica 6.0 software. Spearman's nonparametric correlation analysis is used.

Results: of the research showed that in 22 patients PAI-1 level was elevated (more than 43 ng/ml, mean value was 134.2 ± 75.4 ng/ml). Correlation analysis showed that uric acid blood level closely correlated to anthropometric parameters and systolic pressure level in patients with MS: waist circumference [r = 0.55, p = 0.0005], weight [r = 0.41, p = 0.0037], systolic pressure [r = 0.36p; 0.0014]. Also positive correlation of hyperuricemia and following biochemical characteristics was found: PAI-1 level [r = 0.59, p = 0.002], LDL[r = 0.55; p = 0.003].

Conclusions: hyperuricemia in patients with MS is associated with more expressed abdominal obesity, systolic hypertension, dyslipidemia and decrease of blood fibrinolytic activity that leads to increased cardiovascular risk.

**PP.26.338** RHOKINEASIS INHIBITION IMPROVES NITRIC OXIDE-DEPENDENT VASODILATOR REACTIVITY DURING HYPERINSULINEMIA IN PATIENTS WITH METABOLIC SYNDROME

F. Schinanzi1, M. Tesauro1, V. Rovella2, P. Gentilesci3, N. More3, A. Adamo3, C. Cardillo3, 1Istituto Patologia Medica, Università Cattolica del Sacro Cuore, Roma-Italy, 2Medicina Interna, Università Tor Vergata, Roma-Italy, 3Chirurgia Generale, Università Tor Vergata, Roma-Italy. 1Farmacologia, Università Cattolica Sacro Cuore, Roma-Italy.

Impaired insulin-mediated vasodilation in the skeletal muscle may be involved in the development of hypertension in patients with metabolic syndrome and may contribute to insulin resistance by diminishing the glucose uptake. Rho-kinase, an effector of the small G protein Rho A, plays an important role in hypertension and has been reported to interfere with insulin signaling in blood vessels through serine phosphorylation of insulin receptor substrate-1. In this study, we examined the role of Rho-kinase in the pathophysiology of the impaired vascular reactivity of patients with obesity-related metabolic syndrome by evaluating the effect of Rho-kinase inhibition on nitric oxide (NO)-dependent vasodilation during hyperinsulinemia. Forearm blood flow responses to graded doses of acetylcholine (ACH), a stimulus for endothelial release of NO, and sodium nitroprusside (SNP), an exogenous NO donor, were assessed during intra-arterial administration of insulin (0.1 mU/Kg/min) in patients with metabolic syndrome (n = 8) and matched controls (n = 5) by use of strain-gauge plethysmography, either in the absence or in the presence of fasudil (an inhibitor of Rho-kinase, given at the dose of 200μg/min). In healthy subjects, insulin-stimulated vascular reactivity to both ACH and SNP was not affected by fasudil infusion (both P > 0.05). In patients with metabolic syndrome, by contrast, fasudil administration during hyperinsulinemia significantly enhanced vasodilator responses to both ACH (P < 0.001) and SNP (P = 0.008). In the absence of hyperinsulinemia, however, Rho-kinase inhibition did not modify vascular responses to ACH and SNP (both P > 0.05) in these patients (n = 5). The favorable effect of Rho-kinase inhibition on insulin-stimulated vasodilator responses was probably due to decreased oxidative stress, because during infusion of the antioxidant vitamin C no additional effect on vascular reactivity to ACH and SNP was observed in patients with metabolic syndrome (n = 5) following infusion of fasudil (both P > 0.05). In conclusion, our data indicate that Rho-kinase inhibition improves NO-dependent vasodilator responsiveness during hyperinsulinemia in patients with obesity-related metabolic syndrome, likely in relation to decreased oxidative stress. This suggests that activation of Rho-kinase may be involved in the pathogenesis of the macrovascular dysfunction in these patients and may constitute a critical link between metabolic and hemodynamic abnormalities in insulin resistant states. Consequently, targeting Rho-kinase might beneficially impact both vascular function and insulin sensitivity in patients with metabolic syndrome.

**PP.26.339** CIRCULATING INDICES OF INFLAMMATION/OXIDATIVE STRESS IN NORMOTENSIVE AND HYPERTENSIVE OBSESE PATIENTS

C. De Cucis1, A. Pila1, E. Porteri1, E. La Borra1, C. Corbellini2, G.E.M. Boari1, F. Mittempergher2, E. Di Betta1, C. Cassella1, C. Agabiti Rosei2, G. Ruggeri3, D. Rizzoni1, E. Agabiti Rosei1. 1Università Di Brescia, Dipartimento Di Scienza Della Nefrologia, 2Chair of General Surgery, Department of Medical and Surgical Sciences, University of Brescia, Brescia-Italy, 3Chair of Clinical Biochemistry, University of Brescia, Brescia-Italy.

Background: Obesity is partly an inflammatory process, and an increased production of inflammatory markers was observed in fat tissue. We have investigated circulating indices of inflammatory and oxidative stress in 27 patients with severe obesity. Twelve of them were normotensive and 15 hypertensive. All obese patients underwent bariatric surgery. We compared results obtained with those observed in 13 normotensive lean controls. Circulating levels of C-reactive protein (CRP), proinflammatory cytokines interleukin-6 (IL-6) and interleukin-18 (IL-18), macrophage chemotactic factor-1 (MCP-1), plasminogen...
activator inhibitor-1 (PAI-1), soluble vascular cell adhesion molecule 1 (VCAM-1) and soluble inter-cellular adhesion molecule 1 (sICAM-1) have been measured in plasma.

**Results:** A statistically significant difference between normotensive lean subjects vs. hypertensive and normotensive obese patients pooled together was observed for circulating levels of IL-6 (1.26 ± 0.64 vs. 5.02 ± 0.71 pg/ml, p = 0.039), sVCAM (941 ± 96.3 vs. 1556 ± 139 ng/ml, p = 0.029) and CRP (287 ± 87.9 vs. 1114 ± 107 ng/ml, p = 0.000038). No difference was observed for total antioxidant power, LPO, MDA, MCP-1, IL-18 sICAM and PAI-1. Similar data were obtained when normotensive lean subjects were separately compared with normotensive and hypertensive obese patients (see Table: Mean ± SEM, * = p < 0.05, ** = p < 0.01, *** = p < 0.001 vs. Normotensive lean subjects).

**Conclusions:** Our data suggest that the presence of obesity is associated with increased systemic inflammation/oxidative stress.

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#### PP.26.340 ABDOMINAL OBESITY, METABOLIC SYNDROME AND INSULIN RESISTANCE

E. Chubenko¹, O. Belyavca², O. Bolsbakova², O. Berkovich³, E. Bashenova⁴, T. Karonova¹, E. Baranova¹, E. Shlyakhto². ¹Saint-Petersburg State Medical University N.A. I.P. Pavlov, Saint-Petersburg-Russia, ²Alamanov Federal Heart, Blood and Endocrinology Centre, Saint-Petersburg-Russia

**Study Objective:** to evaluate insulin levels and HOMA index in patients with abdominal obesity and metabolic syndrome (MS).

**Material and Methods:** 525 patients with abdominal obesity (AO) were examined. 388 women (73.9%) and 137 men (26.1%), age 40.5 ± 0.3 years; 319 (60.8%) patients had MS. MS was diagnosed according to ATP III criteria (2005). 50 healthy persons without AO (38 women and 12 men) were examined, age 40.5 ± 0.9 years. Serum insulin concentration was determined by ELISA. The homeostasis model assessment was applied to evaluate insulin resistance (HOMA-IR). Statistical analyses were performed using SPSS 17.0 for Windows (SPSS, Inc., Chicago, IL, USA).

**Results:** Insulin levels in women with AO and arterial hypertension were higher than in normotensive women with AO and healthy women (22.7 ± 2.0; 19.1 ± 1.1; 6.7 ± 0.1 mkm/E/ml, accordingly, p < 0.05). HOMA-IR index in women with AO and arterial hypertension was higher than in normotensive women with AO and healthy women (5.2 ± 0.2; 4.4 ± 0.2; 1.4 ± 0.02, accordingly, p < 0.05). Insulin levels in women with MS were higher as compared to AO (23.4 ± 1.2; 19.9 ± 1.1 mkm/E/ml, accordingly, p < 0.05). HOMA-IR index was higher in women with MS as compared to AO (5.8 ± 0.4; 4.8 ± 0.2, accordingly, p < 0.05). Insulin levels and the HOMA-IR index in hypertensive and normotensive men with AO and MS patients did not differ (21.6 ± 2.1; 19.8 ± 1.9; 22.2 ± 2.8 mkm/E/ml and 5.1 ± 0.3; 5.0 ± 0.3; 5.3 ± 0.5, accordingly, p > 0.05), but were significantly higher than in healthy (5.5 ± 0.09 mkm/E/ml and 1.1 ± 0.02), p < 0.01.

**Conclusions:** Metabolic syndrome and arterial hypertension in women with abdominal obesity are accompanied by high levels of insulin. Metabolic syndrome in women is characterized by greater resistance to insulin than in patients with abdominal obesity. In men, these patterns are not revealed. Male patients with abdominal obesity had hyperinsulinemia as compared to healthy persons.

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#### PP.26.342 LEPTIN, METABOLIC SYNDROME AND LEFT VENTRICULAR REMODELING IN HYPERTENSIVE PATIENTS

S. Potabenko, Kharkiv National Medical University, Kharkiv-Ukraine

**Objective:** investigation of leptin and metabolic syndrome relations to different geometric patterns of left ventricular remodeling in hypertensives.

**Material and Method:** 118 patients with essential hypertension from 34 to 67 years of age (average 58.6 ± 6.1 years), females – 85 (72%), males – 33 (28%) were enrolled in the study. 4 geometric patterns of left ventricular remodeling (by Banu A., Devereux R.B., Roman M.J. et al., J. Am. Coll. Cardiol., 1992, Vol. 19) were defined among hypertensive patients: eccentric hypertrophy (EH), concentric hypertrophy (CH), concentric remodeling (CR) and normal geometry (NG). The metabolic syndrome (MS) was defined according to criteria of International Diabetes Federation 2005. The plasma levels of leptin were assessed by ELISA method.

**Results:** Among hypertensives there were defined such distribution of left ventricular geometric patterns: EH – 25 (21%), CH – 38 (33%), CR – 33 (28%), NG – 22 (18%). The plasma level of leptin was higher in patients with CH (22.27 ± 18.01) than with EH (11.12 ± 9.97, p > 0.05). CR (9.71 ± 4.64, p > 0.05) and NG (7.99 ± 4.04, p > 0.05). Plasma concentration of leptin significantly correlated with left ventricular myocardial mass index by height in 2.7 power (r = 0.39, p < 0.001) and with relative thickness of left ventricular wall (r = 0.24, p < 0.001). MS was revealed in 94 (79%) of hypertensive patients. Among them MS was defined in 32 (84%) patients with LH, 20 (80%) patients with EH, 27 (81%) with CR and 15 (68%) patients with NG.

**Conclusions:** The elevation of plasma leptin in hypertensives predominantly associates with concentric pattern of left ventricular hypertrophy. Patients with MS have higher rate of abnormal types of left ventricular geometric remodeling than normal geometry.
The objective of this study was to compare the effect of a validated prescriptive lifestyle intervention to reduce blood pressure at home versus clinic among rural patients with metabolic syndrome (MetS) delivered in a primary care setting. 50 participants with MetS (aged 57.1 ± 10.1 years) were recruited from southwestern Ontario, Canada and followed for 6 months. Patients were provided Bluetooth enabled home BP monitors that synced to a secure web database (HealthAnywhere™) through a Blackberry™ smartphone hub. Home measures were collected twice daily, 2 times per week and clinic blood pressure was collected at baseline (V0), 3 (V1) and 6 (V2) months. Fitness, weight and metabolic parameters of MetS were determined at each clinic visit. Clinic SBP decreased from 142.4 ± 18.5 mmHg (V0) to 132.8 ± 13.5 mmHg (V2, p < 0.001), with no change from V0 to V1. Clinic DBP decreased from 87.4 ± 10.6 mmHg (V0) to 83.8 ± 10.6 mmHg (V1, p = 0.009) and 81.3 ± 9.7 mmHg (V2, p < 0.001). There was no change in clinic SBP or DBP from V1 to V2. Home BP was significantly lower than clinic BP at all visits except for DBP at V1 (p = 0.051) and V2 (p = 0.092). Home SBP decreased from 130.2 ± 15.9 mmHg (V0) to 126.1 ± 12.7 mmHg (V1, p = 0.038) and 124.3 ± 12.8 mmHg (V2, p = 0.001) with no change in at-home SBP between V1 and V2. Home BP showed no change between V0 and V1 but decreased from 83.5 ± 10.2 mmHg (V0) to 79.3 ± 9.5 mmHg to 79.3 ± 9.5 mmHg (V1, p = 0.001) and from 79.3 ± 9.5 mmHg to 76.2 ± 9.7 mmHg (V2, p = 0.031). There were also changes observed in weight from 91.9 ± 16.4 kg (V0) to 90.5 ± 15.9 kg (V1, p = 0.001) and to 89.9 ± 16.1 kg (V2, p = 0.001), no change observed in weight between V1 and V2. Fitness, measured in relative maximal oxygen consumption (VO2max), increased from 30.7 ± 7.3 ml/kg/min (V0) to 32.3 ± 7.1 ml/kg/min (V1) but the increase was not maintained at V2. In conclusion, the STEP, used at the primary care level, improved fitness and weight in patients with MetS. Similar trends in BP reduction were observed in home and clinic settings supporting self monitoring of home blood pressure in studies of lifestyle management over 6 months.

**PP.26.344** EVALUATION OF THE QUALITY OF LIFE IN PATIENTS WITH METABOLIC SYNDROME IN THE PROVINCE OF ALBACETE.


**Objectives:** determine the quality of life in patients with metabolic syndrome in the province of Albacete.

**Methods:** Descriptive study among patients attending consultations in primary care setting and in rural and urban health centres in the province of Albacete and meeting the criteria of metabolic syndrome according to ATP III criteria. The design was in male patients, over 18 and under 65. Patients who did not accept or not gathered sufficient mental qualities were excluded from the study. Selected once cited them in consultation for collection of anthropometric data and to pass the quality of life questionnaire LISAT 8 questionnaire.

**Results:** as soon as general life 5.3% spoke it was unsatisfactory, 15.8% felt that it was somewhat unsatisfactory, 15.8% replied that it was somewhat successful, 36.8% was of the view that it was satisfactory and 21.1% was very satisfactory. No patient spoke was very unsatisfactory. As sexual life 26.3% spoke it was unsatisfactory, 15.8% replied that it was somewhat successful, 26.3% was of the view that it was satisfactory, and 10.5% was very successful. As family life 5.3% felt it was somewhat unsatisfactory, 5.3% replied that it was somewhat successful, 52.6% was of the view that it was satisfactory and 36.8% was very satisfactory. No patient spoke was very unsatisfactory and it was somewhat satisfactory, 10.5% replied that it was somewhat successful. 26.3% was of the view that it was satisfactory and for remaining with 68.4% was very satisfactory. No patient referred was unsatisfactory. On leisure life 5.3% replied that it was somewhat successful, 26.3% was of the view that it was satisfactory and 10.5% was very successful. 5.3% was of the view that it was somewhat successful, 26.3% was of the view that it was satisfactory and very unsatisfactory. 5.3% was of the view that it was somewhat successful, 26.3% was of the view that it was satisfactory and very unsatisfactory.

**Conclusions:** A recent study estimated the prevalence of metabolic syndrome in males in Albacete 20.9%, the prevalence increases with age, suffering from this syndrome to a third of over 60 men. These patients satisfaction with overall life was satisfactory, being more satisfactory life of leisure and family than the sex. As regards sex life many patients recognized that his sex life was unsatisfactory, perhaps less than those who really think this is a taboo subject.
Results: All patients concluding the study without showing intolerance or side effects to the drugs. BP was lowered in all groups to less than 140/90 mm Hg. At the end of the study LV mass index reduced from 165.2 ± 6.7 to 148.7 ± 3.5 g/m² in group A, p < 0.01, from 163.8 ± 6.0 to 144.7 ± 3.4 g/m² in group B, p < 0.01 and from 164.4 ± 6.3 to 140.7 ± 3.1 g/m² in group C, p < 0.01. The decrease in LV mass index was essentially caused by reduction of LV wall thickness and diameter. At the end of the study E/A ratio increased from 0.94 ± 0.06 to 1.16 ± 0.07 in group A, p < 0.01, from 0.96 ± 0.05 to 1.18 ± 0.06 in group B, p < 0.01 and from 0.95 ± 0.02 to 1.36 ± 0.02 in group C, p < 0.001. IVRT decreased from 104.5 ± 6.4 to 85.6 ± 3.1 msec in group A, p < 0.01, from 102.4 ± 5.9 to 83.3 ± 5.2 msec in group B, p < 0.01 and from 103.1 ± 4.1 to 75.6 ± 3.3 msec in group C, p < 0.001. DT passed from 169.2 ± 8.1 to 147.3 ± 4.2 msec in group A, p < 0.01, from 167.2 ± 7.3 to 146.5 ± 4.1 msec in group B, p < 0.01 and from 170.2 ± 4.1 to 137.4 ± 2.0 msec in group C, p < 0.001.

Conclusions: BP control was stable and effective in all groups. Compared to Ca and E, F demonstrated more pronounced improvement of LV diastolic function independent of similar regression of LV hypertrophy.

**PP.26.347**

**LEPTIN AS AN INDEPENDENT PREDICTOR OF HIGH BLOOD PRESSURE IN YOUNG PATIENTS WITH ESSENTIAL HYPERTENSION**

E. Loginova, G. Nechaeva, M. Shipina, A. Semenkin, O. Drokina. *Omuk State Medical Academy, Omuk-Russia*

**Objectives:** To study the association of leptin level with high blood pressure (BP) and other risk factors in young patients with essential arterial hypertension (AH).

**Methods:** The study involved 114 patients aged 18-25 years with essential AH (mean systolic/diastolic BP 150.2 ± 4.5/90.6 ± 2.3 mm Hg). The control group consisted of 63 age and sex matched healthy individuals (mean systolic/diastolic BP 116.7 ± 6.7/70.4 ± 5.9 mm Hg). The measurements of serum leptin, lipids and glucose levels were performed.

**Results:** Metabolic syndrome was found in a low proportion of patients with AH (6.7%). Despite most of the metabolic parameters did not exceed the physiological range, young patients with AH were characterized by unfavorable metabolic profile (body mass index (BMI) 24.5 ± 4.4 vs. 21.3 ± 2.1 kg/m², total cholesterol 5.27 ± 1.37 vs. 4.35 ± 1.32 mmol/l, LDL cholesterol 3.18 ± 1.21 vs. 2.23 ± 0.99 mmol/l, HDL cholesterol 1.32 ± 0.34 vs. 1.55 ± 0.45 mmol/l and triglycerides 1.69 ± 0.37 vs. 1.26 ± 0.54 mmol/l, respectively, p < 0.01 for all). Leptin levels were significantly higher in patients with AH compared with the control group (20.86 ± 2.57 vs. 8.48 ± 1.38 ng/ml, p < 0.001, respectively). In patients with AH leptin levels significantly correlated with systolic BP (r = 0.56, p < 0.001), diastolic BP (r = 0.49, p < 0.001), BMI (r = 0.61, p < 0.001), LDL cholesterol (r = 0.44, p < 0.01) and triglycerides (r = 0.50, p < 0.001). On multivariate regression analysis leptin remained significant predictor of BP levels (p < 0.05 for systolic and diastolic BP).

**Conclusion:** High leptin levels are associated with metabolic abnormalities in young patients with essential AH. Independently of other metabolic abnormalities leptin is a predictor of high BP in this population.

**PP.26.348**

**BLOOD ADIPOPOINCTIN LEVEL IN HYPERTENSIVE PATIENTS WITH METABOLIC DISTURBANCES**

V. Boubko, S. Koval’ I. Snegurkaya, L. Tsioma, D. Miloslavsky, O. Mysimchenko. Institute of Therapy amc of Ukraine, Kharkov-Ukraine

**Objective:** To study the adiponectin level in blood serum in patients with essential hypertension (EH) in combination with metabolic disturbances.

**Design and Methods:** The research involved 60 patients (36 men and 24 women) with EH grades 1-2 at the age from 28 to 69. In 47 patients EH was associated with dyslipidemia (DLA), in 26 patients - with abdominal obesity (AO). In 20 patients from this group were determined metabolic syndrome (MS). Control group consisted of 12 practically healthy people. The level of adiponectin, glucose, insulin and parameters of lipid spectrum in blood were determined by the immunofermental method.

**Results:** Reliable gender differences were revealed in blood adiponecitin level (reliably higher in the women than in the men) in both practically healthy people and EH patients. The research demonstrate a significant value of adiponectin for EH development especially in females.

**Conclusions:** Reliable gender differences were revealed in blood adiponecitin level in both practically healthy people and EH patients. An important patho-genetic role of adiponectin, a hormone of the fatty tissue, in the development of MS and such its components as AO and DLA was shown. Results of the research demonstrate a significant value of adiponectin for EH development especially in females.
POSTER SESSION

POSTER SESSION 27
DIABETES

PP.27.350  MORTALITY RISK IS ATTENUATED IN HYPERTENSIVE INDIVIDUALS WITH TYPE 2 DIABETES

A.J. Manolis1, A. Pittaras1, M. Doumas2, M.S. Kallistratos1, N. Kouremenos1, C. Pasel1, E. Nylen2, J.P. Kokkinos1, P. Kokkinos2.

Asklepieion General Hospital, Athens-Greece, 2Veterans Affairs Medical Center Georgetown University School of Medicine, Washington DC, USA

Introduction: Hypertension (HTN) and Type 2 diabetes mellitus (DM) are major and independent risk factors for cardiovascular (CV) mortality. This risk multiplies when the two coexist. Increase in physical activity is an integral part of both prevention and management of HTN and DM. However, the effects of physical activity in mortality risk reduction for hypertensive diabetics have not been thoroughly investigated.

Methods: Between 1986 and 2009, 2,163 men (age: 69 ± 11) with HTN and type 2 DM from the VAMC, Washington DC underwent routine exercise tolerance testing using the Bruce protocol. Peak workload was estimated in metabolic equivalents (METs) using standardized equations. Fitness categories were established based on peak METs achieved. Those with an exercise capacity within the lowest 20% (≤4 METs) comprised the lowest fit category and those with 9 METs comprised the highest fit category. Additional fitness categories were established for each 1-MET increase between 4.1-9.0 METs. Women and those with any of the following were excluded: 1) history of an implanted pacemaker, 2) left bundle branch block, 3) unstable symptom, and 4) impaired chronotropic response. Diabetes was verified using the VA EMR (CPRS). Dates of death were verified from the VA Beneficiary Identification and Record Locator Systems File. Statistics: ANOVA to determine differences among fitness categories. Cox Proportional Hazard survival analysis, adjusted for age, BMI, CVD, cardiac risk factors meds.

Results: There were 617 deaths, with an annual mortality of 4.2%. After controlling for age, risk factors and medications, we observed an inverse and graded association between mortality risk and exercise capacity (p < 0.001). For every 1-MET increase in exercise capacity, the mortality risk was lowered by 14% (HR = 0.86; CI: 0.82-0.90; p < 0.001). We also observed a graded reduction in mortality risk with increase fitness. More specifically, when compared to the lowest fit category (≤4 METs), the mortality risk in the next fitness category (4.1-5 METs) was lowered by 22% and 53% lower for those who achieved 6.1-7.0 METs. The mortality risk continued to decline progressively, reaching 62% for those with an exercise capacity of ≥9 METs.

Summary and Conclusion: Our findings support an independent inverse and graded association between fitness levels and mortality risk in individuals with HTN and type 2 DM. The mortality risk reduction ranged from 22% for those in the next to the least fit category (≤4 METs) and progressively declined to approximately 60% for those with an exercise capacity of ≥7 METs. The mortality risk was 14% lower for each 1-MET increase in exercise capacity. These significant health benefits are realized by relatively moderate improvements in fitness status, attainable by a daily brisk walks of about 30 minutes in duration. Significant health benefits are realized by relatively moderate improvements in fitness status, attainable by a daily brisk walks of about 30 minutes in duration. These results support that ABPM has a clinical requirement for proper cardiovascular risk stratification among patients with DM.

PP.27.352  INFLUENCE OF SLEEP-TIME BLOOD PRESSURE FOR THE PROPER IDENTIFICATION OF ISOLATED OFFICE AND MASKED HYPERTENSION AMONG PATIENTS WITH TYPE 2 DIABETES: THE HYGIA PROJECT

A. Moya1, E. Sineiro1, M.C. Castiñeira2, S.M. Gomara1, A. Mojon3, M.J. Fontao3, S. Lorenzo1, D.E. Ayala1, R.C. Hermida2, on behalf of Hygia Project Investigators. 1Gerencia de Atencion Primaria, Lugo-Spain, 2Gerencia de Atencion Primaria, Pontevedra-Spain, 3University of Vigo, Vigo-Spain

Objectives: Target organ damage and cardiovascular (CVD) risk are more closely associated with ambulatory (ABPM) than with clinic blood pressure (BP). Accordingly, masked hypertension (HTN) has been associated with higher CVD risk than normotension or isolated-office (white-coat) HTN. Independent prospec- tive studies have also found that the sleep-time BP mean is a better predictor of CVD risk than the awake BP. However, isolated office and masked HTN are frequently defined by comparing awake BP to the diagnosis of isolated-office and masked HTN. Accordingly, we evaluated the impact of using sleep-time as a new BP pattern in patients with diabetes participating in the Hygia Project, designed to evaluate prospectively cardiovascular risk by ambulatory BP monitoring (ABPM) in primary care centers of Northwest Spain.

Methods: Within two years, we studied 7087 subjects (3848 men/3239 women; 1804 with DM), 61.4 ± 13.8 years of age. Among the subjects, 6216 were hypertensive, and among these 1766 had DM. Hypertension was defined as an awake BP mean ≥135/85 mmHg for systolic/diastolic BP, or an asleep BP mean ≥120/70 mmHg, or BP-lowering treatment. These thresholds were reduced by 10 mmHg in DM. BP was measured at 20-min intervals from 07:00 to 23:00h and at 30-min intervals at night for 48h. During monitoring, subjects maintained a diary listing the times of going to bed at night and awakening in the morning.

Results: Among subjects without DM, the prevalence of extreme-dipper, dipper, non-dipper and riser BP patterns were 4.3, 44.5, 43.1 and 8.1%, respectively. The prevalence of non-dipping and rising were significantly greater among patients with DM (46.7 and 17.1%, respectively; P < 0.001). The prevalence of rising was highest among treated hypertensive patients with DM (18.9%). Elevated sleep-time BP was a major factor for the diagnosis of hypertension in DM; thus, 95.9% of the uncontrolled hypertensive patients with DM had nocturnal hypertension.

Conclusions: This cross-sectional study documents the high prevalence of an altered circadian BP pattern in DM. Most important, the prevalence of a high-risk riser BP pattern is more than double in DM than in subjects with DM, either they have hypertension or not. The elevated sleep-time BP mean in DM leads to a very high prevalence of nocturnal hypertension and, thus, to misdiagnosis of hypertension when identification of the condition is based on clinic or even awake BP determination. These results support that ABPM has a clinical requirement for proper cardiovascular risk stratification among patients with DM.
the previous classification). The prevalence obtained using only asleep BP for classification was 4.3, 8.5, 12.5 and 74.7%, respectively.

**Results:** Total 508 proteinuric diabetic DN patients were included. 192 patients were on “OH agents” alone and 288 on OH and insulin (insulin was added after oral glycosylamines failed to control hyperglycemia). Comparing OH treated group vs. OH and insulin treated group. The age was 65 ± 12 vs. 64.8 ± 11 yrs, male sex 60.4% vs. 48.6%, duration of diabetes 13.8 ± 7 vs. 16.6 ± 7.2yrs. Duration of follow up was 9.2 ± 3.7 vs. 10.2 ± 3.9 yrs. Significantly higher incidence of cardiovascular events occurred in OH-Insulin treated group. Comparing OH vs. OH-Insulin group, angina occurred 70 (36.5%) vs. 118 (41%) patients, atrial fibrillation was 6 (3.1%) vs. 10.3(%) patients, foot infections 10 (5.2%) vs. 25 (8.7%), MI = 25% vs. 26.4%, Stroke = 14.1% vs. 21.5% (p = .03), ampu-
tation = 4.6% vs. 4.9% (p = .53), mortality = 10.4% vs. 16.3 (p = .05), vitre-
ous hemorrhage = 0% vs. 1%, three vessels affected = 2.1% vs. 5.6% patients (p = .04).

Conclusion: Higher incidence of cardiovascular complications were observed in patients treated with insulin and oral hypoglycemic combined, after OH alone failed to control hyperglycemia.
low stress professions with arterial hypertension (AH). 197 men with AH were examined: the first group – machinists (n = 149; average age 43.3 ± 8.1 years), the 2nd group – assembly workers (filters) of the railways (n = 48; 44.4 ± 6.9 years). For revealing of cardiometabolic factors of risk smoking, hereditary history, level of glucose, lipid blood spectrum were determined, index of body mass (IBM) was calculated. Risk of cardiovascular disorders development was appreciated with the help of the scale SCORE, absolute risk of ischemic disorders development – PROCAM, 10-years risk of diabetes mellitus development – FINDRISC. Abdominal obesity (AO) – WV more than 102 cm and boundary AO, than WV = 94-102 cm.

Evident differences in age, unfavourable hereditary history, level of glucose and HbA1c were not revealed. In the 1st group smoking was registered 16%. (χ² = 20.1; p = 0.001); boundary AO 1.7 times (χ² = 4.15; p = 0.04) more often. Inside the 1st group boundary AO was 1.9 times (χ² = 9.09; p = 0.0026) more often than WV more than 102 cm. Increased risk of DM in the 1st group occurred 1.6 times (χ² = 6.68; p = 0.0087), risk to PROCAM 2.4 times (χ² = 6.2; p = 0.01); risk to SCORE 1.3 times (χ² = 7.1; p = 0.076) more often. Patients with the increased risk of DM in the 1st group had moderate and high risk according to SCORE 2 times (χ² = 4.1; p = 0.04) and to PROCAM 7.7 times (χ² = 7.66; p = 0.0056) more often than in the 2nd group. Combination of increased risk according to SCORE and PROCAM in the 1st group occurred 3.4 times (χ² = 9.63; p = 0.0019), additional risk according to all three scales was registered 7.6 times (χ² = 7.66; p = 0.0056), more often than in the 2nd. In the group of the increased risk according to FINDRISC, SCORE, PROCAM smoking and dislipoproteidemy were revealed in 95% of cases, aggravated heredity in 33%, obesity – 45%, and excess weight in 55% of cases, AO in every person (100%), but WV 94-102 cm was registered of 2.7 times (χ² = 7.36; p = 0.0067) more often than WV more than 102 cm.

Summary: combination cardiometabolic factors with the professional stress increase risk of the development of cardiovascular diseases 2.4 and DM 1.7 times. In men with professional stress and AH boundary AO prevails 2 times and 3 times with an existence of triple additional risk according to the screening scales, that may cause multiple effect of the development of cardiovascular complications.

**PP.27.357 EFFECT OF ALISKIREN ON QT DISPERSION IN DIABETIC AND NON DIABETIC HYPERTENSIVE PATIENTS**

R. Fogari, A. Mugellini, A. Zoppi, G. Derosa. Department of Internal Medicine, University of Pavia, Pavia-Italy

Aim of this study was to compare the effect of aliskiren on QT dispersion in hypertensive patients with or without diabetes

After a 2 week placebo period 98 mild hypertensive patients with well controlled type 2 diabetes (HbA1c < 7%) and 102 mild hypertensive patients without diabetes were treated with aliskiren 300 mg for 12 weeks. At the end of the placebo period and treatment period BP was evaluated and an ECG was recorded using a paper speed of 50 mm/s. The QT intervals were measured manually in hypertensive patients.

Table 1. QT dispersion in diabetic and non-diabetic hypertensive patients

<table>
<thead>
<tr>
<th>Groups</th>
<th>QTc dispersion (ms)</th>
<th>β-coefficient (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetic</td>
<td>50.2 ± 19.9</td>
<td>0.03 ± 0.01</td>
</tr>
<tr>
<td>Non-diabetic</td>
<td>46.5 ± 19.2</td>
<td>0.02 ± 0.01</td>
</tr>
</tbody>
</table>

In the 1st group of patients (n = 98), the QT dispersion decreased significantly by 3.9 ± 22.6 ms (p = 0.02) and in QTmax (-2.1 ± 22.1 ms, p = 0.02); the QT dispersion change did not correlate with BP change. In hypertensive patients without diabetes aliskiren induced a smaller and non significant reduction in QTc dispersion (-4.8 ± 19.6 ms, p = 0.09) and in QTmax (-3.9 ± 19.6 ms, p = 0.11). Aliskiren reduces QT dispersion in hypertensive diabetic patients and this effect is not related to the BP lowering. It suggests that aliskiren has the potential to reduce severe arrhythmic complications in this type of patients.

**PP.27.356 LEFT VENTRICULAR HYPERTROPHY IN TYPE 2 DIABETES; EFFECT OF INDEXING TO HEIGHT VERSUS BODY SURFACE AREA ON PREVALENCE AND CARDIOVASCULAR EVENTS**

B. Wai, Sheila K. Patel, Sharon Grant, Piyush M. Srivastava, Louise M. Burrell. University of Melbourne, Austin Health, Melbourne-Australia

**Background:** Different methods of normalising left ventricular mass (LVM) for body size may affect both the prevalence of LVH and the relative risk for major adverse cardiovascular events (MACE). This is likely to be true in a population with high rates of obesity such as type 2 diabetes mellitus (DM). We hypothesised that LVH defined by LV mass indexed to body surface area (BSA) or to height (Ht) would affect the prevalence of LVH and its predictive value for MACE in DM.

**Methods:** We studied 1072 DM subjects recruited prospectively for an echocardiogram and followed up for a median of 4.0 years (IQR:2.5-5.3 y). LVH-BSA was defined as LVH when LVM indexed to BSA was > 225g/m² in males and > 155g/m² in females. LVH-Ht was defined as LVH when LVM indexed to height was > 49g/m² in males and > 45g/m² in females. MACE were defined as all cause mortality, stroke, heart failure admission, myocardial infarction and coronary and peripheral vessel revascularization.

**Results:** The mean ± SD age of subjects was 63 ± 12 y, 60% were male, and 35% were overweight (body mass index (BMI) ≥25kg/m² and < 30kg/m²) and 49% were obese (BMI≥30kg/m²). In the cohort, LVH-BSA was present in 32% and LVH-Ht in 52%; similar prevalence of LVH-BSA and LVH-Ht in those with a BMI < 25kg/m² (Fig 1). During the follow up period, 265 MACE occurred. With Cox regression analyses, after adjustment for age, gender, cardiovascular risk factors, duration of DM, pre-existing macrovascular and microvascular complications, LVH-BSA and LVH-Ht had a similar risk for subsequent MACE despite the higher prevalence of LVH-Ht (LVH-BSA, hazard ratio (HR) 1.57, 95% CI:1.19-2.07 (P = 0.002); LVH-Ht, HR 1.58, 95% CI:1.17-2.11 (P = 0.003)). The adjusted population-attributable risks (PAR) for LVH-Ht were 1.5 fold greater than for LVH-BSA in the whole cohort.

**Conclusion:** Higher prevalence of LVH and adjusted PAR were seen in DM when LVM is indexed to Ht instead of BSA. Our results suggest that it is more appropriate to index LVM to Ht to define LVH in a DM cohort with high rate of obesity.

**PP.27.359 HYPOADIPONETINEMIA AS A RISK FACTOR OF DIABETES MELLITUS 2 TYPE IN OVERWEIGHT PATIENTS WITH ARTERIAL HYPERTENSION**

T Ambrosova, T. Ashcheulova. Kharkiv National Medical University, Kharkiv-Ukraine

**Objective:** It was proposed that changes of adipokines plasma levels increase risk of diabetes mellitus (DM) 2 type development in hypertensive patients. The aim of the study was to assess carbohydrates metabolism parameters in relation to adipokines (TNF-alpha, IL-6, adiponectine) activity depend on insulin resistance (IR) and DM 2 type presence in overweight patients with arterial hypertension.

**Design and Methods:** 91 patients (23 males, 68 females) were examined by anthropometric methods (height, body mass, body mass index (BMI), waist circumference). Fasting glucose, insulin plasma levels were measured, HOMA was calculated. Adipokines plasma levels by ELISA were evaluated. Patients were divided into 3 groups: 1st group – 30 pts without IR (HOMA < 2.77), 2nd group – 37 pts with IR (HOMA > 2.77), 3rd group – 24 pts with DM 2 type.

**Results:** Adipokines profile of 2nd group hypertensive pts with IR characterized by elevated TNF-alpha (15.75 ± 5.55 pg/ml) and reduced adiponectine (5.17 ± 0.59 mg/ml) as compared with 1st group pts without IR (10.80 ± 1.71 pg/ml; 9.88 ± 0.65 mg/ml correspondingly, P < 0.05). in analysis of adipokines changes in 3rd group hypertensives with DM 2 type maximum significant increasing of TNF-alpha (29.61 ± 6.11 pg/ml) and decreasing of adiponectine plasma levels (4.30 ± 0.71 mg/ml) were detected vs 1st and 2nd groups (P < 0.05 in all cases).

There were no statistically significant differences in IL-6 levels among examined groups. Linear relationships between adiponectine and waist circumference, body mass index, glucose were found.

**Conclusion:** Obtained results suggest that hypoadiponetinemia and hyperactivity of TNF-alpha are closely related to DM 2 type formation in overweight hypertensive patients.
Objective: The aim of this study was to compare the effects of treatment with combined angiotensin-converting-enzyme (ACE) inhibitor Ramipril (R) and angiotensin II receptor antagonist Valsartan (V) or ACE inhibitor R monotherapy on left ventricular (LV) mass index (LVMI) and systolic function in patients with essential hypertension and type 2 diabetes mellitus.

Methods: A total of 62 hypertensive (BP ≥ 140/90 mm Hg) type 2 diabetic patients with LV hypertrophy (LVMI ≥ 125 g/m² for men and ≥ 110 g/m² for women) and LV systolic dysfunction (ejection fraction-EF ≤ 40% or lower) were treated with ACE inhibitor R at a constant dose (10 mg once a day) for 30 days or longer. We randomly assigned 31 patients, aged 52-64 years, V 40 mg daily;31 patients aged 48-63 years, were treated only with R until the end of the study. Echocardiography was performed at baseline and after 12 months of therapy. LVMI and parameters of LV systolic function (EF, endocardial and midwall fractional shortening (end FS and mid FS)) were calculated. Differences in the efficacy parameters were analysed using 2-tailed Student’s t-test for quantitative parameters.

Results: Blood pressure (BP) was lowered in both groups to less than 140/90 mm Hg. LVMI decreased from 168.1 ± 4.7 to 133.2 ± 4.2 g/m² with V and R in combination (p < 0.001), from 166.5 ± 5.2 to 144.1 ± 4.3 g/m² with R alone (p < 0.001). EF increased from 53.8 ± 2.2 vs 57.5 ± 1.1% with V and R in combination (p < 0.001), 49.0 ± 2.2 vs 38.4 ± 1.2% with R alone (p = 0.011). End FS and mid FS also increased at the end of the study [40.1 ± 1.2 vs 25.9 ± 1.1% and 22.6 ± 0.5 vs 14.7 ± 0.2%, respectively with V and R in combination (p < 0.001); 39.3 ± 1.6 vs 29.6 ± 1.4% and 21.8 ± 0.5 vs 18.6 ± 0.3%, respectively with R alone (p < 0.001)].

Conclusions: The combined therapy with V and R showed greater beneficial actions on LV structure and function compared to monotherapy with R beyond their BP-lowering effects in hypertensive type 2 diabetic patients. Consequently, treatment with combined ACE inhibitors and angiotensin II receptor antagonists might have advantages over ACE inhibitors monotherapy.
PP.27.366 PREVALENCE OF ARTERIAL HYPERTENSION AND OTHER MICROANGIOPATHIES IN CHILDREN AND 15-30 YO OLDER CHILDREN WITH TYPE 1 DIABETES MELLITUS IN RUSSIAN FEDERATION

T. Shiryaeva, I. Aleksandrova, E. Titovich, E. Andrianova, Y. Sunztov. Endocrinological Research Center, Moscow-Russia

Objective: The aim of our study was to estimate the prevalence of arterial hypertension (AH) and other microangiopathies in children and adolescents with type 1 diabetes mellitus (T1DM) in several regions in Russian Federation (RF).

Design and Method: 843 patients with T1DM aged from 3 to 18 years old from three different regions of RF were examined in the course of screening programs in 2005 and 2010 years (233 children 3-14 years old and 210 adolescents 15-18 years old and 248 children and 141 adolescents respectively). Average age of T1DM manifestation was 6.08 ± 0.38 years old in children and 9.16 ± 0.75 years old in adolescents. The levels of Hba1c and microalbuminuria (MAU) were measured on Bayer DCA 2000+ analyzer. The ophthalmoscopy was performed by direct view method. The technique of blood pressure (BP) measurement was standardized. Statistical analysis was performed with descriptive statistical methods and Fisher exact test (p-criteria).

Results: In 2005 year 1.1–4.4% (in different regions) of children with T1DM had AH, other children systolic blood pressure (SBP) on 95% for aging standard (p = 0.004), average level was 102.18 ± 1.41. Average DBP level was 64.07 ± 1.22. Among the adolescents group 2.5–12.5% had AH. Average SBP was 105 ± 1.1, average DBP level was 71.6 ± 1.1, Diastolic blood pressure (DBP) levels were not significantly different. In 2010 year 1.7–7.63% of children and 7.17-22.7% of adolescents with T1DM had AH, but the difference between 2005 and 2010 year data was not statistically significant. In 2005 year the retinopathy (DR) was diagnosed in 2.8–4.4% of children and 17.6–20.0% of adolescents respectively. Hba1c level > 7.5% was measured in 79.88% of adolescents and in 56-90% of children depending of region of residence. Median Hba1c level in adolescents was on 0.2–0.9% in excess of prepregnant children (p = 0.03). MAU was measured in 22.7 and 35% in children and adolescents respectively (p > 0.05). In 2010 year the DR was diagnosed in 0–2.6% of children and 2.6–7.0% of adolescents. Hba1c level > 7.5% was measured in 80-86% of adolescents and in 62-70% of children. As well as in 2005 year the difference between median Hba1c levels was not statistically significant. MAU was indicated in 1.3–8.4% and 9.3–21.7% in children and adolescents respectively, difference between two groups from the same region was not statistically significant. Levels of cholesterol, triglycerides, creatinine were in normal ranges as to children and adolescents from all the regions both in 2005 and 2010 year.

Conclusions: 1. Our observations revealed a clear link between the quality of metabolic control and altered BP regulation even in paediatric patients. 2. The prevalence of AH in children and adolescents is the same to this one of DR. 3. The unexpected high prevalence of MAU was obtained indicate that MAU has to be estimated like diagnostic criteria if the influence of others factors was excluded.

PP.27.367 PIOGLITAZONE CAN REDUCE CARDIOVASCULAR RISK IN JAPANESE METABOLIC SYNDROME WITH INSULIN RESISTANCE

T. Furumoto1, S. Fujii2, H. Tsutui1. 1Cardiovascular Medicine Hokkaido University Graduate School of Medicine, Sapporo-Japan, 2Department of Molecular and Cellular Pathobiology and Therapeutics Nagoya City University Graduate, Nagoya-Japan

Objective: The pathophysiological basis of metabolic syndrome (Mets) is the insulin resistance (IR). Recently these patients maintain an upward trend. Thiazolidinedione derivative, pioglitazone is expected to exist beneficial effects on glucose tolerance in Mets via insulin sensitizing action. However, its effects on cardio vascular (CV) risk remain unknown. So the purpose of this study is to elucidate that pioglitazone can reduce CV risk in Mets with IR.

Methods: We evaluate IR by oral glucose tolerance test. Patients are administered 15mg of PG daily 3 months. We examined vascular endothelial function by flow mediated dilatation (FMD), and assayed fibrinolytic factor and inflammatory factor in blood sample as risk factors of CV disease.

Results: Table 1 shows that body weight, blood pressure and abdominal circumference remained unchanged. Table 2 shows that as expected, fasting blood glucose and insulin levels were significantly increased. %FMD was significantly improved accompanied with increasing of nitric oxide production after treatment. Plasma activity and antigen of Plasminogen activator inhibitor type I were
Conclusions: Pioglitazone can improve vascular endothelial function in metabolic syndrome with insulin resistance in association with the increase in NO production and adiponectin and the decrease in PAI-1. Pioglitazone can not only ameliorate glucose tolerance but also improve cardiovascular risk factors which may be useful in preventing cardiovascular disease in metabolic syndrome.

**Table 1: Patient’s Characteristics**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Baseline</th>
<th>After treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>1.69 ± 0.2</td>
<td>1.70 ± 0.3</td>
</tr>
<tr>
<td>Body weight</td>
<td>79.3 ± 4.2</td>
<td>79.1 ± 4.0</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>138.5 ± 6.7</td>
<td>137.8 ± 6.5</td>
</tr>
</tbody>
</table>

**Table 2: Results**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Baseline</th>
<th>After treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBS</td>
<td>110.6 ± 4.2</td>
<td>110.5 ± 4.3</td>
</tr>
<tr>
<td>B送往</td>
<td>16.0 ± 4.2</td>
<td>16.0 ± 4.3</td>
</tr>
<tr>
<td>HDL</td>
<td>110.6 ± 4.2</td>
<td>110.5 ± 4.3</td>
</tr>
<tr>
<td>LDL</td>
<td>16.0 ± 4.2</td>
<td>16.0 ± 4.3</td>
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</tbody>
</table>

**Objective:** To investigate the role of products xanthine - xanthine oxidase in the regulation of Ca2+ - dependent potassium permeability of red blood cells of patients with arterial hypertension accompanied by type 2 diabetes mellitus.

**Design and Method:** We examined 20 patients with arterial hypertension accompanied by type 2 diabetes mellitus and 15 healthy volunteers. The increase of intracellular calcium concentration in presence of calcium ionophore A23187 led to erythrocyte membrane hyperpolarization due to opening of Ca2+ - activated potassium channels. Erythrocyte membrane potential was recorded via measurement of pH of the incubation medium in presence of potentiometric pH-electrode. The magnitude of hyperpolarization response (DE) was measured by a change of potential difference obtained from red blood cells with and without xanthine-xanthine oxidase. The results were analyzed statistically using non-parametric tests.

**Results:** Incubation of red blood cells of patients and healthy donors xanthine and xanthine oxidase for 10 min did not cause any change in DE. Incubation for 20 or 30 minutes increased the parameter DE patients, but not in healthy donors. Maximum production of superoxide anion system xanthine-xanthine oxidase was determined spectrophotometrically. At 10 min of incubation, and then prevailed formation of hydrogen peroxide interfere in the regulation of Ca2+ -dependent potassium permeability of red blood cells of patients with arterial hypertension accompanied by type 2 diabetes mellitus.

**Conclusion:** These results show that the products of xanthine - xanthine oxidase, in particular, hydrogen peroxide interfere in the regulation of Ca2+ - dependent potassium permeability of red blood cells of patients with arterial hypertension accompanied by type 2 diabetes mellitus.

- **PP.27.368 EFFECT OF PRODUCTS OF XANTHINE-XANTHINE OXIDASE TO CA2+ - DEPENDENT POTASSIUM PERMEABILITY OF ERYTHROCYTE MEMBRANES PATIENTS WITH ARTERIAL HYPERTENSION ACCOMPANIED BY TYPE 2 DIABETES MELLITUS**

I. Petrova1, O. Trubacheva1, A. Sitozhevskiy2, T. Suslova2. 1Siberian State Medical University, Tomsk-Russia, 2Research Institute of Cardiology with Tomsk Research Center, Tomsk-Russia

- **PP.27.370 RELATIONSHIP OF AUTONOMIC IMBALANCE AND CIRCADIAN DISRUPTION WITH OBESITY AND TYPE 2 DIABETES IN RESISTANT HYPERTENSIVE PATIENTS**

L. Boer-Martins1, V.N. Figueiredo2, L.C. Martins1, C. Demaçi1, F. Consolin-Colombo1, F.P.S. Cannavan1, M.J. Figueiredo1, R.C. Santos1, T. Quingulal1, H. Moreno1. 1Faculty of Medical Sciences - State University of Campinas, Campinas-Brazil, 2Faculty of Medicine of University of Sao Paulo, Sao Paulo-Brazil

**Background:** Hypertension, diabetes and obesity are not isolated findings, but represent a series of interacting physiologic derangements. Taking into account genetic background and lifestyle behavior, AI (autonomic imbalance) could be a common root for RHTN (resistant hypertension) or RHTN plus type 2 diabetes (T2D) comorbidity development. Moreover, circadian disruption can lead to metabolic and vasomotor impairments such as obesity, insulin resistance and resistant hypertension. In order to better understand the triggered emergence of obesity and T2D comorbidity in resistant hypertension, we investigated the pattern of autonomic activity in the circadian rhythm in RHTN with and without type 2 diabetes (T2D) associated, and its relationship with serum adiponectin concentration.

**Methods:** Twenty five RHTN patients (15 non-T2D and 10 T2D, 15 males, 10 females; age range 34 to 70 years) were evaluated using the following parameters: BMI (body mass index), biochemical analysis, serum adiponectin, echocardiogram and ambulatory electrocardiograph heart rate variability (HRV) in time and frequency domains stratified in three periods: 24-hour, day time and night time.

**Results:** Both groups demonstrated similar characteristics despite of the laboratory findings, which include increased body mass index, blood pressure (systolic > diastolic) and increased serum adiponectin concentration. The frequency domain analysis showed increased PNN50 (percentage of normal to normal RR intervals) in both groups. The time domain analysis showed increased SDNN (standard deviation of normal-to-normal intervals), SDANN (standard deviation of the mean of normal-to-normal intervals) and RMSSD (square root of the mean of sum of squares of differences between adjacent normal R-R intervals) in both groups. The heart rate variability (HRV) was significantly lower in the T2D group compared to the non-T2D group. The adiponectin levels were significantly higher in the T2D group compared to the non-T2D group. The conclusion is that the increased adiponectin levels in T2D group could be a potential risk factor for the development of resistant hypertension.
tone). T2D group had increased BMI and serum triglycerides values (mean 33.7 ± 4.0 vs 26.6 ± 3.7 mg/dL - p = 0.00); 190.2 ± 103.6 vs 108.6 ± 48.7 mg/dL - p = 0.04), lower levels of adiponectin (6729.7 ± 3381.5 vs 10911.5 ± 5554.0 ng/mL - p = 0.04) and greater autonomic imbalance evaluated by HRV parameters in time domain compared to non-T2D RHTN patients. Total patients had HRV correlated positively with serum adiponectin (r = 0.37 [95% CI -0.04 - 1.00] p = 0.03), negatively with HbA1c levels (r = -0.58 [95% CI -1.00 - -0.31] p = 0.00) and negatively with HbA1c levels (r = -0.40 [95% CI -1.00 - -0.07] p = 0.02).

Conclusion: Type 2 diabetes comorbidity is associated with greater autonomic imbalance, lower adiponectin levels and greater BMI in RHTN patients. Similar circadian disruption was also found in both groups indicating the importance of lifestyle behavior in the genesis of RHTN.

**PP.27.371** THE PRESENCE OF DIABETES IN PREGNANT WOMEN AS A RISK FACTOR FOR PREECLAMPSIA

P. Stanciu1, M. Craina1, E. Bernd1, S. Pantea1, C. Serban1, R. Nitu1. 1University of Medicine and Pharmacy Victor Babes/Bega Clinic of Obstetrics and Gynecology, Timisoara-Romania, 2University of Medicine and Pharmacy Victor Babes/The Clinic of Surgery II, Timisoara-Romania, 3University of Medicine and Pharmacy Victor Babes/Pathophysiology Department, Timisoara-Romania

Objective: Preeclampsia was reported as a complication of gestational diabetes but the relationship between these two diseases incriminates insulin resistance, chronic inflammation and endothelial dysfunction. The purpose of our study was to analyze the frequency of diabetes (gestational or type 2 diabetes) in women diagnosed with preeclampsia and to evaluate the risk factors for preeclampsia and gestational diabetes.

Design and Method: The study included 68 pregnant women that attended in six months the University Clinic of Obstetrics and Gynecology "Bega" from Timisoara-Romania and were diagnosed with preeclampsia (moderate or severe). We divided the patients in two groups: group 1 formed by diabetics and pregnant women and group 2 formed by non-diabetic pregnant women. We recorded data risk factors in all the women included in the two groups. Preeclampsia was defined as blood pressure ≥140/90 mmHg and proteinuria (2+ on a dipstick) after 20 weeks of gestation and preterm delivery as delivery before 37 completed gestational weeks.

Results: 23 women out of 68 (33.9%) diagnosed with preeclampsia were diagnosed with gestational diabetes. 20 of preeclamptic diabetic women were with age over 35 years (29.4%), 15 with body mass index > 27 kg/m2 (22.1%), 14 had first-degree relatives with type-2 diabetes (20.6%), 8 were with personal history of diabetes (11.8%), 13 had a prior delivery of a newborn over 4000 g weigh (19.1%), and 10 of them were with history of miscarriages (14.7%).

Conclusions: The results from our study demonstrate that gestational diabetes and preeclampsia may have similar risk factors. Our results confirm the need of pregnancy planning before 35 years old and a pre-gestational and gestational control of maternal glycemia in order to prevent appearance of preeclampsia.

**PP.27.372** DUAL INHIBITION OF CLASSICAL PKCALPHA AND BETA ISOFORMS LEADS TO PROTECTION AGAINST EXPERIMENTAL MURINE DIABETIC NEPHROPATHY

J. Menne, J.K. Park, N. Shushakova, H. Haller, M. Meier. Medical School Hannover, Hannover-Germany

Introduction and Aims: Both classical PKC isoforms, PKC-α and -β, have been implicated in the pathogenesis of diabetic microvascular diseases. We previously elucidated the specific role of these individual isoforms and revealed that activation of the PKC-β isoform contributes to high-glucose-induced renal fibrosis whereas perlecan as well as neprisin and VEGF expression are regulated by a PKC-α isoform-dependent signaling pathway leading to diabetic albuminuria.

Methods: completely abolish the development of diabetic nephropathy in the streptozotocin- induced diabetic mouse model. We therefore studied distinct pharmacological approaches while inhibiting both classical PKC isoforms and validated the phenotype of nondiabetic and streptozotocin-induced diabetic homoygous PKC-α/β double knock-out mice (PKC-α/β-) compared to appropriate 129/SV wild type mice.

Results: After 8 weeks of diabetes mellitus the high-glucose-induced renal and glomerular hypertrophy as well as the increased expression of extracellular matrix proteins such as collagen and fibronectin was abolished in the PKC-α/β- mice compared to WT controls. Furthermore, the high-glucose-induced expression of the proangiogenic cytokine TGF-β1, was significantly diminished in the PKC-α/β- mice in comparison to diabetic WT mice. The loss of the basal membrane protease perlecan and the podocyte protein nephrin is prevented in the diabetic state in the PKC-α/β- mice. Furthermore, we were able to demonstrate, that a PKC-α/β inhibitor had a similar effect.

In summary, blockade of the two prominent PKC isoforms and are able to prevent early diabetic nephropathy while inhibiting proangiogenic glomerular and tubulo- interstitial changes as well as the development of albuminuria. These results demonstrate that downregulation of the dual PKCα/β isoform activation in the diabetic state in vivo is a suitable therapeutic target in the prevention of diabetic microvascular complications such as diabetic nephropathy.

**PP.27.373** IMPACT OF HSCRP AND ADIPO-CYTOKINE ON CORONARY ARTERY CALCIFICATIONS IN TYPE 2 DIABETES

T. Kunugi1, A. Sato1, K. Nagai1, M. Era1, K. Saka1, S. Hasumi1, Y. Iwamoto1. 1Diabetes Center, Tokyo Women Medical University, Tokyo-Japan, 2Nishiuwa-Do Hospital, Ibaraki-Japan

Background and Aim: Coronary artery calcification (CAC) is a risk factor of coronary artery disease. It was reported that the case without CAC had very low risk of cardiovascular disease such as myocardial infarctions for the next 2-5 years, so that Multidetector Computed Tomography (MDCT) is used to evaluate the low-risk group. Biomarkers of subclinical vascular inflammation such as high-sensitivity C-reactive protein (hsCRP) play an important role of development to atherosclerosis. Recently, the osteoblastic differentiation and calcified acceleration effect of the leptin were reported, it is suggested the relationship of bone metabolism and adipokine (AC). The aim of this study is to determine the association between CAC and AC or hsCRP in patients with Type 2 diabetes.

Subject and Methods: ECG gated 40 lines of multi-cross section CT (PHILIPS Brilliance CT 40) was performed after injection of iomipidol in 59 consecutive type 2 diabetes patients (20 men mean age, 66 ± 9 years) from 2009 to 2010. The patients with the acute coronary syndrome, the known coronary artery disease, the renal failures (2 mg/dL of S-Cr or more), the inconstant heartbeat and the contrast media contraindication, were excluded. For analysis, we divided coronary artery into four branches, right coronary artery (RCA), left main trunk (LMT), left anterior descending coronary artery (LAD), left coronary artery circumflex (LCx). A doctor of circulatory specialist estimated CAC, and Coronary artery stenosis (CAS) assessed by existence of 50% and more stenosis with MDCT. Adiponectin, leptin and interleukin-6 (IL-6) as an AC and hsCRP as an inflammatory biomarker were measured at the examination of MDCT. We compared the presence of CAC and AC, hsCRP and clinical characteristics.

Result: On MDCT, 23 diabetic patients (68%) had CAC (CAC group), and 47% had CAS. Average numbers of CAC branches were 1.5 branches, when coronary artery disease, the known coronary artery disease, the renal failures (2 mg/dL of S-Cr or more), the inconstant heartbeat and the contrast media contraindication, were excluded. For analysis, we divided coronary artery into four branches, right coronary artery (RCA), left main trunk (LMT), left anterior descending coronary artery (LAD), left coronary artery circumflex (LCx). A doctor of circulatory specialist estimated CAC, and Coronary artery stenosis (CAS) assessed by existence of 50% and more stenosis with MDCT. Adiponectin, leptin and interleukin-6 (IL-6) as an AC and hsCRP as an inflammatory biomarker were measured at the examination of MDCT. We compared the presence of CAC and AC, hsCRP and clinical characteristics.

Conclusions: There was no relationship between presence of CAC and AC or hsCRP in type 2 diabetic patients. But, hsCRP was associated to widespread of CAC. It suggests that multi-vascular coronary disease is associated to chronic inflammation in type 2 diabetic patients.

**PP.27.374** BLOOD PRESSURE VARIABLES AND PREVAILING ELECTROCARDIOGRAPHIC LEFT VENTRICULAR HYPTERTROPHY IN SUB-SAHARAN INDIVIDUALS WITH DIABETES

A. P. Kengne1, S. P. Choukem2, M. Y. Dehayem3, A. I. Dzudie2. 1Medical Research Council, South Africa, Cape Town-South Africa, 2General Hospital of Douala, Douala-Cameroon, 3Yaounde Central Hospital, Yaounde-Cameroon

Background: To investigate whether blood pressure variables including systolic (SBP), diastolic (DBP) blood pressure, pulse (PP) and mean arterial pressure (MAP) are similar determinants of prevalent electrocardiographic left ventricular hypertrophy (LVH) in sub-Saharan Africans with type 2 diabetes.

Methods: The study included 420 individuals (49% men) with type 2 diabetes who were receiving chronic care in two main referral centers in the two major cities (Douala and Yaounde) of Cameroon. Logistic regressions
models were used to estimate the odd ratio (OR) and 95% confidence interval (95% CI) for a standard deviation (SD) higher level of SBP (25 mmHg), DBP (13 mmHg) and MAP (20) for the risk of LVH. Discrimination was assessed and compared with c-statistics and relative integrated discrimination improvement (RIDI, %).

Results: The multivariable adjusted OR (95% CI) for prevalent LVH with each SD higher blood pressure variable were: 1.61 (1.22-2.11) for SBP, 1.27 (0.99-1.63) for DBP. 1.62 (1.23-2.15) for PP and 1.55 (1.18-2.03) for MAP. C-statistic comparison showed no difference in discrimination of models with each of the BP variable (p-values > 0.09). However, RIDI statistic always showed and enhancement in models discrimination when other BP variables were replaced with PP, although such an enhancement was marginal for SBP. Using BP combination modestly improved models’ discrimination.

Conclusions: PP and SBP were the best predictors of prevalent LVH in this population, while DBP was the less effective. These findings have implications for cardiovascular risk stratification and monitoring of risk reducing therapies (CAD) and type 2 diabetes and assessment of it’s administration as medication for prevention of complications in such patients.

Methods: Thirty five patients (28 men and 15 women, average age 47.2 ± 1.5 years) with arterial hypertension (AH) I and II stage (WHO classification, 1999) and CAD stable angina I-II functional classes (classification of Canadian Cardiologist’s Association) combined with type 2 diabetes without signs of heart failure. The echocardiography, lipid and carbohydrate exchange analyses were performed to all of them on baseline and after 18 months of treatment. End systolic volume (ESV), ejection fraction (EF), left ventricular mass index (LVMI) and arterial cholesterol (TC), low-density lipoprotein (LDL-C), high-density lipo- protein (HDL-C), triglycerides (TG) and level of fasting glucose in blood serum were determined. All patients received Bisoprolol 5 mg daily and antidiabetic per oral Gliklazide in 30mg daily dose.

Results: Statistically significant decrease of blood pressure (BP) up to purposed level < 130/80 mmHg was achieved in all patients after 12 months of treatment. Statistically significant decrease of angina pectoris attacks and need in sublingual use of Nitroglycerine on 66% were revealed. Decrease of ESV by 7.1% (p < 0.05), increase of EF by 5.5% (p < 0.05) were accompanied with decrease of LVMI by 12.8% (p < 0.05). 12-week treatment with Bisoprolol didn’t influ- enced on blood lipid specter, i.e. TC, LDL-C, HDL-C levels, but TG level had statistically significant decrease by 10.9% (p < 0.05). That became corresponded to recommended level for patients without type 2 diabetes - 1.80 mmol/l. Level of fasting glucose in blood serum hadn’t exposed to statistically significant changes.

Conclusions: Hypotensive effect of Bisoprolol in hypertensive patients with CAD and type 2 diabetes accompanies with regression of left ventricular hypertrophy, decrease of numbers of angina pectoris attacks and need in sublingual use of Nitroglycerine. Bisoprolol 5 mg/daily hasn’t caused negative effect on lipid and carbohydrate metabolism as other beta-adrenoblockers, but promotes decrease of manifestation of diabetic dyslipidemia. Thus, Bisoprolol in hypertensive patients with CAD and type 2 diabetes can be approved not only as treating agent but also as preventive medications in such group of patients.

Objective of this study was to detect the main cardiovascular risk factors (CVRF) and assess clinical and echocardiography features of hypertensive dia- betic patients with and without ACS according to ESH guidelines. Little of data is available in Algeria.

Design and Method: From 2008 to 2010 in an observational study 199 consecutive hypertensive diabetic patients (81 men and 118 women, mean age 63 ± 10years) were assessed. Patients were divided into two groups: G1 (ACS +), n = 88 and G2 (ACS -) n = 111. They underwent physical exami- nation, ECG, complete echocardiography study and coronary angiography in (ACS +). Follow up of the two groups has been made in our outpatient care unit according to ESH/ESC guidelines.

Results: Mean body mass index (BMI)29.60 kg/m2 in G1 and 29.25kg/m2 in G2; mean waist circumference (WC); 106cm in women G2 vs. 98 cm in men G2 (p < 0.05). Half of the patients (51%) have concentric LVH. Among ACS- more than half of the patients had 3 to four CVRF, 58% a past history of stroke; 35% a peripheral vascular disease and 7% carotid plaques. BP was at goal in 62% of patients. Heart failure was present in 14 patients (12.61%) and all of them had left ventricular dysfunction. Elevated LV filling pressures were present in 12% of cases. Concentric LVH was seen in 66% of the cases. ACEI or ARBs were prescribed in 40% of patients and 30% of patients. A half of ACS patients had STEMI (52%) and a third NSTEMI. CHF was present in 21 patients (23.86%) with left ventricular dysfunction. Only 56% of STEMI continue lipid-lowering medication. Despite our advises with regards the need to modification of lifestyle habits we notice poor adherence in this matter.

Conclusion: Our preliminary data show that the prevalence of CVRF in the diabetic Algerian population is extremely high and rates of control are poor. These results highlight the difficulties in the management of hypertensive-dia- betic patients and demand better treatment strategies for an effective CV risk reduction.
**PP.27.378** IMPACT OF DIABETES AND HYPERTENSION ON LEFT VENTRICULAR SYSTOLIC FUNCTION

A. Bamushi, S Qirko, E. Petrela, A. Deliana, T. Goda, G. Husi, A. Goda. University Hospital Center M. Theresa, Tirana-Albania

**Background:** The aim of this study was to compare the interaction diabetes-hypertension on left ventricular (LV) longitudinal systolic function in asymptomatic patients.

**Methods:** The study population included 132 consecutive patients (55 ± 10 years): 50 patients with hypertension (HT), 47 with diabetes (DM), 35 who have both hypertension and diabetes (HT + DM) and 30 healthy controls. Systolic mitral annulus velocity (Sm) by Tissue Doppler, LV mass index (LVMi) and model of cardiac remodeling were evaluated.

**Results:** Sm was similarly reduced in HT group (8.57 ± 1.3 mm) and DM group (8.62 ± 2.3 mm) compared with the controls (10.92 ± 1.1 mm), and was further depressed in HT + DM group (7.7 ± 1.9 mm). There was a statically difference between HT + DM group and HT, or DM groups regarding LVMi (p < 0.001), Sm (p < 0.001) and left ventricular remodeling (p < 0.001).

**Conclusions:** The longitudinal systolic dysfunction was present in asymptomatic hypertensive diabetic patients with normal ejection fraction, correlated with higher left ventricular mass and cardiac remodeling.

**PP.27.379** DIABETIC HYPERSENSITIVITIES ARE CHARACTERIZED BY POOR QUALITY OF LIFE

V. Katsi, G. Sourretis, D. Tousoulis, C. Vlachopoulos, C. Stefanidis, I. Kallikazaros. Hippokration Hospital, Athens-Greece

**Background:** Mounting evidence suggests that essential hypertension (EH) has a negative impactation health-related quality of life (H-rQoL). Diabetes mellitus type II (DM-II) is associated with marked acceleration of vascular aging. We assessed the hypothesis that the combination of EH with DM-II could have an additive detrimental effect on H-rQoL.

**Methods:** We examined 145 subjects with newly diagnosed, untreated uncomplicated stage I-II EH (aged = 56 ± 16 years, DM-II = 37, office blood pressure = 156/92 mmHg). The validated Greek version of the Short Form 36 (SF-36) General Health Survey questionnaire was administered to all participants. The SF-36 is a generic H-rQoL instrument that includes eight subscales: physical functioning, physical role, bodily pain, general health, vitality, social functioning, emotional role and mental health. The subscales were further grouped into two summary scales: the physical component summary (PCS) and the mental component summary (MCS).

**Results:** Diabetic hyper-sensitivities demonstrated lower scores in all SF-36 dimensions compared to non-diabetics (Table).

**Comparison SF-36 scores between diabetics and non diabetics**

<table>
<thead>
<tr>
<th>SF-36 SCALES</th>
<th>DIABETES (n=37)</th>
<th>NO DIABETES (n=108)</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Functioning</td>
<td>40.01</td>
<td>51.02</td>
<td>0.21</td>
</tr>
<tr>
<td>Role Physical</td>
<td>49.62</td>
<td>51.12</td>
<td>0.86</td>
</tr>
<tr>
<td>Bodily Pain</td>
<td>48.72</td>
<td>50.64</td>
<td>0.87</td>
</tr>
<tr>
<td>General Health</td>
<td>34.91</td>
<td>51.78</td>
<td>0.05</td>
</tr>
<tr>
<td>Role Emotional</td>
<td>48.89</td>
<td>57.62</td>
<td>0.27</td>
</tr>
<tr>
<td>Mental Health</td>
<td>49.62</td>
<td>54.79</td>
<td>0.28</td>
</tr>
<tr>
<td>PCS</td>
<td>41.74</td>
<td>51.04</td>
<td>0.21</td>
</tr>
<tr>
<td>MCS</td>
<td>47.74</td>
<td>52.36</td>
<td>0.27</td>
</tr>
<tr>
<td>TOTAL SF-36 SCORE</td>
<td>43.52</td>
<td>51.37</td>
<td>0.24</td>
</tr>
</tbody>
</table>

**Conclusions:** Hypertension accompanied with DM- II exert a deleterious effect on health-related quality of life. Perhaps the earlier identification of hypertensive subjects with DM-II, may improve not only the cardiovascular outcome but the capability to cope with everyday needs.

**PP.27.380** IS DIFFERENT THE MANAGEMENT OF THE DIABETIC PATIENTS IN MENTOR PRACTICES FAMILY PHYSICIAN OR IN NON-MENTOR?

J. Burradile-Iriso1, G. Mediavilla-Tris1, A. Rodriguez-Fernandez2, J. Hurtado-Mendoza2, E. Lopez-De Uralde Perez De Alben1, ME Alarcia-Ceballos1, M. Lasso De La Vega-Martinez1, A. Iñiguez De Cirano-Landa2, O Ruiz De Arbaud-De Alegría1, Ma Roldan-Marrodan1, A. Lamin-Labiad1, LM Sanchez-Gonzalez1, Ai Gil-Moreno1, N. Sanchez-Garriod Lestache1, U. Blanco-Fuentess1, “C.S. Ciego Viejo (Vitoria-Gasteiz), Vitoria-Spain, ‘Comarca Araba, Vitoria-Spain

**Introduction:** Diabetes is a disease that our medical residents should know very well, because it has great importance in the specialty program. The teachers of the specialty must be well trained in the disease. Purpose To determine whether the management of diabetic patient is different if the family physician is mentor or not mentor.

**Material and Methods:** Descriptive study population. All primary care physicians in a city of 227,767 people over 14 years old. Data obtained from OSABIDE software. We use the G-STAT statistical program.

**Results:** There are 143 general practitioners. 17.5% are mentors of the specialty. 67.1% are women.

<table>
<thead>
<tr>
<th>No Mentors</th>
<th>Mentors</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population 14–84 years old</td>
<td>128.43</td>
<td>1325</td>
</tr>
<tr>
<td>Population 65–74 years old</td>
<td>150.3</td>
<td>151.7</td>
</tr>
<tr>
<td>Population &gt; 75 years old</td>
<td>149.8</td>
<td>155.2</td>
</tr>
<tr>
<td>Screening diabetes</td>
<td>57%</td>
<td>59.89%</td>
</tr>
<tr>
<td>Diabetic population</td>
<td>91.8</td>
<td>107</td>
</tr>
<tr>
<td>Advice on diet and physical exercise, eye’s fundus, foot care, clog hypertension</td>
<td>12.46%</td>
<td>20.59%</td>
</tr>
</tbody>
</table>

**Conclusions:** The mentors have more medical diagnoses and improved management of diabetic patients. We must improve the knowledge and management of diabetic patients at doctors not teachers.

**PP.27.381** RENOPROTECTIVE EFFECT OF THE LISINOPRIL AND AMLODIPINE FIXED COMBINATION IN PATIENTS WITH ARTERIAL HYPERTENSION AND DIABETES MELLITUS

K. Protasov1, O. Fedorishina2, A. Drizinsky1, N. Antonenko1 Irsuk Institute of Medical Postgraduate Education, Irkutsk- Russia, 1Railway Hospital, Irkutsk-Russia

**Objective:** Renoprotective effect of lisinopril and amlodipine fixed combination was not studied before. The aim of our study was to investigate the albuminuria and glomerular filtration rate (GFR) dynamics as well as vascular and antihypertensive effects under the influence of lisinopril and amlodipine fixed combination in type 2 diabetes and arterial hypertension patients with microalbuminuria.

**Design and Method:** 24 hypertensive and diabetic patients with microalbuminuria - 13 males and 11 females; mean age 56(51-60) - were investigated. The initial dose was 10 mg of lisinopril and 5 mg of amlodipine. The study duration was 24 weeks. Urinary albumin concentration, GFR by MDRD formula, office and average daily BP levels, endothelium-dependent vasodilation (EDTV) test by D. Celsermager and orthostatic BP reduction were evaluated on the 12 and 24 week of the selected therapy.

**Results and Conclusions:** At the end of the study urinary albumin excretion was significantly reduced by 47.0%, albumin/creatinine ratio - by 51.8% (see picture), office BP – by 18.7/15.7 and diurnal BP - by 9.9/7.5 mmHg. Normalalbuminuria was achieved in ten persons (41.7%), target BP (130/80 mmHg) - in 15 (62.5%). In five patients (20.8%) the level of albuminuria was elevated, GFR did not change reliably (from 80.5(66-105) to 84.0(72-95) ml/min; p = 0.7). We also revealed the trend to EDV increase by 3.4% (from -0.3; 5 +4) to +4.0; 1 +8%) p = 0.05. At the same time the orthostatic hypotension did not rise. We concluded that the fixed combination of lisinopril and amlodipine effectively decreases the urinary albumin excretion and BP level alongside with improving the endothelial function in diabetic and hypertensive nephropathy patients.
Conclusion: GTE reduced NADPH oxidase activity and the formation of ROS in the prediabetic stage of T2D rat model, which resulted in improved endothelial dysfunction and insulin resistance, and reduced BP.
**HEART FAILURE**

**POSTER SESSION**

**PP.28.383 INFLUENCE OF BETA-BLOCKER ON ENDOTHELIAL FUNCTION, ALBUMINURIA AND FIBRONECTINE IN PATIENTS WITH HEART FAILURE WITH PRESERVED SYSTOLIC FUNCTION**

O. Soya1, O. Kuryata1, A. Miroshnichenko2. 1Academy, Dnipropetrovsk-Ukraine, 2Regional Clinical Hospital Named After Mechnikov, Dnipropetrovsk-Ukraine

**Background:** Beta-blockers (BB) now are the first-line drugs for treatment of CHF with low ejection fraction (EF) but there are no standards for therapy pts with preserved left ventricular EF (LVEF). Besides, their influence on microalbuminuria, fibrinectine and endothelial function are not fully investigated. The aim was to investigate and compare effects of treatment with nebivolol or other beta-blockers by doctor’s choice on: level of albuminuria and fibrinectine, endothelial function in patients with CHF with preserved EF (>45%).

**Methods:** We studied the effect of 6 months treatment in 56 patients with NYHA II-III functional class CHF due to ischemic heart disease or arterial hypertension (male 27, female 29, mean age 60.16 yrs ± 1.2), and left ventricular ejection fraction (LVEF) > /< 45%, with left ventricular hypertrophy (LVMH), with microalbuminuria and fibrinectine before treatment. Patients with CHF were divided in two groups. In the 1st group were 31 patients treated by nebivolol (mean dosage 4.82 ± 0.4 mg once daily), in the 2nd group ~ 25 patients with treatment by beta-blockers by doctor’s choice. The content of fibrinectine in urine was detected by sensitive and quantitative dot-blot assay. Albuminuria was measured by method ELISA, microalbuminuria was defined as between 30-300 mg/24h. Endothelial function was assessed by flow-mediated dilatation of brachial artery by high-frequency ultrasound.

**Results:** Microalbuminuria was detected in 24.1% in patients before and in 3.1% after treatment, the percent of reduction reached 76.2% in 1st group and 65.9% in 2nd group. All patients with microalbuminuria had endothelial dysfunction and were demonstrated significant correlation between microalbuminuria and endothelial dysfunction (R2 = 0.50, P < 0.05) and diastolic dysfunction (R2 = 0.63, P < 0.05). We have found more significant improves endothelial dysfunction in group treated with nebivolol (60.6 vs 42.7%, P < 0.05). We have found strong overexpression of fibrinectine occurred in all pts with CHF with preserved systolic function compared to control (0.0788 ± 0.0357 mcg/ml vs 0.0307 ± 0.0253 mcg/ml) that could reflect the damage of kidney tissue. The percent of reduction of fibrinectine reached 59.3% in 1st group and 50.8% in 2nd group (P < 0.044).

**Conclusions:** Treatment with nebivolol has additional effect for correction of endothelial dysfunction. Parameters of albuminuria and fibrinectine significantly improved in all treatment regimens, but were shown additive effect of nebivolol in patients with heart failure with preserved systolic function.

**PP.28.384 A HERBAL MEDICINE (KAMPO): KAMI-SHOYO-SAN COULD PREVENT STRESS INDUCED CARDIAC DYSFUNCTION LIKE α AND β BLOCKER**

Y. Takano, F. Ishikura, M. Egawa, K. Komaru, S. Toyokawa. Osaka University, Suita-Japan

**Background:** We have reported that α and β blocker protects, such as labetalol against emotional stress-induced cardiac dysfunction but protective effects of other alternative medicines, such as Kanpo is unknown. Kami-shoyo-san is a unique herbal medicine which could reduce stress-induced symptoms. The purpose of this study is to evaluate the effect of Kami-shoyo-san to prevent stress induced cardiac dysfunction.

**Methods:** Rats premedicated with Kami-shoyo-san (100mg/kg/day) or vehicle, were restrained for 30 minutes (immobilization stress: IMO) to reproduce emotional stress, and anesthetized to release stress. We measured the fractional area change (FAC) using SONOG5500 (Philips) with s12 probe (frequency: 5-12MHz, frame rate: 120Hz) at the end of IMO and every 10 min for 60 minutes.

**Results:** During IMO, FAC with Kami-shoyo-san was same as that with vehicle. At 20 minutes after IMO, FAC with Kami-shoyo-san was significantly higher than that with vehicle (66 ± 5% vs. 56 ± 6%, p < 0.05). At rest, mean blood pressure with Kami-shoyo-san was slightly lower than that with vehicle (82mmHg vs 100mmHg).

**Conclusion:** Kami-shoyo-san could prevent a sudden drop of cardiac function after acute stress like IMO. Kami-shoyo-san might have a protective effect on stress induced cardiac dysfunction like α and β blocker.
**PP.28.386** CHARACTERISTICS OF ACUTE HEART FAILURE PATIENTS WITH HISTORY OF LONGSTANDING HYPERTENSION MANIFESTED AS PULMONARY OEDEMA (DATA FROM THE AHEAD REGISTRY)

M. Felsoci1, J. Parenica1, J. Jarkovsky2, J. Widimsky3, A. Linhart1, F. Malek1, M. Fedorcova2, Z. Coufal1, R. Miklik1, J. Spinar1. 1 University Hospital Brno, Masaryk University, Brno-Czech Republic, 2Masaryk University, Institute of Biostatistics and Analyses, Brno-Czech Republic, 3Charles University, University Hospital Kralovske Vinohrady, Department of Cardiology and Angiology, Prague-Czech Republic, 4Charles University, General University Hospital, Department of Cardiology and Angiology, Prague-Czech Republic, 5Homolka Hospital, Department of Cardiology, Prague-Czech Republic, 6Pulacky University, Olosme University Hospital, Department of Cardiology, Olomouc-Czech Republic, 7Bata Regional Hospital, Zlin-Czech Republic

**Objective:** Hypertension (HT) is considered as one of the most common precur- sor of heart failure (HF). Our aim was to characterize patients with previous longterm HT who developed acute HF and presented with pulmonary oedema (PE) at hospital admission.

**Design and Method:** We used data from Czech national multi-centric HF registry. 586 patients with known history of previous HT and hospitalisation for acute HF-PE were enrolled during the study period of 2005-2009. We compared them with 139 non-HT HF-PE patients. Acute decompensated HF, cardiogenic shock, hypertensive crisis and right HF were excluded from the analysis. Descriptive data, previous hospital course, medication, in hospital (HIM) and long-term all cause mortality (LTM) rates were assessed.

**Results:** Patients were older (73,9 years, non-HT 67,0 p < 0,001), no gender differences were found (women 45,4%, non-HT 37,4%, p = 0,11), both groups presented more as new-onset HF (56,8%, non-HT 64,0%, p = 0,13). When compared to non-HT group, HT patients had more often diabetes mellitus (56,2%, non-HT 55,3%, p = 0,001), history of previous myocardial infarction (39,1%, non-HT 27,3%, p < 0,05) and stroke (19,8%, non-HT 10,8%, p < 0,05), less dilated cardiomyopathy (5,8%, non-HT 13,0%, p < 0,05). HT was more frequently associated with higher NYHA class III/IV (46,6%, non-HT 35,3%, p < 0,05) and higher BMI (28,6 kg/m2, non-HT 26,4, p < 0,001). No difference was found in the level of LV ejection fraction (36,8%, non-HT 35,2%, p = 0,15). HT patients had more frequently coronary heart disease confirmed, if coronary angiography was performed (85,1%, non-HT 69,5%, p = 0,001). Serum creatinine level on admission of HT patients was increased significantly when compared to non-HT group (129,9μmol/l, non-HT 124,0 p < 0,05), as well as maximal creatinine (163,5μmol/l HT, 144,3 non-HT, p < 0,05) and serum entry glycaemia level (11.4mmol/l, non-HT 9,7, p < 0,001). Contrarywise entry haemoglobin was lower in HT group (128,7g/l, non-HT 132,6, p < 0,05). There was no difference in NTProBNP level (11504ng/ml, non-HT 9482, p = 0,85). No difference in HIM was found (HT 6,8%, non-HT 7,2%, p = 0,85), but HT patients had worse LTM rates (3-year survival 55,2%, non-HT 67,2%, p < 0,05).

**Conclusions:** Patients with history of longterm HT who develop acute HF with PE are older, with more co-morbidities and worse laboratory profile. Long-term outcome of HT patients with PE is worse, when compared to patients with no previous history of HT.

**PP.28.387** EFFECT OF COMBINATION THERAPY WITH BONE-MARROW MONONUCLEAR CELLS IMPLANTATION AND FASUDIL ON ANGIOGENESIS AND CARDIAC PERFORMANCE IN MYOCARDIAL ISCHEMIA

N. Kobayashi, H. Takeshima, W. Koguchi, M. Ishikawa, F. Sugiyama, T. Ishimitsu. Dokkyo University School of Medicine, Tochigi-Japan

The present study was to investigate whether combination therapy with bone marrow mononuclear cells (MNCs) and Rho-kinase inhibitor, fasudil, shows to enhance angiogenesis and ameliorates cardiac function compared with MNCs alone in a canine model of chronic myocardial infarction. Immediately after aspiration of BM, a model of chronic myocardial ischemia was created by LAD aspiration of BM, and chronic myocardial ischemia was created by coronary artery ligation in adult beagles, and then BM-MNCs or medium alone (control) was injected into the LAD risk area. Fasudil was administered by orally (30 mg/ kg/day) in combination therapy with BM-MNCs and fasudil. Four weeks later, end-systolic elastance (Ees) was measured by the pressure-volume loop using conductance catheter, and pathological findings, and immunohistochemistry (anti-VWF, CD31, and alfa-SMA antibody) were measured for angiogenesis. At 4 weeks, MNCs groups decreased infarct sizes, increased capillary den- sity, and improved Ees compared to control-group. Combination therapy with MNCs and fasudil shows to enhance angiogenesis, circulating CD34-positive cells by FACS, and ameliorates cardiac function compared with MNCs alone. These findings suggest that fasudil enhances neovascularization and improves cardiac function, which may be mediated by in part by endothelial progenitor cells mobilization.

**PP.28.388** AUTONOMIC INDEXES OF HEART RATE VARIABILITY AND BLOOD PRESSURE VARIABILITY ARE SIMILARLY ALTERED IN CONGESTIVE HEART FAILURE AND CORONARY ARTERY DISEASE PATIENTS, INDEPENDENTLY FROM THEIR EJECTION FRACTION

A. Radulescu1, G. Paolini2, D. Bonfant1, M. Di Rienzo3, G. Mancia1, P. Castiglioni1. 1Division of Cardiac Rehabilitation, Ospedale San Gerardo, Monza-Italy, 2Cardiochirurgia Ospedale San Gerardo, Monza-Italy, 3Medicina Fisica E Riabilitativa, Ospedale S Gerardo, Monza-Italy, Fondazione Don G.Gnocchi, Milan-Italy, 4Department of Clinical Medicine & Prevention, University of Milano-Bicocca, Milan-Italy

**Objective:** It has been shown that baroreflex activity is similarly impaired in coronary artery disease (CAD) patients with normal LVEF and in congestive heart failure (CHF) patients. Aim of this work was to evaluate whether spectral indexes of the control that the autonomic nervous system exerts on the heart and on the blood vessels are similarly altered in these two groups of patients.

**Methods:** We studied 12 CHF patients (LVEF = 36% ± 5%, M + SD), 10 CAD patients (LVEF = 59% ± 5%), and 12 healthy (CNT) age-matched controls (CHF: 63 ± 8 yrs; CAD: 64 ± 11 yrs; CNT: 58 ± 6 yrs; p > 0,20). ECG, finger arterial pressure and respiratory rate were recorded in supine position for 10 minutes. R-R intervals (RRI), systolic and diastolic blood pressure (SBP and DBP) were extracted for spectral analysis. RRI powers in the low- (LFRRRI) and high- (HFRRI) frequency bands, the latter being index of vagal tone, low-frequency DBP power (LFDBP, index of vasomotor fluctuations due to baroreflex resonance) and high-frequency SBP power (HFSPB, index of respiratory effects on blood pressure) were estimated. Groups were compared by one-factor ANOVA, with Newman-Keuls post-hoc analysis, after log-transformation.

**Results:** SBP, DBP, RRI and breathing rate did not differ among groups. The table shows spectral indexes indicating differences vs. CNT with * (p < 0,05) or ** (p < 0,01). Low and high frequency powers of RRI and low frequency power of DBP are significantly lower in CAD and CHF. No differences are found between CAD and CHF.

**Conclusion:** Spectral indexes of autonomic modulation are similarly altered in CHF and in CAD patients as compared to controls both at the heart and at the blood vessels. In these patients the reduction in autonomic cardiovascular modulation occurs independently of ejection fraction.

**Vol 29, e-Supplement A, June 2011**

**PP.28.389** HYPERTENSION INCREASES ELECTRICAL INSTABILITY IN POST-INFARCTION HEART FAILURE

I. Mozos, M. Hanca. University of Medicine and Pharmacy Victor Babes, Timisoara-Romania

**Hypothesis:** Electrical instability and sudden cardiac death risk are increased in post-infarction heart failure patients, and can be assessed using noninvasive methods: 12-lead ECG (QT and Tpeak-Tend interval), signal averaged ECG (late ventricular potentials) and body surface mapping (multipolar isointegral QRSST maps). We hypothesized that hypertension increases electrical instability in post-infarction heart failure patients.

**Methods:** A total of 40 post-infarction heart failure patients, aged 62 ± 11 years, underwent standard 12-lead ECG, signal averaged ECG (SAECG) and 64-electrodes body surface mapping (BSM). Left ventricular hypertrophy (LVH) was assessed using 2D-echocardiography. The patients were divided in two groups: with (+) and without hypertension (0). QT intervals, T wave, QTmax (the maximal QT interval duration in all 12 ECG leads), QTc, QTC intervals. We hypothesized that hypertension increases electrical instability in post-infarction heart failure patients.

**Results:** QTmax (the maximal QT interval duration in all 12 ECG leads), QTc, QTC intervals. We hypothesized that hypertension increases electrical instability in post-infarction heart failure patients.

<table>
<thead>
<tr>
<th>LF RRI (ms^2)</th>
<th>HF RRI (ms^2)</th>
<th>LF DBP (mmHg^2)</th>
<th>HF SBP (mmHg^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNT 456 (391)</td>
<td>153 (89)</td>
<td>2.7 (1.6)</td>
<td>1.8 (1.1)</td>
</tr>
<tr>
<td>CAD 122 (89)</td>
<td>67 (56)</td>
<td>1.5 (1.1)</td>
<td>4.4 (4.0)</td>
</tr>
<tr>
<td>CHF 130 (82)</td>
<td>58 (42)</td>
<td>1.2 (0.5)</td>
<td>2.3 (1.9)</td>
</tr>
</tbody>
</table>

**Conclusion:** Spectral indexes of autonomic modulation are similarly altered in CHF and in CAD patients as compared to controls both at the heart and at the blood vessels. In these patients the reduction in autonomic cardiovascular modulation occurs independently of ejection fraction.
and 540 ± 67 ms vs. 466 ± 78 ms (p = 0.0024), respectively. Late ventricular potentials (LVP), multipolar isointegral QRST maps (mpQRST) and LH V were more prevalent in the hypertensive group. Multiple regression analysis revealed a significant association (multiple R = 0.774, significance F ≤ 0.01) between LH V and Tpe (p < 0.01), mpQRST (p < 0.01) and LVP (p < 0.01).

Conclusions: Hypertension, as comorbidity, increases electrical instability in post-infarction heart failure patients, due to a higher prevalence of left ventricular hypertrophy.

**PP.28.390 DIASTOLIC HEART FAILURE OF HYPERTENSIVE PATIENTS**


Objective: To identify factors that coexist and influence diastolic heart failure of hypertensive patients.

Methods: We monitored 224 hypertensive patients (male 37%), of mean age (MA): 59.8 years, with high normal, stage 1 arterial hypertension or arterial hypertension under medication, with mean office systolic/diastolic blood pressure (MS/DBP): 136.2/82.8 mmHg. For those patients we measured the levels of brain natriuretic peptide (BNP). All patients were underwent echocardiography, m-mode 2D Doppler and tissue-Doppler and the structural and functional potentials (LVP), multipolar isointegral QRST maps (mpIQRST) and LVH were divided into two Groups according to the level E/E' (9). Group A: E/E' ≤ 9 and Group B: E/E' > 9.

Table 1: Parameters comparison according to ANOVA method between the two Groups

<table>
<thead>
<tr>
<th></th>
<th>MA (years)</th>
<th>SBP (mmHg)</th>
<th>DBP (mmHg)</th>
<th>BNP (pg/ml)</th>
<th>EF</th>
<th>LA (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>67.1</td>
<td>141.4</td>
<td>81.3</td>
<td>61.1</td>
<td>74.9</td>
<td>58.9</td>
</tr>
<tr>
<td>(N = 58)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group B</td>
<td>57.3</td>
<td>134.3</td>
<td>83.3</td>
<td>31.3</td>
<td>75.8</td>
<td>45.9</td>
</tr>
<tr>
<td>(N = 106)</td>
<td>p = 0.005</td>
<td>p = 0.009</td>
<td>NS</td>
<td>p = 0.05</td>
<td>NS</td>
<td>p = 0.002</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p = 0.011</td>
</tr>
</tbody>
</table>


Conclusion: Hypertensive patients with diastolic heart failure and similar EF and DBP, are of greater age, have higher systolic blood pressure, higher BNP levels and greater left atrial dimensions.

**PP.28.391 PULMONARY ULTRASOUND “COMET TAIL” ARTIFACT IN PATIENTS WITH ARTERIAL HYPERTENSION AND HEART FAILURE**


Background: Arterial Hypertension is one of the most important risk factors of Heart Failure (HF). Pulmonary congestion and Oedema is a useful mark of HF. The aim of this study was to determine the place of pulmonary ultrasound in diagnosis of HF in patients with Arterial Hypertension.

Methods: We studied 120 hypertensive patients with II-IV NYHA class HF. 80 Patients have Systolic Heart Failure (SHF) (I gr), 40 patient – Diastolic Heart Failure (DHF) (II gr) and 100 patients with Arterial Hypertension but without signs of HF (control, III gr). All patients undergone standard EchoCG examination. Sonographic evaluation of a lung was done in horizontal or vertical positions of patient, from 10 points of thoracic wall which corresponded to the projection of lower, middle and upper lobes of right lung and upper and lower lobes of left lung.

Results: In patients with HF we significantly often found the one of the sorts of reverberation - “Comet tail Phenomenon” (CTPh), which was registered in 90.0%, 85.0% and 40.0% of patients in I, II and III gr respectively (the difference between control an HF groups was significant). The count of points from where the CTPh was registered was 8.8 in SHF group, 6.8 in DHF gr. and 0.7 in control gr. The CTPh was registered from 3 or more points 0.2 thoracic wall in 85% of patients in I gr, 77.5% - in II gr and only 5% in III gr. In HF groups CTPh was prominent, protracted and multiple while in the control group it was single and short lasting, like lightening. There was a good correlation between the count of CTPh registration points from the thoracic wall and the heart failure NYHA class (r = 0.56), left ventricular systolic (r = 0.40) and diastolic (r = 0.32) diameters and negative correlation with EF% (r = -0.42).

Conclusion: Thoracic US is sensitive and accurate method for evaluation pulmonary congestion in hypertensive patients with HF. The US sign of pulmonary congestion in HF is a “Comet tail phenomenon”, which is protracted, prominent, multiple and registered from larger area of thoracic wall (3 points or more).

**PP.28.392 PROGNOSTIC ROLE OF PERIPHERAL BLOOD FLOW DEPENDING ON ETIOLOGY OF CHRONIC HEART FAILURE**

I. Shkurat. Institute of Cardiology, Kiev-Ukraine

Objective: To establish the dependence of peripheral blood flow (PBF) on severity, etiology and 12-months survival prognosis of CHF.

Methods: We examined 126 CHF patients (pts), NYHA II-IV, with left ventricular ejection fraction (LVEF) < 40%. Hypertensive heart disease (HHD) was established in 86pts, and dilated cardiomyopathy (DCMP) – in 40pts. Peak systolic (Vps) and end diastolic (Ved) velocities in a dorsalis pedis a.DP were measured ultrasonographically; index of peripheral resistance (RI) was calculated by formula: RI = (Vps-Ved)/Vps. Kaplan-Meier 12-months survival analysis was performed for Vps, Ved, RI based on «below median vs. above median» approach.

Results: In CHF pts Vps and Ved was significantly impaired in comparison to age-matched controls (39.3 ± 2.1 vs. 56.4 ± 6.6cm/s, p = 0.01 and 5.2 ± 0.8 vs. 12.9 ± 1.7cm/s, p < 0.01) and RI was significantly higher (0.83 ± 0.04 vs. 0.77 ± 0.02unit, p < 0.01) than in controls. More pronounced impairment of Vps and Ved and increase in RI in III-IV NYHA class pts than in II NYHA class was observed (Vps: 35.3 ± 2.6 vs. 42.4 ± 3.1cm/s, p < 0.01; Ved: 4.9 ± 0.4 vs. 6.1 ± 0.6cm/s, p < 0.01; RI: 0.85 ± 0.04 vs. 0.80 ± 0.00 unit, p < 0.01). In DCMP Vps and Ved was significantly worse and RI was significantly higher than in HHD (Vps: 34.3 ± 2.0 vs. 44.4 ± 3.6cm/s, p < 0.01; Ved: 4.3 ± 0.3 vs. 5.9 ± 0.4cm/s, p < 0.01; RI: 0.86 ± 0.06 vs. 0.80 ± 0.00unit, p < 0.01) compared despite comparable LVEF (p = 0.42) and NYHA class (p = 0.59) in both groups, and younger age (p < 0.01) in DCMP group. 12-months survival was significantly better in group with better (above-median) Vps and Ved (91% of pts alive vs 83% of pts alive in below-median group, p = 0.049) and with lower RI (92% of pts alive vs 81% of pts alive in above median group, p = 0.049), although LVEF in both groups were comparable (35.5 ± 7.2% vs 33.1 ± 6.3%, p = 0.32).

Conclusions: In patients with CHF PBF is significantly lower and this is accompanied by increase in resistance of resistive vessels in comparison with control. In CHF PBF is impaired and resistance of resistive vessels is increase, particularly in NYHA III-IV and DCMP patients. The better PBF demonstrated the better 12-months survival despite comparable LVEF in both groups.

**PP.28.393 DIASTOLIC HEART FAILURE AND PRESSURE VARIABILITY IN AGEING PATIENTS**

G. Lombardo, F. D’amico. Department of Geriatrics-Subintensive Care Unit Hospital of Patti, Messina-Italy

Objective: Hypertension (H) is one of the main causes for heart failure (HF) in elderly people. Besides diastolic heart failure adds up to 40% of all cases and the prevalence of diastolic heart failure increases with age. The aim of this study was to evaluate the prevalence of diastolic heart failure in elderly subjects with hypertension.

Design and Methods: 47 elderly subjects were included (22 males, 25 females, mean age 79 ± 8 years). They all entered our Geriatric ward with a diagnosis of heart failure. Design of the study included: 1) clinical measurement of blood pressure; 2) NYHA class evaluation: 3) electrocardiogram; 4) echocardiogram.

Results: 73.2% subjects had hypertension. Prevalence of heart failure increased with aging (78.5% > age 80). Mean blood pressure values were: SBP 140 ± 15 mmHg and DBP 85 ± 15 mmHg. 34.7% had controlled blood pressure. Among all cases 23 affected by diastolic heart failure had a 48.5% ejection fraction. During the first week of hospitalisation those patients also showed a higher NYHA Class score. Those in the CHF + H had a higher percentage of worsening heart failure compared with patients with uncontrolled hypertension. Hypertensive patients in Class 2 or 3 NYHA had a similar recovering rate both with controlled and uncontrolled hypertension. However hypertension objects showed a definite decrease of heart failure in NYHA Class (18%) versus controlled ones (5%). In a multivariable model these differences depended on age, gender, BMI, Diabetes Mellitus, CK-MB, atrial fibrillation. Through the same
investigation we detected that a history of hypertension was an independent predic-
tive factor of NYHA Class diastolic heart failure (p < 0.05).

Conclusions: Prevalence of heart failure is higher in hypertensive elderly
people and it increases with aging. These is also a significant relation between
uncontrolled hypertension and diastolic heart failure.

THE EFFECT OF OLMESARTAN ON MYOCARDIAL
FIBROSIS IN ANIMAL MODEL OF ADRIAMYCIN
INDUCED CARDIOMYOPATHY AND EXPRESSION
OF CARDIAC ANKYRIN REPEAT PROTEIN IN H9C2
CELLS

University of Korea, Seoul-South Korea

Background: Previous studies demonstrated that adriamycin (AD) aggravates
apoptosis of cardiomyocytes and myocardial fibrosis. We observed the effect of
olmesartan (OT) on apoptosis rate and myocardial fibrosis in AD induced
cardiomyopathy.

Materials and Methods: 20 Normotensive Wistar-Kyoto rats (WKY) and 20
spontaneously hypertensive rats (SHR) were divided into eight groups AD
injected vs. normal saline (NS) injected, placebo vs. OT treated. 2.5mg/kg
of AD was injected intraperitoneally twice a week for 3 weeks to four AD
treated groups and daily dose of 10 mg/kg OMST was administered orally for
6 weeks to four OT treated groups. Immunohistochemical stain using synthe-
sized CARP antibody and picrosirius stain was performed on left ventricle.
The positively stained areas were measured by using an image analysis pro-
gram (Image Pro-Plus 4.5). The CARP volume fractions (CaVF) and colla-
gen volume fractions (CVF) were calculated. H9C2 cells were cultured and
expression of CARP was observed after AD and OT treated.

Results: The CaVF of OT treated groups were increased significantly even in
AD injected groups. The CVF of AD injected groups increased significantly,
compared to NS injected groups in both WKY and SHR respectively. The CVF
of OT treated groups decreased significantly in SHR groups. CARP expression
of OT treated H9C2 cells were increased but AD suppressed CARP expression
whether OT was treated or not.

Conclusion: OT treatment increases CARP expression even in AD injected
groups and reduced myocardial fibrosis in SHR. OT induces changes in CARP
expression in H9C2 cells.

PP.28.394  THE EFFECT OF OLMESARTAN ON MYOCARDIAL
FIBROSIS IN ANIMAL MODEL OF ADRIAMYCIN
INDUCED CARDIOMYOPATHY AND EXPRESSION
OF CARDIAC ANKYRIN REPEAT PROTEIN IN H9C2
CELLS

A. Huerta, A. González, B. López, O. Beloqui, J. D’ez. Cima, University of
Navarra, Pamplona-Spain.  ‘University of Navarra Clinic, Pamplona-Spain

Objectives: Cardiorenal syndrome has been intensely studied in the last years.
However the relationship between chronic kidney disease (CKD) and left ven-
tricular (LV) diastolic dysfunction and the myocardial remodelling underlying
this condition in hypertension is not fully understood. Therefore, the objective
of this study was to analyse the association of cystatin c, a sensitive marker
of kidney damage, with LV diastolic function and with circulating markers of
myocardial collagen metabolism in hypertensive patients with chronic heart
failure (CHF).

Design and Methods: Two hundred and thirty three hypertensive patients
with CHF with and without chronic kidney were included in the study. Cardiac
morphology and function was assessed by echocardiography. Renal function
was evaluated with the estimated glomerular filtration rate (eGFR; MDRD
formula). Serum cystatin c levels and the biomarkers of collagen synthesis
(carboxy-terminal propeptide of procollagen type I or PICP) and degrad-
ation (matrix metalloproteinase-1 or MMP-1. and tissue inhibitor of MMPs-1 or
TIMP-1) were analyzed by ELISA. A group of 16 hypertensive subjects with
myocardial collagen metabolism in hypertensive patients with chronic heart
failure (CHF).

Results: Cystatin c was strongly correlated with the eGFR (P < 0.001) in hyper-
tensive CHF patients. Cystatin c levels were increased (P < 0.01) in hypertensive
patients with CHF as compared to those with no cardiac affection indepen-
dently of kidney damage. Cystatin c was inversely correlated to the E/E' ratio
(P < 0.01) and directly associated with the deceleration time (P < 0.05), both
parameters assessing LV diastolic dysfunction. Regarding collagen metabolism,
no association was found between cystatin c and the parameter assessing colla-
gen synthesis (PICP). However, cystatin c was strongly correlated with TIMP-1
(P < 0.001) and as a consequence inversely associated with the MMP-1/TIMP-1
ratio (P < 0.05), an index of MMP-1 activity.

Conclusions: These findings suggest that CKD may contribute to the impair-
ment of LV diastolic function in hypertensive patients with CHF. This effect
may be related to increased myocardial fibrosis, since there is an association
between kidney damage, as assessed by cystatin c, and impaired collagen deg-
radation, thus favouring its accumulation, which in turn, might contribute to
increased LV stiffness. Moreover cystatin c constitutes a potential circulating
biomarker of these processes.

PP.28.396  MYOCARDIAL HIBERNATION IN ARTERIAL
HYPERTENSION AND ACUTE MYOCARDIAL
INFARCTION AS PREDICTOR OF HEART FAILURE

O. Barnett, Y. Kyyak. Lviv National Medical University, Lviv-Ukraine

Introduction: Hypertension (HT) and Coronary Artery Disease (CAD) are
the main causes of Heart Failure (HF) development. However, morphological
and pathophysiological mechanisms remain unclear. Our aim was to inves-
tigate the influence of HT and Acute Myocardial Infarction (AMI) on myo-
cardial remodeling, evaluate ultrastructural evidence of diastolic and systolic
dysfunction.

Subjects and Methods: Myocardial express-necropies from 46 patients
(39 males, 7 females, age range 45-79) who suffered from HT and died from
Acute Myocardial Infarction (AMI) complicated by congestive Heart Failure
(CHF) or Cardiogenic Shock were examined. Transthorax necropsy of the
heart was performed immediately (15 min. average) after patient’s death in
clinic. Control group consisted of 5 persons who died of extra cardiac causes
in the same age. Intact and near infarction zones of the left ventricle were
examined.

Results: HT leads to HF development due to cardiomyocyte (CMC) hyper-
trophy, altered microcirculation which leads to hyperperfusion and interstitial
fibrosis. In parallel to this occur CMC enlargement, their dissociation and
fibrosis. In parallel to this occur CMC enlargement, their dissociation and
inflammation. These processes predominantly develops in near-necrotic and intact
zones. This process partly spreads in to intact zone of the left ventricle. The
progression of CMC apoptosis leads to left ventricle dilation and systolic
dysfunction that results in advanced CHF development.

Conclusions: The main feature of CMC hibernation is accumulation of glyco-
gen. Long-term hibernation leads to apoptosis and therefore apoptotic bodies
formation. These processes predominantly develops in near-necrotic and intact
zones and considerably influence the degree of Heart Failure. Appropriate
pharmacotherapy may partly prevent CMC hibernation and apoptosis and
therefore progression of Heart Failure.

PP.28.397  OSTEOPONTIN PLASMA LEVEL AS A TARGET IN THE
ASSESSMENT OF SEVERITY HEART FAILURE AND
CARDIAC REMODELLING

A. Bereznii, V. Seden. ‘State Medical University, Zaporozhye-Ukraine,
‘Region Hospital, Kherson- Ukraine

Background: In some recent studies have been reported that osteopontin is
dramatically increased in blood in patients with mild-to-severe of heart failure
(HF), and it is associated with systemic inflammatory response.

Aim: To investigate interrelations between plasma level of osteopontin with
both neurohumoral/proinflammatory activation and severity of cardiac remod-
eling in patients with mild-to-severe of HF.

Methods: Peripheral blood was collected from 64 patients with mild-to-severe
HF due to ischemic heart disease and 30 healthy control subjects. Area of both
left ventricle and left atrial were examined by Echo, mitral regurgitation was
analyzed by Doppler. Left ventricular ejection fraction (LVEF) was calculated
using a modified Simpson’s rule. The 64 patients were classified into 3 classes
according to the New York Heart Association (NYHA) functional classification.
Osteopontin, tumor necrosis factor-alpha and NT-pro-brain natriuretic peptide
in plasma were examined by ELISA.
Results: Plasma levels of osteopontin, tumor necrosis factor-alpha and NT-pro-brain natriuretic peptide were higher in patients with HF than in controls ($p = 0.012; p < 0.05$ and $p < 0.001$). Furthermore, both the plasma osteopontin levels and NT-pro-brain natriuretic peptide increased in proportion to the severity of the NYHA functional class. Tumor necrosis factor-alpha in plasma is correlated well with NYHA functional class in patients with moderate-to-severe HF only ($r = -0.380, p < 0.01$). It this patients population tumor necrosis factor-alpha level was correlated with body mass index ($r = -0.328, p = 0.014$) and LVEF ($r = -0.388, p = 0.0036$). The osteopontin plasma level was significantly correlated with LVEF ($r = -0.406, p = 0.0022$), mitral regurgitation ($r = 0.40, p < 0.05$), area of both left ventricle and left atrial ($r = 0.402, p < 0.01$ and $r = 0.406, p < 0.001$), log plasma NT-pro-brain natriuretic peptide level ($r = 0.45, p = 0.002$), and tumor necrosis factor-alpha level ($r = 0.301, p = 0.012$). However, after adjustment to age, sex, body mass index and treatment regimes osteopontin plasma level had been preserved significant interrelationships with both severity of symptomatic HF and cardiac remodelling.

In conclusions: osteopontin plasma level reflects the severity of symptomatic HF and correlates well with both LVEF and NT-pro-brain natriuretic peptide concentration. Osteopontin could be considered as target in the assessment of severity both HF and cardiac remodelling.

**PP.28.398 ASSESSMENT OF RIGHT VENTRICULAR FUNCTION MAY PREDICT THE NEW ONSET DIASTOLIC HEART FAILURE IN HYPERTENSIVE PATIENTS**

K. Hristova¹, A. La Gerche¹, Tz. Katova¹, V. Kostova¹, I. Simova¹. ¹National Heart Hospital, Department of Noninvasive Diagnostic and Im, Sofia-Bulgaria, ²Catholic University, Leuven-Belgium

**Aim:** The aim of our study is to determine the e impact of arterial hypertension and hypertensive cardiac remodelling on right ventricular (RV) function, using vector velocity echocardiography to determine strain and strain rate and make prognosis for new onset diastolic heart failure.

**Methods:** We compared echocardiographic measures in 40 patients with arte-rial hypertension and left ventricular hypertrophy (LVH group) with 20 healthy control subjects. of note, none of the hypertensive patients had symptomatic heart failure. Apical four-chamber images were acquired (frame rate 74 ± 6 frames/s) and analyzed offline in order to extract the strain (rate) curves. From these, the maximal systolic strain (PSS) and peak strain rate (PSR) on right and left ventricles were derived, using vector velocity imaging (VVI) software. Tricuspid annular plane systolic excursion (TAPSE) and as well as mid-apical and basal peak ejection strain (S) and strain rate (SR) of the RV free wall were measured.

**Results:** Body surface area, blood pressure, and heart rate were comparable between the LVH and control groups. Relative to controls, the LVH group had greater average wall thickness ($13.49 ± 1.67 \text{ mm} \times 9.2 ± 0.55\text{ mm}, p < 0.01$), LV mass ($238 ± 15.3g \text{ vs. } 173 ± 11.3g, p < 0.01$) and left ventricle diameter ($51.05 ± 5.13 \text{ cm vs. } 46.03 ± 3.201\text{ cm}, p = 0.64$). The E/A ratio on mitral inflow tract was lower in the LVH group ($0.75 ± 0.41 \text{ vs. } 1.87 ± 0.48; P < 0.001$). Global strain measures for the LV were not significantly different between groups ($\text{PSSLV -16.4 ± 3.14 vs. -19.69 ± 1.82, p = 0.56}$ whereas RV strain was diminished in the LVH group ($\text{PSS RV -10.03 ± 4.5 vs. -15.5 ± 2.3, p < 0.01}$). Similarly, greater differences were seen for strain rate in the RV (PSR 0.45 vs. 1.75 1/s, $p < 0.01$ for LVH vs. control). For regional RV function, PSS was lower in the LVH group than the control group in the mid ($-11.24 ± 3.2\% \text{ vs. -17.23 ± 2.23\%, p = 0.01}$) and apical ($-7.87 ± 2.34\% \text{ vs. -12.3 ± 2.56\%; P < 0.05}$). RV free wall, whilst basal PSS was similar ($-12.31 ± 3.87\% \text{ vs. -14.03 ± 3.78\%, p = 0.65}$). TAPSE (LVH, 21 ± 2.9 mm vs. Control, 23 ± 2.2 mm, $P = 0.34$) did not differ between groups and other conventional RV measures were also similar in both groups.

**Conclusions:** Myocardial velocity and strain rate imaging have promising results for assessing of RV and is less depends on LV geometry. The present study demonstrates that measures of RV deformation are reduced in patients with LVH secondary to hypertension. Thus, this data suggests that LVH may cause early sub-clinical RV dysfunction even in the absence of overt diastolic heart failure.

**E. Belu¹, R Musetescu¹, C. Batajou², M. Popescu¹, M Cosulschi², N. Florescu¹, D.-D. Ionescu¹. ¹Cardiology Center, Craiova-Romania, ²University, Craiova-Romania**

**Objectives:** To assess the LV function in patients with normal ejection fraction (EF > 50%) and long-term right ventricular (RV) apical pacing. Evidence suggests the hemodynamic benefit of AV sequential pacing over ventricular pacing. The aim of the present analysis was to evaluate if pacemaker-dependent patients with sick sinu syndrome (SSS) may have a benefit from DDD pacemaker when compared with VVI patients in terms of systolic function of the left ventricle.

**Methods:** We have assessed the outcomes after long-term (mean follow up 4.2 years) ventricular pacing for SSS in 38 patients (mean age 64 ± 3 years) without a LV dysfunction (ejection fraction EF > 50%) at the time of pacemaker implantation. All the patients were implanted in our center with VVI vs. DDD devices. We compared the number of atrial fibrillation episodes, NYHA class, the number of hospitalisations and several echocardiographic parameters between the subgroups with LV systolic dysfunction (EF < 30%) and normal LV systolic function.

**Results:** Continuous RV apical pacing (> 90% of time) was associated with the progression to LV dysfunction in 38% vs. 32% of patients with SSS. We have also noticed an increased number of hospitalisations and the growth of the NYHA class in this subgroup ($p < 0.05$).

**Conclusions:** The loss of AV synchrony induced by VVI pacing is associated with different detrimental effects. This process may be partly responsible for the higher incidence of atrial fibrillation in patients undergoing VVI pacing compared with AV sequential pacing. Single-site right ventricular apical pacing in patients without previous LV dysfunction is associated with marked progressive ventricular dysfunction on mid term follow-up.
Objective: In spite of the overwhelming evidence of benefits of antihypertensive therapy, the J-curve phenomenon is recently revisited. We investigated the single and combined effects of systolic and diastolic blood pressures on albuminuria in a Chinese population.

Methods: The study subjects were recruited from a newly established residential area in the suburb of Shanghai. We measured blood pressure (BP), anthropometry, and urinary excretions of albumin and creatinine, and defined albuminuria as a urinary albumin-to-creatinine ratio (mg/g) of at least 17 and 25 mg/g in men and women, respectively.

Results: The 1068 participants included 407 (38.5%) men and 410 (38.4%) hypertensive patients, of whom 331 (31.0%) took antihypertensive drugs. A J-shaped relationship between the risk of albuminuria (prevalence, 7.8%) and blood pressure was observed for both systolic (mean ± SD, 126.1 ± 18.9 mm Hg) and diastolic (77.1 ± 9.4 mm Hg) with a nadir level 120 mm Hg and 75 mm Hg, respectively. After subdivision of all participants into 3 subgroups according to systolic (< 120, 120-129, and ≥130 mm Hg) and diastolic blood pressure (< 70, 70-79 and ≥80 mm Hg), the risk of albuminuria was positively associated with diastolic BP only in the subjects with a systolic BP of at least 130 mm Hg, and with diastolic BP only in subjects with a diastolic BP of at least 80 mm Hg.

Conclusions: As far as albuminuria is concerned, there is indeed a J-shaped phenomenon. However, it has a nadir level far below the currently recommended target BP of 140/90 mm Hg, or 130/80 mm Hg, and is apparent only when both systolic and diastolic BP are at low levels.

Objective: To compare survival of essential hypertension persons suffering from type 2 diabetes mellitus (DM) or atrial fibrillation (AF) or both conditions.

Methods and Design: In a result of initial analysis of 1192 high risk hypertensive (1st-3rd level of blood pressure increase (ESC, 2007)) patients card boards there were chosen 353 ones. Data are shown as means and standard deviation of the mean. The patients, divided into 3 groups, were adjusted by gender, age, body mass index. 1st group included 122 persons with DM in combination with AF (58 males and 64 females, mean age 67.1 ± 7.6 y). 2nd group included 128 subjects with DM but without AF (58 males and 70 females, mean age 63.7 ± 6.7 y). 3rd group included 103 subjects with nonvalvular and nonthyreotoxic AF (52 males and 51 females, mean age 67.1 ± 8.7 y). Office baseline pulse pressure levels were 56 ± 16, 57 ± 18, 68 ± 20 mmHg respectively (1st vs 3rd groups p < 0.05; 2nd vs 3rd groups p < 0.05). A number of patients with paroxysmal, persistent, permanent AF forms in the 1st and 2nd groups were equal. There were studied retrospectively the general survival rate by Kaplan-Meyer method at the 2002-2010 yrs period.

Results: During investigational period the share of died from any reason persons constituted 20.8% in the 1st group, 9.4% in the 2nd group and 10.7% in the 3rd group (criterion lambda’s 1st group vs 2nd group, p = 0.0000, 1st group vs 3rd group, p = 0.04).

Conclusions: Researched by us high risk essential hypertensive subjects simultaneously suffering from type 2 DM and AF have the worst general prognoses in comparison with persons suffering from or type 2 DM or AF.
Conclusions: 1. Higher apelin concentration in group of hypertensive patients with exceeded body weight suggests that apelin action in development of insulin resistance and carbohydrates disorders may prevail over its role in pathogenesis of arterial hypertension in this population. 2. The mechanism of apelin action both, in hypertensive and overweight patients, requires further studies.

Materials and Method: The study was conducted on 100 patients who attended the hypertension clinic in our institution. Microalbuminuria was measured by micr test. Micr test uses an albumin Sensitive, Immunosassay test strip and offers a simple exact semi quantitative assessment of albumin concentration in the urine at various level (20, 50, 100 mg/l). The inclusion criteria were:1) patients age > 40 years 2) Known hypertension > 2 years duration. The Exclusion criteria were:1) Diabetes Mellitus 2) Renal disease 3) UTI 4) Proteinuria in urine routine examine. 5) Drugs known to cause proteinuria like ACE inhibitors, D-penicillamine, gold etc. 6) Febrile state and recent intercurrent illness.

Results: S.No. VARIABLES NUMBER PERCENTAGE MEAN VALUE 1 MALES 41 41 - 2 FEMALES 59 59 - 3 AGE GROUP (YEARS) 43 – 47 24 24 - 48 – 51 51 52.98 – 7.02 59 – 70 25 25 4 DURATION OF HTN (YEARS) < 4 49 49 – 6 33 33 4.66 ± 2.40 > 6 18 18 5.50 ± 1.18 ALCOHOLICS 24 24 - 7 BODY MASS INDEX NORMAL 60 60 4.80 ± 1.86 INCREASED 28 28 4.00 ± 1.01 9 RETINOPATHY 7 70 11.52 ± 3.98 MICROALBUMIN 32 32 - S.No. VARIABLES NUMBER PERCENTAGE MEAN VALUE 1 MALES 15 46.9 - 2 FEMALES 17 53.1 - 3 AGE GROUP (YEARS) 43 – 47 1.3 - 48 – 51 34.60 ± 3.50 ± 59 – 70 20 62.5 4 DURATION OF HTN (YEARS) < 4 4.1 3.1 3.34 ± 2.44 > 6 13 10.66 ± 6.13 8 18.53 3.5 SMOKE 3 12 - 7 MICROALBUMIN 25 - 7 BODY MASS INDEX NORMAL 12.37 5 25.98 ± 2.46 INCREASED 20 62.5 ± 3.5 MAP – 111.52 ± 3.98 MICROALBUMIN 7 21.9 - 10 SMOKE 22 68.8

Summary and Conclusion: 1. The prevalence of microalbuminuria in non diabetic hypertensive population was 32%. Incidence of microalbuminuria increases with increase in age and duration of hypertension. Occurrence of microalbuminuria was independent of levels of arterial pressure. Incidence of microalbuminuria was higher in patients with increased body mass index. Microalbuminuria is not a good predictor of retinopathy in hypertension. From this study, it is conceived that microalbuminuria can be used as a predictor of future cardiovascular events in hypertensive patients.

PP.29.405 COMPLICATIONS DURING THE FIRST WEEK OF HOSPITALIZATION IN HYPERTENSIVE PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

N. Vijayakumar, J Rajesh, S Vithivath. Aarupadai Veedu Medical College, Puducherry-India

Introduction: Microalbuminuria is known to predict the onset of clinical proteinuria and chronic renal failure in both insulin dependent diabetes mellitus and non insulin dependent diabetes mellitus. More recently, it has been found to be an independent risk factor for cardiovascular disease in non diabetic populations.

Aim of the Study: To find out the prevalence of microalbuminuria in non diabetic hypertensive populations in a south Indian population. To examine the correlation between microalbuminuria with age, duration of hypertension, body mass index and two indices of target organ damage namely, left ventricular hypertrophy and retinopathy.

Materials and Method: The study was conducted on 100 patients who attended the hypertension clinic in our institution. Microalbuminuria was measured by micr test. Micr test uses an albumin Sensitive, Immunosassay test strip and offers a simple exact semi quantitative assessment of albumin concentration in the urine at various level (20, 50, 100 mg/l). The inclusion criteria were:1) patients age > 40 years 2) Known hypertension > 2 years duration. The Exclusion criteria were:1) Diabetes Mellitus 2) Renal disease 3) UTI 4) Proteinuria in urine routine examine. 5) Drugs known to cause proteinuria like ACE inhibitors, D-penicillamine, gold etc. 6) Febrile state and recent intercurrent illness.

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Summary and Conclusion: 1. The prevalence of microalbuminuria in non diabetic hypertensive population was 32%. Incidence of microalbuminuria increases with increase in age and duration of hypertension. Occurrence of microalbuminuria was independent of levels of arterial pressure. Incidence of microalbuminuria was higher in patients with increased body mass index. Microalbuminuria is not a good predictor of retinopathy in hypertension. From this study, it is conceived that microalbuminuria can be used as a predictor of future cardiovascular events in hypertensive patients.

PP.29.406 COMPLICATIONS DURING THE FIRST WEEK OF HOSPITALIZATION IN HYPERTENSIVE PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

R. Musetescu1, D. Toader1, E. Belu1, A.E. Musetescu2, M. Popescu3, D.D Ionescu1, ‘Cardiology Center, Craiova-Romania, 2University of Medicine and Pharmacy, Craiova-Romania

Purpose: Acute myocardial infarction is characterized by regional myocardial damage that may lead to systolic and diastolic dysfunction. High values of left ventricle end-diastolic pressure in acute phase of myocardial infarction was associated with high mortality. Aim of the study was to find a correlation between echocardiographic parameters of filling pressure and clinical aspects in short and long term after acute myocardial infarction.

Methods: A number of 98 hypertensive patients (56 males and 43 females), admitted with acute myocardial infarction with ST-segment elevation were evaluated during the first week of hospitalization, before discharge by: clinical examination, 12 lead standard ECG, echocardiographic measurements of: left ventricle mass index (LVMi); cut off values for left ventricular hypertrophy (LHV) were LVMi > 131g/m2 in males and > 125g/m2 in females, the presence of dilatation of left ventricle (DLV) using transthoracic echocardiography, mitral inflow and pulmonary venous flow using Doppler echocardiography, tissue Doppler echocardiography at lateral and medial corner of mitral annulus, color Mmode echocardiography. E/E’ ratio, E/e’ ratio and A-A duration were calculated. Second evaluation was made after one year using the same methods.

Results: using chi squared (CS), odds ratio (OR) and relative risk (RR) we found significant correlation between: 1. During the first week of hospitalisation: E/E’ > 14 and: NYHA class of heart failure CS = 1.648203 (no statistically significance correlation, ns), A-A duration > 25ms and: NYHA class of heart failure CS = 3.936475, pericarditis CS = 7.059837, left ventricular aneurysm CS = 3.84, -A-A duration > 25ms and: NYHA class of heart failure CS = 3.657778, pericarditis CS = 6.455135, RR = 3.586937, RR = 2.7, left ventricular aneurysm CS = 1.2440764, OR = 2.012987, RR = 1.5. After one year: E/E’ > 14 and: NYHA class of heart failure CS = 1.502823 (ns), E/e’ > 1.5 and: NYHA class of heart failure CS = 25.290845, left ventricular aneurysm CS = 0.008899, -A-A duration > 25ms and: NYHA class of heart failure CS = 9.4528715, left ventricular aneurysm CS = 23.22963, OR = 36.63636, RR = 23.4.

Conclusions: 1. Diastolic dysfunction is early in hypertensive patients with AMI. Statistically significant correlations were found between some echocardiographic parameters of filling pressure in left ventricle and clinical aspects. 2. In short and long term, the clinical course was influenced by the diastolic dysfunction: patients with increased left ventricular pressure had more severe evolution.

PP.29.407 PREDICTORS AND IMPACT OF MITRAL REGURGITATION IN HYPERTENSIVE PATIENTS WITH A MYOCARDIAL INFARCTION


Objective: Ischaemic Mitral Regurgitation (MR) is multifactorial, involving local and global left ventricular remodelling. It has strong prognostic significance in the early stage of a Myocardial Infarction (MI). Its importance
in particular of mild MR) in the mean/long term, has not been unequivocally established. The aim of this study is to investigate clinical and analytical predictors of MR in hypertensive patients with a MI and to establish its prognostic value (ability to predict mortality (M) and decompensation (d) heart failure (HF)) during a 2-year follow-up.

**Design and Method:** 568 hypertensive patients admitted for a MI (age 70.7 ± 11.9y, 63.2% males, 61.4% with diabetes, 41.9% with STEMI). Data: analytical study at admission, risk scores, maximum Troponin I, coronary angiography, transthoracic echocardiogram pre-discharge. Patients followed for 2 years. Potential clinical and analytical predictors of moderate-severe MR pre-discharge were investigated, and the prognostic value of MR at 2 years, especially of mild MR, was assessed.

**Result:** A predictive model for moderate-severe MR pre-discharge included predictors GRACE for 6 month mortality (OR 1.018, p < 0.001) and left atrium (LA) transverse diameter (OR 1.041, p < 0.045). In univariate analysis, moderate-severe MR predicted at 2 year mortality (OR 3.15, p < 0.001), but was not a ddHF predictor. Mortality rate at 2 years was proportional to the severity of pre-discharge MR (41.7% for severe MR, 38.1% for moderate MR, 24.2% for mild MR and 12.6% for those without MR). Mild MR (vs. no MR) was associated with higher risk for 2 year mortality (OR 2.22, p = 0.013) and re-admission for ddHF (OR 2.86, p < 0.001). A predictive model for 2 year mortality included predictors glomerular filtration rate (GFR) (OR 0.985, p = 0.050) and GRACE for 6 month mortality (OR 1.033, p < 0.001).

**Conclusions:** Both the GRACE score and LA transverse diameter were independent predictors for the occurrence of moderate-severe MR in hypertensive pts with a MI. In univariate analysis, MR predicted two year mortality, with a continuous increasing risk profile with increasing seriousness of the MR, including mild MR. In multivariate analysis, however, the presence of MR did not add prognostic power to a predictive model for mortality that included the GRACE score and GFR.

**PP.29.408 PREVALENCE OF MICROALBUMINURIA AND STATINS TREATMENT**

C. Mena, N.R. Robles, J. Polo, J. Velasco, E. Angela, J. Espinosa Micrex Investigators Group, Badajoz-Caceres-Spain

**Aims:** It has been shown that hydroxy-methyl-glutaril-CoA inhibitors, also called statins, may interfere with tubular reabsorption of albumin, increasing urinary albumin excretion. There are not epidemiological studies which have evaluated this problem. We have evaluated the prevalence of microalbuminuria among patients treated with statins.

**Design and Methods:** Observational, cross sectional, descriptive study. 496 subjects between 25 and 79 years attended at primary care settings. Patients evaluated this problem. We have evaluated the prevalence of microalbuminuria among patients treated with statins.

**Results:**
- The prevalence of microalbuminuria was 8.15% for those patients not taking statins vs. 21% for those one receiving statin treatment.
- Among patients treated with statins, may interfere with the tubular reabsorption of albumin, increasing urinary albumin excretion. This phenomenon is more strong in diabetic patients. The risk for microalbuminuria is higher in patients treated with atorvastatin than those treated with simvastatin.
- There are not epidemiological studies which have evaluated this problem. We have evaluated the prevalence of microalbuminuria among patients treated with statins.

**Conclusions:** Statin treatment seems to be associated to abnormal urinary albumin excretion. This phenomenon is more strong in diabetic patients. The risk for microalbuminuria is higher in patients treated with atorvastatin than those treated with simvastatin.
Methodology: A multi-center, open label Ibrabradine was given to 277 chronic stable angina pectoris (CSA) patients diagnosed by cardiologists and were followed-up for 4 months. The efficacy of Ibrabradine in reduction of HR and frequency of angina attacks were monitored.

Results: Mean HR reductions are given in the table below.

<table>
<thead>
<tr>
<th>Table: Reduction of Heart Rate from baseline to month 4. *significant at P&lt;0.001</th>
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<tbody>
<tr>
<td><strong>Baseline HR (bpm)</strong></td>
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<tr>
<td>------------------------</td>
</tr>
<tr>
<td>Overall CSA population (N=277)</td>
</tr>
<tr>
<td>Hypertensive (N=158)</td>
</tr>
<tr>
<td>Non-hypertensive (N=109)</td>
</tr>
<tr>
<td>BMI low-to-normal (≤24.5)(N=110)</td>
</tr>
<tr>
<td>BMI moderate-to-high (&gt;25.0)(N=122)</td>
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Conclusions: In Thai patients with CSA, Ibrabradine significantly reduced both heart rate and angina symptoms irrespective of the blood pressure level or BMI profile.

**PP.29.412 THE ASSOCIATIONS BETWEEN 24-H AMBULATORY BLOOD PRESSURES MONITORING PARAMETERS, 24-HOUR URINE COLLECTION SODIUM AND POTASSIUM EXCRETION AND MICRUALBUMIN/CREATININE RATIO IN PATIENTS WITH ESSENTIAL HYPERTENSION.**

A. Brzeska, J. Pereczynska-Furtak, K. Widencek, T. Miziaowski. **Department of Hypertension and General Medicine Pum, Szczecin- Poland**

**Purpose:** To assess the association between 24-hour ambulatory blood pressures monitoring parameters, 24-hour urine sodium and potassium excretion and microalbumin/creatinine ratio in patients with dipping or non-dipping essential hypertension.

**Material and Methods:** The study was performed on 59 subjects with essential arterial hypertension (28 females, 31 males). In all patients a 24-h blood pressure monitoring (ABPM) protocol was performed using a SpaceLab 90207 monitor (SpaceLab Healthcare; Issaquah, WA). Blood pressure was measured every 20 min during the daytime (from 06.00 to 22.00) and every 30 min at night-time (22.00-06.00). The following parameters were calculated: 24h mean (MAP), systolic (SBP) and diastolic (DBP) blood pressure, day-systolic (DSBP) and diastolic (DDBP) blood pressure as well as night-systolic (NSBP) and diastolic (NDBP) blood pressure. The non-dipper hypertension was defined if declines in blood pressure at night were below 10% of the daytime values. Of 59 patients we identified 32 dippers (16 females, 16 males; mean age 37.19 ± 14.94 yrs) and 27 non-dippers (12 females, 15 males; mean age 36.33 ± 16.37 yrs). Microalbuminuria and creatinine level in random urine sample were assessed to calculate microalbumin/creatinine ratio. A 24-hour urine collection was taken for sodium and potassium excretion.

**Results:** 1. We did not find any statistically significant difference in microalbumin/creatinine ratio between dippers and non-dippers (4.4± 4.01 vs 6.31 ± 5.6). 2. Microalbumin/creatinine ratio was positively correlated (r = 0.29, p < 0.05) with 24-h MAP and day-MAP in all patients with essential hypertension. 3. In all patients with essential hypertension microalbumin/creatinine ratio was inversely correlated with a 24-h urine sodium (r = -0.28, p < 0.05) and potassium excretion (r = -0.49, p < 0.001).

**Conclusions:** In patients with essential hypertension microalbumin/creatinine ratio, which is a marker of early-stage kidney disease, is associated with 24-h mean blood pressure, day-mean blood pressure and also inversely correlates with 24h sodium and potassium excretion, irrespectively of dipping and non-dipping hypertension.

**PP.29.413 PROFILE OF THE YOUNG HYPERTENSIVE PATIENTS ADMITTED TO A DEPARTMENT OF INTERNAL MEDICINE.**


**Purpose of the Study:** To describe the cardiovascular profile and the treatment used in young hypertensive patients (less than or equal to 55 years) who are admitted in our internal medicine department.

**Material and Methods:** A descriptive study of a total of 401 hypertensive patients admitted from the months of January to October 2010, which we divided into two groups: a) less than or equal to 55 b) over 55 years. We picked up the sex, age, cardiovascular risk factors, the measurement of the blood pressure on admission and the treatment performed. We compared both groups using statistical analysis Chi2 for qualitative variables and t Student for quantitative ones.

**Results:** We obtained a total of 17 (4.2%) patients ≤ 55 years and 384 (95.4%) > 55 years. Among young people 13 (76.4%) were men compared to 189 (49.2%) among the elderly group (p = 0.024). We found that younger people had a low presence of DM (17.6% vs 43.2% p = 0.029), CHF (0% vs 17.1% p = 0.044), renal failure (0% vs 16.9% p = 0.046) and they were more tobacco users (64.7% vs 8% p = 0.001). We found no differences in the presence of dyslipidemia, stroke, ischemic heart disease and peripheral arterial disease. Regarding the degree of control of blood pressure there were no differences between both groups, being the average SBP 132± 22 mmHg in young and 136 ± 29 mmHg in the elderly, and the average for DBP were 77 ± 15 mmHg in young and 69 ± 16 mmHg in the elderly. Analyzing the treatment we found that young people used less diuretics (17.6% vs 60.4% p = 0.001) and beta-blockers (11.7% vs 34.8% p = 0.015) without differences concerning the use of alpha-blockers, calcium antagonists, ACE inhibitors, angiotensin II receptor antagonists and direct renin blockers. The number of drugs used in young people was 1± 1.2 and 1.1 ± 1 in the elderly (p = 0.001).

**Conclusions:** The profile of young hypertensive patients admitted to our service was: male, smoker with low presence of diabetes, heart failure and kidney failure, which takes a single drug being diuretics and beta blockers rarely. Probably the low prescription of diuretics and beta blockers are attributable to the little prevalence in this group of heart failure and ischemic heart disease. Perhaps we prefer the young patient starting treatment with an ACE inhibitor or ARB.

**PP.29.414 PROFILE OF REFERRED HYPERTENSIVE PATIENTS FROM PRIMARY CARE TO SPECIALIZED CARE**

N. Martell-Charo1, J.L. Zamorano2, A. Galgo-Nafria1. **1Hypertension Unit. Hospital Clinico San Carlos, Madrid-Spain, 2Cardiovascular Institute. H Clinico San Carlos, Madrid-Spain, 3C.S. Espronceda, Madrid-Spain**

**Objective:** Analysis of the hypertensive patient profile who are referred to a specialized service by Primary Care (PC) physicians in Spain.

**Material and Methods:** A prospective, multicenter study in which 178 investigators consecutively enrolled 10 patients each. The following variables were collected: Clinical assessment, family and personal backgrounds, anthropometric data on the date of the visit, reason for referral (consensus document SEH-LELHA-2008), smoking, alcohol, analysis performed in PC, drugs, complementary examinations requested by the specialist, their results, diagnosis and final treatment.

**Results:** A total of 1780 surveys were received, 1769 (response index 99.4%) being valid. Age: 62.4 ± 13.6 years (18 – 99), 55% male. BMI: 29.0 ± 4.7, abdominal obesity: 58.9%. Smokers: 26.5%, ex-smokers 25.1%. Drinkers: 13.7%. Sedentary life style: 86.3%. BP: 159.0 ± 19.9 92.3 ± 12.8 mmHg. Time since diagnosis 8.0 ± 7.7 years [range 0.5- median 7 years (CI: 2-11)]. Reason for referral: Need for urgent treatment: 11.9%. Suspicion of secondary AHT: 37.8%. Treatment difficulties: 21.1%. Extreme variability: 12.2%. Recent diagnosis: 4.8%; pregnancy: 1.1%; other reasons: 23.3%. The final diagnosis of the patients after evaluation by the specialist was: 11.6% secondary AHT (Stenosis renal artery: 7.2%, renal disease: 3.8%, hyperaldosteronism 1.7%, pheochromocytoma 0.5%), 0.8% had accelerated AHT, 3.1% severe AHT, AHT with chronic renal failure: 5.3% (2.2% serum creatinine > 3 mg/dL, decrease of glomerular filtration rate: 1.1%), AHT and pregnancy: 0.8%. Refractory AHT 11.9%, AHT and metabolic syndrome 22.1%, AHT and others: 34.7%. A total of 74.7% of referrals were considered correct by the specialist (95% CI: 72.7- 76.7). However, 34.0% (95% CI: 31.8-36.2) (n = 601) of them were considered
late referrals. The referral report was very good: 5.4%, sufficient: 50.7%, insufficient: 36.9%, did not exist: 7.1%.

Conclusion: Almost 75% of the patients were referred correctly. However, 34% of them had been referred late according to the evaluation of the specialist. The referral documents were not adequate in 43.9%. This work was supported by an unrestricted grant provided by Daichi-Sankyo Spain.

ASSOCIATION OF C-REACTIVE PROTEIN AND LIPID PROFILE WITH SUBCLINICAL ORGAN DAMAGE BASED ON ANKLE BRACHIAL INDEX IN THE GROUP OF HYPERTENSIVE PATIENTS

L. Woznicka-Leskiwicz, A. Posadyz-Malacynska University of Medical Science, Poznan-Poland

Keywords: C-reactive protein (CRP), HDL cholesterol, ankle-brachial index (ABI), hypertension (HTN).

Objectives: The relationship between CRP, lipid profile and subclinical organ damage based on Ankle Brachial Index in the group of hypertensive patients.

Design and Methods: We evaluated 38 patients with HTN and 28 patients without HTN. The average age of them-respectively: 54; 56 yrs. We divided all patients in three groups A-with CRP: 0- 2.99mg/l, B-with CRP: 3- 4.99mg/l, C-with CRP: ≥5mg/l. Following measurements were taken: BMI, serum level of: HDL, LDL and total cholesterol (Tchol), triglycerides (TG), fasting plasma glucose, urea, creatinine, uric acid, eGFR. We also examined ABI on each patient. The t-student test was used for the statistical analysis, r Spearman was taken to analyze the correlation of statistically significant values.

Results: We revealed the statistically significant differences between the following means. Tchol[mmol/l] A:1.55 and C:2.24(*); B:1.68 and C:2.24(*); LDL[mmol/l] A:3.30 and C:3.93 (*); B:3.54 and C:3.93(*); TG[mmol/l] A:1.55 and C:2.24(*); B:1.68 and C:2.24(*) [for p ≤ 0.05, ** for p < 0.001]. In the group of patients with HTN we revealed negative correlation between the level of CRP and HDL cholesterol (p = 0.006). Moreover between level of CRP and ABI value (p = 0.033).

Conclusions: 1) ABI is significantly associated with CRP. 2) Lipids profiles are significantly different in the groups with vary CRP compartments. 3) Lipids profile has significant impact on ABI.

ACEI-RELATED ANGIOEDEMA: LONG-TERM STUDY FOLLOW-UP OF 111 PATIENTS

L. M. Beltrami1, L. C. Zingale1, R. Vacchini2, L. A. Dalla Vecchia1, S. Carugo3, M. Cicardi2. 1Fondazione Salvatore Maugeri Irccs, Milan-Italy, 2Ospedale Luigi Sacco, Milan-Italy, 3Asp Immes E Pau, Milan-Italy

Objective: To investigate the frequency of recurrences of ACE-inhibitor (ACE-I) related angioedema (AE) after the discontinuation of ACE-I.

Design and Method: This retrospective study was conducted in an outpatient tertiary-level centre, for a total period of 173 months (about 14 years). Consecutive patients with recurrent AE symptoms initiated during treatment with an ACE-I inhibitor, who had been followed for ≥12 months after discontinuation of the drug were eligible. The primary study variable was the incidence of recurrences of AE after ACE-I discontinuation. AE location, type of ACE-I and indication for this treatment and the drugs prescribed after the discontinuation of ACE-I were also evaluated.

Results: In total, 111 patients were followed; 54 of them (49%) were on enalapril. After discontinuation from ACE-I, 51 patients (46%) had further recurrences of AE; in 18 relapsers (16% of the total) the frequency of AE recurrences remained unchanged when compared with that reported during ACE-I treatment. The large majority of relapsers (88%) had the first recurrence of AE within the first month since ACE-I discontinuation. The switch to a different anti-hypertensive therapy did not seem associated with a reduction in the frequency of AE attacks.

Conclusions: Even with all the limitations on any observational analysis, this long-term study suggests for the first time that patients with AE while on ACE-I treatment seem to have a condition predisposing AE that is elicited by the treatment with these drugs. Further studies in this field appear advocated due to the potential severity of AE attacks.

INTERCONNECTION OF AN UNFAVOURABLE BLOOD PRESSURE PROFILE AND ARRYTHMIAS IN HYPERTENSIVE PATIENTS

E. Rebeco, A. Mrochek. Republic Scientific and Practical Center «Cardiology», Minsk-Belarus

Objective: To study the interconnection of 24-hour ambulatory blood pressure monitoring parameters and cardiac arrhythmias in hypertensive patients.

Design and Method: The study cohort consisted of 97 patients with proved essential hypertension. The average age of patients was 51.3 ± 8.6 years. All patients were studied with the use of 24-h blood pressure monitoring, 24-h dynamic Holter monitoring, monoch- and two-dimensional echocardiography and exercise ECG testing to exclude coronary artery disease. Depending on blood pressure profile the patients were divided into the following groups: the group with unfavourable systolic blood pressure profile (non-dipper and night-peeker), n = 36; the group with favorable systolic blood pressure profile (diaper and over-dipper), n = 61; the patients with unfavourable diastolic blood pressure profile, n = 25; the group with favorable diastolic blood pressure profile, n = 72. During the analysis of atrial arrhythmias, complex atrial arrhythmias (atrial couplets, paroxysms of atrial tachycardia, paroxysms of atrial fibrillation) were taken into account. Ventricular arrhythmias were categorized according to Lown-Wolf classification.

Results: It was revealed that high gradient ventricular arrhythmias were recorded more often in the group with unfavourable systolic blood pressure profile than in the group with favorable one (Yates corrected χ2; p = 0.025).

Conclusions: The unfavourable blood pressure profile can be a risk factor of threatening ventricular arrhythmias and complex atrial arrhythmias in hypertensive patients.

THE CORRELATION BETWEEN MICROALBUMINURIA AND THE DETERMINING ACTIVITY FACTORS OF RHEUMATOID ARTHRITIS

V. Duraj, M. Gjeta, L. Collaku, A. Tafaj Uc Mother Teresa, Tirana-Albania

Introduction and Aims: Microalbuminuria has a high prevalence in the population with rheumatoid arthritis Microalbuminuria has been reported to occur in has mainly as 27. 7% patients with rheumatoid arthritis compared with 7. 8% of controls. Disease activity was assessed by the erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) The purpose of this study is to assess the prevalence of microalbuminuria in patients with AR and to provide evidence on the correlation among microalbuminuria and the determining factors of the activity of the disease as of the eritrosediment and the C reactive protein.

Methods: The patients were divided into two groups. Group I was composed of 35 patients with rheumatoid arthritis who were compared to 25 patients that did not present signs of rheumatoid arthritis. Both groups were placed under the same conditions with regard to their age and gender. Microalbuminuria was determined with the presence of albumin in the morning urinary spot with more than 30mg/dl. It was established for the patients the value of the eritrosediment and of the creative protein as assessors of the disease activity.

Results: The prevalence of microalbuminuria in patients with rheumatoid arthritis is significantly higher compared to the subjects of control p < 0.01). Microalbuminuria in patients with rheumatoid arthritis had also a positive correlation with the eritrosediment and the C-reactive protein as compared to the control group p < 0.05)

Conclusions: Microalbuminuria in this population correlated with the factors of the activity of the disease as the C reactive protein and the eritrosediment.

INFLUENCE OF SMOKING ON MINERALS STATUS AND SERUM LIPIDS AND GLUCOSE IN HYPERTENSIVE PATIENTS

J. Suliburska1, P. Bogdanski2, M. Szulinska3, D. Pupek-Musialik2. 1Department of Human Nutrition and Hygiene, Life Sciences University, Poznan-Poland,

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Design and Methods: The study population comprised 28 smoking (currently) and 30 nonsmoking (currently and in the past) patients with diagnosed hypertension. The smoking group included 16 women and 12 men and in the nonsmoking group were 17 women and 13 men. Mean age equaled 44.8 ± 4.8 years in the smoking group and 46.1 ± 4.3 years in the nonsmoking group. The distribution across each age decade was similar in both groups. The hypertensive subjects were selected from out-patients of Internal Diseases and Metabolic Disorders Clinic at Poznan University of Medical Sciences. All patients from the study group were undergoing pharmaceutical treatment. All participants had blood collected from a forearm vein. The content of iron, copper, zinc, calcium and magnesium in serum samples were determined by the flame atomic absorption spectrometry (Zeiss AAS-3 spectrometer with deuterium background correction). Sodium and potassium serum level was measured using indirect potentiometer. The accuracy of the method was verified by Certified Reference Material. It amounted to 95%, 99%, 94%, 99% 102% and 98%, 96% for Ca, Mg, Fe, Zn, Cu and sodium, potassium respectively. Plasma total cholesterol, low-density lipoprotein cholesterol (LDL), high-density lipoprotein cholesterol (HDL), triglycerides and glucose levels were measured using commercial kits. Statistica 6.0 software (Stat Soft) was used for statistical analysis of the results. Mann-Whitney’s test was used to establish significance of group differences at the significance level of 0.05. Results: It was found markedly higher concentration of triglycerides in smoking subjects (1.185 ± 0.93 mmol/l) than in nonsmoking (1.60 ± 0.85 mmol/l). It was also observed that level of HDL cholesterol was significantly lower in serum of patients who smoked compared to nonsmoking group. Interestingly, the concentration of glucose was slightly higher in nonsmoking patients (5.76 ± 1.30 mmol/l) than in smoking (5.35 ± 1.17 mmol/l). The total cholesterol and LDL cholesterol levels were comparable in both groups. In this study was found differences between level of iron, zinc and copper in serum of smoking and non-smoking patients. The higher concentration of iron was observed in serum of smoking (26.1 ± 4.32 mmol/l) than in serum of never smoking patients (17.3 ± 5.25 mmol/l). It was also found markedly lower concentration of zinc and copper in serum of smoking patients with hypertension (Zn: 11.7 ± 3.69 mmol/l; Cu: 11.0 ± 3.15 mmol/l) than in nonsmoking (15.8 ± 4.62 mmol/l; Cu: 12.6 ± 3.94 mmol/l). The analysis of the data showed that smoking does not influence on concentration of sodium, potassium, calcium and magnesium in serum of subjects. Conclusions: Smoking increases level of triglycerides and decreases concentration of HDL cholesterol in hypertensive patients. There is a link between smoking and higher concentration of iron and lower levels of copper and zinc in serum of patients with hypertension.

**PP.29.420 INVESTIGATION OF SUBCLINICAL TARGET ORGAN DAMAGES, CARDIAC AUTONOMIC NEUROPATHY AND BAROREFLEX-SENSITIVITY IN DIABETIC AND NON-DIABETIC HYPERTENSIVES**

P. Legrady1, I. Fejes1, D. Bajcsy1, P. Kempler2, A. Kovacs3, A. Letoja1, J. Tóth1, G. Abraham1. 1Univ. of Szeged, 1St Dep. of Int. Med., Szeged-Hungary; 2Semmelweis Univ., 1St Dep. of Int. Med., Budapest-Hungary.

We investigated cardiovascular (CV) status in 22 non-diabetic (HT), 18 diabetic (DMHT) treated hypertensive and 15 normotensive healthy (C) individuals. The continuous blood pressure data were recorded with the Finometer device. The data were analysed with the Nevrocard and the Beatscope softwares. We calculated the up, down and all baroreflex-sensitivity by sequence method and total peripheral resistance (TPR) in lying and standing positions. Cardiac autonomic neuropathy was assessed by means of five standard reflex tests and we counted a score from 0 to 10. The carotid-femoral (cfPWV) and baroreflex-sensitivity (crPWV) pulse wave velocity were estimated with PalPen device by the means of applanation tonometry. We also estimated the ankle-brachial index (ABI). The peripheral sensory neuropathy was characterized via current perception thresholds (CPTs) measured with a Neumometer (Neurotron Inc.) on the foot and the peroneal nerves at 2000, 250 and 5 Hz. We measured the serum insulin (Inz), aldosterone (Ald), renin (Re), norepinephrine (NE), and counted HOMA-IR index. All the patient groups were CAN positive (C: 1.0; HT: 3.64; DMHT: 4.1). The CAN score was highest in group DMHT. All the BRS values decreased after standing up in all groups, and they were highest in group C and lowest in group DMHT. The Inz, HOMA-IR, Re, cfPWV and crPWV were highest in group DMHT. The ABI was lowest in group DMHT. The CPTs at all frequencies were highest in group DMHT, at 250 Hz in group HT and DMHT they raised into pathological range. In group HT we found positive correlation between the 30/15 ratio and all the BRS values in standing position, and in group DMHT between the Inz, HOMA-IR and down-BRS calculated on mean frequencies were highest in group DMHT, at 250 Hz in group HT and DMHT they raised into pathological range. In group HT we found positive correlation between the 30/15 ratio and all the BRS values in standing position, and in group DMHT between the Inz, HOMA-IR and down-BRS calculated on mean frequencies were highest in group DMHT, at 250 Hz in group HT and DMHT they raised into pathological range.
risk for cardiovascular disease (CVD). In patients with Systemic Lupus Erythematosus (SLE), CVD represents an important cause of morbidity and mortality, and on the other hand, SLE by itself stands as a significant risk factor for CVD development.

**Objectives:** The aims of the study were to evaluate the presence of metabolic syndrome in SLE patients with hypertension and left ventricular hypertrophy and to estimate the impact on prognosis.

**Methods:** We analysed 55 hypertensive patients (47 females and 8 males), diagnosed with SLE according to ACR criteria, with a mean age of 45.9 ± 7 years, mean disease duration of 5.5 ± 4.2 years. We also assessed the disease activity score on 28 joints.

**Results:** 37 patients fulfilled the criteria for metabolic syndrome. They had significantly higher glucose levels, lower HDL cholesterol, higher triglycerides and higher body mass index. 18 patients from this group had serious cardiovascular events (2 sudden death, 4 myocardial infarctions, 9 angina pectoris, 3 severe bilateral stenosis of carotid arteries) while among the second group, without metabolic syndrome, only 2 cardiovascular events (1 myocardial infarction, 1 angina pectoris) In patients with serious cardiovascular events we noticed increased glucose levels, increased LVMI increased left atrium dimensions, as well as high disease activity scores. By multivariate analysis, metabolic syndrome (p < 0.009) and left ventricular mass (p < 0.003) significantly associated with serious incidents in patients with SLE as well as with high disease activity scores (p < 0.02)

**Conclusion:** Metabolic syndrome is frequent in SLE patients with hypertension and left ventricular hypertrophy being associated with an increased risk of cardiac events as well as with high disease activity scores, with unfavorable impact on prognosis.

**PP.29.423 WATER BALANCE CHANGES IN PATIENTS WITH ARTERIAL HYPERTENSION**

N. Bulanova, G. Ivanov, S. Kuznetsova. The I St Moscow State Medical University Named After I.M. Sechenov, Moscow-Russia

Arterial hypertension (AH) is one of the most common cardiovascular diseases, especially in the elderly. Some of the antihypertensive drugs realize their action by preserving extracellular water and increasing extracellular fluid volume. Simultaneously they can increase cardiovascular resistance. The aim of the study was to evaluate the impact of AH on frequency segmentary bioimpedancometry with 4 pairs of electrodes, placed on the patients arms and ankles. We made one recording for each of the controls and two recordings for each of AH patients: 1) at admission and 2) in 7-8 days after antihypertensive therapy was started at hospital. The parameters we analysed were total impedance, upper and lower limbs impedance at low (LF – 20 kHz) and high (HF-500 kHz) frequencies. On their basis the program calculated the parameters of water sectors of the body. The results have shown that by the second recording the impedance parameters decreased in almost all the areas and extracellular and interstitial water increased in 61% and 66% of AH patients accordingly. Hyperhydration was found in 8 (16%) patients with AH and in 2 AH patients (4%) signs of hypohydration were found.

**Conclusion:** The method of bioimpedance analysis allows to reveal small water balance changes in AH patients without any clinical signs of water balance disturbances. Parameters of lower limbs impedance in LF area were more sensitive in evaluating those changes.

**PP.29.424 ADAPTED PHYSICAL EXERCISE AND DAILY ACTIVITIES IN ELDERLY PEOPLE AFFECTED BY COGNITIVE DECLINE**

F. D’Amico1, R. Natoli, P. Crescenzi. 1 Department of Geriatrics Hospital of Patti-School of Medicine University of Messina, Messina-Italy, 2 Department of Geriatrics Hospital of Patti, Messina-Italy

**Objective:** The goal of this study is to evaluate the effects of a life-style including adapted physical exercise and group therapy on blood pressure (BP), Activities of Daily Living (ADL) and on the Instrumental Activities of Daily Living (IADL).

**Design and Methods:** 43 elderly people were included (M 19, F 24, average age 75 ± 8) all affected by mild-moderate hypertension and mild-moderate cognitive decline. The design of the study included tests performed before and after follow-up such as: 1) Clinical measurement of BP, 2) Ambulatory blood pressure measurement (ABPM); 3) Mini Mental State Examination (MMSE); 4) Activities of Daily Living (ADL); 5) Instrumental Activities of Daily Living (IADL). Clinical measurement of BP resulted from a mean of 3 measurements taken at 5 minutes distance. Mean MMSE score was 23.7 ± 8.3. In the group 21 subjects showed an ADL score < 3, 27 had IADL < 4. All subject were prescribed a hypocaloric and hyposodic diet. They were also proposed an aerobic exercise program including walking and muscle stretching on a 3-4-times-a-week basis.

**Results:** Before and after follow-up we detected: 1) Blood pressure SBP 157 ± 22 vs 137 ± 15 mmHg (p < 0.01); DBP 95 ± 14 vs 86 ± 15 mmHg (p < 0.01); 2) ADL 3/6 score vs 5/6 score (p < 0.01); 3) IADL 4/8 score vs 6/8 score (p < 0.01).

**Conclusion:** Life-style including adapted physical exercise and group therapy in elderly people determined a reduction of BP, an improvement in performing both instrumental activities of daily living (IADL) and activities of daily living.

**PP.29.425 ASSOCIATION BETWEEN FASTING OR NON-FASTING HYPERTRIGLYCERIDEMIA AND SUBCLINICAL ORGAN DAMAGES AND CARDIOVASCULAR DISEASE**

C. Park, J. Kim, J. Na, C. Choi, H. Lim, E. Kim, S. Rha, H. Seo, D. Oh. Korea University Guro Hospital, Seoul-South Korea

**Objectives:** To investigate the difference of effect whether fasting or non-fasting hypertriglyceridemia influence subclinical organ damages and cardiovascular disease.

**Study Design:** Cross sectional study of 405 patients who visited cardiovascular center of Korea University Kuro Hospital.

**Result:** Fasting and non-fasting hypertriglyceridemia showed significant correlation with classic risk factors as BMI, HbAlc, creatinine, fasting serum glucose, and postprandial serum glucose. Patients with LVH showed significantly higher level of fasting and non-fasting triglyceride (p = 0.018, p = 0.0016). In estimated GFR, higher fasting triglyceride was found in patients with decreased estimated GFR without significance. Non-fasting triglyceride showed significant higher prevalence of hypertension, although there were no substantial differences in diabetes, CHF and CHD such as, angina, MI between fasting and non-fasting triglyceride. DM and abnormal glucose tolerance showed significant association with both fasting and non-fasting triglyceride.

**Conclusion:** Both fasting and non-fasting triglyceride show significant relationship with LVH. Non-fasting triglyceride showed significant higher prevalence of hypertension, however, did not show any differences compared with fasting triglyceride in other SOD and CVD. This study showed a possibility of triglyceride as a predictor of SOD irrespective fasting or postprandial.

**PP.29.426 LEFT VENTRICULAR HYPERTROPHY NOT ALWAYS REGRESSES WITH THE LOWERING OF BLOOD PRESSURE**

D. Psikor, A. Tommasi. Sanatorio Británico Sa, Rosario-Argentina

It is considered that In hypertensive (HT) patients (p) the regression of target organ damage is achieved by lowering blood pressure (BP).

**Objectives:** To determine the impact of BP reduction in HT p on left ventricular hypertrophy.

**Material and Methods:** First consult HT p as defined by international guidelines. Left ventricular hypertrophy (LVH) diagnosed by echocardiography with Devereux method, considering LVH a left ventricular mass index (LVMi) ≥ 125 gr/m2 in men and ≥ 110 gr/m2 in women; p were divided in two groups (G1) 1 controlled BP: BP ≤ 140-90 mmHg or < 130-80 mmHg in p at high risk, diabetic nephropathy or ischemic heart disease, 2) uncontrolled BP: BP > the figures set out at the end of follow-up. Statistical analysis Students t test, statistical significance p < 0.05; risk ratio and 95% confidence interval.

**Results:** 77 consecutive p were included, 41 p belonging to G1 (53.3%) and 36 p to G2 (46.7%), followed up 794 ± 85 days. There were no differences between G in sex, mean age, weight, height or body mass index. The p of G2 had a higher
frequency of type 2 diabetes: 6 p (16.7%) vs 1 p (2.4%), p < 0.0025. Treatment on first consult was 0.83 ± 0.92 drugs in G1 vs 1.03 ± 0.88 drugs in G2, p = NS. In the final visit G1 p received 1.71 ± 0.98 drugs vs 1.97 ± 0.85 drugs in G2, p = NS. In G2 25% received dihydropyridine calcium channel blockers vs 4.9% in G1, p < 0.0125, no significant differences were found in other drugs. The initial BP in G1 was 153 ± 29/90 ± 15 mmHg vs 162 ± 27/94 ± 13 in G2, p = NS. Follow-up BP was 125 ± 13/73 ± 9 mmHg in G1 vs 157 ± 14/83 ± 11 mmHg in G2, p < 0.0005. The initial LVMI was 144 ± 19 g/m² in G1 and 149 ± 29 g/m² in G2, p = NS, at follow-up LVMI was 118 ± 37 g/m² G1 vs 133 ± 45 g/m² G2, p < 0.01, 26 p (63.4%) G1 normalized LVMI vs 18 p (50%) G2, OR 0.58, 95% confidence interval 0.24 to 1.43.

Conclusions: 1) 36.6% p that normalized BP did not reach normal LVMI in 2 years of follow up, 2) 50% p that did not normalized their BP reached a normal LVMI, 3) variables other than BP levels achieved by the treatment are involved in LVMI regression.

PP.29.427 ELECTROCARDIOGRAM AND CHANCE OF REVERSAL OF LEFT VENTRICULAR HYPERTROPHY
D. Piskorz, A. Tommasi. Sanatorio Británico Sa, Rosario-Argentina
Regression of left ventricular hypertrophy (LVH) is a therapeutic target in hypertension, and the detection of patients (p) less likely to achieve it could help in making decisions.

Objectives: To determine the value of the electrocardiogram in predicting the probability of regression of LVH.

Material and Methods: 138 hypertensive p with LVH measured by echocardiography according to Devereux’s method. LVMH was considered a left ventricular mass index (LVMI) greater than 110 g/m² in women (W) or 125 g/m² in men (M). ECG criteria for LVH were: 1) Sokolow Lyon (SL) greater than 35 mm, 2) Cornell Voltage (CV) greater than 28 mm in M and 20 mm in W, 3) product of the CV and the duration of QRS (LIFE) more than 2440 mm²/(ms, 4) presence of one of the above three criteria (1 of 3). Statistics: Students t test for differences of means and proportions, we calculated the odds ratio (OR) and confidence interval (CI) 95%.

Results: 65 p (47.1%) males, mean age 59.6 ± 12.2 years, LVMI 143.4 ± 26.2 g/m², follow up 739 ± 382 days. 40.6% (56 p) showed regression (R) of LVH, LVMH was considered a left ventricular mass index (LVMI) greater than 110 g/m² in women (W) or 125 g/m² in men (M). ECG criteria for LVH were: 1) Sokolow Lyon (SL) greater than 35 mm, 2) Cornell Voltage (CV) greater than 28 mm in M and 20 mm in W, 3) product of the CV and the duration of QRS (LIFE) more than 2440 mm²/(ms, 4) presence of one of the above three criteria (1 of 3). Statistics: Students t test for differences of means and proportions, we calculated the odds ratio (OR) and confidence interval (CI) 95%.

Conclusions: In hypertensive patients with echocardiographic LVH the presence of high CV or 1 of 3 indicate less likelihood of regression of LVH after approximately 2 years of treatment.

PP.29.428 ANKLE-BRACHIAL INDEX AND CAROTID ARTERY RISK IN 1057 HYPERTENSIVE PATIENTS. A RETROSPECTIVE ANALYSIS.
J. Maldonado¹, T. Peireta², P. Rodriguez³, M. Carballo³. ¹Instituto De Investigación E Formación Cardiovascular, Coimbra-Portugal, ²Escola Superior De Tecnologia Da Saúde, Coimbra-Portugal, ³CFMica Da Aveleira, Aveleira-Portugal

Introduction: The ankle-brachial index (ABI) is a recognized marker of atherosclerosis. Several studies have demonstrated a strong relationship between abnormal ABI (< 0.9) and the risk of major cardiovascular events (MACE). However, the predictive potential of ABI in hypertensive patients without peripheral arterial disease (PAD) remains unclear; this issue constitutes the main objective of this work.

Methods: We enrolled 1057 consecutive hypertensive patients (51.8% women) in a cross-sectional study. The mean age was 63.88 ± 12.50 years, systolic (SBP) and diastolic (DBP) blood pressure were respectively 147.62 ± 19.19mmHg and 83.36 ± 10.08mmHg; 33.5% had diabetes, 57.2% had dyslipidemia and 11.1% were smokers; 6.8% had a recent history of cerebrovascular accident (CVA), 7.1% of coronary heart disease (CHD) and 10.7% had PAD. BP was measured after a 10 minutes resting period, simultaneously in the arm with the highest SBP and in both lower limbs. ABI was calculated bilaterally (ankleSBP/brachialSBP). The lower ABI value was considered for analysis. All patients were also evaluated clinically and biochemically.

Results: The mean ABI was 1.09 ± 0.14 mmHg (0.45mmHg-1.99mmHg). The ABI was significantly lower in smokers (1.06 ± 0.12mmHg vs 1.095 ± 0.10 mmHg, p = 0.016) and in patients with a history of cardiovascular events (1.063 ± 0.09 mmHg versus 1.095 ± 0.12 mmHg, p = 0.016) and was similar in other subgroups. The ABI was significantly correlated with age (r = -0.180, p < 0.001) and estimated glomerular filtration rate (eGFR; r = 0.173, p < 0.001). In a multiple regression analysis (stepwise) the ABI was correlated independently with eGFR (β = 23.156, p < 0.001). Global univariable logistic regression depicted an important relationship of ABI with the occurrence of cardiovascular events (OR = 0.144, 95 CI 0.040-0.518, p = 0.003). After adjustment for conventional risk factors, the ABI was marginally related with cardiovascular events (OR = 0.274, 95 CI 0.066-1.129, p = 0.066). The OR for cardiovascular events in hypertensive patients with PAD was 2.196 (95 CI 1.253-3.843, p = 0.006). Replicating the analysis excluding all hypertensive patients with PAD (ABI < 0.9), there was no relationship between ABI and cardiovascular events, both in univariable (OR = 0.265, p = 0.216) or multivariable analysis (OR = 0.308, p = 0.236).

Conclusions: The results of this analysis indicate that a lower ABI reflects a high cardiovascular risk profile in hypertensive patients. However, the relationship between ABI and cardiovascular events was documented only in patients with well-established peripheral atherosclerotic disease (ABI < 0.9), and no evidence of association was found when considering ABI levels between 0.9 and 1.3, hence this vascular indicator does not seem appropriate to assess earliest stages of vascular involvement.
Conclusion: ACE (I/D) and AGTR1 (A1166C) genes’ polymorphisms aren’t directly associated with the lipids profile changes in hypertensive patients; though determine connection of hemodynamics and lipids metabolism indexes.

**PP.29.430**

**THE POWERFUL ADDITIVE PREDICTIVE EFFECT OF NOCTURNAL HEMODYNAMICS AND ARTERIAL STIFFNESS ON THE DEVELOPMENT OF MICROALBUMINURIA IN HYPERTENSION: A 6-YEAR FOLLOW-UP STUDY**

E. Andrikou, C. Tsoukis, C. Thomopoulos, A. Kordalis, I. Andrikou, M. Giaouris, L. Lionis, K. Kintis, I. Bafikis, C. Stefanadis. First Cardiology Clinic, University of Athens, Hippokration Hospital, Athens-Greece

Objective: Nocturnal blood pressure and arterial stiffness have been implicated in target organ damage and they bear an increased cardiovascular risk. Thus, the purpose of this study was to assess whether arterial stiffening defined by carotid-femoral pulse wave velocity (PWV) has either additive or synergistic effect with nighttime BP load on the occurrence of microalbuminuria during follow-up.

Design and Method: 163 white hypertensive non-diabetic patients (52 ± 10 years, 98 men, 59 smokers, body mass index = 28.8 ± 5.4Kg/m²) were prospectively studied for 6 years. All patients underwent 24-hour ambulatory monitoring and PWV measurement with Complior SP. Metabolic profile, estimated creatinine clearance (eGFR) and echocardiographic measurements were performed at baseline and last outpatient clinic visit (last follow-up: 4.5 ± 0.89 years). Microalbuminuria was defined as ACR between either 20 or 30 (men and women respectively) and 300mg. All subjects were under optimal antihypertensive therapy complemented by vasoactive drugs where appropriate. The administered medication during the last 6-month period before last visit consisted of: renin-angiotensin system inhibitors RAASI (49%), diuretics (25%), calcium-channel blockers (20%), beta-blockers (13%), statins (16%) and anti-platelet agents (18%).

Results: Baseline nighttime systolic and diastolic BP were 121 ± 13 and 73 ± 8mmHg, while the incidence of microalbuminuria was 15.5% (n = 22). Between baseline and last visit there was a decrease in BMI by 1.9 ± 4.1Kg/m², while PWV was increased by 1.83 ± 1.37m/s (7.9 ± 1.5 vs. 9.6 ± 1.5m/s). During follow-up, 24h systolic and diastolic BP were decreased by 12.7 ± 9.1 and 8.2 ± 6.2mmHg (150 ± 12 ± 122 ± 12 and 80 ± 9 ± 75 ± 8mmHg) respectively. In Cox regression models after adjustment for confounders, independent predictors (HR [95% CI]) of microalbuminuria were: baseline nighttime systolic BP, 1.034 [1.001-1.068], p = 0.046, baseline PWV, 1.317 [1.048-1.654], p = 0.018, and the interaction term of nighttime systolic BP x baseline PWV, 1.003 [1.001-1.004], p < 0.001.

Conclusions: Baseline nighttime systolic BP and PWV exert an additive effect on new-onset microalbuminuria suggesting that renal damage at the early stages of hypertension can be predicted by integrated stiffening measures.

**PP.29.432**

**PREDICTORS OF LEFT VENTRICLE HYPERTROPHY DEVELOPMENT IN PATIENTS WITH UNCOMPROMICED ARTERIAL HYPERTENSION SHOWING HIGH COMPLIANCE WITH TREATMENT**

N. Koziołova, I. Shatunova. 1. Perm State Medical Academy, Perm-Russia, 2. Hygeia “Gaprom” Outpatient Clinic, Moscow-Russia

Objective: to estimate occurrence and risk factors of left ventricle hypertrophy (LVH) development in patients with arterial hypertension (AH) without target organ damage at baseline showing high compliance with treatment and a prolonged dynamic observation.

Materials and Methods: 428 patients with uncomplicated AH were examined. Average age was 53.5 ± 8.3 years. Baseline SBP was 154.7 ± 9.8 mmHg, baseline DBP was 96.2 ± 4.7 mm Hg. Average AH duration was 53.6 ± 4.58 years. Observation period was 8.8 ± 2.6 years. LVMMI > 12.5 g/m² for males and LVMMI > 11.0 g/m² for females considered to be a criterion for LVH.

Results: LVH occurrence was 36.9% (95%CI = 0.34?0.40). Left ventricle concentric remodelling prevailed among cardiac structural changes in patients with LVH (p = 0.021). LVMMI was reliably connected with age (p = 0.008), particularly in males over 55 years (p < 0.001), AH duration (p = 0.048), BMI (p = 0.02), baseline DBP > 100 mm Hg (p = 0.043), pulse BP > 50 mm Hg (p = 0.005), level of LDL > 3 mmol/L (p = 0.002), fasting plasma glucose > 5.6 mmol/L (p < 0.001). SBP between 125/710 mm Hg and DBP between 80/74 mm Hg in the daytime (p = 0.03; p = 0.041 respectively), night systolic AH (p < 0.01) led to LVMMI increase. LVH associated with arterial damage estimated based on aortic PWV (p = 0.005) and IMCs in carotids (p = 0.048), diastolic dysfunction (p < 0.001) with decrease of LV EF below the normal range (p = 0.044), associated clinical conditions (p = 0.048).

Conclusions: LVH occurrence in patients with uncomplicated AH showing high compliance with treatment during prolonged observation is high and is determined with intensity and quantity of risk factors of AH.

**PP.29.433**

**RELATIONSHIP BETWEEN CARDIOVASCULAR REACTIVITY TO A MENTAL STRESS TASK AND ENDOThELiUM-DEPENDENT VASODILATION OR TARGET ORGAN DAMAGE IN RESISTANT HYPERTENSIVE SUBJECTS**

P. Armario1, P. Castelanos1, M. Larroo2, R. Hernandez-Del-Rey1, S. Vázquez1, L. Sans1, A. Oliveras1, A. De La Sierra2, M. Martin-Baranera1. 1Hospital General L’hospitalet, Barcelona-Spain, 2Hospital Clinic, Barcelona-Spain, 3Hospital Del Mar, Barcelona-Spain, 4Hospital Matiu De Terrassa, Barcelona-Spain, Concevri Santitari Integral, Barcelona-Spain

Background: Several biological or lifestyle factors can contribute to the development of resistance to hypertension treatment. However, the relationship between reactivity to mental stress to endothelial dysfunction or target organ damage in resistant hypertension is unknown.

Aim: To assess the possible relationship between blood pressure (BP) increase during a mental arithmetic stress task with endothelial dysfunction and target organ damage in resistant hypertensive subjects.

Patients and Methods: We performed a cross-sectional analysis of a cohort of 69 consecutive patients visited in two hypertension units with confirmed clinical diagnosis of resistant hypertension. Patients with secondary hypertension or advanced renal failure (estimated glomerular filtration rate (eGFR) < 30 ml/ min/1.73 m2) were excluded. All subjects underwent clinical-demographic, laboratory evaluation, 2D-echocardiography and 24h-Ambulatory BP monitoring (24h-ABPM). A mental arithmetic stress task (MAST) was performed in all subjects. Microalbuminuria was defined as a urinary albumin excretion (UAE) > 30 mg/24h, and left ventricular hypertrophy (LVH) as a left ventricular mass index (LVMI) > 125 g/m² in men and > 110 g/m² in women. Forearm endothelium-dependent vasodilation was determined by measuring blood flow
response to ischemia-reperfusion by strain-gauge venous plethysmography (ECSR-Hokasnon, Bellevue, WA).

Results: Sixty-nine patients with clinical RH, aged 61.5 ± 8; 29.0% of them had diabetes, 31.8% had eGFR between 30-60 mL/min/1.73 m² and 11.6% were current smokers. The prevalence of LVH and microalbuminuria was 65.2% and 27.5% respectively. A significant inverse correlation was observed between endothelium-dependent vasodilatation and diastolic blood BP increase during MAST (r = -0.290; p = 0.030) while correlation with systolic BP increase did not reach statistical significance (r = -0.192; p = 0.157). BP increase during MAST did not correlate neither with LVMV or UAE.

Conclusion: An inverse correlation was observed between blood pressure increase during mental stress task and endothelium-dependent vasodilatation in resistant hypertension subjects.

PP.P.2474

ASSOCIATION BETWEEN EYE VASCULAR ALTERATIONS AND RENAL DAMAGE IN ESSENTIAL HYPERTENSION WITH METABOLIC SYNDROME

V. Katsi, G. Sourretis, N. Alexopoulos, D. Papoutsis, I. Vlasseris, An. Koumoulidis, D. Barlagiannis, Ch. Stefanidis, I. Kalikazaros. Hippokration Hospital, Athens-Greece

Background: In the ongoing debate about metabolic syndrome (MS), it is still unresolved whether it is a marker or a mechanism. We sought to unravel the mystery of the interrelationships of the hypertensive fundus, a time honored target organ damage (TOD), especially in the setting of MS. We hypothesized that there might be an association between retinal alterations and the other parameters of target organ damage, such as renal dysfunction and inflammatory activation.

Methods: Our population consisted of 202 consecutive subjects with newly diagnosed untreated stage 1/II essential hypertension (aged 60 ± 11 years, 122 female), without overt cardiovascular disease. All participants underwent fundoscopy examination and were classified according to Scheie’s grading system into 5 categories (Scheie’s scale 0, I, II, III, IV: normal, arteriolar narrowing, arteriovenous nicking, hemorrhages ± exudates and papiloedema respectively). Anthropometric parameters, as well as lipid profile, plasma glucose, high sensitivity C-reactive protein (hsCRP) and serum creatinine levels were assessed. Renal function was classified according to the estimated glomerular filtration rate (eGFR) calculated by the Cockroft-Gault formula. MS was identified according to the Third Report of the National Cholesterol Education Program Adult Treatment Panel. The subjects were divided in two groups regarding the absence (group A), or the presence of MS (Group B).

Results: Group B compared to group A had increased levels of uric acid and hsCRP (5.5 ± 0.33 vs 4.5 ± 0.27 mg/dl and 2.9 ± 0.18 vs 1.6 ± 0.11 mg/dl respectively, all p < 0.05) and significantly lower GFR (81 ± 5 vs 96 ± 7 ml/min, p < 0.05). The two groups did not differ regarding age, sex and office blood pressure. In each of the five Scheie’s categories there was a significant difference in RI and PI, within the categories of MS components, presenting a prevalence of 6%, 14%, 47%, 71% and 62%, respectively (p < 0.05).

Conclusions: The metabolic syndrome, although not an established pathogenetic entity, is associated with marked acceleration of the hypertensive retinal damage, kidney dysfunction and inflammatory activation.

PP.P.2495

GENDER FEATURES OF MICROALBUMINURIA AND ITS ASSOCIATION TO INTRARENAL HEMODYNAMIC AND LEPTIN LEVEL IN ESSENTIAL HYPERTENSION

V.I. Podzolkov, A.E. Bragina, J.N. Rodionova. First Moscow Medical State University I.M. Sechenov, Moscow-Russia

Objective: To investigate the prevalence of microalbuminuria (MAU) in genders and its association to leptin level and intrarenal hemodynamic in essential hypertension (EH).

Methods: There were examined 35 patients at 2-3 stage of EH (15 men and 20 women). Mean age 49.4 ± 7.1 years, body mass index – 32.2 ± 3.8 kg/m². All clinical and demographic data were comparable. participants underwent ultrasonography of intrarenal vessels. Glomerular filtration rate (GFR) was calculated by creatinine clearance. Leptin level was determined by radioimmunoassay. MAU was detected by semiquantitative dipstick test in urine. The results were processed with SPSS-11.0 program.

Results: The prevalence of MAU was higher among female hypertensives in contrast to males: 40% vs 26%, though the differences only trended toward the significance (p = 0.056). Hypertensives with MAU demonstrated higher both resistance index (RI) and pulsatility index (PI). Females revealed statistically significant differences of RI and PI in renal arteries. Significant differences of both RI and PI in persons with MAU were highly significant (p < 0.001) in all levels of visualization (renal, segmental and interlobar arteries), whereas patients without MAU did not demonstrate similar stability. Female hypertensives with MAU had lower GFR (79.1 ± 13.2ml/min/1.73m²) than those without MAU (89.4 ± 17.2ml/min/1.73m²). On the contrary, male hypertensives with MAU had higher GFR: 126 ± 32.5ml/min/1.73m² vs 105.4 ± 16.7ml/min/1.73m². The plasma leptin level in females with MAU was significantly higher than in those without MAU: 103.5 ± 38.7ng/ml vs 76.7 ± 46.4ng/ml (p = 0.04). In opposite, leptin level did not differ in male hypertensives. In males MAU positively correlated with GFR (r = 0.372, p = 0.003), whereas in females – in negative way (r = -0.34, p = 0.02). Along with this in females MAU correlated with plasma leptin level (r = 0.48, p = 0.01).

Conclusions: Female hypertensives with MAU demonstrate more stable elevation of resistance and pulsatility indices in contrast to males. The presence of MAU correlates with GFR in opposite ways: in males positively and in females – negatively, that assume probably different mechanisms of renal damage in hypertensive males and females. One of the possible explanations may be related to the significantly higher leptin level in women with MAU in contrast to men and the presence of positive correlation between MAU and leptin level as leptin is considered to be one of the fibrogenesis promoters.

PP.P.2436

URINARY ALBUMIN EXCRETION-PREVALENCE IN HYPERTENSIVE PATIENTS IN SLOVENIA AND TELMISARTAN REDUCTION EFFECT

J. Bruguljan, R. Accetto, B. Salobir, P. Dolenc. University Medical Centre Ljubljana, Ljubljana-Slovenia

Objective: Assessment of microalbuminuria plays an important role in evaluating organ damage. Microalbuminuria (MAU) prevalence has not been reported for Slovenia. Reducing MAU translates in reduction of cardiovascular risk. The influence of telmisartan on reduction of detected MAU in our population was assessed.

Design and Methods: 1) screening for microalbuminuria in hypertensive patients attending general practitioners: 3293 patients coming to GP-s with hypertension grade 1 or 2 were screened for MAU with Microal-Test® (immuno- logical slide test with semiquantitative properties) in daily urine spot, measuring albumin secretion. Method considered reliable due to retesting in our hospital laboratory and good correlation with albumin/creatinine ration was found.
2) influence of telmisartan on MAU: 200 MAU positive patients were included in second part of the study. Telmisartan was added to their usual therapy and after 4 to 6 months MAU was screened again. Blood pressure was measured three times in sitting position at the beginning and at the end of the study. 3) This study was designed also to promote assessing MAU in GP-s daily practice.

Results: Among 3293 screened patients 3104 were analysed 45.5% were men, SBP 157.1 ± 10.2, DBP 89.7 ± 10.3, at study end, respectively. At the end of the study MAU prevalence was comparable to other reported data. The prevalence of MAU was 35.4% in men and 37.7% in women. Gender difference was significant (p = 0.001). 200 MAU positive patients were included in second part of the study, 48.0% men, age 64.8 ± 10.3 years. Baseline SBP was 157.1 ± 17.9, DBP 89.7 ± 10.3, HR 75.2 ± 9.4 and 140.2 ± 14.2, 81.2 ± 7.2, 72.8 ± 10.2, at study end, respectively. At the end of the study MAU was present in 56% of included patients.

Conclusions: Prevalence of MAU was comparable to other reported data. The reason for the observed gender difference is unknown. The addition of telmisartan to the therapy led to normalalbuminuria in almost half of patients.

PP.P.437

CLINICAL, MORPHOLOGICAL AND DOPPLER CHARACTERISTIC OF OBSESE AND NON OBSE HYPERTENSIVE PATIENTS. IT TAKES TWO TO TANGO

I. Burzarić, S. Stefanovic M, Burzarić V, Stefanovic V. Clinic For Cardiovascular Diseases, Clinical Center Nis, Nis-Serbia, 2General Hospital, Knjazevac-Jugoslavija

The relevance of both hypertension and obesity, as important public health challenges, is increasing worldwide. The growing prevalence of obesity is increasingly recognized as one of the most important risk factors for the development...
of hypertension. This epidemic of obesity and obesity-related hypertension is paralleled by an alarming increase in the incidence of other cardiovascular risk factors. We aimed to investigate clinical, morphological and Doppler characteristics of obese and non obese patients who suffer hypertension and their possible interrelationship.

Patients and Methods: The study enrolled 167 patients (pts) with hypertension (60 + 8.5 years of age, 55% males) without coronary artery disease of whom normal weight was present in 25% (group I), overweight in 22% (group II) and obesity in 53% (group III). Patients’ data were noted, blood pressure was measured and ECG was recorded. Exercise test, lab analysis and echo study were performed in each patient. We analyzed in details left ventricular mass, its relation to body surface, dimensions of septum, posterior wall, left atrium, left ventricle, and Doppler characteristics: E, A, Ea, IVRT, deceleration time, pulmonary vein velocities etc.

Results: The results of our study indicated that majority of our patients’ population was obese 53% (BMI 27.3 ± 4.5 mg/kg), their hypertension was known for an average of 8 years, mean systolic blood pressure was 169 + 20 mmHg and diastolic 98 ± 14 mmHg – significantly higher compared to group I and group II. 55.8% were smokers. Left ventricular mass was significantly different in obese patients with hypertension compared to overweight and normal weight patients (p < 0.001), also its relation to body surface was related to obesity (p < 0.05) but not overweight. Septum and posterior wall were thicker in group III compared to overweight and normal weight hypertensives (p < 0.001). No significant difference was present between group I and II. Deceleration time was related to obesity and shorter in group III (p < 0.001). Pulmonary vein velocities (systolic and diastolic) were related to obesity. Yet, no difference in diastolic dysfunction pattern was noticed between examined groups (E, A, Ea).

Conclusion: obesity is highly present in patients with hypertension and is related to with spectrum of systolic dysfunction echo parameters as well as with changes in left ventricular mass, thickness and geometry. The changes might represent the background for future cardiovascular events.

PP.29.438 HYPERURICEMIA CONTRIBUTES TO HYPERTENSION AND RENAL DYSFUNCTION

K. Takeda, Kyoto Industrial Health Association, Kyoto-Japan

Objects: Recently, it has been suggested recently that, hyperuricemia causes hypertension has been suggested. However, hyperuricemia cause hypertension is not yet clarified. In this study, the incidence of hypertension and renal dysfunction was compared between hyperuricemia with gout and normouricemic male.

Material and Methods: Hyperuricemia with gout patients 528 males (uric acid > 7.0mg/dl) were enrolled. Normouricemic males (uric acid < 7.0 to 2.0mg/dl) were selected of 5,895 males who underwent health screening. Those under treatment of hyperuricemia or being administrated with diuretics were excluded treated hyperuricemia or being administrated with diuretics were excluded. eGFR was calculated using an estimation equation recommended by Japanese Society of Nephrology (eGFR = 194XScr-0.783 X Age-0.293). Hypertension was defined as SBP > 140 and/or DBP > 90.

Results: Incidence of Hypertension was significantly higher in the hyperuricemic group at any age as compared with normouricemic group. eGFR was lower in the hyperuricemic group compared with the control group. Prevalence of proteinuria was also higher in the hyperuricemics Multiple regression analysis revealed that hyperuricemia is important factor to reduce eGFR and to induce hypertension.

PP.29.439 THE PATIENTS WITH RESISTANT ARTERIAL HYPTENSION IN THE HOSPITAL PRACTICE

A.U Gurina, S.U Volkova, I.V. Medvedeva. Tyumen State Medical Academy, Tyumen-Russia

Aim: To give clinical description of patients with resistant AH

Materials and Methods: 42 patients of Tyumen Clinical Regional Hospital cardiology departments No 1 and No 2 with resistant AH (43% men, mean age = 57 years, 57% - women, mean age = 59 years) are included into investigation.

Results: in 4 patients (9.5%) AH resistance was secondary (due to kidney parenchyma and vessel pathology, non-specific aorta-arteritis, endocrine disorders). In 38 patients (90.5%) the origin of resistance was not found for sure. These patients have such concomitant diseases as metabolic syndrome (63.2%), diabetes mellitus (31.5%), obstructive sleep apnea (68.4%), smoking (47.4%), AH family history (39.5%). Hypotensive medications used at basis were thiazide diuretics (92.1%), ACE inhibitors (50%), BRA (47.4%), α-blockers (84.2%), dihydropyridine calcium channel blockers (81.6%), imidazole receptor agonists (34.2%). However, not always these medications were used in maximally recommended doses. These are: ACE inhibitors (68%), BRA (56%), dihydropyridine calcium channel blockers (71%), imidazole receptor agonists (77%). Adequate (according to guidelines) antihypertensive therapy, that included three medications, was registered in 13% of cases. Most often 4-5 anti-hypertensive drug component combination was used. Assuming the necessity of treating concomitant disorders the quantity of taken drugs at once was about 6 to 9. Frequent taking of several drugs and concomitant risk factors in this group of patients undoubtedly reduced compliance to therapy.

Conclusion: in the majority cases the origin of resistant AH was disposable. Not always antihypertensives were used in maximally recommended doses. Thus it is necessary to use 3-component rational antihypertensive therapy and to come to 4-component therapy only after reaching maximal doses.

PP.29.440 VERY PREMATURE BIRTH INFLUENCES BLOOD PRESSURE AND SUBCLINICAL ORGAN DAMAGE IN YOUNG MEN BORN SMALL FOR GESTATIONAL AGE

M. Laganović1, D. Kazanmić1, J. Vuković-Lela1, M. Vukić-Kirhmajer1, Lj. Banilić1, M. Milošević1, V. Premuzić2, S. Karanović1, Lj. Fodor3, B. Jelaković1, 1University Hospital Center Zagreb, Zagreb-Croatia, 2University of Zagreb, School of Public Health “andrija Štampar”, Zagreb-Croatia

Objective: Although increased rates of cardiovascular (CV) events in subjects born small for gestational age (SGA) were reported, discussion about additional unfavourable effects of premature birth continues. Our aim was to determine CV risk factors and subclinical organ damage in young men SGA and to analyse the relation and effects of premature birth on CV risk profile and target organ damage.

Subjects and Methods: A total of 95 healthy men (21.0 ± 0.89 years) born SGA and 90 healthy men (21.5 ± 1.02 years) controls with normal intrauterine development were enrolled. Height, weight, body mass index (BMI), waist circumference (WC), office and ambulatory blood pressure (BP), heart rate (HR), fasting blood glucose, total cholesterol, LDL cholesterol, HDL cholesterol, triglycerides, albumin/creatinine ratio (ACR), eGFR, kidney volume (KV), left ventricular mass index (LVMi), carotid intima media thickness (cIMT) and pulse wave velocity (PWV) were measured in all participants. Birth parameters were obtained from medical records.

Results: Higher systolic BP (p = 0.048), 24h BP variability (p = 0.044) (BPV), pulse pressure (PP) (p = 0.008), HR (p = 0.001), altered lipid profile (χ2 = 6.827 p = 0.009), cIMT (p = 0.001), LVMI (p = 0.032), and smaller kidney volume (p < 0.001) and eGFR (p = 0.001) were observed in the whole SGA group. When prematurity was taken into account, higher ambulatory systolic BP (p = 0.001), PP (p = 0.013), HR (p = 0.002), ACR (p = 0.038), LVMI (p = 0.031) and lower KV (p < 0.001) were found only for very preterm born participants (< 32 weeks). Multiple regression analysis showed pregnancy duration as key determinant of ambulatory systolic BP (β = 0.54, p = 0.003). Altered lipid profile was more pronounced in the group born SGA at term (χ2 = 7.247 p = 0.027) There were no differences in BMI, WC, FPG, and PWV (p > 0.05) between the SGA participants born prematurely and at term.

Conclusion: We found that only very premature birth has an additional unfavourable effect on systolic BP and subclinical target organ damage in young
men born SGA. Because of higher risk for developing sustained hypertension and premature cardiovascular incidences, those subjects should be monitored more closely from early adulthood. Our results are in agreement with previous findings showing increased systolic BP, metabolic disturbances, impaired kidney growth and target organ damage to be the characteristics of SGA subjects.

**PP.29.441 MICROALBUMINURIA AND SERUM URIC ACID LEVELS IN PREECLAMPTIC WOMEN**

M. Craina1, P. Stanciu1, E. Bernd1, C. Serban2, R. Nitu1. 1University of Medicine and Pharmacy Victor Babes/Department of Obstetrics and Gynecology Bega, Timisoara-Romania, 2University of Medicine and Pharmacy Victor Babes/Pathophysiology Department, Timisoara-Romania

**Objective:** The pathogenic mechanism responsible for the compromise of the renal circulation in preeclampsia is still unknown. A reduced renal excretion appears to be the major source of elevated uric acid level in pregnancies. The role of microalbuminuria during pregnancy has not been clearly defined. The purpose of this study was to compare the values of serum uric acid levels and microalbuminuria in preeclamptic women and healthy pregnant women.

**Design and method:** This prospective study included 68 pregnant preeclamptic women and 60 women with uncomplicated pregnancy, aged and gestational age matched that attended the University Clinic of Obstetrics and Gynecology “Bega” from Timisoara-Romania in a six months period. Preeclampsia was diagnosed if blood pressure \( \geq 140/90 \) mmHg and proteinuria \( \geq 300 \) mg in a 24-h urine sample. Arterial blood pressure, serum uric acid, creatinine clearance and microalbuminuria were determined in all the women included in the study. For the measurement of microalbuminuria it was used an immunoturbidimetric method.

**Results:** We observed significantly increased serum levels of serum uric acid in preeclamptic women compared with healthy pregnant women (5.32 ± 2.83 vs 2.12 ± 1.11 mg/dL, \( p < 0.001 \)). The level of microalbuminuria was significantly increased in preeclamptic women compared to healthy pregnant women (115 ± 14.33 mg/l vs 42 ± 52.61 mg/l, \( p < 0.001 \)).

**Conclusions:** Our study showed that renal function in women with preeclampsia is significantly impaired. Microalbuminuria could reflect a renal manifestation of a generalized vascular disease or an underlying renal disease in preeclamptic women and uric acid may have a role in pathogenic mechanism of preeclampsia.

**PP.29.442 ASSOCIATION OF INFLAMMATORY SYNDROME WITH PREECLAMPSIA**

M. Craina1, P. Stanciu1, E. Bernd1, C. Serban2, R. Nitu1. 1University of Medicine and Pharmacy Victor Babes/Department of Obstetrics and Gynecology Bega, Timisoara-Romania, 2University of Medicine and Pharmacy Victor Babes/Pathophysiology Department, Timisoara-Romania

**Objective:** The maternal syndrome of preeclampsia is caused by a maternal systemic inflammatory response. The main objective of our study was to evaluate the values of leukocytes and neutrophils as components of the inflammatory response in the serum of preeclamptic women during the last trimester of pregnancy compared to a healthy pregnant group.

**Design and method:** The study included all preeclamptic women (with moderate or severe form) and a single pregnancy that attended in a six month period (July 2010- December 2010) the University Clinic of Obstetrics and Gynecology “Bega” from Timisoara-Romania. We excluded from the study the pregnant women with diseases associated with a chronic inflammatory response. We performed a careful anamnesis, physical examination and lab tests in all women included in the study. The preeclamptic group was compared in terms of leukocytes and neutrophils with a normal group formed by gestational matched healthy pregnant women.

**Results:** A significant increase in leukocyte (12970.5 ± 2130.1/mm3 vs 10820.5 ± 2223.2/mm3, \( p < 0.001 \)) and neutrophil values (10082.5 ± 1878.4/mm3 vs 7825 ± 2022.7/mm3, \( p < 0.001 \)) was found in preeclamptic women compared to healthy pregnant women. There was no significant correlation between the leukocyte count and systolic blood pressure (SBP) in preeclamptic group, but we found a highly significant correlation was found between the leukocyte count and diastolic blood pressure (DBP) in the same group (\( r = 0.5, p < 0.001 \)). We found no correlation between the neutrophil count and SBP, but it was observed a highly significant positive correlation between the neutrophil count and DBP (\( r = 0.5, p < 0.001 \)). Conclusions: Our results proved that preeclamptic women have increased values of leukocytes and neutrophils compared to healthy pregnant women due to a generalized inflammatory response.
Uncontrolled hypertension is present in most patients treated with only single morning dose or one of the tablet contain combined therapy, usually most of them showed a high prevalence of a non-dipper blood pressure pattern. In most of cases non-dipping is related partly to the absence of 24-hour therapeutically coverage of the single morning doses. Accordingly, we investigated the impact of treatment time on the blood pressure pattern in 30 patients with uncontrolled hypertension on the basis of clinic measurements who were studied by 24-hour ambulatory monitoring during four months follow-up. All of them received their medication on awakening, most of the treatment was calcium channel blockers and other ACEI, and 10 patients were taking one tablet of combined treatment (calcium blocker with ACEI). After the control period we switched all patients to take their therapy at bedtime. The percentage of patients with controlled ambulatory blood pressure was 0.86 in patients taking the drug at bedtime (P = 0.005). Twenty-six patients with uncontrolled hypertension, receiving one drug or the combined therapy at bedtime showed a significant reduction in the 24-hour mean of systolic and diastolic blood pressure (6.2 and 2.6 mm Hg, respectively; P < 0.009). This reduction was much more prominent during nighttime (8.3 and 5.0 mm Hg; P = 0.001). In addition the entire 26 patient showed normal blood pressure < 140/90 during clinic measurement at daytime. Only 4 patients who treated with monotherapy on the morning were unresponsive to the switching and their blood pressure was controlled by the addition of second drug at bedtime. In patients with uncontrolled hypertension, switching therapy to bedtime should take into account to improve control and to avoid the non-dipper pattern especially in patients with chronic illness, diabetes and renal diseases associated to higher cardiovascular risk, we need to complete this research with more time periods and sample to check the reliability of changing treatment time and testing this method on patients with chronic diseases and multiple drugs therapy.

**NEW INDICES DERIVED FROM AMBULATORY BLOOD PRESSURE AND HEART RATE VARIABILITY ARE ASSOCIATED WITH SURVIVAL**

B. Gavid1, M. Burzynski1. 1InterCure Ltd., Lod-Israel, 2Hadassah-Hebrew University Medical Center, Mount-Scopus, Jerusalem-Israel

**Background:** The ratio between the variability of systolic (S) and diastolic (D) blood pressure (BP) measured with ambulatory monitoring (ABPM) and expressed by the 24 h SD has been shown to have prognostic significance. The present study aimed to investigate similar but new indices that include the heart rate (HR) variability.

**Methods:** The study included analysis of ABPM records with adequate quality of 1,259 hypertensive patients treated with antihypertensive drugs and whose survival was assessed over a 5-year period (age 55 ± 16, 54% male, 9% with diabetes). The indices BPRV, SHVR and DHVR were defined as the variability ratio between SBP & DBP, SBP & HR and DBP & HR, respectively. The difference between mean value of an index (or variability) of patients who died and those who were survived was estimated using a multi-linear regression model that included a survival indicator and the covariates age, gender, BMI, mean arterial pressure, pulse pressure, diabetes, and indicators for the antihypertensive drug class (ACE inhibitors, beta blockers, calcium channel blockers, diuretics and alpha blockers). Prognostic significance was assessed with Cox regression models adjusted by the same covariates.

**Results:** Shown in the table for 1183 patients, who survived and 77 who died from any cause within the 5-year after ABPM. Cox analysis showed that for the study population SHVR and DHVR (but none of the other indices, variability or covariates) were significantly associated with mortality (p < 0.02).

<table>
<thead>
<tr>
<th>BPRV</th>
<th>AAHR</th>
<th>SHVR</th>
<th>DHVR</th>
<th>SBP</th>
<th>DBP</th>
<th>SD HR</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBP</td>
<td>DBP</td>
<td>HR</td>
<td>SBP</td>
<td>DBP</td>
<td>HR</td>
<td>SBP</td>
</tr>
<tr>
<td>Uncontrol</td>
<td>1.3948 ± 0.3</td>
<td>1.2623 ± 0.17</td>
<td>1.3549 ± 0.57</td>
<td>15.7 ± 3.4</td>
<td>10.1 ± 2.3</td>
<td>9.7 ± 3.3</td>
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<tr>
<td>Died</td>
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<td>0.5540 ± 0.14</td>
<td>2.781 ± 0.45</td>
<td>1.6346 ± 0.38</td>
<td>17.1 ± 4.9</td>
<td>10.0 ± 2.9</td>
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<tr>
<td>T-value</td>
<td>&lt;0.05</td>
<td>&lt;0.05</td>
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Conclusions: SHVR and DHVR have a potential of serving as markers for cardiovascular control having prognostic value.

**THE IMPACT OF POORLY CONTROLLED HYPERTENSION ON AMBULATORY CARE RESOURCES IN MALAYSIA**

Q. Alefan1, M. Izhani1, T. A. Razak1, A. Ayub1. 1IIUM, Kuantan-Malaysia, 2USM, Penang-Malaysia, 3Inovax SDN BHD, Petaling Jaya-Malaysia

**Abstract:** Since many Malaysians with hypertension have poor control rates of blood pressure, this study was conducted to determine the impact of uncontrolled hypertension on the utilization of ambulatory care resources.

**Setting:** The study took place at the Jaya Gading Polyclinic in Kuantan city, Pahang, Malaysia.

**Methods:** This was a 1-year follow-up of 600 hypertensive patients who were classified into groups, based on average blood pressure. The monthly direct and indirect costs and the differences in costs were determined.

**Main outcome measure:** Data analysis using the Mann–Whitney test was performed to compare the direct costs which were associated with controlled and uncontrolled blood pressure.

**Results:** The direct costs were significantly higher in the uncontrolled blood pressure groups as compared to the controlled blood pressure groups.
Medication costs represented the major portion of the total direct costs in both the controlled and the uncontrolled blood pressure groups.

Conclusion: Poor control of uncomplicated hypertension is associated with the higher utilization of the ambulatory care resources in Malaysia. Aggressive strategies are needed to control hypertension and to reduce the utilization of the ambulatory care resources.

Background: Recent mega-analyses established a J-shaped relation between adverse health outcomes and BMI. However, the contribution of BMI to risk over and beyond BP remains poorly documented, and no previous study has systematically investigated the advantage of the superiority of ambulatory (ABP) over conventional (CBP) BP in risk assessment.

Methods: We recorded CBP and ABP in 8467 participants (mean age, 54.6 years; 47% women) randomly recruited from 10 populations. We computed hazard ratios for the risks associated with BMI, CBP and ABP. In categorical analyses, we cross-classified participants by BMI and daytime ABP (10 AM – 8 PM): NT (CBP < 140/90 and ABP < 135/85 mm Hg; n = 4211), WCH (≥ 140/90 and < 135/85 mm Hg; n = 867), MH (≥ 140/90 and ≥ 135/85 mm Hg; n = 1181) and SHT (≥ 140/90 and ≥ 135/85 mm Hg; n = 2206). Patients on antihypertensive treatment were classified according to the achieved BP.

Results: Median follow-up was 10.6 years. Across deciles of baseline BMI, the sex- and age-adjusted risks were curvilinearly distributed with significant elevation in the lowest BMI decile for mortality (1271 deaths) and in the highest decile for fatal combined with nonfatal CV events (n = 1092). To account for curvilinearity while maintaining statistical power in fully adjusted models, we evaluated the risk associated with BMI by quartiles of its distribution (< 22.6, 22.6 – 25.1, 25.2 – 27.8, ≥ 27.9 kg/m²). Covariates were cohort, sex, age, smoking and drinking, antihypertensive drug treatment, serum cholesterol, previous CV disease and diabetes. In models also including CBP or 24-h ABP, BMI remained curvilinearly associated with all-cause mortality (P < 0.05), but lost significance (P > 0.29) for CV mortality and CV events. The prevalence of WCH, MH and SHT increased (P < 0.0001) with higher BMI quartile. In cross-classification analyses of CBP and daytime ABP with NT as the reference group, the risk of mortality decreased (P = 0.040) across quartiles of BMI for MH (hazard ratio from 1.94 to 0.84), whereas the opposite trend was present for WCH (0.74 to 1.41). For MH, the risk of death also decreased (P = 0.014) across quartiles of BMI (1.66 to 0.76). For WCH, the risk of a CV event tended to increase (P = 0.15) across quartiles of BMI (0.92 to 1.48). The opposing trends across BMI quartiles for the risks associated with WCH and MH were significant (P ≤ 0.047) for total and CV mortality and all CV events. SHT carried similarly increased risks versus NT, independent of BMI. Sensitivity analyses excluding smokers (28%) or patients on antihypertensive treatment (21.5%) were confirmatory.

Conclusions: BMI does not predict CV events, but modulates the risks associated with WCH (higher in obese subjects) and MH (higher in lean subjects).

Ambulatory blood pressure monitoring for stratification of cardiovascular risk in obese and non-obese subjects

T. W. Hansen1, K. Asayama1, L. Thij2, J. Boggia3, Y. Li4, M. Kitakata5, T. Okubo5, C. Torp Pedersen1, K. Stolarz-Skrzypek3, V. Tikhopo2, S. Malysyna6, L. Lind7, K. Kavecka-Jaszej8, Y. Imai9, J. A. Staessen1; On Behalf of the IDACO Investigators. 1Department of Clinical Physiology, Nuclear Medicine and PET, University of Copenhagen, Copenhagen-Denmark; 2Department of Cardiovascular Diseases, University of Leuven, Leuven-Belgium; 3Universidad de la Republica, Montevideo-Uruguay, 4Shanghai Juotong University School of Medicine, Shanghai-China, 5Tohoku University Graduate School of Pharmaceutical Sciences and Medicine, Sendai-Japan; 6Agelioian University Medical College, Krakow-Poland, 7Department of Clinical and Experimental Medicine, University of Padova, Padova-Italy; 8Institute of Internal Medicine, Novosibirsk-Russia; 9Department of Public Health and Caring Sciences, Uppsala University, Uppsala-Sweden

Ambulatory Blood Pressure Monitoring for Stratification of Cardiovascular Risk in Obese and Non-Obese Subjects

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Conclusions: BMI does not predict CV events, but modulates the risks associated with WCH (higher in obese subjects) and MH (higher in lean subjects).
whom BP did not decrease. Pts in whom cIMT decreased had greater arte-
rstial injury and lower metabolic abnormalities at diagnosis. After 12 months
these pts had greater decrease of leptin and greater increase of SAT. Pts in whom
LHV decreased were younger and had greater decrease of WC, WHR and
lesser decrease of adiponectin concentration compared to pts in whom
LHV did not decrease. When pts were divided according to the changes in
fat tissue distribution it occurred that pts in whom VAT/SAT ratio decreased
had greater regression of metabolic abnormalities and regression of TOD.

The step-wise regression analysis revealed that the main predictor of LHV
cand cIMT regression was the decrease of waist circumference ($R^2 = 0.205;
β = 0.481; p = 0.005$), the main predictor of WCWSA was the decrease of iVAT/
SAT ($R^2 = 0.472$; $β = 0.476; p = 0.004$).

Conclusions: Visceral obesity is strictly related to metabolic abnormalities
and TOD in children with PH. The main predictors of TOD regression are the
decrease of iVAT/SAT. It suggest protective role of SAT.

### PPLB2.450 AUTOMATED OFFICE BLOOD PRESSURE RECORDED AT ONE MINUTE INTERVALS

M. Myers. Sunnybrook Health Sciences Centre, Toronto-Canada

Background: Automated office blood pressure (AOBP) is replacing conven-
tional manual office BP (MOBP) in routine clinical practice in Canada and
elsewhere. AOBP provides more accurate readings and virtually eliminates the
white coat effect seen with routine MOBP. Most studies on AOBP have used the
BpTRU device which does not require any antecedent period of rest, takes a
single ‘test’ reading and then automatically records 5 readings at 1 or 2-minute
intervals (timed from the start of one reading to the start of the next reading) with
the patient resting alone in the examining room.

Objective: To examine the time-course of the decrease in BP when AOBP is
recorded at 1-minute intervals and to compare AOBP with the awake ambula-
tory BP.

Methods: Patients ($n = 139$) with a manual systolic BP ≥ 140 mmHg who were
referred for 24-hour ambulatory BP monitoring (ABPM) were enrolled in the
study. A series of 5 AOBP readings recorded over 5 minutes with the patient
resting alone in an examining room was obtained using the BpTRU device
prior to initiating ABPM.

Results: The initial ‘test’ reading (mmHg) with the observer present averaged
153.6/86.6. The next 5 mean AOBP readings in sequence with the patient test-
ing alone were 148.2/83.3, 142.2/82.1, 140.8/80.8, 138.3/80.8 and 136.2/80.9.
The mean of all 5 AOBP readings was 142.8/81.8. If only the first 3 or 4 readings taken with the
patient being alone were used to calculate the AOBP, the mean values would be
143.7/82.1 and 142.3/81.8, respectively.

Conclusion: In previous studies in which AOBP was recorded 5 times at
2-minute intervals, the entire decrease in BP occurred after the second of 5
readings. In contrast, readings taken at 1-minute intervals show a gradual
decrease in BP from the first to last reading. AOBP taken at 1-minute intervals
is superior to the awake ambulatory BP when either 4 or 5 readings are recorded
under research conditions. Including the time taken for an initial ‘test’ reading,
AOBP can be obtained over 5–6 minutes without any antecedent period of rest.

### PPLB2.451 INSULIN PROMOTES VASCULAR SMOOTH MUSCLE CELL PROLIFERATION VIA MICRORNA-208 MEDIATED DOWN-REGULATION OF P21

Y. Zhang, Y. Wang, X. K. Wang, Y. Zhang, C. Zeng. Daping Hospital, Chongqing-China

Objective: Abnormal vascular smooth muscle cell (VSMC) proliferation is
involved in the development of vascular diseases. However, the mechanisms by
which insulin exerts this effect are not completely known. We hypothesize that
microRNAs might be involved in insulin-induced VSMC proliferation.

Methods: VSMC proliferation was determined by [3H]-thymidine incorpora-
tion; microRNAs were determined by microRNA chips and real-time PCR;
miR-208 and p21 was direct. Using a luciferase reporter with entire wild-type
sequence of ECE-1 is the rate limiting step in the production of ET-1 which has been implicated in the
development of cerebral vasospasm. This study used cerebrospinal fluid (CSF)
from subarachnoid haemorrhage (SAH) patients who developed cerebral vas-
ospasm, to investigate if ECE-1 shedding occurs in vivo.

ECE-1 activity was measured by the method of Korotkova. The change of office BP by 10 or
more was confirmed by using the ECE-1 preferring inhibitor CGS35066 (500 nM).
The average ECE-1 activity in CSF taken from patients over three days
following SAH was 0.126 ± 0.018 μU of CSF cleaved/mL of CSF (n = 4).
Further proof for the presence of ECE-1 in CSF was obtained by monitor-
ing the cleavage of BigET18–34, a truncated form of the natural substrate
using mass spectrometry. Incubation with CSF over 48 hrs at 37°C cleaved
BigET18–34 to produce the C-terminal cleavage product BigET23–34.
This product was not detected in the presence of CGS35066, thereby confirming
ECE-1 mediated cleavage of BigET18–34. Furthermore, western blotting
using antibodies directed against the extracellular domain of ECE-1 showed
an 80KDa immuno reactive band in CSF. This corresponds to the size of
soluble ECE-1.

In conclusion, these data for the first time confirms the existence of a soluble
form of ECE-1 in CSF of SAH patients who have developed cerebral vasospasm.
This finding highlights the potential to use ECE-1 as a predictive marker of cere-
bral vasospasm in SAH patients.

### PPLB2.452 SOLUBLE FORM OF ENDOTHELIN CONVERGING ENZYME-1 IN CEREBROSPINAL FLUID : A POTENTIAL BIOMARKER OF CEREBRAL VASOSPASM

S. Kuruppu1, S. Chou1, I. Hanchapola1, M. Ning1, A. Smith1. 1Monash University, Clayton-Australia, 2Brigham and Women’s Hospital, Boston-USA, 3Massachusetts General Hospital, Boston-USA

Endothelin Converting Enzyme 1 (ECE-1) is endogenously expressed by endo-
thelial cells, and is essential for the production of the potent vasoconstrictor
peptide endothelin-1 (ET-1). We have previously shown that ECE-1 is shed
from the surface of EA.hy926 cells. ECE-1 shedding is a rate limiting step in
the production of ET-1 which has been implicated in the
development of cerebral vasospasm. This study used cerebrospinal fluid (CSF)
from subarachnoid haemorrhage (SAH) patients who developed cerebral vas-
ospasm, to investigate if ECE-1 shedding occurs in vivo.

ECE-1 activity was measured by the method of Korotkova. The change of office BP by 10 or
more was confirmed by using the ECE-1 preferring inhibitor CGS35066 (500 nM).
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ing the cleavage of BigET18–34, a truncated form of the natural substrate
using mass spectrometry. Incubation with CSF over 48 hrs at 37°C cleaved
BigET18–34 to produce the C-terminal cleavage product BigET23–34.
This product was not detected in the presence of CGS35066, thereby confirming
ECE-1 mediated cleavage of BigET18–34. Furthermore, western blotting
using antibodies directed against the extracellular domain of ECE-1 showed
an 80KDa immuno reactive band in CSF. This corresponds to the size of
soluble ECE-1.

In conclusion, these data for the first time confirms the existence of a soluble
form of ECE-1 in CSF of SAH patients who have developed cerebral vasospasm.
This finding highlights the potential to use ECE-1 as a predictive marker of cere-
bral vasospasm in SAH patients.

### PPLB2.453 THE RESPONSE OF BLOOD PRESSURE IN SALT-SENSITIVE PATIENTS TO TEST THE LOAD

A. Kirichenko, Y. Novichkova, N. Zakirova. Russian Medical Academy

Objective: the study of the reaction of blood pressure (BP) in salt-sensitive patients
on the test sample with salt load.

Methods and Design: Initially by a method of questioning risk factors of
arterial hypertension (A were revealed. Test-sample with the salt load with
the subsequent registration of BP in 30 minutes, a hour, 2 and 3 hours was
was carried out on all patients, then the results were written down in a dia BP
was measured by the method of Korotkova. The change of office BP by 10 or
even more mmHg w described as salt-sensitive. On the day of research hypo-
tensive therapy was not imposed. There were persons with 2nd–3rd levels of
BP increase (ESC, 2007). Among them the following groups of patients
were allocated: group 1st (57.4 %): increase of the office BP by more than
10 mmHg in response to salt load, group 2nd (42.6%): increase of the office
BP up to 10 mmHg. Data are shown as mean ± std. dev. The groups were
adjusted by average age (53.7 ± 7.0, 54.9 ± 8.7; p > 0.05). Duration hyperten-
sive anamnesis (years) was similar in each group (9.35 ± 5.8, 9.8 ± 6.0 yrs
p > 0.05).

Results: In the 1st group the patients with the 3rd degree of AH prevailed
(54.8% of the cases), hypos diet was not observed in 64.5% of cases. As in
the 1st and 2nd groups, the increase in BP has already been registered
in 30 minutes after the test sample. The majority of patients as salt-sen-
sitive, and n salt-sensitive the increase of diastolic BP (DBP) was registered in 30 minutes (32.26%, 18.2%; p > 0.05 and amounted to 5.37 ± 5.3, 2.2 ± 2.0 mmHg (p = 0.0008). In both groups systolic BP (SBP) also rose in minutes (45.16%, 32.4% p > 0.5), but the salt-sensitive persons, had it significantly higher (11.55 ± 10, 2.5 ± 2.2 mmHg p = 0.0002). Patients of group 1st had the frequency of SBP increased in an hour, contrast to the persons of group 2nd (48.4%, 18.2% p = 0.03), and it was 10.18 ± 9.2, 1.7 ± 1.58 mmHg (p = 0.0001). The frequency of occurrence of DBP in an hour, BP in two and SBP in three hours in groups did not significantly differ, but the salt-sensitive persons, had it significantly higher. The patients of group 1st in 3 hours after the salt load had the frequency of DBP with significant difference (22.58%, 9.09%; p = 0.000), which was 6.38 ± 4.27, 1.5 ± 1.0 mmHg (p = 0.0000).

Conclusions: Among the patients with hypertension salt-sensitive patients can be found in 57.4% of cases. The increase of BP on the salt load is registered among salt-sensitive patients in 30 minutes. There is a growing frequency of occurrence of the SBP in an hour after the test sample. The salt-sensitive individuals, compared with the non-salt-sensitive ones, in 3 hours have SBP and DBP significance higher.

**PPBL2.454 PECULIARITIES OF DAILY RHYTHM IN SALT-SENSITIVE PATIENTS WITH ARTERIAL HYPERTENSION**

A. Kirichenko, Y. Novichkova, N. Zakirova, Russian Medical Academy Postgraduate Education, Moscow-Russia

**Objective:** to study the daily rhythm of the salt-sensitive patients with arterial hypertension (AH).

**Methods and Design:** All the patients were daily monitored of blood pressure (SMBP) on “MDP-NS 02” device. It was on 3rd–4th day of the patient’s stay in the hospital on the background of the treatment and the free movement regime. The average values of systolic and diastolic BP during the day an night (SBPn and DBPn, SBPm and DBPm), was measured, its daily rhythm of the night decline of SBP and DBP (NDR SBP and NDR DBP), which was treated with generally accepted provisions was also estimated. Test-sample with the salt load with the subsequent registration was carried out and the results were written down in a diary. BP was measured by the method of Korotkova. The change of office BP by 10 or even more mm Hg was described as salt-sensitivity. Sixty persons with 2nd–3rd level of blood pressure (BP) increase (ESC, 2007). Among them the following groups of patients were allocated: group 1st (salt-sensitive): increase of the office BP by more than 10 mm Hg in response to the salt load, group 2nd (non-salt-sensitive): increase of the office BP up to 10 mm Hg. Data are shown as mean ± SD.

**Results:** The groups were adjusted by average age (53.7 ± 7.0; 54.9 ± 8.7 p > 0.05). Duration of hypertension anamnesis (years) was similar in each group (9.35 ± 5.8; 9.8 ± 6.0 years p > 0.05). When analyzing the dynamics of BP during the day, it turned out that among the salt-sensitive individual SBP and DBP both during the daytime and at night was higher than among the non-salt-sensitive patients (SBPd 133.48 ± 19.4 vs 123.0 ± 15.7, DBPd: 81.74 ± 10.2 vs 75.9 ± 8.0; SBPm: 120.7 ± 16.4 vs 110.7 ± 15.3, DBPm: 71.2 ± 8.0 vs 65.9 ± 9.3 mm Hg (for all comparisons p < 0.05). In the 1 group non dippers amounted to 62.9%, dippers – 25.7%, night-speakers – 8.5%, over-dippers – 2.9%. In patients o the second group dippers were met in 52.0% of cases (p < 0.05), non-dippers – in 32% (p < 0.05), over-dippers – 16.0% (p > 0.05).

**Conclusions:** The salt-sensitive individuals have BP higher during the day than the non-salt-sensitive patients. They have a broken circadian rhythm in the form of relative (non-dipper – by 2 times more) o absolute (night-speaker) increase of BP during the night hours. Only among them night-speakers are found.

**PPBL2.455 24 HOUR AMBULATORY RECORDING OF AORTIC PULSE WAVE VELOCITY AND CENTRAL SYSTOLIC AUGMENTATION—A FEASIBILITY STUDY**

L. Luzzardo1, I. Lujambio2, M. Sotolongo2, A. da Rosa2, O. Noboa1, L. Thijs3, J.A. Staessen4, I. Boggia1, 1Unidad de Hipertensión Arterial-Centro de Neftología, Hospital de Clinicas-Universidad de la República, Montevideo-Uruguay, 2Departamento de Fisiopatología, Hospital de Clínicas, Universidad de la República, Montevideo-Uruguay, 3Estudios Coordinating Centre, Division of Hypertension-University of Leuven, Leuven-Belgium, 4Department of Epidemiology, Maastricht University, Maastricht-The Netherlands

**Background:** Recording ambulatory profiles of central haemodynamic variables might help in risk stratification. We assessed the feasibility of ambulatory pulse wave analysis by comparing this approach with an established tonometric technique at rest.

**Methods:** We investigated 20 volunteers (51.5 years; 55.0% women) exclusively at rest (R study) and 83 volunteers (49.9 years; 61.4%) at rest and during daytime (10:00 h – 20:00 h) ambulatory monitoring (R + A study). We recorded central systolic (cSP), diastolic (cDP) and pulse (cPP) pressures, central augmentation index (cAI) and central pulse wave velocity (PWV) by brachial oscilometry (Mobil-O-Graph 24 h PWA Monitor) and radial tonometry (SphygmoCor). We applied Bland and Altman’s statistical method.

**Results:** In the R study, tonometric and oscillometric estimates of cSP (108.8 vs. 110.0 mm Hg), cDP (76.9 vs. 77.1 mm Hg) and cPP (31.8 vs. 33.0 mm Hg) were lower (P ≤ 0.001) on oscillometric than tonometric assessment. In the R + A study(Fig), tonometric vs. oscillometric assessment yielded similar values for cSP (115.4 vs. 113.9 mm Hg; P = 0.31), but lower cDP (77.8 vs. 81.7 mm Hg; P < 0.001), so that cPP was higher (37.5 vs. 32.2 mm Hg; P < 0.0001); cAI (27.5 vs. 26.8%) and PWV (7.9 vs. 7.3 m/s) were higher (P < 0.05) on tonometric assessment. The differences between tonometric and oscillometric estimates increased (P < 0.004) with level for cSP (r = 0.39), cAI (r = 0.39) and PWV (r = 0.30), but not (P ≥ 0.12) for cPP (r = 0.14), cPP (r = 0.08).

**Conclusion:** Irrespective of measurement conditions, brachial oscilometry compared with an established radial tonometric method provided similar estimates of cSP, but slightly different values for cAI and PWV. Our study suggests that ambulatory measurement of central haemodynamic characteristics is feasible. However, further validation in diverse populations is required before clinical application can be recommended.
Objective: To analyze the results of the Reproductive Age Mortality Survey (RAMOS) and NCD risk-factors survey (STEPS).

Results:
- In 2006 more than one third of early maternal mortality and more than 60% of late maternal mortality is caused by primordial diseases, mainly congenital and acquired cardio-vascular diseases, severe sequelae due to pregnancy. (RAMOS)
- The main cause of CVD mortality in reproductive age women is hemorrhage stroke (57%) developed because of hypertension. (RAMOS)
- Arterial Hypertension prevalence in the population accounts 33.9%. (NCD Risk-factors Survey)
- 35.2% of 18-64 age population has 3 or more risk-factors. (NCD Risk-factors Survey)
- Only 6.4% of population has not got any risk factor. (NCD Risk-factors Survey)

Conclusion: Cardio-vascular diseases proper management should develop into one of the main components of public health strategy in Georgia.
Background: The ESC guidelines emphasize that diagnosis and management of hypertension should be related to quantification of global cardiovascular risk. This implies that all patients should be classified not only in relation to the grades of hypertension but also in terms of the coexistence of different risk factors, organ damage and disease. Observational studies show clear associations between raised systolic or diastolic blood pressure and the risk of cardiovascular disease. Prospective data on blood pressure control and comorbidities of patients with raised systolic or diastolic blood pressure and the risk of cardiovascular disease. Observational studies show clear associations between raised systolic or diastolic blood pressure and the risk of cardiovascular disease. This implies that all patients should be classified not only in relation to the grades of hypertension but also in terms of the coexistence of different risk factors, organ damage and disease. Observational studies show clear associations between raised systolic or diastolic blood pressure and the risk of cardiovascular disease. Prospective data on blood pressure control and comorbidities of patients with raised systolic or diastolic blood pressure and the risk of cardiovascular disease.

Methods: In the non-interventional 3A Registry study conducted in Germany since 3 years, patients were eligible for documentation in whom the physician had decided to modify the therapy. This included treatment with the direct renin inhibitor aliskiren or an ACE inhibitor or an angiotensin receptor blocker or an agent not blocking the RAS, alone or on top of an existing drug regimen.

Results: Among the 14998 patients included 5284 patients (40.3%) had grade 1 (SBP 140-159 or DBP 90-99 mm Hg), 5358 patients (40.9%) with grade 2 (SBP 160-179 or DBP 100-109 mm Hg), and 2458 patients had hypertension grade 3 (16.3%) (SBP 180 or DBP> 110 mm Hg) classified according to office BP values while on therapy. Diagnostic procedures were similar between the three grades, however ABDM was less performed in the Grade 3 hypertensives (40.4, 39.1 and 35.6%, respectively). Cardiovascular disease (32.9, 27.8, 29.7%), Diabetes (29.7, 27.0, 28.8 %), Chronic kidney disease (10.1, 7.4, 8.6%), Peripheral artery disease (6.9, 5.2, 5.1 %) and stroke (4.3, 4.1, 4.4%) were not more prevalent in the grade 3 hypertensives. After 1 year blood pressure at follow up for the three grades were 135 ± 13/80 ± 8. 139 ± 14/82 ± 8 and 144 ± 18/84 ± 10, with a blood pressure reduction of 12.5 ± 10/6 ± 10. 24 ± 15/11 ± 11 and 42 ± 22/18 ± 14 respectively. MACCE: remaining of death, myocardial infarction, stroke, after 1 year was not significant different among the three grades (1.2, 1.5, 1.3%).

Conclusions: In grade 3 hypertensive patients cardiovascular disease, stroke, peripheral artery disease or chronic kidney disease are not more present than in less severe hypertension. Physicians choose significantly more often an Aliskiren based regimen in grade 3 hypertensive patients. In grade 3 hypertensive patients cardiovascular disease, stroke, peripheral artery disease or chronic kidney disease are not more present than in less severe hypertension. Diagnostic procedures were performed independently of the severity of the hypertension. Surprisingly, 24h ABDM was significantly less performed in grade 3 hypertensives. Cardiovascular disease manifestations (MACCE) were similar between the three hypertension severity grades.

EPIEMIOLOGICAL STUDY OF HYPERTENSION IN AHMEDABAD, INDIA

H. Nayak. B.J.Medical College, Ahmedabad-India

Objectives: 1) To know the prevalence of hypertension in Ahmedabad municipal corporation area.2) To study the sociodemographic profile of study population.3) To study various risk factors associated with hypertension

Design and Method: Study population & Area: persons > 20 yrs of age from all the six zones of AMC. Study design: cross sectional study. Sample size: 904 people of above 20 yrs of age. Sampling technique: stratified random sampling from different wards of respective zones. Study period: one year. Study method: interview with questionnaire method and clinical examination. Data analysis: data were collected, compiled into excel sheet & Analysed by suitable statistical methods with help of epi-info software.

Result: Total 904 persons were included in the study after going for stratified random sampling. Maximum i.e.204 (22.6%) belongs to 30-39 years. systolic blood pressure ≥ 120mmHg was found in 516(57.1%) persons, however Diastolic blood pressure ≥ 80 was found in 441(48.8%) persons. Out of 904, 229(25.3%) already had Hypertension and on treatment. while 111(12.3%) were newly diagnosed hypertensives, followed by 311(34.4%) were prehypertension. major 25(2.5%) hypertensives belonged to age 40-49 yrs. However prehypertension was more prevalent (28.9%) among 30-39 yrs.188 (39.4%) of females had hypertension while152 (35.6%) of males were hypertensive. Mean age of hypertensives was 54.57 ± 15 and that of prehypertension was 40.94 ± 13 among the hypertensives mean duration of hypertensive was7.8 ± 6.9. Family history of hypertension and Hypercholesterolemia was not significantly associated with hypertension. Sedentary occupation was strongly associated with hypertension (p < 0.001).other risk factors, smoking, tobacco, education and socioeconomic status etc. were also checked.

Conclusion: Prevalence of both the hypertension and pre hypertension is appears to be high. Rule of half is still prevailing. Health promotional and other preventive strategies must start to curtail the epidemic and decrease the burden of hypertension and its complication.
Background: Previous studies in Iran showed a high prevalence of obesity. It has been suggested that lifestyle modification has great potential to reduce obesity and other related cardiovascular risk factors. This study aimed to evaluate the impact of obesity and overweight on Diabetes and hypertension control following the performance of Isfahan Healthy Heart Program intervention activities.

Methods: The IHHP study was conducted in three counties (Isfahan and Najaf-Abad) that were considered as intervention areas and (Arak) as reference area, all located in central Iran. The program started in 2000 and finished in 2007. A questionnaire contained demographic information, smoking, nutritional and physical activity habits, medical history. Body mass index, waist, waist to hip ratio and blood pressure were measured. Controlled hypertension is defined as SBP < 140 mm Hg or DBP < 90 mm Hg and currently taking BP medication Controlled DM was defined as FBG < 126 mg/dl and 2hpb < 200 mg/dl and currently taking antidiabetic treatment.

Results: Both sexes had a higher BMI, WC and WHR in intervention area, WHR was the only factor significantly different in hypertensive women between intervention and reference area in 2001 - 2007. Abdominal obesity (WC and WHR) decreased significantly in total population (P = 0.001, P = 0.003). In addition, we have found in controlled diabetes women WC decreased significantly in intervention area (P = 0.041).

Conclusion: Our results demonstrated the control of HTN and DM has association with decreasing in obesity prevalence following the performance of IHHP interventional activities.

Objective: Elevated plasma concentrations of remnant-like particle cholesterol (RLP-c) are atherogenic. Recently, RLP-c is suggested to be associated with cardiovascular disease (CVD) in a cross-sectional study, and it may induce endothelial dysfunction through oxidative mechanisms. The present study was designed to determine whether high plasma RLP-c levels predict the development of hypertension.

Design and Methods: A total of 1,485 subjects (602 males and 883 females) aged 40 years received a health examination in a Japanese Cohort of Seven Countries Study in 1999, when, we examined blood pressure (BP), body mass index (BMI), and blood chemistries including fasting RLP-c levels. The serum levels of RLP-c were measured by an immunosuppression method. We excluded 676 subjects from the analysis who had hypertension (BP ≥ 140/90mmHg) and/or antihypertensive medications and/or antihypertensive medications at baseline. Ten years later, 683 subjects (504 males and 433 females) were re-examined (follow-up rate = 92%).

Results and Conclusion: Of 683 normotensives at baseline, 303 subjects developed hypertension. We divided the baseline plasma RLP-c levels into quartiles. The odds ratio for the development of hypertension after 10 years was 1.874 (95% confidence interval (95% CI): 1.150-3.051, p = 0.05) in the highest quartile compared to the lowest quartile of RLP-c level after adjustments for confounding factors. A high level of plasma RLP-c predicts all-cause death in a large number of a general population.

Design and Method: A total of 1,452 subjects (aged over 40 years: 586 men and 866 women) received a health examination in Tanushimaru in 1999. Plasma ET-1 levels were measured by specific radioimmunoassay at baseline and subjects were followed periodically until 2009. We succeeded in very high follow-up rate (96.8%).

Results: A total of 178 subjects (12.2%) died during the follow-up. Plasma ET-1 levels were significantly higher (p < 0.01) in those who died (n = 178) than those who survived (n = 1,228). Cox proportional hazards regression analysis demonstrated that ET-1 was an independent predictor of all-cause mortality: hazard ratio: 1.054; (95%C.I.:1.018-1.090, p = 0.0022) after adjustments for confounding factors.

Conclusions: This 10-year prospective study demonstrated that elevated plasma ET-1 level was a strong and independent predictor of all-cause death.

Objective: To assess the relationship of blood pressure (BP) with all cause mortality in 85 years olds.

Results: Subjects were more likely to be physically inactive compared to untreated hypertensives and normotensives (38.28,27% p < 0.005), have poor self rated health (39, 25, and 21%, p < 0.0001), be diabetic (24,17, and 8%, p < 0.0005), to have heart disease (45,11, and 19%, p < 0.0001), to have higher systolic BP (SBP), mean SD (148 ± 21, 157 ± 16, and 127 ± 16mmHg, p < 0.0001), higher pulse pressure (74 ± 18, 78 ± 14, and 56 ± 9mmHg, p < 0.0001). Awareness of hypertension was 73%, prevalence 91%, treatment rate 78%, control rate 35%. During 5 years 327 patients died. There was no
difference in mortality between normotensive, untreated and treated hypertensive men or women. Treated subjects with controlled SBP had the highest mortality 34%, p = 0.29. In order to control for the higher comorbidity among treated hypertensives a Cox proportional hazard model was performed. Continuous SBP yielded a hazard ratio (HR) of 1.00, 95% confidence interval (CI) 0.95-1.01, in a model that included gender HR = 1.78, 95%CI 1.39-2.30, diagnosis of heart failure HR = 1.60, 95%CI 1.17-2.18, physical activity HR = 0.49, 95%CI 0.38-0.63, and good self rated health HR = 0.52, 95%CI 0.40-0.68, the diagnoses of diabetes, coronary and cerebrovascular diseases, smoking and antihypertensive therapy were not predictive. Exclusion of the 114 dead during the first two years of follow up did not affect the results.

Conclusion: In the community SBP does not seem to affect mortality of 85 year olds, and patients with controlled SBP tended to have the worse outcome.

PP.30.13 ABDOMINAL OBESITY, BLOOD PRESSURE AND DIABETES MELLITUS IN BULGARIAN URBAN POPULATION
St. Naydenov1, S. Todorova2, F. Nikolov3, S. Tosnev1, N. Naydenova4. Clinic of Cardiology, KPHV, Medical University-Sofia, Sofia-Bulgaria, 2Hypertension Excellence Center, Tokuda Hospital, Sofia-Bulgaria, 3Clinic of Cardiology, Medical University - Plovdiv, Sofia-Bulgaria, 4Clinic of Cardiology, St. Naydenov1, Sv. Torbova2, F. Nikolov3, Sv. Tosnev1, N. Naydenova4.

Objective: To assess the blood pressure (BP), abdominal obesity (AO) and blood sugar (BS) and their correlations in Bulgarian urban population.

Design and Method: A cross-sectional study, conducted between 17th and 22nd of May 2010. Measurements of BP, WC and BS were organized in 4 year olds, and patients with controlled SBP tended to have the worse outcome. Measurements of BP, WC and BS were organized in 4 year olds, and patients with controlled SBP tended to have the worse outcome. Among treated hypertensives a Cox proportional hazard model was performed.

Results: Healthy WC was found in 47.8% of the males and 23.8% of the females. Increased WC was found in 52.5% males and 16.9% females. Abdominal obesity was present in no one of the males but 59.3% of the females. The WC increased with age. The mean age of the groups were as follows: healthy WC males - mean age 52.3 years; increased WC - mean age 60.9 years; abdominal obesity - mean age 63.4 years. The correlation between BP and WC shows that participants with arterial hypertension (AH) have normal WC in 40.6%, increased WC in 45.3% and abdominal obesity in 13.6%. Participants without history of AH have normal WC in 25.7%, increased in 17.5% and abdominal obesity in 50.0%. The WC in participants with diabetes mellitus (n = 88) was as follows: normal WC in 18.2%, increased in 20.5% and abdominal obesity - 61.4%. The correlation between population’s BP and WC was as follows: the mean BP of the participants with healthy WC was 133/78 mmHg, participants with increased WC - 142/80 mmHg and in participant with abdominal obesity - 144/184.5 mm Hg. The mean values of the blood glucose were 5.6 ± 1.94, 5.98 ± 1.32mmol/L and 6.5 ± 1.99 mmol/L for the three groups respectively.

Conclusions: Two thirds of Bulgarian urban population has unhealthy WC and 40% - abdominal obesity. The percent of abdominal obesity in Bulgarian hypertensive population is low - 13.6, but in diabetics and normotensives is high. The results show the insufficient information of the Bulgarian urban population for the abdominal obesity as a cardiovascular risk factor.

PP.30.14 CARDIOVASCULAR RISK IN WOMEN ATTENDED IN PRIMARY CARE. BASELINE DATA OF THE EVA STUDY
M.A. Prieto Diaz1, N. Salaman Cabary1, J.J. Garcia Noro1, F.J. Montero Lopez1, V. Garcia Varez1, R. Sanchez Martinez1, J. Flores Garcia1, A. Gallardo Gonzalez1, E. Fernandez Huelga1, A. Diaz Villanueva1, M.E. Martin Ceinos1, R. Alonso Reguera1, A. De La Vega Cuyas2, B. Buznego Alvarez2, F. Fernandez Vega2, On Behalf of The Eva Study Investigators/ Health Center Validation - La Florida, Pravia-Spain, 3Hospital Clinico, S. Nephrology–Hta Unit, Valladolid-Spain, 4Primera Health Center La Cuesta, Leon-Spain, 5Primera Health Center La Palomera, Leon-Spain, 6Primera Health Center Cangas De Onis-Spain, 7Primera Health Center Cangas De Onis, 8Primera Health Center La Meneda, Avila-Spain, 9Primera Health Center Rondilla 1, Valladolid-Spain, 10Primera Health Center Pamarin, Oviedo-Spain, 11Primera Health Center La Parque, Gijon-Spain, 12Hospital Universitario Central De Asturias, 13S. Nephrology–Hta Unit, Oviedo-Spain

Objective: The aim is to know the morbidity, mortality and cardiovascular risk in women attended in primary care in Asturias, Leon, Palencia and Valladolid, Spain.

Methods: A descriptive, cross-sectional and multicenter study between October 2009 and January 2010, baseline data of a 5 years prospective study. Population: Random selection of women with age between 45 and 75 years attended in primary care. The following variables were analyzed: associated cardiovascular risk factors (CVRF), target organ damage (TOD) and cardiovascular or renal disease (CVD) defined following ESH-ESC 2007 guidelines. Blood pressure (BP) < 140/90 mm Hg and < 130/80 mmHg in diabetics were considered as target blood pressure values.

Results: 903 women were selected, mean age 59.6 ± 8 years; body mass index 28.2 ± 5.5 kg/m2; abdominal circumference 91.4 ± 12.8 cm; systolic blood pressure 131.1 ± 16 mmHg; diastolic blood pressure 78.5 ± 9 mmHg. 412 women (45.6%) were hypertensive, with a 59.7% BP control; 13.3% diabetics with a 34.2% BP control; 41.7% dyslipidemia; 14.3% smoke; 30.7% obesity; 35.5% sedentary; 7.4% with family history of early cardiovascular disease; 38.9% metabolic syndrome by ATP III criteria; 18.9% had microalbuminuria 1.8%; glomerular filtration rate < 60 ml/min/1.73m2 (MDRD) 12.4%; slight increase in plasma creatinine 1.6% and left ventricular hypertrophy 2.9%; 9.3% had CVD: stroke 2.2%; coronary heart disease 3.4%; heart failure 1.8%; renal disease 1.4% and peripheral vascular disease 1.6%. 44.4% had a high or very high cardiovascular risk.

Conclusions: Four in ten women attended in primary care had a high or very high cardiovascular risk. Hypertension, dyslipidemia, obesity and sedentary are the CVRF more prevalent and one in three had a metabolic syndrome. A 10% had cardiovascular or renal disease. Half of hypertensive women and one third of diabetics had blood pressure controlled. The most commonly used drugs were blockers of the renin-angiotensin system followed by diuretics.
had higher levels of moderate/severe dependence (p < 0.0001). Patients with controlled BP were 29.4% (A), 25.5% (B) and 23.7% (C) (p < 0.0001). Clinical inertia — the failure to intensify therapy in patients who do not achieve control objectives — reached 47.1% (A), 51.6% (B) and 57.9% (C) (p = 0.0002), respectively. Global treatment compliance was 94.3%, and the difficulty for taking the medication significantly increased with age (p < 0.0001). A multivariable logistic regression model was performed to identify main predictors of lack of BP control: absence of previous hypertension promotes control (OR 0.020, 95% CI 0.016 to 0.103, p < 0.0001), while sedentarism (OR 1.479, 95% CI 1.267 to 1.724, p < 0.0001), BMI > 30 (OR 1.383, 95% CI 1.148 to 1.667, p < 0.0001) and abdominal obesity (OR 1.235, 95% CI 1.045 to 1.460, p = 0.0134) are directly associated with lack of BP control.

Conclusions: Older hypertensive patients have poorer BP control and their treating physicians did more clinical inertia. These patients have also higher prevalence of TOD and CVD, worse functional status and worse treatment compliance.

**Abstract PP.30.16**

**HYPERTENSION TREATMENT AS THE INITIATION OF COMPREHENSIVE GLOBAL RISK MANAGEMENT**

K. Kim, Ys Cho, TJ Youn, Gy Cho, Ih Chae, Dj Choi, Ch Kim. Seoul National University Bundang Hospital, Seongnam-South Korea

**Background:** We analyzed the Korean National Health and Nutrition Examination Survey (KNHNES) database to determine the coexistence of cardiovascular risk factors and to analyze the effect of hypertension treatment on the management of other risk factors in a Korean population.

**Methods:** The KNHNES, which was conducted by the Korean Ministry of Health and Welfare, was a cross-sectional, nationally representative survey in which a stratified multistage sampling design was used. The most recent KNHNES survey, conducted in 2008, was analyzed.

**Results:** A total of 6,547 adults (≥ 20 years) were included in the analysis. Mean age was 49.1 ± 16.3 years and male subjects were 42.0%. The prevalence of hypertension, hypercholesterolemia, diabetes mellitus, and obesity were 26.9%, 10.5%, 9.5%, and 31.2%, respectively. Hypertension was significantly associated with other risk factors (Fig. 1A). Fasting glucose and cholesterol concentrations were significantly higher in patients with hypertension (glucose: 95.8 ± 21.7 mg/dl vs. 106.4 ± 31.5 mg/dl, cholesterol: 184.9 ± 34.6 mg/dl vs. 196.2 ± 38.9 mg/dl, p < 0.0001, respectively). Furthermore, treatment of hypertension was significantly related with the management of other risk factors, especially the treatment of hypercholesterolemia (Fig. 1B). However, there was no difference in serum cholesterol level in patients with statin therapy irrespective of hypertension or hypertension treatment.

**Conclusions:** Hypertension is the most prevalent risk factor and most common reason for an outpatient visit. We should focus on the evaluation of hypertensive patient to identify other cardiovascular risk factors and to reduce the global risk of the subjects.

**Abstract PP.30.17**

**THE INFLUENCE OF METABOLIC SYNDROME ON THE OCCURRENCE AND SEVERITY OF CAROTID ATHEROSCLEROSIS IN HYPERTENSIVE PATIENTS WITH LEFT VENTRICULAR HYPERTROPHY**

B. Lović1, D. Lović1, D. Djordjević2, M. Lović1, V. Stojanov3, B. Jakovljević4, T. Lović1

1Clinic for Internal Diseases-Intermedica -Dr Lovic, Nis-Serbia, 2Institute Niška Banja, Niš-Serbia, 3Clinical Centre of Serbia, Belgrade-Serbia, 4Institute of Hygiene and Medical Ecology, School of Medicine, Belgrade-Serbia

**Objectives:** Metabolic syndrome (MS) belongs to the most important risk factors for the occurrence of cardiovascular (CV) diseases. The aim of this study was to estimate the prevalence of MS in patients with hypertension and left ventricular hypertrophy (LVH), and to assess the presence of carotid atherosclerosis among patients with or without metabolic syndrome. Design and methods: The study comprised 102 hypertensive patients (50 men and 52 women), aged 56 ± 7 years. All of them were diagnosed with LVH, using echocardiography parameters (average LVMI = 164.2 ± 30.7 g/m2). Colour Duplex ultrasound examination of carotid arteries was performed using Toshiba ultrasound with linear probe of 7.5MHz. Results: Metabolic syndrome was present in 44 patients (43.1%), aged 57 ± 7 years. They had significantly higher glucose level, lower HDL cholesterol, higher triglycerides and higher body mass index than patients without MS (30.6 ± 4.6 kg/m2 vs. 26.5 ± 3.4 kg/m2; p < 0.03). Patients with MS had more often complex VA and significantly lower values of HRV. After eleven years of follow-up, six patients in this group had fatal CV events (4 CV -1 deaths, 2 sudden deaths), in comparison to three sudden deaths among patients without MS (p > 0.05). The ultrasound examination revealed that patients with MS had significantly greater thickness of the intimo-medial complex compared to patients without MS (1.13 ± 0.05 vs. 0.92 ± 0.08 mm; p < 0.05). 15 patients with MS (34%) had carotid plaques, compared to only 11 (18.9%) patients without MS (p < 0.04). Coronary disease was diagnosed in 19 patients (43%) with MS (4 PTCA with inbuilt stent, 5 with angioplasty and positive exercise tests), and in 6 patients (10.8%) without MS (p < 0.002). Conclusions: Patients with LVH and metabolic syndrome had significantly higher prevalence of carotid atherosclerosis and coronary artery disease than patients without MS. Metabolic syndrome also affects the severity of carotid artery disease in patients with LVH.

**Abstract PP.30.18**

**ASSOCIATED FACTORS TO INADEQUATE CONTROL OF ARTERIAL BLOOD PRESSURE IN HYPERTENSIVE PATIENTS UNDER MEDICAL TREATMENT: CLINICAL PRACTICE BASED STUDY IN ARGENTINA**

G. Micali1 D. Piskorze2, On Behalf of HTA NC Study Investigators. 1Sanofi Aventis Argentina, Buenos Aires-Argentina, 2Sanatorio Británico S.A. Rosario-Argentina

**Objective:** to determine the predictors of inadequate blood pressure (BP) control after an observational period of 3 months.

**Design and Method:** non-interventional, prospective, observational, based in medical practice, multcenter study. Sample: Adults (≥ 21 years); outpatients;

![Graph](image-url)
uncontrolled hypertension defined as systolic blood pressure (SBP) ≥ 140 mmHg and/or diastolic blood pressure (DBP) ≥ 90 mmHg in non hypertensive patients and SBP ≥ 130 mmHg and/or DBP ≥ 80 mmHg in hypertensive diabetic patients after at least 6 weeks of antihypertensive treatment. Statistical methods: averages, standard deviations and confidence intervals 95% for continuous variables; proportions and percentage for categorical variables. The statistical analysis was performed using a 2-tailed test with a significance level of 5%. The factors involved in non achieving hypertension control at 3 months follow up visit were evaluated using multiple regression model.

Results: 379 patients included and followed at 39 sites between October 06, 2008 and August 13, 2009. Mean age 67.04 ± 12.47 years (CI95% 65.79-68.29); females 57.8% (n = 219); Body mass index 28.82 ± 5.32 (IC95% 28.29-29.36); diabetics 20% (n = 79); smokers 12.7% (n = 48). Mean basal BP: SBP 154.41 ± 12.62 mmHg (CI95% 153.15-155.67) and DBP 90.39 ± 8.73 mmHg (CI95% 89.52-91.23). Mean follow up BP: SBP 133.06 ± 12.4 mmHg (CI95% 131.8-134.32) (p < 0.0001) vs basal SBP and DBP 80.51 ± 8.26 mmHg (CI95% 79.67-81.35) (p < 0.0001) vs basal DBP. Mean basal SBP in diabetic patients 152.45 ± 14.11 mmHg (CI95% 149.33-155.63) vs 154.82 ± 12.19 mmHg (CI95% 153.45-156.18) in non diabetics, p = NS. Mean basal DBP in diabetic patients 87.42 ± 9.9 mmHg (CI95% 85.38-89.45) vs 91.17 ± 8.5 mmHg (CI95% 90.92 - 92.12) in non diabetic patients, p = NS. Compared BP during the follow-up: SBP diabetic patients 133.4 ± 12 mmHg (CI95% 130.6-136.1) vs 133 ± 12.5 mmHg (CI95% 131.5-134.4) non diabetic patients, p = NS; DBP diabetic patients 80.2 ± 7.5 mmHg (CI95% 78.5-81.9) vs 80 ± 8.4 mmHg (CI95% 79.6-81.5) non diabetic patients, p = NS. Target achieved in 81.5 % (n = 309) in general, in diabetic patients 46.8 % (n = 37) and in non diabetic patients: 88 % (n = 272), p < 0.001. In the logistic regression diagnoses (OR 8.4 IC95% 4.8-14.7, p = 0.0001) was the only variable associated with lack of control of hypertension.

Conclusions: this descriptive study of clinical practice in Argentina established the role of diabetes as a “predictive condition” to treatment failure, although, further assessment is needed. This work was supported by an unrestricted grant from sanofi-aventis.

**PP.30.19** RESISTANT HYPERTENSION OR POOR THERAPEUTIC CONTROL
B. Georgiev1, N. Gotcheva1, D. Gotchev1, 1National Heart Hospital, Sofia-Bulgaria, 2Military Medical Academy, Sofia-Bulgaria

The Resistant Hypertension (RH) is defined as blood pressure remaining above the goal though the concurrent use of 3 antihypertensive agents of different classes and one of the 3 used agents should be a diuretic and all agents should be prescribed at optimal dose. The prevalence of RH is unknown, but many trials suggested that the frequency has been about 20% of all hypertensive patients. The aim of the study was to analyze the frequency of poor therapeutic control in the Bulgarian cohort of European Action on Secondary and Primary Prevention by Intervention to Reduce Events III (EUROASPIRE III) – asymptomatic high risk patients.

Methods: The EUROASPIRE III survey was carried out in 2006–2007. Consecutive high risk patients from the general practice were identified and then followed up, interviewed and examined.

Results: 327 patients were interviewed. The prevalence of high blood pressure is 88.1% and 86.7% out of all hypertensives were on drug treatment. The mean blood pressure was 160.89/86 mmHg. The patients achieving the goal blood pressure were 16% of non-diabetic and 4% of diabetics. 27.6% were on active antihypertensive treatment but the vast patients' number in EUROASPIRE III cohort.

Conclusions: Almost all hypertensive patients from the Bulgarian cohort in EUROASPIRE III were on active antihypertensive treatment but the vast majority of them did not achieved the predetermined goal BP levels with final results being the worst compared with all 12 countries population. These results suggested a false positive group of patients with RH being treated with average number of 1.7 drugs and doses below recommended.

**PP.30.20** THE PREVALENCE OF HYPERTENSION AND METABOLIC DISORDERS IN YOUNG PEOPLE
A. Osipov1, E. Popova2, L. Borisova1, O. Antropova1, V. Kondakov1, I. Osipova1, 1Alay State Medical University, Barnaul-Russia, 2Municipal Hospital 7, Barnaul-Russia

The study included 522 residents of the Altai Region at the age of 16 to 29 years, passed examination at the Center for Health: men – 79%, women – 21%. The median age of the patients was 19.3 years (men – 19.1, IQR 2.7, women – 21.9 ± 4.1). The main risk factors were estimated: blood pressure (BP), body mass index, total cholesterol, glucose. During BP examination, 65% of the patients revealed an optimal BP (< 120/80 mm Hg; p < 0.001), 31% - normal BP (120-129/80-84 mm Hg), 4% - high BP (> 130/130/85-89 mm Hg). In women optimal BP was identified 1.8 times more frequently than men (72 and 39%, p < 0.001). Normal and high blood pressure were more frequent male than female (48 and 27%, p < 0.001). Hypertension is more important in men aged 24-29 years (36%), in women – 20 - 04 years (5%, p < 0.005). 67% of the patients had normal body weight, 18% - overweight and obesity. Normal weight dominated by 20% in women (72% and 52%, p > 0.005); overweight (23% and 10%, p < 0.005) and obesity (10% and 3%, p < 0.005) in men. Obesity is prevalent in men aged 25-29 years (29%), women in the same age category (7%, p < 0.005). Physical inactivity presented in 90% cases. The analysis of total cholesterol revealed that 84% of patients had no abnormalities, 16% had hypercholesterolemia (16 %- women, 12% - men). Proportion of hypercholesterolemia was equally high for men and women aged 25 to 29 years (36% and 36%). Smoking diagnosed significantly more often in men aged 20-24 years (63%), in women aged 16-19 years (26%, p < 0.005). Hyperglycemia was detected in 6% of the patients, gender differences were not revealed.

Conclusions: Among the patients of the health center a high level of risk factors (high BP, total cholesterol, overweight) was detected in young people, mostly in men. These findings point to the need for early prevention.

**PP.30.21** CIRCULATING ADIPOCYTOKINES LEVELS IN CHILDREN: THE ASSOCIATION WITH BIRTH WEIGHT, BLOOD PRESSURE AND METABOLIC FACTORS
M. Franco, M. Rangel, R. Puccini, Mw. Strufaldi, Federal University of São Paulo, São Paulo-Brazil

Objectives: Adipocytokines levels have been implicated in the development of vascular inflammation and endothelial dysfunction. They can be potential candidates in explaining the link between fetal programming and development of hypertension. Our purpose was to determine in 6-to-12-year-old children if the adipocytokines are associated with birth weight, blood pressure levels and metabolic variables.

Methods: Plasma concentrations of adiponectin, TNF-alpha, MCP-1 and PAI-1 were measured in 204 children.

Results: Low Birth weight children exhibited elevated amounts of TNF-alpha (p < 0.001), MCP-1 (p = 0.022), PAI-1 (p = 0.036). This result was associated with lower levels of adiponectin (p = 0.027). Similar findings were observed after covariate analysis with adjustment for BMI and HOMA index. The changes in the circulating levels of adiponectin, TNF-alpha, MCP-1 and PAI-1 correlated significantly with birth weight, systolic blood pressure levels and HOMA index, in the entire population, a stepwise regression analysis demonstrated that birth weight, uric acid and abdominal circumference were independent predictors of systolic blood pressure (R2 = 0.87). In addition to this, we observed that tri-glycerides, uric acid, abdominal circumference and PAI-1 were an independent determinant of HOMA index (R2 = 0.416).

Separate analyses performed in low birth weight children yielded findings that supported these associations. According to the regression analysis, circulating levels of uric acid and adiponectin were correlated with systolic blood pressure in these children (R2 = 0.281). Similar analyses were performed in appropriately-for-gestational-age children and only abdominal circumference and BMI reached statistical significance (R2 = 0.128).

Conclusion: It is possible that the association of fetal programming with elevated risk for vascular and metabolic disease in later life is, at least in part, mediated by a subtle perturbation of the adipokines and proinflammatory pathways.

**PP.30.22** COMPARISON OF AMBULATORY BLOOD PRESSURE MONITORING PROFILE IN AFRICAN BLACKS AND CAUCASIANS UNTREATED HYPERTENSIVE PATIENTS MATCHED FOR AGE AND GENDER
J. Polonia1, C. Mamibe2, L. Barbosa1, Ja. Silva1, D. Diogo2, T. Madede2, A. Damasceno2, 1IP Unit Hospital Pedro Hispano, Matosinhos-Portugal, 2Faculdade De Medicina, Universidade Eduardo Mondlane, Maputo-Mozambique

Introduction: Few studies have evaluated 24h-ambulatory blood pressure (ABP) profile in black hypertensive patients (n ≥ 9) living in Africa.
Abstract PP.30.22

**Aim and Methods:** The aim of that study was to compare ABP profile in never treated BHP of Mozambique (20-80 years) vs never treated Caucasians hypertensive patients (CHP) matched for age and gender. Only patients with 24h ABP \( > 130/80 \) mm Hg were included. CHP were \( n = 555 \), 47 ± 12 years, 51% women, BMI = 28 ± 8 kg/m², 7% smokers; BHP were \( n = 620 \), 50 ± 13 years, 50% women, BMI = 27 ± 5 kg/m², 18% smokers (p < 0.02). Versus CHP, BHP showed higher 24h, daytime and nighttime BP values and lower nighttime BP fall (in %) in almost all decades of age distribution (Table1, \( * p < 0.001 \) vs BHPs). Percentage of dyslipidemia and diabetes did not differ between groups. Heart rate 24h was significantly higher in BHP vs CHP only for 20-30 and 41-50 years. Differences between BHPs and CHPs were maintained significant when calculations were done separately for both men and women.

**Conclusions:** Our data suggest that untreated Africans BHP present systematically a higher ABP values and a lower nighttime BP fall than untreated CHP for almost all spectrum of age distribution. That may lead to a worse cardiovascular health risk profile and may explain our higher ABP that we have observed in this population.

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**Abstract PP.30.23**

**METABOLIC SYNDROME AND THE RISK OF PERIPHERAL ARTERIAL DISEASE: DATA FROM THE EVALUATION OF ANKLE/BRACHIAL INDEX IN HUNGARIAN HYPERTENSIVES (ERV) SCREENING PROGRAM.**

K. Farkas1, Z. Iárái2, E. Kolossváry3, A. Ludányi4, I. Kiss1. 1Szent Imre Hospital, Budapest-Hungary, 2Semmelweis University, Budapest-Hungary, 3Egis Pharmaceuticals, Budapest-Hungary

**Background and Objective:** Metabolic syndrome (MetS) is a well-known risk factor for cardiovascular (CV) disease in the general population. Peripheral arterial disease (PAD) is characterised by a high risk of cardiovascular mortality. PAD can be diagnosed already in the early, asymptomatic stage, with a simple, noninvasive test, the ankle/brachial index (ABI). A low ABI (≤ 0.9) is an indicator of how cardiovascular risk in asymptomatic patients. The objective of the present study was to evaluate the prevalence of low ABI in hypertensive patients with and without MetS.

**Patients and Method:** Hypertensive patients (age 50-75 years) who were attended at 55 hypertension outpatient clinics from Hungary, during a 12 years, 51% women, BMI = 27 ± 8 Kg/m², 7% smokers; CHP were \( n = 620 \), 50 ± 13 years, 50% women, BMI = 27 ± 5 Kg/m², 18% smokers (p < 0.02). Versus CHP, BHP showed higher 24h, daytime and nighttime BP values and lower nighttime BP fall (in %) in almost all decades of age distribution (Table1, \( * p < 0.001 \) vs BHPs). Percentage of dyslipidemia and diabetes did not differ between groups. Heart rate 24h was significantly higher in BHP vs CHP only for 20-30 and 41-50 years. Differences between BHPs and CHPs were maintained significant when calculations were done separately for both men and women.

**Conclusions:** Our data suggest that untreated Africans BHP present systematically a higher ABP values and a lower nighttime BP fall than untreated CHP for almost all spectrum of age distribution. That may lead to a worse cardiovascular health risk profile and may explain our higher ABP that we have observed in this population.

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**Abstract PP.30.24**

**SURVEY OF MEDICATIONS USED IN THE MANAGEMENT OF HYPER-TENSION PATIENTS WITH HYPER-COLESTEROLEMA SEEN IN PRIMARY CARE CENTRES IN WEST ATTICA, GREECE (THE ELEFSIS I STUDY)**

S. Tsoutsos1, M. Kiousi1, A. Komantzia1, G. Karahalios2, G. Panoutsopoulos2, Z. Anezouni1, I. Kalpogiannakis1, L. Hasbun1, A. Korakidou1. 1Primary Care Unit of Megara, Megam-Greece, 2General Hospital Thrasios, Elefsis-Greece

**Objectives:** To review the anti-hypertensive and anti-lipidemic medication therapies prescribed to treat hypertensive, hypercholesterolemic patients in primary care in Greece. The West Attica area was chosen due to its distinctive profile: an industrial area, polluted, with a higher than average percentage of Rom population and immigrants.

**Methods:** A descriptive study was conducted of patients who had sought medical assistance at primary care centres for various reasons. The study was conducted in primary care centres and lasted two years, from October 2008 through September 2010. Each physician provided data about randomly selected patients on a weekly basis. Within the total context of ELEFSIS studies, a total of 2,780 patients were included. The parameters measured included: Past medical history, blood pressure, anthropometric details, diagnostic tests such as glycosylated haemoglobin, serum lipids, kidney function, ECG measurements. We also recorded the medications prescribed for hypertension and hypercholesterolemia, for the 941 hypertensive hypercholesterolemic patients. For this study we excluded 140 patients that reported having diabetes, cardiovascular events or arrhythmias in their past medical history. Therefore, the eligible sample consisted of 398 women and 403 men.

**Results:** We report the following distribution of anti-hypertensive medications: Diuretics: 723 patients or 90,3 percent, Angiotensin-Converting Enzyme Inhibitors: 723 patients or 90,3 percent, Angiotensin II Receptor Antagonists: 624 patients or 77,9 percent, Calcium Antagonists: 180 patients or 22,5 percent, Beta-Blockers: 146 patients or 18,2 percent, Direct Renin Inhibitor: 39 patients or 4,9 percent, Alpha-Blockers: 29 patients or 3,6 percent, Benzodiazepines: 279 patients or 34,8 percent. We report the following distribution of anti-hypercholesterolemic medications: Atorvastatin: 280 patients or 35 percent, Simvastatin: 167 patients or 20,8 percent, Ezetimibe + Simvastatin: 137 patients or 17,1 percent, Rosuvastatin: 105 patients or 13,1 percent, Pravastatin: 72 patients or 9 percent, Fluvastatin: 40 patients or 5 percent.

**Conclusion:** We note the pre-dominance of diuretics in hypertension treatment, apparently due to their well known behavior and their low cost, as well as a similarly high use of Angiotensin-Converting Enzyme Inhibitors despite their higher cost. We also note an increase in Benzodiazepines prescriptions, attributable to an increasing occurrence of anxiety-aggravated hypertension that we have observed in this population.

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**Abstract PP.30.25**

**COMPARISON OF CARDIOVASCULAR RISK PROFILE BETWEEN NON HYPERTENSIVE DIABETIC AND NON DIABETIC HYPER-TENSION AFRICAN PATIENTS.**

B. Alonge1, A. Odili2. 1Kaduna Industrial Clinic, Nnpc, Kaduna-Nigeria, 2College of Health Science, University of Abuja, Abuja-Nigeria

**Objective:** To compare the cardiovascular risk profile of black hypertensive non diabetic patients with that of non hypertensive diabetic patients in a tertiary health facility in North Central Nigeria.

**Design and Method:** We conducted a cross sectional survey of 70 diabetic non hypertensive and 70 hypertensive non diabetic patients recruited from various clinics at Jos University Teaching Hospital Jos, North Central Nigeria. Fasting blood sugar, total cholesterol (TC), HDL Cholesterol (HDL C), Uric acid and microalbuminuria were estimated in all the patients. The cardiovascular risk profile was compare between the two groups using atherogenic index AI(= TC/HDL C).

**Results:** The mean uric acid level was significantly higher in the hypertension group (113.7 mmol/l vs 256.6 mmol/l; p < 0.05). HDL C is significantly lower in the diabetic group as compared to the hypertension group (1.05 mol/l vs 1.20 mol/l; p < 0.05). The atherogenic index (TC/HDL C) showed no significant difference between the 2 groups (3.4 ± 2.7 vs 3.4 ± 2.7; P > 0.05).
Conclusion: Cardiovascular risk profile measured by atherogenic index is similar among diabetic non-hypertensive black patients and their hypertensive non-diabetic counterparts.

**PP.30.26** CARDIOVASCULAR RISK IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE. STUDY AMONG HOSPITALIZED PATIENTS.


Objective: Different studies suggest that chronic obstructive pulmonary disease (COPD) increases the frequency of cardiovascular disease. The aim of this study was to determine the prevalence of cardiovascular risk factors and cardiovascular disease among patients with COPD that needed hospitalization at the Internal Medicine Department (Hospital La Serranía, Ronda, Málaga, Spain) during 2009 and to compare this data with a similar group of patients that did not suffer COPD.

Material and Methods: All patients with COPD who needed hospitalization for any cause at the Internal Medicine Department during 2009 were included. Control group included patients who did not suffer COPD that needed hospitalization for any cause at the same department during the same period of time. Blood pressure, fasting plasma glucose, and serum lipids were measured. Results were expressed as average and standard deviation.

Results: 175 patients were included (159 men, 16 women) in COPD group and 179 (162 men, 17 women) in control group. Median of age was 76.06±10.43 years in the first group and 77.06±10.10 in the second one (no statistically significant difference). Results in COPD group were: hypertension 131 (74.9%), diabetes 66 (37.7%), hypercholesterolemia 64 (36.6%), hypertriglyceridemia 12 (6.9%), smoking 124 (70.8%), coronary disease 41 (23.4%), stroke 34 (19.4%), peripheral arterial disease 16 (9.1%), heart failure 64 (36.6%) and renal chronic disease 32 (18.3%). When comparing both groups, there were differences statistically significant only among frequencies of hypercholesterolemia (56.6% vs. 26.8%, p = 0.048), smoking (70.8% vs. 35.8%, p = 0.001) and heart failure (36.6% vs. 14%, p = 0.001). Frequencies of the other variables were similar in both groups.

Conclusions: Prevalence of cardiovascular risk factors and cardiovascular disease among patients with COPD was very similar in both groups, despite of differences in tobacco use. Main differences found were a higher prevalence of smoking among COPD patients, as expected, and an increased prevalence of heart failure in this group (probably due to cor pulmonale related to COPD). The higher frequency of hypercholesterolemia in the first group was the only difference that was not explained by pathogenesis and natural history of COPD. Further investigation on this issue is needed as these findings differ from conclusions of previous studies.

**PP.30.27** MICROALBUMINURIA IN RELATION TO THE METABOLIC SYNDROME AND ITS COMPONENTS IN A CHINESE POPULATION

C. Sheng, B. Hu, W. Fan, J. Zou, Y. Li, J. Wang. Shanghai Institute of Hypertension, Shanghai-China

Objective: We investigated the prevalence of microalbuminuria and its association with the metabolic syndrome and its components in a Chinese population.

Methods: The study subjects were recruited from a newly established residential area in the suburb of Shanghai. We measured anthropometry, blood pressure (BP), fasting glucose and lipids. Serum creatinine, uric acid, body mass index (BMI) and waist circumference, systolic BP, or serum HDL cholesterol and triglycerides.

Results: The 1079 participants included 410 (38.0%) hypertensive patients, and 66 (6.1%) diabetic patients. The prevalence of microalbuminuria (6.3%) was 2.6 times higher in 98 patients with the metabolic syndrome (≥ 3 components) than 981 subjects with 2 components or fewer (14.3% vs. 5.5%, P = 0.0007). In multiple regression analysis adjusted for sex, age, body mass index, current smoking, alcohol intake and the use of antihypertensive drugs, and mutually adjusted for the components, the microalbuminuria was significantly associated with diastolic BP (odds ratio 1.60 for +10 mmHg; 95% confidence interval [CI] 1.08–2.36; P = 0.02) and fasting plasma glucose (1.17; 95% CI 1.01–1.36; P = 0.04), but not (P = 0.10) with waist circumference, systolic BP, or serum HDL cholesterol and triglycerides.

Conclusions: Microalbuminuria is common in the Chinese population, and much more prevalent in the presence of the metabolic syndrome, mainly attributable to elevated diastolic BP and plasma glucose.

**PP.30.28** HIGH BLOOD PRESSURE INCIDENCE AND PREDICTIVE FACTORS ACCORDING TO AGE IN THE IPC COHORT

B. Pannier1, G. London1, F. Thomas1, K. Beán1, N. Danchin1. ‘Centre Ipc, Paris-France, ‘Hospital Manhes, Fleury-mergosa-France

Objective: To evaluate the incidence and predictive factors of hypertension (HTn) according to age in the large French IPC cohort.

Design and Method: The population of 40,926 subjects (26,016 men: 46.5 ± 12.4 years; 14,910 women: 45.5 ± 10.6 years) had two standardized health checkups at the IPC Center between January 1992 and December 2007. The average delay between two visits was 5.8 ± 2.2 years. All subjects were normotensives at the first visit: systolic blood pressure (SBP) < 140 mmHg and diastolic BP (DBP) < 90 mmHg. Age was classified into 3 groups: < 50 years, 51-60 and > 60. At the second visit, 4 groups were defined: 1. normotensives (normal BP without treatment), 2. antiHTn treatment and normalized BP, 3. high BP without treatment, 4. antiHTn treatment and uncontrolled BP. The 6-year incidence of HTn was calculated in each baseline age group. Forward multiple regression analyses were carried out in each age group to identify predictive factors of HTn. These analyses were performed in men and women and in the 3 groups of HTn status.

Results: Among men < 50 years old, 18.8% became HTn (6.6% in group 2, 17.8% in group 3 and 0.4% in group 4); among men 51-60 years old, 30.3% became HTn (1.5% in group 2, 27.3% in group 3 and 1.5% in group 4) and among men older than 60 years, 41.5% became HTn (2.1% in group 2, 36.9% in group 3 and 2.5% in group 4). Among younger women, 12.7% became HTn (0.8% in group 2, 11.2% in group 3 and 0.7% in group 4); among women between 50 and 60 years of age, 25.8% became HTn (2.1% in group 2, 22.0% in group 3 and 1.7% in group 4) and among the oldest women, 37.8% were HTn at the second visit (32.8% in group 2, 2.2% in group 3 and 2.8% in group 4). Baseline SBP, baseline DBP, body mass index (BMI), age, cholesterol and family history of HTn were major factors for predicting HTn onset. The role of each baseline determinant was heterogeneous according to age classes: SBP was strong determinant in middle aged and older subjects, heart rate (HR) in younger and middle-aged subjects, glycaemia and lack of physical activity were predictive of HTn in middle-aged and older subjects.

Conclusion: In this general normotensive population, 6-year incidence of hypertension varied from 13% (women < 50 years) to 42% (men > 60 years). Normal baseline level of SBP is the major determinant of HTn. Other variables had different impacts in each age group: HR in the young and middle aged, glycaemia and lack of physical activity in middle aged and elderly subjects.

**PP.30.29** CARDIOVASCULAR RISK FACTOR(S) PREVALENCE IN GREEK HYPERTENSIVES. EFFECT OF GENDER AND AGE.

G. Vysoulis1, E. Karpanou2, C. Liakos1, S-M. Kyvelou1, V. Tzamou1, A. Michaelides1, A. Triantafyllou1, P. Spanos1, C. Stefanadis1. 1St Cardiology Clinic, Hypertension Unit, Athens University, Hippokration Hospital, 11227, Athens-Greece, 2St Cardiology Clinic, Antihypertension Center, Onassis Cardiosurgery Center, 17674, Athens-Greece

Objective: Cardiovascular (CV) risk factors (RFs) and target organ damage (TOD) are common in hypertensive patients. The aim of this study was to determine RFs and TOD clustering in Greek hypertensives stratified by gender and age.

Design and Methods: This retrospective study comprised 21280 adults with uncomplicated essential hypertension (11309 males). Serum glucose, total and HDL cholesterol, triglycerides, apolipoproteins A1 and B were measured, left ventricular mass index (LVMI), estimated glomerular filtration rate (eGFR), total 10-years CV risk according to Framingham Risk Score (FRS) and HeartScore (HS) were calculated.

Results (Figure): Overall, only 10% had no concomitant RFs. More than half (53%) had one additional RF (49% dyslipidemia, 3% smoking, 1% diabetes),...
a third (33%) had two accessional RFs (26% dyslipidemia and smoking, 7%
dyslipidemia and diabetes, 0.3% smoking and diabetes) and 4% had all four
traditional RFs. Obesity was present in 30%, metabolic syndrome in 38%,
low eGFR in 24% and LV hypertrophy in 49%. Mean FRS risk was 35% for
males and 24% for females while in high risk (≥20%) were 69% and 51%
respectively (p < 0.0001). Mean HS risk was 8% for males and 6% for females
while in high risk (≥5%) were 49% and 36% respectively (p < 0.0001). Age
was correlated to pulse pressure, eGFR, LVMI and CV risk in both genders
(p < 0.0001). Ageing was found to increase the difference between genders
in the risk for total (p = 0.001) but less so for fatal CV events (p = NS). In the age
spectrum 45-54 years, postmenopausal women (n = 1271, mean age = 51.0)
had an elevated mean CV risk (p < 0.0001) compared to premenopausal
females (n = 1076, mean age = 49.0 years) even after adjustment for age (16.9
vs. 13.8% according to FRS and 1.1 vs. 0.7 % according to HS).

Conclusions: As RFs tend to cluster in hypertensives, the calculation of CV
risk should guide treatment decisions.

[PP.30.30] COMMON ACTIVITY OF PHYSICIAN, PHARMACIST
AND PATIENT TO IMPROVE ADHERENCE TO
MEDICATION IN HYPERTENSION

M. Leppée1, J. Culig1, J. Boskovic2. 1andrija Stampar Institute of Public
Health, Zagreb-Croatia, 2Faculty of Pharmacy and Biochemistry Zagreb,
Zagreb-Croatia

Objective: Adherence is one of the important factors of patient behavior
during antihypertensive treatment, and talks about the extent to which patient behavior
coincides with the recommendations of physicians about taking the prescribed
therapy, healthy living, or other acceptable behavior. Number of factors affect adherence,
such as: socioeconomic factors, health system, general health of the patient, therapeutic factors and factors related to the patient. In the European
Union, each year about 200000 people die from not taking or taking improper
treatment than they were prescribed. Clinical trials have demonstrated that the
treatment of mild-to-moderate hypertension can reduce the risk of stroke by 30
to 43% and of myocardial infarction by 15%.

METHOD: We conducted two pharmacoepidemiological observational stud-
ies about adherence to antihypertensive medication. They were designed as a
cross-sectional survey by use of a self-administered questionnaire. First study
included 635, second 152 individuals collecting or buying drugs for the treat-
ment of chronic diseases, with special reference to subjects taking antihy-
tensive agents.

Results: In first study nonadherent subjects (60.7%) prevailed over adher-
ent. In second study, two years later, number of nonadherent subjects reduced
to 39.1. Pharmacists have conducted an extensive campaign of education
patients with chronic diseases and is possible that is this decline associated
with this activity. Forgetfulness was the first reason of nonadherence to antihy-
pertensive drugs. One of the most important thing is good communication with the
chronic patient. With an information exchange patients can come to terms
with the severity of their disease, weigh the advantages and disadvantages of a
treatment plan, and ensure that they understand their situation correctly.

Conclusions: Various explanations have been proffered to explain why such a
large percentage of patients have resistant hypertension, including secondary
hypertension and endogenous resistance to treatment. However, the main rea-
son for inadequate control of blood pressure is poor adherence to the treatment
regimen, both pharmacological and behavioural. Understanding the reasons for
patient nonadherence with antihypertensive medication is essential if blood pres-
sure is to be more effectively managed.

[PP.30.31] RISK FACTORS FOR PRIMARY PREVENTION OF
HYPERTENSION IN THE POPULATION LIVING IN THE
RADIONUCLIDE CONTAMINATED TERRITORY

A. Stchastlivenko. Vitebsk State Medical University, Vitebsk-Belarus

Objective: To study the risk factors for primary prevention of hypertension in the population living in the radionuclide contaminated zones (RCZ) compared with the control group of «clear» region (CR) after the Chernobyl accident.

Design and Methods: Some ecological research expeditions were held. During the expeditions four representative groups were formed: the first consisting of 285 adults from RCZ with density of Cs137 from 555-1480 kBq/m2; the second - 214 adults from RCZ with density of Cs137 from 185-555 kBq/m2; the third - 274 adults from RCZ with density of Cs137 from 37-185 kBq/m2; the fourth (control) group - 336 adults from CR with density of Cs137 less than 37 kBq/m2. The survey included standard questionnaires (WHO) for detection of cardio-
vascular risk factors, measurements of blood pressure, electrocardiography, lipid metabolism and psychological testing.

Results: All groups were of similar mean age. Higher prevalence of hyperten-
sion in the first group - 69.2% (P < 0.001) and second - 64.3% (P < 0.001) then
in fourth - 45.6% was found. No change was noted in prevalence of hyperten-
sion between third and fourth groups (48.8% vs. 45.6%; P > 0.05). The risk ratio
of hypertension prevalence with adjustment for age and sex was higher in the
first group 3.2 (P < 0.001), second group 2.4 (P < 0.001) and third group 1.2
(P > 0.05) compared with fourth (control) group. The exposures of hyperten-
sion risk factors were determined in the logistic regression analysis. The only
significant results (P < 0.05) were included in the final model. The hyperten-
sion prevalence with adjustment for age and sex was positively associated with
body mass index (P < 0.001), family history of premature cardiovascular disease
(P < 0.001), anxiety (P < 0.001), residence of people in the RCZ with density of Cs137 more than 185 kBq/m2 (P < 0.001), alcohol abuse (P < 0.001), gustatory
sensitivity to sodium chloride (P < 0.001), heart rate (P < 0.001), past and present smoking (P < 0.01), profession (P < 0.01), total cholesterol (P < 0.05).

Conclusions: Higher prevalence of hypertension is closely associated with body mass index, family history of premature cardiovascular disease, anxiety, residency of people in the RCZ with density of Cs137 more than 185 kBq/m2, alcohol abuse, gustatory sensitivity to sodium chloride, heart rate, past and present smoking, profession, total cholesterol. The new causal relationships for primary prevention of hypertension in the population living in the RCZ may be determined to nutrition by <CARCHAR>protocol.

Objective: This study aimed to assess the prevalence of metabolic syndrome among uncontrolled hypertensive individuals and evaluate the cardiovascular risk profile in this population.

Design and Methods: A number of 6782 uncontrolled hypertensive patients were included in the study. This was a one visit study in which physicians gathered data regarding demographic and baseline characteristics and performed a full physical examination including BP measurements. Patients were also asked to provide the most recent laboratory measurements of their blood glucose and their blood lipid levels. Physical examination findings and data from medical history were used from physicians in order to make the diagnosis of the metabolic syndrome as well as to stratify patients according to their cardiovascular risk.

Results: In total, 6782 patients were recruited in the study, 322 had missing data and were excluded from the statistical analysis and 6460 patients were analyzed and included in the statistical report. The mean age and the mean BMI of the sample was 62.4 ± 10.3 years and 29.4 ± 4.1 kg/m2 respectively. The mean systolic blood pressure was 153.8 ± 13.3 mmHg; the mean diastolic blood pressure was 93.8 ± 9.0 mmHg, while the mean heart rate was 79.2 ± 9.7 bpm. The prevalence of the Metabolic Syndrome was 71% using the NCEP-ATP III criteria. The proportion of Metabolic Syndrome was higher in older patients (p-value < 0.001), in men compared to women (p-value < 0.001), in patients with higher BMI (p-value < 0.001) and in smokers (p-value < 0.001). The percentage of patients fulfilling 3/5 criteria was 31%, where 4/5 criteria were found at a percentage of 40% and 5/5 criteria were found at a percentage of 23%. According to the Cardiovascular risk classification 440 patients (6.8%) were of low risk, 1711 (26.5%) of medium, 3251 (50.3%) of high and 1058 patients (16.4% of the sample) were of very high risk. More specifically, high and very high risk was more frequently observed in older patients, in male patients, in patients having Metabolic Syndrome and in obese patients.

Conclusions: Metabolic syndrome is highly prevalent among uncontrolled hypertensive individuals. The presence of the metabolic syndrome is more likely in older patient, in men, in patients with higher BMI and in smokers. Additionally, a great percentage of uncontrolled hypertensive subjects presents with high and very high cardiovascular risk. Among these subjects older patients, males, patients having metabolic syndrome and obese patients are more likely to present with high or very high cardiovascular risk.

Objective: This study aimed to assess the prevalence of metabolic syndrome among uncontrolled hypertensive patients in Greece.

Design and Methods: A number of 6782 uncontrolled hypertensive patients were included in the study. This was a one visit study in which physicians gathered data regarding demographic and baseline characteristics and performed a full physical examination including BP measurements. Patients were also asked to provide the most recent laboratory measurements of their blood glucose and their blood lipid levels. Physical examination findings and data from medical history were used from physicians in order to make the diagnosis of the metabolic syndrome as well as to stratify patients according to their cardiovascular risk.

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Conclusions: Metabolic syndrome is highly prevalent among uncontrolled hypertensive individuals. The presence of the metabolic syndrome is more likely in older patient, in men, in patients with higher BMI and in smokers. Additionally, a great percentage of uncontrolled hypertensive subjects presents with high and very high cardiovascular risk. Among these subjects older patients, males, patients having metabolic syndrome and obese patients are more likely to present with high or very high cardiovascular risk. More than one metabolic abnormalities. There was no difference between positive and negative family history groups about general clinical characteristics and target organ damage (all P > 0.05). The most common target organ damage taking 19.05% was left ventricular hypertrophy which positively correlated with BMI, 24hSBP and/or 24hDBP suggested by multiple liner regression. And in logistic regression, BMI was the main risk factors to LVMI.

Conclusion: Most of hypertensive adolescents have no apparent identifiable secondary cause of hypertension. However they often have cardiovascular risk factors in aggregation, and target organ damage.

Objective: This study aimed to assess the prevalence of metabolic syndrome among uncontrolled hypertensive patients in Greece.

Design and Methods: A number of 6782 uncontrolled hypertensive patients were included in the study. This was a one visit study in which physicians gathered data regarding demographic and baseline characteristics and performed a full physical examination including BP measurements. Patients were also asked to provide the most recent laboratory measurements of their blood glucose and their blood lipid levels. Physical examination findings and data from medical history were used from physicians in order to make the diagnosis of the metabolic syndrome as well as to stratify patients according to their cardiovascular risk.

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Conclusions: Metabolic syndrome is highly prevalent among uncontrolled hypertensive individuals. The presence of the metabolic syndrome is more likely in older patient, in men, in patients with higher BMI and in smokers. Additionally, a great percentage of uncontrolled hypertensive subjects presents with high and very high cardiovascular risk. Among these subjects older patients, males, patients having metabolic syndrome and obese patients are more likely to present with high or very high cardiovascular risk. More than one metabolic abnormalities. There was no difference between positive and negative family history groups about general clinical characteristics and target organ damage (all P > 0.05). The most common target organ damage taking 19.05% was left ventricular hypertrophy which positively correlated with BMI, 24hSBP and/or 24hDBP suggested by multiple liner regression. And in logistic regression, BMI was the main risk factors to LVMI.

Conclusion: Most of hypertensive adolescents have no apparent identifiable secondary cause of hypertension. However they often have cardiovascular risk factors in aggregation, and target organ damage.
c-f PWV was positively associated with alcohol intake ($r = 0.28$, $p = 0.004$). Compared to natives (18% vs 5%, $p = 0.02$), immigrants are characterized by higher alcohol consumption and stiffer aorta compared to natives. This unfavourable BP profile may contribute to the disproportionate CV risk of this frail population.

**PP.30.36 IDENTIFICATION OF PATIENTS AT HIGH CARDIOVASCULAR RISK: A CLINICAL PRACTICE STUDY IN PRIMARY CARE SETTINGS**

F. Valls-Roca1, V. Pallares-Carratala2, V. Gil-Guillen1, D. Orozco-Beltran1, J.L. Listerri-Caro3, T. Fuster1, J. Redon1, A. Fernandez-J.C. andres1. 1Cs Benignum, Benignum-Spain, 2Unin De Matanzas, Barriana-Spain, 3Universidad Miguel Hernande, San Juan-Spain, 4Cs Ingeniery Joaquin Benlloch, Valencia-Spain, 5Cs Beniopa, Gandia-Spain, 6Hospital Clinico Universitario, Valencia-Spain

**Introduction:** There is much debate about what risk scale must be used to identify high risk, but few clinicians wonder whether they apply in their patients. This study assesses the opinion of physicians about the scales and if they are using it in their clinical practice, we compare the cardiovascular high risk estimated by the physicians opinion with that obtained in scales, including those of the European Guidelines and assesses the factors that influence the identification of cardiovascular high risk.

**Material and Methods:** A Cross-sectional observational descriptive design. 1,200 patients were selected by 60 physicians from two areas of the Valencian Community. We performed a survey which assessed the opinion of physicians about risk scales in their clinical practice. Higher risk for patients is estimated by the physicians and compared with Score, REGICOR and European Guidelines. Also, predictive factors to identify high risk by multivariate analysis were analyzed.

**Results:** 62.1% of the physicians known some scale (59.3 to 64.9), they applied it for patients in 52.8% (50.0 to 55.6). The best known were Score with 70.1% (66.8 to 73.4) and Framingham-Anderson with 55% (51.4 to 58.6). The CV risk is estimated only for 54.8% of patients (52.0 to 57.6). When comparing estimated risk with calculated risk it is underestimated by the European Guidelines and overestimated for REGICOR. No differences were found in the high cardiovascular risk among patients of doctors who use or not use any of the scales ($p > 0.05$). The multivariate model was significant ($p = 0.000$), explained the variability of high risk in 85.1%, and significant variables were age ($p = 0.000$), sex ($p = 0.020$), hypertension ($p = 0.000$), diabetes mellitus ($p = 0.000$), type of prevention ($p = 0.000$), metabolic syndrome ($p = 0.000$) and target organ damage ($p = 0.004$).

**Conclusions:** There is a significant lack of information about risk scales and insufficient use in patients. Its application does not decrease the percentage of cardiovascular high risk obtained by scale. Clinicians opinion are quite good to estimate high risk when compared to Score but underestimated it compared to the European Guidelines and overestimated compared to REGICOR.

**PP.30.37 CARDIOVASCULAR RISK FACTORS PREVALENCE IN GREEK HYPERTENSIVES STRATIFIED BY GENDER AND AGE**

C. Liakos1, G Vyssoulis1, E. Karpanou1, S-M Kyvelou1, V Tramou1, C Stefanadis1, 11St Cardiology Clinic University of Athens Hippokration

Hospital, Athens-Greece, 11St Cardiology Clinic Onassis Cardiosurgery Center, Athens-Greece

**Objective:** Cardiovascular (CV) risk factors (RFs) and target organs damage (TOD) are common in hypertensive patients. The purpose of this study was to determine the frequency of clustering of RFs (dyslipidemia, smoking diabetes and obesity) and TOD (left ventricular hypertrophy - LVH, renal impairment) in Greek hypertensive patients stratified by gender and age. DESIGN AND METHODS: This retrospective study comprised 21,280 adult patients with uncomplicated essential hypertension (11,309 males). Serum glucose, total cholesterol, HDL cholesterol, triglycerides, apolipoproteins A1 and B were measured, left ventricular mass index (LVM1) and estimated glomerular filtration rate (eGFR) were calculated in all patients. In addition, total 10-years CV risk was estimated after calculation of the Framingham Risk Score (FRS) and the HeartScore (HS).

**Results:** From 21,280 patients, only 10% had no concomitant RFs. More than half (53%) of the study cohort had one additional RF (49% dyslipidemia, 3% smoking, 1% diabetes). One out of 3 patients (33%) had two accessional RFs (26% dyslipidemia and smoking, 7% dyslipidemia and diabetes, 0.3% smoking and diabetes). The remaining 4% of patients studied had all four traditional risk factors. Furthermore, obesity was present in 30%, metabolic syndrome in 38%, low eGFR in 24% and LVH in 49% of all patients. According to FRS, mean CV risk was 35% for males and 24% for females while in high risk (> 20%) were 69% of males and 51% of females. According to HS, mean risk for fatal CV events was 8% for males and 6% for females while in high risk (> 5%) were 49% of males and 36% of females. A strong correlation was found between age and pulse pressure, eGFR, LVM1 and CV risk in both genders. Ageing seems to increase the difference between males and females in total CV events but not in fatal CV events.

**Conclusions:** Hypertensive patients should be classified not only in relation to hypertension severity but also in terms of the total CV risk resulting from the coexistence of additional risk factors, organ damage and disease and decisions on treatment strategies should depend on the initial level of risk.

**PP.30.38 AGE- AND SEX-RELATED DIFFERENCES IN NUTRITION PATTERN IN SUBJECTS WITH HIGH NORMAL BLOOD PRESSURE**

O. Molchanova, A. Britov. State Research Centre for Preventive Medicine, Moscow-Russia

**Objective:** to study and to evaluate differences in nutrition in subjects with high normal blood (BP) pressure.

**Material and Methods:** 608 female and 589 male subjects from an organized working population with high BP 130-139/85-89 mm Hg were examined using 24-hour recall method. Data were analyzed according to the sex and age groups (aged 25-34, 35-44 and 45-54).

**Results:** Consumption of sodium was higher in men, than in female, but decreased with age, while it remained stable in women. A similar situation was true for potassium in men. Women with advancing age had nutrition with higher consumption. Cholesterol consumption was higher in men; it was decreased with age in men, while in female with age it was increasing. Protein consumption was higher in women with advancing age. Nutrition with less fiber consumption was observed in men; it was decreased with age in men and remained stable in women. Cholesterol consumption was higher in men; it decreased with age in men, but increased in women. The similar trend was for dietary fat and carbohydrates consumption. Calorie intake was higher for men ($p < 0.001$) and decreased with age in both sexes ($p < 0.05$)

**Conclusion:** Age- and sex-related differences should be taken into account for diet recommendations to prevent hypertension in subjects with high normal blood pressure.

**PP.30.39 PREVALENCE OF ANXIETY IN FEMALE POPULATION 25-64 YEARS IN RUSSIA**

D. Panov1, V. Gafarov2, I. Gagulina1, E. Gromova1. 1Institute of Internal Medicine Sl Rrams, Novosibirsk-Russia, 2Col.Lab.Epidemiology Civil Sl Rrams, Novosibirsk-Russia

**The Aim:** to study levels of personal anxiety and its association with an arterial hypertension (AH) in female population of 25-64 years in Russia.
Results: In the third screening, high level of personal anxiety (HLA) in female population of 25-64 years was 60.4%. Depending on the age the highest level of anxiety was registered in population of the 35-44 age group. Women who had AH showed a higher proportion of persons with HLA (58.2%), and it was registered more often in a younger age group. There was a trend for higher prevalence of HLA in women who have elementary level of education and women who have HP diagnosis (11% As for the occupation, top and middle level occupation manager reported HLA more often - 80% and 62.2%, respectively, as well as women in manual social classes (61%) for middle-hard and 61.2% for easy physical work, respectively. Concerning marital status married women reported HLA more often - 74.6%.

Conclusion: The results show high prevalence HLA in female population of 25-64 years. Women who have AH are dominated by persons with HLA. Women who have elementary level of education and high level education, being in such professional classes as “senior manager” and “manual physical work”, and also the “married” status were associated with HLA.

PP.30.40 POORLY CONTROLLED HYPERTENSIVE PATIENT MONITORED IN GENERAL PRACTICE: CLINICAL PROFILE AND ADHERENCE TO TREATMENT

J.R. Banegas1, F.I. Alonso Moreno2, J.I. De La Cruz1, C. Álvarez1, P. Tarilonte3.1 Preventive Medicine & Public Health Department, Universidad Autónoma De Madrid, Madrid-Spain, 2Silleria Hc., Toledo-Spain, 3Pijker Spain, Madrid-Spain

Aim: To evaluate clinical characteristics and adherence to treatment of the poorly controlled hypertensive patient seen at general practice office.

Methods: Multicentric, transversal, descriptive and epidemiologic study carried out in general practice centers of Spain. Men and women over 18, with not controlled HP diagnosis (BP ≥ 140/90 mmHg ≥ 130/80 mmHg for diabetics), and antihypertensive treatment since at least 3 months, were selected. Morisky-Green test was carried out to measure adherence to treatment based on clinic interview. A patient was considered compliant when he/she answered correctly the 4 questions of the test. An adherent patient was the one that answered correctly one or more questions, and non-adherent if the patient answered incorrectly to the 4 questions.

Results: 9670 patients were included in the study. 1597 (16.5%) were excluded for not fulfilling selection criteria. 8073 patients were assessed. 7.481 (94.6%) in the group of patients with one or more years of HPB diagnosis and 430 (5.4%) in the group of patients with less than one year of HPB diagnosis. 54.2% of assessed patients were men. mean age 64±(±11.0) years and mean BMI 29.5±(±4.4) mmHg and mean diastolic BP was 88.9±(±8.8) mmHg. 62.3% of the patients who were diagnosed more than a year ago and 64.1% of the patients who were diagnosed less than a year ago, presented mild hypertension, p = 0.0118. 65.8% of the patients had cholesterol > 190mg/dl, 60.8% had LDL cholesterol > 115mg/dl, 26.7% had HDL cholesterol < 40mg/dl in men or < 46mg/dl in women, 43.1% had triglycerides > 150mg/dl, 75.6% had non-HDL cholesterol ≥ 130mg/dl. 62.2% of patients had fasting glucose controlled (< 110mg/dl). Mean HbA1c and creatinine were 6.6% (±1.2) and 1.0 (±0.5) mg/dl, respectively. 35.6% of patients who were diagnosed one or more years ago and 29.9% of patients who were diagnosed less than a year ago, suffered from CV disease or nephropathy (p < 0.0001). As for, 10-year CV risk, according to ESHPESC 2007, 2.6% of patients had mild risk, 12.4% had moderate risk, 45.5% had high risk and 40.4% had very high risk. The percentage of compliant patients was 32.0% in the group of patients with one or more years of diagnosis and 41.7% in the group of less than a year, statistically significant (p = 0.0001). The percentage of adherent patients was 95.9% in the group of patients with one or more years of diagnosis and 94.1% in the group of less than a year.

Conclusions: The most part of hypertensive patients at pharmacological treatment had blood pressure levels that were classified as mild hypertension. Eight in ten patients had high or very high cardiovascular risk. We had found an important number of non-compliant patients among hypertensive patient with poorly controlled blood pressure. Our data suggest that there is a tendency for an increase of non-adherence to treatment in patients with more years in the evolution of their hypertension.
**Abstracts e441**

**PP.30.43** RISK FACTORS FOR CARDIOVASCULAR DISEASE IN CHILDHOOD: THE ROLE OF BIRTH WEIGHT AND CURRENT OBESITY


**Background:** Low birth weight is associated with increased risk of cardiovascular disease (CVD), especially in children with rapid catch-up of growth and weight. Aim: Our purpose was to assess whether birth weight is associated with risk factors for CVD in overweight children.

**Methods:** We analyzed 223 (mean age 9 ± 1.4 years old) excess weight children (142 overweight and 81 obese). Subjects were divided in groups according to birth weight: Normal (= 3000g: NBW), Insufficient (2500-2999g: IBW) and Low Birth Weight (< 2500g: LBW). The variables: abdominal circumference (AC), systolic and diastolic blood pressure (SBP, DBP), lipid profile and Insulin Resistance (IR) using HOMA (Homeostasis Model Assessment) index were evaluated.

**Results:** Overweight former LBW children showed statistically significant associations with SBP (p < 0.001), DBP (p < 0.001) and IR (p = 0.007). Statistical difference in SBP and DBP was observed between former IBW and ABW (p < 0.005). Obese former LBW children demonstrated increasing values of SBP, DBP, triglycerides and decreasing HDL levels compared to ABW group. 14% of obese former LBW children showed 4 risk factors for CVD.

**Conclusions:** Low birth weight was associated with risk factors for CVD: higher blood pressure and IR in excess weight children. Supported by: FAPESP

**Abstract PP.30.44** PREVALENCE OF CARDIOVASCULAR RISK FACTORS AND LIPID DISORDERS IN ELDERLY WOMEN OF TALLINN, ESTONIA (2002-2004)

J. Abina1, M. Saava2, M. Vigmara2, P. Laane2. 1. Institute of Biomedical of Engineering of Tallinn University of Technology, Tallinn-Estonia; 2. Estonian Institute of Cardiology, Tallinn-Estonia.

**Objective:** A random sample of the female population of Tallinn aged 65-74 (n = 190) was examined for cardiovascular risk factors. The response rate was 63.3%.

**Methods:** The screening procedure included systolic and diastolic blood pressure (SBP, DBP), height and weight measurements, BMI and waist-to-hip ratio (WHR) calculations. The lipid profile was assessed by total cholesterol (TC), triglycerides (TG) and high density lipoprotein cholesterol (HDL-C) mean values as well as by the EAS classification of hyperlipidaemia: group A (TC 200-250 mg/dl, TG < 200 mg/dl), group B (TC 250-300 mg/dl, TG < 200 mg/dl), group C (TC < 200 mg/dl, TG 200-500 mg/dl), group D (TC 200-500 mg/dl, TG 200-500 mg/dl). Group E (TC > 300 mg/dl, TG > 500 mg/dl).

**Results:** The survey showed high mean values of SBP and DBP (157.1 and 92.9 mm Hg) as well as extremely high prevalence of arterial hypertension (BP ≥ 140/90 mm Hg or on medication) – 82.1%. 63.7% of elderly women were overweight (BMI ≥ 25 kg/m2). In 39.5% of women, obesity (BMI ≥ 30 kg/m2) was noted. Elevated TC and TG values (≥ 200 mg/dl) were found in 73.7% and 13.0% of women, low HDLLC values in 14.8%. According to the EAS classification only 22.1% of women had TC and TG < 200 mg/dl; 34.6% of women belonged to group A. The percentage of women belonging to group B was 23.7. Isolated hypertriglyceridaemia was observed very seldom – 2.1%. The prevalence of mixed forms (D + E) was 12.4%. BP and plasma lipids had many correlations with anthropometric data: SBP and DBP had positive associations with weight, BMI, waist and hip circumferences (p < 0.01). TG significantly correlated with weight, BMI waist, WHR, but HDL-C had negative correlations to the above mentioned variables.

**Abstract PP.30.45** SELF-EVALUATION OF CARDIOVASCULAR RISK IN EMPLOYEES USING INTERACTIVE COMPUTER-BASED AVATAR SYSTEM

J. Tyszkiewicz1, B. Symonides1, J. Bugajska2, Z. Gaciong1. 1. Medical University of Warsaw, Warsaw-Poland; 2. Central Institute for Labour Protection - National Research Institute, Warsaw-Poland.

Efficient mass screening for subjects with high cardiovascular (CV) risk may reduce related morbidity and mortality. Since individual assessment of CV risk based on classic questionnaires is time consuming and responder-to-responder relation dependent process, we have created an intuitive, interactive computerized mass-screening tool for CV risk evaluation. An interactive communication module with touch panel and virtual animated humanoid with integrated voice synthesizer (Avatar), allowing conversion and calculation of CV risk. We studied 499 employees with no history of CV diseases, diabetes mellitus or known risk factors (see Table 1). Individual risk calculation was based on European Cardiac Society (ECS) 2007 Guidelines and SCORE chart for Poland. Correctable risk factors are highly prevalent in the population of employees in Poland and among population studied 10.5% presented with high (> 5%) risk of CV death within 10 years. Relative CV risk is elevated in subpopulations of “hypertensives”, “hyperglycaemics” and smokers otherwise healthy respondents. Results show the efficacy of new Avatar screening tool in working, supposedly healthy population, facilitating selection of subjects with elevated risk of cardiovascular diseases.

**Abstract PP.30.46** ASSESSMENT OF THE PREVALENCE OF DYSFUNCTION ERECTILE IN PATIENTS WITH METABOLIC SYNDROME IN THE PROVINCE OF ALBACETE.

M. Á. Palomino Medina1, P. J. Tarraga Lopez2, J. Lucas Perez Romero3, M. Lucas Perez Romeo1, P. Rodenas Romero1, M. T. Tolosa Navalon1, J. L. Castro Navarro1, E. Arjona Laborda2, J. Solera Albero3, M. L. Marcos Navarro2. 1Medical University of Albacete; 2University of Almeria; 3University of Albacete, Spain

**Objectives:** determine the prevalence of erectile dysfunction in patients with metabolic syndrome in the province of Albacete.

**Patients and Methods:** Descriptive study among patients attending consultations in primary care of various urban and rural health centres in the province of Albacete and meet the criteria of metabolic syndrome according to ATP III criteria. The design was in male patients, over 18 and under 65. Patients who did not accept or not gathered sufficient mental qualities were excluded from the study. Selected once cited them in consultation for collection of anthropometric data and to pass the SHIM questionnaire of erectile dysfunction.

**Results:** 15.8 per cent of patients not suffering from erectile dysfunction. 84.2% Of patients had greater or lesser extent erectile dysfunction. 21.1% Of patients observed 47.3% mild, erectile dysfunction erectile dysfunction level-moderada and 5.3% moderate erectile dysfunction. Not found in the group any patient with severe erectile dysfunction. In confidence in having an erection was sufficiently rigid to penetration in 15.8% was low at 36.8% moderate, 36.8% it was high, at 10.5% was very high. There was no any patient with very little or no trust. In confidence that erection was sufficiently rigid to penetration in 15.8% was low at 36.8% moderate, 36.8% it was high, at 10.5% was very high. There was no any patient with very little or no trust. Regarding the sexual satisfaction

**Table 1:** Characteristics of population of "healthy" employees (data presented as mean ± SD); *p < 0.05

<table>
<thead>
<tr>
<th></th>
<th>CVD not known</th>
<th>BP &gt; 140/90mmHg</th>
<th>FPG &gt; 110mg/dl</th>
<th>TC &gt; 200mg/dl</th>
<th>BMI &gt; 30kg/m²</th>
<th>Smokers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women/Men</td>
<td>351/148</td>
<td>42/33</td>
<td>6/10</td>
<td>152/65</td>
<td>56/22</td>
<td>115/50</td>
</tr>
<tr>
<td>Age [years]</td>
<td>45 ± 9.8</td>
<td>48.5 ± 9.2*</td>
<td>45.2 ± 13.2</td>
<td>47.6 ± 8.5</td>
<td>44 ± 7.8</td>
<td>44 ± 9.2</td>
</tr>
<tr>
<td>SCORE [%]</td>
<td>0.7 ± 1.2</td>
<td>1.6 ± 1.7*</td>
<td>1.6 ± 2.1</td>
<td>0.9 ± 1.3*</td>
<td>0.6 ± 0.8</td>
<td>0.8 ± 1.4*</td>
</tr>
<tr>
<td>BMI [kg/m²]</td>
<td>26 ± 4.2</td>
<td>28.2 ± 4.1*</td>
<td>26.5 ± 4.21</td>
<td>26 ± 3.8</td>
<td>32.9 ± 2.5</td>
<td>25.7 ± 4.5</td>
</tr>
<tr>
<td>SBP [mmHg]</td>
<td>123.4 ± 15.9</td>
<td>147.5 ± 12.8*</td>
<td>128.4 ± 15.2</td>
<td>125.3 ± 16.6</td>
<td>124 ± 14.8*</td>
<td>124 ± 16.6</td>
</tr>
<tr>
<td>DBP [mmHg]</td>
<td>77.1 ± 12.8</td>
<td>88.7 ± 17.9*</td>
<td>81.2 ± 11.5</td>
<td>77.7 ± 13.8</td>
<td>83.3 ± 12.8</td>
<td>78.2 ± 11.7</td>
</tr>
<tr>
<td>TC [mg/dl]</td>
<td>196.2 ± 36.1</td>
<td>205.9 ± 38.1</td>
<td>199 ± 34.9</td>
<td>229.5 ± 23.7*</td>
<td>197 ± 38.5</td>
<td>202.3 ± 35.4</td>
</tr>
<tr>
<td>FPG [mg/dl]</td>
<td>90.3 ± 13.7</td>
<td>92.6 ± 15.3</td>
<td>121.9 ± 13.2*</td>
<td>91.8 ± 13</td>
<td>93.2 ± 14.5</td>
<td>90.7 ± 15.1</td>
</tr>
</tbody>
</table>
Conclusion: In this study there were no significant differences in the (CRS) to compare three different forms used to evaluate the (OD).

**PP.30.47 ARE THERE DIFFERENCES IN CARDIOVASCULAR RISK STRATIFICATION BY COMPARING THREE WAY TO ASSESS SUBCLINICAL ORGAN DAMAGE?**


**Objective:** To determine whether differences in cardiovascular risk stratification (CRS) to compare three different ways of assessing subclinical organ damage (OD).

**Design and Methods:** Descriptive study. A total of 100 hypertensive patients treated 53% female and 47% male, with a mean age 58.34 ± 11.60 years, examined between (October-December 2010). We did a (CRS) according to criteria established in 2007 by (ESH/ESC), evaluating (OD) of three different ways, which resulted in the distribution of the sample into three groups: Group A: carotid Doppler: carotid intima-media thickness (IMT), presence of plaque and renal function assessment (RFA): plasma creatinine and glomerular filtration rate. Group B: echocardiography: left ventricular mass index (LVMI) and (RFA). Group C: radial applanation tonometry using (HDI/PW CR-2000 and SphygmoCor) evaluated: index of large artery elasticity (C1), systolic blood pressure and aortic pulse pressure (AoSP and AoPP), augmentation index (AIx) and (RFA). Comparison groups: Group A vs Group B, Group A vs Group C, Group B vs Group C. Statistical analysis was performed by Chi

**Results:** When comparing the groups: group A vs group B: Chi ² 1.76 p: 0.77 no significant difference (NSD), group A vs group C: Chi ² 2.01 p: 0.73 (NSD), group B vs group C: Chi ² 1.07 p: 0.89(NSD).

**Conclusions:** A routine blood chemistry and survey is important part of cardiovascular risk stratification in general population and useful for appropriate antihypertension treatment.
**POSTER SESSION**

**PP.31.49** AMBULATORY BLOOD PRESSURE MONITORING AS PREDICTOR OF CAROTID INTIMA-MEDIA THICKNESS VALUES IN ADOLESCENTS

G. Bermudez, E. Silva, J.J. Villasmil, L. Chacin, M. Bracho, C. Esis, G. Calmon, E. Clavell, A. Gonzalez. **Instituto De Enfermedades Cardiovasculares, Universidad Del Zulia, Maracaibo-Venezuela**

**Objective:** To determine the predictive value of ambulatory blood pressure monitoring (ABPM) on carotid intima-media thickness (c-IMT) values in adolescents.

**Methods:** This study included 118 adolescents, 51 males and 67 females of Maracaibo, Venezuela. Demographic and anthropometric data, as well as, blood pressure (BP) were recorded. The ABPM was expressed as systolic and diastolic ABPM during 24-hs, awake and sleep periods. Intima-media thickness was measured at carotid common artery near the bifurcation at far wall by high resolution B-mode ultrasound (Vivid i, GE). The measurement of the c-IMT was performed by special software to determine the thickness average.

**Statistical Analysis:** The Pearson Correlation (r) was used to estimate the association between c-IMT and independent variables (waist circumference, weight, BMI, systolic and diastolic casual BP and ABPM). The Stepwise Linear Regression Procedure was applied to build the best predictive model for c-IMT.

**Results:**
- The c-IMT was 0.43 ± 0.7 mm in all adolescents; also, it was higher in males [0.45 ± 0.6 for males and 0.42 ± 0.1 for females (p < 0.0001)]. Likewise, the systolic/diastolic ABPM values were: 104.7 ± 9/66.5 ± 14, 102.3 ± 15/63.5 ± 6, 97.6 ± 12/95.1 ± 11 mmHg for 24-hs, awake and sleep periods in all subjects. Males showed systolic ABPM values during 24-hs and sleep periods higher than females [107.9 ± 8 and 106.7 ± 12 mmHg for males; 102.2 ± 8 and 95.3 ± 11 mmHg for females (p < 0.01)]. There was a statistically significant correlation between c-IMT and the factors: systolic ABPM in sleep (r = 0.29, p < 0.001), waist circumference (r = 0.28, p < 0.002), weight (r = 0.26, p < 0.004), systolic ABPM in 24-hs (r = 0.25, p < 0.006), height (r = 0.24, p < 0.01), systolic ABPM in awake (r = 0.24, p < 0.01), gender (r = 0.22, p < 0.01) and body mass index (r = 0.21, p < 0.03). The stepwise linear regression analysis showed that systolic ABPM in sleep period and waist circumference were the predictor factors for the c-IMT value, and estimated the following model to predict c-IMT (R² = 0.12):

  \[
  \text{Y} = 0.192 + 0.00 \text{[systolic ABPM in sleep] + 0.00 [waist circumference].}
  \]

**Conclusions:** This study showed that systolic ABPM in sleep period is useful to predict c-IMT values in adolescents. Therefore, it is necessary to control BP in sleep to decrease the possibility of atherosclerosis progression, which would reduce the occurrence of cardiovascular events during the adult life.

**PP.31.50** DIFFERENCES IN ORGAN DAMAGE FOR DIPPER AND NON-DIPPER PATTERNS IN 2 ETHNIC GROUPS

Y. Izumi, N. Takekoshi, T. Kanda, T. Mizuno, Y. Ozawa, Y. Kasamaki, M. Ohtsuki, T. Nakayama, H. Kawamura, M. Masaumo, H. Dihuta, Konan University Medical School, Himeji Municipal Hospital, Himeji-Japan, Division of Cardiology, Department of Medicine, Nihon University School of Medicine, Tokyo-Japan, Department of Pathology and Microbiology, Nihon University School of Medicine, Tokyo-Japan, Department of Medicine Nippon Dental University, Tokyo-Japan, Department of Cardiology, Xiangjiang Medical University, Urumqi-China, Department of Science and Research, Xinjiang Medical University, Urumqi-China

**Background:** Dipper (Dip)/non-dipper (Non-Dip) pattern of circadian blood pressure can be defined using ambulatory BP monitoring (24h ABPM). The Non-dip pattern is a known risk factor for cardiovascular mortality. We performed a medical survey in Xinjiang, China and several parameters were compared between the Dip and Non-dip groups in 2 ethnicities.

**Methods:** Two ethnic groups, Uygur (n = 99, age, 65-70) and Kazakh (n = 118, age, 65-70), provided blood and urine samples and underwent 24-h ambulatory blood pressure monitoring (ABPM). The cardiovascular, aortic, mitral valve index (LVMI), common carotid intima-media thickness (IMT) and the Scheie grade (SG) based on funduscopy findings, were determined.

**Results:** The prevalence of hypertension was higher in the Kazakh than in Uygurs. The prevalence of the Non-dip pattern was 78.4% in the Kazakhs, and 63.3% in the Uygurs. No differences were observed between the Dip and Non-dip subgroups from both ethnic groups with respect to BP, pulse rate, IMT, LVMI, SG, glomerular filtration rate, urinary Na excretion (UNa), plasma renin activity, and plasma aldosterone. However, urinary K excretion (UK) in the Non-dip group was significantly lower than that in the Dip group, only in the case of the Kazakhs whose UNa/UK ratio was more than 2 times Uygurs.

**Conclusion:** No differences were observed between the Dip and Non-dip subgroups of both ethnic groups with respect to the status of end-organs. Significant differences between the Dip and Non-dip subgroups with respect to UK were only observed in the Kazakh group. Thus, in the case of the Kazakhs, high BP combined with high sodium intake may highly sensitized blood vessels to potassium.

**PP.31.51** RELATIONSHIP BETWEEN MORNING BLOOD PRESSURE SURGE AND EARLY ORGAN DAMAGE IN PREVIOUSLY UNTREATED HYPERTENSIVE PATIENTS


**Objective:** Recent data indicate that morning blood pressure surge (MBPS) may indicate higher cardiovascular risk. The aim of the study was to evaluate the relationship between MBPS and early organ damage in previously untreated hypertensive patients.

**Design and Methods:** The study included 241 patients (183M 58F, mean age 36.7 ± 10.8 yrs) with recently diagnosed and untreated hypertension. In all patients metabolic syndrome (MS) components as well as albuminuria were assessed. Left ventricular mass index (LVMI) and echocardiography tissue Doppler indices (including E/E' and E'/E') were calculated. The intima-media thickness of the common carotid arteries (CIMT) was measured. RI and PI were measured in Doppler duplex examination of renal arteries. MBPS was defined: sleep-trough MBPS (stMBPS) - average of systBP during the first 2 hours after wake up minus the average systBP of 3 readings centered on the lowest nighttime reading; waking MBPS - average of systBP during first 2 hours after wake up minus average of systBP during first 2 hours before wake up. We assessed cusum plot height of blood pressure from 03:00 to 9:00h from a plot of cumulative sums (cMBPS).

**Results:** MBPS indices correlated significantly with age and 24h, daytime and nighttime BP levels. There were no differences in MBPS indices between men and women and between patients with and without metabolic syndrome. There were significant correlations between MBPS indices and CIMT. After adjusting for age, there was a tendency towards a significant correlation between stMBPS and CIMT (r = 0.13; p < 0.09). There were significant correlations between E/E' and MBPS (r = -0.32; p < 0.001) and E'/E' (r = 0.27; p < 0.01), which were still significant after adjusting for age. No correlations were found between MBPS indices and LVMI, RI, PI and albumin excretion rate.

**Conclusions:** In our group of never-treated hypertensive patients MBPS correlated significantly with early target organ damage - common carotid arteries IMT and tissue echocardiography Doppler indices.

**PP.31.52** REPRODUCIBILITY OF 24-HOUR AMBULATORY BLOOD PRESSURE VARIABILITY INDICES

G.S. Stergiou, A. Kollias, D. Tzamouranis, V. Karra, L.G. Roussias. **Hypertension Centre, Third University Department of Medicine, Sotiria Hospital, Athens-Greece**
There is increasing interest in the clinical relevance of blood pressure variability. This study assessed the reproducibility of several indices of ambulatory blood pressure (ABP) variability. A total of 126 untreated hypertensives (mean age 48.2 ± 10.7 [SD] years, 70 men) underwent 24h ABP monitoring at 20-min intervals, twice 2-4 weeks apart. Variability was quantified using the standard deviation (SD) of average ABP, the coefficient of variation (CV) and the time rate index (TRI). The reproducibility of these indices was assessed using the following criteria: (i) repeatability coefficient (RC = 2*SD of differences); (ii) RC expressed as a percentage of close to maximal variation (pMV = RC/[4*SD of the mean of paired recordings]); (iii) coefficient of variation (CV); (iv) correlation coefficient (CC); (v) agreement (kappa) between the two assessments to detect subjects at the top quartile of the respective distributions. There were no significant differences in SD/CV/TRI values of 24h, awake and asleep systolic/diastolic ABP between the two assessments. For 24h systolic/diastolic ABP: (i) RC values for SD were 6.0/4.5 respectively, for CV 6.0/4.06 and TRI 4.4/0.17; (ii) pMV for SD 53.6/53.6, for CV 54.5/54.6 and TRI 54.5/78.7; (iii) CV for SD 0.21/0.21, for CV 0.21/0.21 and TRI 0.56/0.20; (iv) CV for SD 0.56/0.56, for CV 0.56/0.56 and TRI 0.55/0.25; (v) agreement (%) for SD 79.78% (kappa 0.44/0.40), for CV 75.75% (0.32/0.30) and TRI 83.71% (0.56/0.20). In conclusion, no differences in the ABP variability indices were found between the two assessments. Moreover, no index was associated with a consistent superiority in terms of reproducibility which appeared to be moderate for all indices.

**PP.31.55**  
**REFERENCE VALUES FOR OFFICE AND SELF-MEASURED BLOOD PRESSURE DURING PREGNANCY**  
I. Fabry1, T. Richart1, L. Thijs1, L. Van Bortel1, J. Staessen1. 1Heymans Institute of Pharmacology, Department of Clinical Pharmacology, Ghent University Hospital, Ghent-Belgium, 2Genetic Epidemiology Unit, Department of Epidemiology, Maastricht University, Maastricht-The Netherlands, 3Studies Coordinating Centre, Division of Hypertension and Cardiovascular Rehabilitation, Department, Leuven-Belgium  
**Objective:** The goal of this study was to determine reference values for office blood pressure (OBP) and home blood pressure (HBP) in each pregnancy trimester and early postpartum.  
**Design and Methods:** Healthy pregnant women (n = 53) underwent OBP and HBP monitoring at 12 ± 1 weeks, 20 ± 1 weeks, 35 ± 1 weeks of pregnancy and at 6 ± 1 weeks postpartum. ESH-task force for home blood pressure measurement guidelines were followed. We calculated reference upper limits using the 95th percentile and mean ± 2SD-method.  
**Results:** All women had normal pregnancies. The course of BP and heart rate was the same for OBP and HBP. Systolic BP (SBP) and diastolic BP (DBP) were (p < 0.001) lower in the first two trimesters than at 35 weeks (105/64 mmHg and 106/62 mmHg versus 110/67 mmHg). BP decreased again in the postpartum period (104/69 mmHg). Heart rate (HR) increased (p < 0.01) continuously during pregnancy (from 70 to 75 to 84 beats per minute). In the postpartum period the HR returned to levels of the first trimester (64 bpm). Reference upper limits for OBP and HBP are, period-dependent, ranging from 125/70 to 129/70 mmHg.  
**Conclusions:** Reference upper limits are 10-20 mmHg lower than thresholds of office or home blood pressure monitored in current ESH guidelines. This may warrant further investigation on maternal and fetal risk during pregnancy and eventually a reappraisal of the current guidelines.

**PP.31.54**  
**GENDER-INDEPENDENT ELEVATION OF FASTING GLUCOSE WITH THE PROGRESSIVE DECREASE IN SLEEP-TIME RELATIVE BLOOD PRESSURE DECLINE: THE HYGIA PROJECT**  
D.E. Ayala1, J.J. Crespo1, A. Moya1, P. Callejas2, P. Eiroa2, A. Otero2, A. Mojon1, J.R. Fernandez1, R.C. Hermida1, On behalf of Hygia Project Investigators. 1University of Vigo, Vigo-Spain, 2Gerencia De Atencion Primaria, Vigo-Spain, 3Gerencia De Atencion Primaria, Pontevedra-Spain, 4Complejo Hospitalario Universitario, Ourense-Spain  
**Objectives:** The lack of a proper sleep-time decline in blood pressure (BP) (non-dipping) has been associated with an increase in end-organ-damage and cardiovascular events. Previous results have indicated that non-dipper subjects are more glucose intolerant than those with a normal dipper BP profile. Moreover, elevated fasting glucose is significantly correlated with increased cardiovascular morbidity and mortality. Accordingly, we investigated the correlation between fasting glucose and the sleep-time relative BP decline in men and women participating in the Hygia Project, designed to evaluate prospectively cardiovascular risk by ambulatory BP monitoring (ABPM) in primary care centers of Northwest Spain.  
**Methods:** We studied 6120 subjects (3328 men/2792 women; 5370 hypertensive), 61.8 ± 13.5 years of age. Hypertension was defined as an awake BP mean ≥ 135/85 mmHg for systolic/diastolic BP, or an asleep BP mean ≥ 120/70 mmHg, or BP-lowering treatment. BP was measured at 20-min intervals from 07:00 to 23:00h and at 30-min intervals at night for 48h. During monitoring, subjects maintained a diary listing the times of going to bed at night and awakening in the morning. Blood samples were obtained for each subject from an antecubital vein in the early morning after nocturnal fasting.  
**Results:** Fasting glucose is characterized by a significant negative correlation with the sleep-time relative BP decline (τ = -0.114; p < 0.001), and a positive correlation with the asleep BP mean (τ = 0.139; p < 0.001). Correlations between glucose and awake BP mean, 24h BP mean, or clinic BP measurements were markedly lower. When subjects were divided according to the standard dipping classification, extreme-dippers and dippers showed the lowest average glucose (105 mg/dl). Glucose increased exponentially in the other groups (109 mg/dl in non-dippers, 118 mg/dl in risers; p < 0.001 between groups). Men showed an expected greater mean glucose than women (111 vs 105 mg/dl; p < 0.001), but the exponential increase in glucose with decrease in sleep-time relative BP decline was similar for both genders.  
**Conclusions:** Glucose is markedly increased in relation to the progressive loss in sleep-time BP regulation towards a non-dipper or even riser profile, independently of gender. Results suggest that a diminished sleep-time relative BP decline and elevated nighttime BP might be the most relevant ABPM characteristics for cardiovascular risk assessment.

**PP.31.55**  
**INFLUENCE OF DURATION OF AMBULATORY BLOOD PRESSURE MONITORING (48 VS. 24 HOURS) ON CARDIOVASCULAR RISK ASSESSMENT**  
**Objectives:** Independent prospective studies have found that ambulatory blood pressure (BP) monitoring (ABPM) is more closely correlated with target organ damage and cardiovascular disease (CVD) risk than clinic BP determination. All these studies have been based on a single baseline 24h ABPM profile, without accounting for changes over time in the level and pattern of BP and, most important, without taking into account that reproducibility of any estimated parameter from a time series, to be potentially used for CVD risk assessment, depends markedly on duration of sampling and not on sampling rate. We evaluated the influence of the duration of ABPM and frequency of BP sampling on CVD risk assessment in the MAPEC study, specifically designed to investigate whether changes of ambulatory BP characteristics during follow-up might be related to increased survival in subjects who were systematically evaluated by periodic ABPM.  
**Methods:** We evaluated 3344 subjects (2610 hypertensive, 1718 men/1626 women), 52.6 ± 14.5 yrs of age. BP was measured at 20-min intervals from 07:00 to 23:00h and at 30-min intervals at night for 48h at baseline and again annually or more frequently (quarterly) if treatment adjustment was required. The Cox proportional-hazard model was used to analyze relative CVD risk associated with increased mean BP values estimated from the original ABPM profiles, from the first 24h of ABPM at the original 20-30 min intervals, and from ABPM series obtained by keeping just one BP reading every 2h for 48h.  
**Results:** The median time of follow-up was 5.6 yrs (range 0.5 to 8.6 yrs). Bland-Altman plots indicate that the awake, asleep and 24h BP means are better reproduced with data sampled every 2h for 48h (up to 24 BP values) than by data sampled at 20-30 minute intervals for just one day (up to 64 BP values). Relative CVD risk for those mean BP values, adjusted by significant confounding factors including age, sex and diabetes, was significantly overestimated by up to 48% for systolic BP and underestimated for diastolic BP using the first 24h of sampling. Relative CVD risk, however, differed by less than 2% for all ABPM characteristics estimated using data sampled at the lower rate of 2h for two consecutive days.  
**Conclusions:** This study on subjects evaluated prospectively by repeated 48h ABPM corroborates that reproducibility of mean BP values depends on duration of monitoring but not on sampling rate. CVD risk associated with increased ambulatory BP is very poorly estimated using the common 24h ABPM, clearly insufficient for a proper diagnosis of hypertension and for CVD risk stratification.
**Abstracts e445**

**PP.31.56**

**EFFECTS OF TIME OF HYPERTENSION TREATMENT ON THE CIRCADIAN BLOOD PRESSURE PATTERN OF SUBJECTS WITH RESISTANT HYPERTENSION: THE HYGIA PROJECT**

M.T. Rios1, M. Dominguez-Sardiña1, L. Pousa1, J. Perez De Lis1, A. Otero2, M.J. Fontao1, J.R. Fernandez1, D.E. Ayalà, R.C. Hermida1. 1On Behalf of Hygia Project Investigators 1Gerencia De Atención Primaria, Vigo-Spain, 2Complexo Hospitalario Universitario, Orense-Spain, 3University of Vigo, Vigo-Spain

**Objectives:** Subjects with resistant hypertension present high prevalence of a non-diaper blood pressure (BP) pattern, associated with increased risk of cardio-vascular events. Non-dipping is partly related to the absence of 24h therapeutic coverage in hypertensives treated with single morning doses. It has been reported that as much as 89% of treated hypertensive subjects, including those with resistant hypertension, ingest all their BP-lowering medication in the morning. Accordingly, we investigated the impact of the time of day of hypertension treatment on the circadian BP pattern in subjects with resistant hypertension participating in the Hygia Project, designed to evaluate prospectively cardiovascular risk by ambulatory BP monitoring (ABPM) in primary care centers of Northwest Spain.

**Methods:** Within two years, we studied 1543 subjects with resistant hypertension (899 men/644 women), 66.8 ± 11.2 years of age. At the time of ABPM evaluation, 293 subjects were ingesting all their medication upon awakening, and the remaining subjects were taken at least one BP-lowering medication at bedtime. BP was measured at 20-min intervals from 07:00 to 23:00h and at 30-min intervals at night for 48h. During monitoring, subjects maintained a diary listing the times of going to bed at night and awakening in the morning.

**Results:** Among subjects ingesting all BP-lowering medication upon awakening, the prevalence of extreme-dipper, dipper, non-dipper and riser BP patterns were 3.0, 26.3, 49.5 and 21.2%, respectively. The prevalence of an sleep-time relative systolic BP decline < 10% (non-dippers/risers) was significantly lower with increasing number of medications ingested at bedtime, and it was at a minimum 46% prevalence when subjects were ingesting all BP-lowering medication at bedtime (p < 0.001). Increased number of medications at bedtime was also associated with a progressive improved control on nighttime BP.

**Conclusions:** In subjects with resistant hypertension, pharmacological therapy should take into account when to treat with respect to the rest-activity cycle of each individual patient. Treatment at bedtime is characterized by increased nighttime BP control and a significantly lower prevalence of a non-dipper and main riser BP pattern, therapeutic targets that have already been shown to significantly reduce cardiovascular risk.

**PP.31.57**

**THE ROLE OF HOME BLOOD PRESSURE MEASUREMENT IN THE CHRONOTHERAPY OF HYPERTENSION**

V. Gorbonov, E. Fedorova, A. Deyev, V. Belolipetskaya. National Research Center for Preventive Medicine, Moscow-Russia

**Objective:** The method of chronotherapy is playing an increasing role in the hypertension treatment. The objective criteria of chronotherapy results are being debated. The aim of our study was to determine the value of home blood pressure measurement (HBP) in the assessment of chronotherapy efficacy.

**Design and Method:** Two similar open, randomized, cross-over studies (morn. vs. evening intake) were performed. The duration of initial washout period was 2 weeks; the duration of both treatment courses – 3 weeks; the interval between courses – 1 week. Only patients with stable hypertension (mean day-time BP > 135/85 mm Hg) were recruited. Ambulatory BP (ABP) monitoring was performed prior to treatment and at the end of both treatment courses. The patients performed HBP measurements throughout the study. The verapamil trial (n = 14, mean daily dose – 240.0 ± 13.87 mg) was included the compliance assessment by pharmacokinetics investigation. In the ramipril trial (n = 30) mean daily dose was 8.9 ± 2.03 mg. The following main ABP variables were analyzed: ABP means and variability, maximal and minimal values, nocturnal blood pressure fall, parameters of Fourier transformation and smoothness index. The morning and evening BP means and morning BP surge (morning – evening BP) were assessed by HBP. The univariate partial t-test was used to describe the own discriminative power for each variable (“morning” vs. “evening” effect). First, this analysis was done separately for each trial. After that, the “one-direction effect” data were summarized.

**Results:** The overall antihypertensive effect was preferable in the case of morning ramipril intake (p < 0.05) and evening verapamil intake. The 1 values, if “one-way” significant, ranged 2.2-2.3 for nocturnal BP fall; 2.0-2.1 for night-time BP variability; 3.8-4.3 for morning BP surge. We found relatively low values of office and 24-hour BP (t ranged 0.2-1.7).

**Conclusions:** Morning BP surge calculated on the basis of HBP is a good instrument for the assessment of chronotherapy effect. The absence of relation with the patients’ dipping status may be an additional merit of this index.

**PP.31.58**

**BENCHMARKING AMBULATORY BLOOD PRESSURE VARIABILITY AGAINST TRADITIONAL AND ADVANCED BLOOD PRESSURE MEASUREMENTS REGARDING THEIR ASSOCIATION WITH SUBCLINICAL ORGAN DAMAGE: THE SABPA STUDY**

A.E. Schutte, R. Schutte, H.W. Huissman, J.M. Van Rooyen, C.M.T. Fourie, N.T. Malan, L. Malan. Hypertension in Africa Research Team (HAR), North-West University, Potchefstroom-South Africa

**Objectives:** The prognostic significance of BP variability has lately enjoyed considerable attention. The need for early markers of cardiovascular dysfunction is imperative in black South Africans who have a significant risk for cardiovascular disease. We therefore compared 24-h BP variability with various traditional and advanced BP measurements regarding their association with subclinical organ damage in black and white South Africans.

**Design and Methods:** The study included 409 African and Caucasian teachers aged 25-60 yrs. We measured office BP, 1-minute continuous (finger) BP, ambulatory BP, BP reactivity and determined weighted 24-hour BP variability. Albumin-to-creatinine ratio, Cornell product and carotid cross-sectional wall area (CSWA) were measures of organ damage.

**Results:** Africans had higher 24-hr BP variability, BP reactivity and sub-clinical organ damage (p < 0.001). Correlations of BP variability with organ damage were overall weak when compared to other BP measurements. In normotensive groups we found an independent association of 24-hr SBP variability with Cornell product only in Africans (r = 0.37; p = 0.01), confirmed in multiple regression models with 24-h SBP included in the model. Only in hypertensive Caucasians a significant correlation between CSWA and 24-h SBP variability was evident (r = 0.30; p = 0.01), although CSWA indicated stronger correlations with office or 24-h SBP than 24-h SBP variability.

**Conclusions:** To conclude, 24-h SBP variability could potentially be an effective measure for the early detection of normotensive Africans at increased risk for the development of cardiovascular complications. Its usefulness based on associations with target organ damage in hypertensive groups seems to be less than traditional office or 24-h BP measurements.

**PP.31.59**

**INTER-ARM BLOOD PRESSURE DIFFERENCES: IMPORTANCE OF ITS RECOGNITION FOR CLINICAL DECISION IN 1057 HYPERTENSIVE PATIENTS.**

J. Maldonado1, T. Fereira2, P. Rodrigues1, M. Carvalho1. 1Instituto De Investigação E Formação Cardiovascular, Coimbra-Portugal, 2Escola Superior De Tecnologia Da Saúde, Coimbra-Portugal, 3Clínica Da Avelreira, Avelreira-Portugal

**Objective:** We sought to evaluate the importance for clinical decision of recognizing the inter-arm differences in blood pressure (BP) in hypertensive patients (HT).

**Methods:** Cross-sectional study including 1057 HT (51.8% women), followed in primary care units and medicated for hypertension (HT). The usual BP measuring arm for each patient was identified. The BP and heart rate (HR) were measured simultaneously in both arms, after a minutes rest period. The BP taken from the usual measuring arm was considered referential (refBP).

**Results:** The mean discrepancy (BP-refBP) for systolic and diastolic BP was respectively 4.3±1.2 mmHg and 1.69±1.7 mmHg (p < 0.001), and the inter-arm discrepancies regarding systolic BP classes were respectively 1.69±2.03 mmHg, 2.03±1.76 mmHg, 3.44±10.30 mmHg, 6.48±13.87 mmHg and 8.86±18.73 mmHg, for normal BP, normal high BP, grade 1, grade 2 and grade 3 HT (p < 0.001), with similar less marked distribution for diastolic BP (p < 0.001). The Bland-Altman analysis revealed a steady increase in the inter-arm differences to increasing levels of BP. In patients with uncontrolled hypertension, 67.6% had inter-arm differences above 10 mmHg. The overall diagnostic concordance in BP classification was moderate (ICC = 0.576; CI:0.52-0.62, p < 0.001), with 55.1% patients changing BP classification from controlled to uncontrolled BP to uncontrolled HT; of these patients, 42.5% had differences above 15 mmHg, 24.5% between 10-15mmHg, 20.9% between 5-10mmHg and 11.9% below 5 mmHg. Considering patients with uncontrolled HT, 27.2% of them were sub-classified in lower grades of hypertension based on the refBP. These
results were independent of gender, presence of co-morbidities (diabetes, dyslipidemia) or history of cardiovascular events.

**Discussion:** The simultaneous measurement of BP in both arms is crucial in a very significant percentage of patients for a proper clinical decision.

**PP.31.60 PATIENTS’ PREFERENCE FOR OUT-OF-OFFICE BLOOD PRESSURE EVALUATION METHOD: AMBULATORY OR HOME MONITORING?**

E.G. Nasothimiou, N. Karpettas, A. Destounis, G. Stergiou. Hypertension Centre, Third University Department of Medicine, Sotiria Hospital, Athens-Greece

Patient’s preference and satisfaction might improve compliance to antihypertensive treatment and long term blood pressure (BP) control. This study aimed to compare patient’s preference in using two different methods for out-of-office BP monitoring. Subjects referred for hypertension, were evaluated with ambulatory BP monitoring (ABPM) (measurements at 20 min intervals for 24 hours) and home BP monitoring (HBPM) (dual mode recording and measurement for 7 days) using validated oscillometric devices in random order within two weeks. Participants filled a questionnaire including demographics, previous experience in BP measurement methods and likert scale based questions on patient’s acceptance, preference, disturbance, activities’ restriction and feasibility of ABPM and HBPM. A total of 143 patients were invited and 104 (70%) agreed to participate (mean age 51 ± 11 years, 58% men, 75% untreated, 22% smokers, 38% working full time, 66% with > 12 years of education, 50% employees, 28% self-employed). A total of 62% of the participants considered ABPM as more reliable than HBPM, yet 60% would choose HBPM for their next BP evaluation. 83% reported a positive overall opinion for HBPM versus 63% for ABPM (p < 0.05). Moderate to severe disturbance from using ABPM was reported by 55% and severe restriction of their daily activities by 30%, compared to 13% and 7% respectively from using HBPM (p < 0.05, for both comparisons). Neither cluster of demographics nor history of BP measurements was found to be an independent predictor of patients‘ preference. These data suggest that HBPM performs significantly better than ABPM in the overall acceptance and preference by hypertensive patients. Further studies are needed to incorporate patient’s preference in routine medical decisions in clinical practice.

**PP.31.61 NIGHTTIME PHYSIOLOGICAL MELATONIN LEVELS ARE INVERSELY ASSOCIATED WITH NOCTURNAL SYSTOLIC BLOOD PRESSURE AMONG THE ELDERLY**

K. Obayashi1, K. Saeki2, K. Tomioka1, N. Okamoto1, S. Nezu3, J. Iwamoto2, Y. Ikada2, N. Kurumatani1. 1Nara Medical University School of Medicine, Nara-Japan, 2Yokohai Nursing and Medical University, Mei-Japan

**Objective:** Endogenous melatonin may play an important role in cardiovascular system including blood pressure (BP) lowering-effect during sleep. However, whether physiological levels of melatonin in the elderly are associated with nocturnal BP has never been reported.

**Design and Method:** For the present cross-sectional analysis, subjects were the initial 88 consecutive participants of the ongoing community-based longitudinal observational study ‘HEIJO-KYO’ based on the relationship between housing environment and health outcomes among the Japanese elderly. We performed overnight urine collection at home, 24-h actigraphic measurement at 1-minute intervals and 24-h ambulatory BP monitoring at 30-minute intervals. We also evaluated the association between the amounts of nighttime urinary melatonin metabolite, 6-sulfatoxymelatonin (aMT6s), sleep BP defined by actigraphy and the prevalence of nocturnal hypertension defined as a mean sleep BP of 125/75 mmHg or more.

**Results:** Of the eighty-eight subjects, 80 (37 males, mean age: 70.2 ± 7.0 years) provided complete data. The median nighttime urine aMT6s was 6.9 g/night [interquartile range 3.7-9.6]. There were thirty-three subjects with prevalent nocturnal hypertension on the night of urine collection. Nocturnal systolic BP (SBP) was significantly reduced among the subjects whose urine aMT6s were in the highest quartile (n = 20, median [range]: 13.8 g/night [9.6-42.8]) compared with those of the others (n = 60, median [range]: 11.3 g/night [6.0-21.2]) (median ± SEM: 112.2 ± 3.2 vs 120.9 ± 2.3 mmHg; p < 0.05, see the Figure). The crude odds ratio and the multivariable odds ratio (adjusted for age and BMI) for nocturnal hypertension among the subjects in the highest quartile compared with those in the others were 0.27 (95% CI 0.08–0.89, p < 0.05) and 0.28 (95% CI 0.08–0.98, p < 0.05), respectively.

**Conclusions:** We found that the nocturnal SBP value and the prevalence of nocturnal hypertension were reduced in the elderly with enhanced nighttime urine aMT6s. Our findings may partly explain the aetiology of nocturnal hypertension among the elderly.

**PP.31.62 HOME VERSUS AMBULATORY MONITORING IN THE ASSESSMENT OF THE DIURNAL BLOOD PRESSURE PROFILE AND THE DETECTION OF NON-DIPPERS**

G.S. Stergiou, E.N. Nasothimiou, A. Destounis, I. Evagelou, D. Tzamouranis, L.G. Roussias. Hypertension Centre, Third University Department of Medicine, Sotiria Hospital, Athens-Greece

A major advantage of 24-hour ambulatory (ABP) over home blood pressure (HBP) monitoring is the assessment of the diurnal blood pressure (BP) profile and the detection of non-dippers. This study assessed the usefulness of an electronic HBP monitor designed for daytime self-measurement and also automated nighttime monitoring in the evaluation of the diurnal BP profile. Untreated or treated subjects referred for hypertension performed within 2 weeks ABP (Microlife WatchBP O3, 24-hours, 20 min intervals) and HBP measurements using a novel device (Microlife WatchBPN, 3 days). On each HBP monitoring day duplicate morning and evening self-measurements and 3 automated prescheduled asleep measurements were obtained (60 min intervals). Forty-three subjects were analyzed (mean age 59 ± 11 [SD] years, 58% male, 79% treated, clinic BP 132 ± 11/77 ± 7.0 mmHg). The crude OR and the multivariable OR for ABPM were 63% for ABPM (p < 0.001) and 0.28 (95% CI 0.08–0.98, p < 0.05; see the Figure). The crude odds ratio and the multivariable odds ratio (adjusted for age and BMI) for nocturnal hypertension among the subjects whose urine aMT6s were in the highest quartile of urine aMT6s (N=20) compared to the others (N=60) the highest quarter of urine aMT6s (N=20) were 3.2 vs.120.9 vs. 120.9 vs.120.9 vs.120.9 mmHg, p = 0.08/ 0.001/ 0.001/ 0.001. There was no difference between awake HBP (130.6 ± 11.97/7.8 ± 7.8 mmHg) and ABP (129 ± 11.78/2 ± 7.8 mmHg). Furthermore, no difference was found between asleep systolic HBP (114.2 ± 12.1 mmHg) and ABP (115.7 ± 10.1 mmHg), whereas diastolic asleep HBP (66.1 ± 7.8 mmHg) was marginally lower than ABP (67.7 ± 5.9 mmHg); mean difference 1.6 ± 5.1 mmHg, p = 0.04). There was substantial agreement (70%) between ABP and HBP in the classification of non-dippers (systolic and/or diastolic BP), which was similar to previously reported data on the reproducibility of the two methods in classifying non-dippers. These data suggest that HBP monitoring performed by new technology electronic devices designed for awake and asleep measurement is a reliable and low-cost alternative to ABP monitoring for the evaluation of the diurnal BP profile and the detection of non-dippers.

**PP.31.63 SEASONAL VARIATION OF CLINIC, HOME AND AMBULATORY BLOOD PRESSURE MEASUREMENTS**

G.S. Stergiou, A. Destounis, A. Kollaris, P. Kalogeropoulos. Hypertension Centre, Third University Department of Medicine, Sotiria Hospital, Athens-Greece

Studies have shown that blood pressure is affected by the seasonal variation of temperature, being higher in winter and lower in summer. This study compared clinic (CBP), home (HBP) and ambulatory blood pressure (ABP) measurements in winter and summer and investigated the relationship between seasonal blood pressure variation and symptoms of orthostatic hypotension. Subjects referred to a Blood Pressure Clinic were assessed in winter and summer with CBP (3 seated and 2 erect measurements), HBP (> 3 workdays) and ABP measurements (24-hours, 20 min intervals). Orthostatic hypotension symptoms were assessed in winter and summer using a questionnaire (score 0-34). Seventy-nine subjects, untreated or on stable treatment during winter and summer were included (mean age 64 ± 8 [SD], 49 men, BMI 27.8 ± 10.1 kg/m², 7 diabetics, 16 with cardiovascular disease). CBP was reduced in summer compared to winter (mean difference 3.2 ± 2.3 mmHg, p = 0.05) and 0.28 (95% CI 0.08–0.98, p < 0.05; see the Figure). The crude OR and the multivariable OR for nocturnal hypertension among the subjects whose urine aMT6s were in the highest quartile of urine aMT6s (N=20) compared to the others (N=60) the highest quarter of urine aMT6s (N=20) were 3.2 vs.120.9 vs. 120.9 vs.120.9 mmHg, p = 0.08/ 0.001/ 0.001/ 0.001. There was no difference between awake HBP (130.6 ± 11.97/7.8 ± 7.8 mmHg) and ABP (129 ± 11.78/2 ± 7.8 mmHg). Furthermore, no difference was found between asleep systolic HBP (114.2 ± 12.1 mmHg) and ABP (115.7 ± 10.1 mmHg), whereas diastolic asleep HBP (66.1 ± 7.8 mmHg) was marginally lower than ABP (67.7 ± 5.9 mmHg); mean difference 1.6 ± 5.1 mmHg, p = 0.04). There was substantial agreement (70%) between ABP and HBP in the classification of non-dippers (systolic and/or diastolic BP), which was similar to previously reported data on the reproducibility of the two methods in classifying non-dippers. These data suggest that HBP monitoring performed by new technology electronic devices designed for awake and asleep measurement is a reliable and low-cost alternative to ABP monitoring for the evaluation of the diurnal BP profile and the detection of non-dippers.
Orthostatic hypotension symptoms were more often in summer (mean difference 1.0 ± 3.2, p < 0.05). The winter-summer difference in symptoms was associated with the winter-summer daytime ABP difference (r = 0.240 ± 0.26, systolic/diastolic, p < 0.05) but not with the winter-summer CBP, BPB and nighttime ABP difference. These data suggest that CBP, BPB and daytime ABP are significantly lower in summer compared to winter and are related to orthostatic hypotension symptoms. However, nighttime ABP remains unchanged, resulting in increased prevalence of non-dippers in summer. The clinical relevance of these data is uncertain and requires further investigation.

**PP.31.64** NON-DIPPING PATTERN IS RELATED TO HYPOADIPONECTINEMIA AND INCREASED ARTERIAL STIFFNESS IN ESSENTIAL HYPERTENSIVE SUBJECTS

I. Andrikou, C. Tsioutis, I. Bafakis, K. Kintis, M. Almyroudi, D. Syrsoulidis, A. Kordalis, D. Aragiannis, C. Stefanadis. First Cardiology Clinic, University of Athens, Hippokration Hospital, Athens-Greece

**Objective:** Reduced nighttime blood pressure (BP) fall has been associated with adverse cardiovascular outcome while adiponectin is emerging as a marker of atherosclerosis evolution. Thus, the purpose of the present study was to investigate the relationship of non-dipping status with plasma concentrations of adiponectin and arterial stiffness in essential hypertension.

**Design and Method:** 148 newly diagnosed untreated non-diabetic patients with stage 1 to II essential hypertension [98 men, mean age = 49 years, office BP = 150/97 mmHg] underwent 24-h ambulatory BP monitoring and were classified as dippers and non-dippers according to the diurnal variation of >10% between mean daytime and nighttime systolic and diastolic BP. Aortic stiffness was evaluated on the basis of carotid to femoral pulse wave velocity (PWV), using Complior SP. Metabolic parameters were assessed from venous blood samples.

**Results:** Non-dippers (n = 38) compared to dippers (n = 110) were older (55 ± 7 vs 49 ± 9 years, p < 0.001) and had higher left ventricular mass index (119 ± 12 vs 101 ± 18 g/m², p < 0.05). In the total population, plasma adiponectin levels were negatively related with BMI (r = -0.168, p < 0.05), waist to hip ratio, (r = -0.421, p < 0.001), office systolic BP (r = 0.285, p < 0.001), 24-h systolic BP (r = 0.194, p < 0.05), total cholesterol (r = -0.220, p < 0.005), and PWV (r = -0.280, p < 0.001), while it was positively associated with systolic BP fall (r = 0.520, p < 0.001). Additionally, PWV was associated with BMI (r = 0.233, p < 0.05), 24-h systolic BP (r = 0.327, p < 0.0001) and negatively related to systolic BP fall (r = -0.17, p < 0.05). Non-dippers compared to dippers exhibited attenuated adiponectin values (7.9 ± 3.6 vs 9.7 ± 4.4 μg/ml, p < 0.05), and higher PWV values (8.6 ± 1.2 vs 7.7 ± 2.1 mm/s, p < 0.05), while the two groups did not differ regarding metabolic profile (p = NS). Analysis of covariance revealed that adiponectin and PWV values remained statistically different between groups after adjustment for confounding factors (p < 0.05).

**Conclusions:** In the setting of essential hypertension, non-dipping status is accompanied by increased arterial stiffening and activation of pro-atherogenic mechanisms, as reflected by high levels of PWV and low levels of adiponectin, thus indicating the increased cardiovascular disease burden associated with non-dipping status.

**PP.31.65** PERSONALITY TRAITS IN MASKED HYPERTENSION


**Objective:** The aim of this pilot study was to evaluate those aspects of personality that characterize patients with masked hypertension (MH). Additional objective was to evaluate target organ damage.

**Design and Method:** 25 consecutive subjects (61.5 ± 16 years old) who in the office evaluation recorded blood pressure (BP) ≤ 140/90 mmHg were selected. None reported diagnosis of hypertension or receiving antihypertensive medication. They underwent a 24-hour ambulatory blood pressure monitoring (ABPM) and based on the obtained measurement, MH subjects (daytime ambulatory BP > 135/85, n = 13) were identified and separated from their normotensive controls (n = 200, r = 0.99, p < 0.001) at the 3mmHg/second of cuff deflation. The mean differences between them were less than 1mmHg in systolic and diastolic BP. The differences with more than 5mmHg were less than 2% and audible Korotkov sounds tended to be weak in these subjects. Vital-signature also showed accurate blood pressure values during arrhythmia or treadmill exercise.

**Conclusions:** According to the use of Y tube, vital-signature was extremely accurate automated sphygmomanometer against current oscillometry sphygmomanometer. Apart from oscillometry method, complicated validation procedure may be not needed for Vital-signature. Our results also suggest that it is very important to analyze arterial wall behaviors under oppressed cuff during Korotkov sound.
Recent evidence suggests that blood pressure (BP) variability offers independent prognostic information in cardiovascular risk assessment. This study investigated the association between BP variability assessed by clinic (CBP), ambulatory (ABP) and home (HBP) measurements with indices of hypertension-induced target organ damage.

Methods: Untreated hypertensive subjects were evaluated with CBP (3 visits), ABP (7 days) and ABP (24-hours) within 2 weeks (all methods with oscillometric devices). BP variability was quantified by the standard deviation (SD) and the coefficient of variation (CV) of mean BP of each individual and measurement method. Target organ damage was assessed by echocardiographic left ventricular mass (LVM), microalbuminuria (MAU), urinary albumin/creatinine ratio (A/C) and carotid-femoral pulse wave velocity (PWV). Different backward linear-regression models were applied for LVM, log MAU, log A/C and PWV with indices obtained by different measurement methods. Studies relating BP variability with cardiovascular risk are needed to investigate the clinical relevance of these differences.

Conclusions: There were no any significant correlation of S/DBP measurements with the SF of the LV regarding hypertensive, newly diagnosed patients, except for the VS/DBP which was highly correlated with the MASS.

**Table: Correlation of BP values with SF parameters of the LV using the Pearson Correlation:**

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</table>

**Conclusion:** There was no significant correlation of S/DBP measurements with axial systolic BP variability as independent predictors of target organ damage.

**PP.31.68** CLINIC, HOME AND AMBULATORY BLOOD PRESSURE VARIABILITY AS INDEPENDENT PREDICTORS OF TARGET ORGAN DAMAGE

E.G. Nasothimiou1, N. Karpettas1, A. Destounis1, I. Moyssakis2, D. Tzamouranis1, G.S. Stergiou1. 1Hypertension Centre, Third University Department of Medicine, Sotiria Hospital, Athens-Greece; 2Cardiology Department, Laiko Hospital, Athens-Greece

**Objective:** Recent evidence suggests that blood pressure (BP) variability offers independent prognostic information in cardiovascular risk assessment. This study investigated the association between BP variability assessed by clinic (CBP), ambulatory (ABP) and home (HBP) measurements with indices of hypertension-induced target organ damage.

**Methods:** Untreated hypertensive subjects were evaluated with CBP (3 visits), HBP (7 days) and ABP (24-hours) within 2 weeks (all methods with oscillometric devices). BP variability was quantified by the standard deviation (SD) and the coefficient of variation (CV) of mean BP of each individual and measurement method. Target organ damage was assessed by echocardiographic left ventricular mass (LVM), microalbuminuria (MAU), urinary albumin/creatinine ratio (A/C) and carotid-femoral pulse wave velocity (PWV). Different backward linear-regression models were applied for LVM, log MAU, log A/C and PWV with indices of hypertension-induced target organ damage.

**Results:** A total of 144 subjects were analyzed (mean age 51 ± 11 [SD] years, BMI 29 ± 4.4 kg/m², men 56%). LVM was predicted by CBM (B 2.8, p < 0.001), female gender (B -25.1, p < 0.05) and systolic CBP (B 0.6, p < 0.001). MAU was predicted by ABP SD (systolic/diastolic, B 0.06/0.06, p < 0.01), BMI (B 0.02, p < 0.05), age (B -0.01, p < 0.05) and systolic CBP (B 0.01, p < 0.05). A/C was predicted by systolic HBP SD (B 0.04, p < 0.01) and CPB (B 0.01/0.01, p < 0.05) and PWV by systolic CBP SD (B 0.1, p < 0.05) and age (B 0.1, p < 0.01). Results were similar for CV and when asleep and 24-hour ABP were evaluated.

**Conclusions:** Different indices of target organ damage are not equally predicted by the BP variability assessed by different measurement methods. Systolic but not diastolic BP variability predicted target organ damage. CBP, HBP and ABP variability appear to be complementary rather than competitive indices in the prediction of target organ damage.

**PP.31.70** SYSTOLIC BLOOD PRESSURE AMPLIFICATION IS DECREASED DURING NIGHT HOURS IN HEALTHY SUBJECTS

A. Bedarek1, P. Jankowski1, A. Olzanecka1, A. Windak2, D. Czarnecka1, K. Karwecka-Jaszc1. 1Department of Cardiology and Hypertension, Jagiellonian University Medical College, Cracow-Poland; 2Department of Family Medicine, Jagiellonian University Medical College, Cracow-Poland

**Objective:** Brachial blood pressure is predictive of cardiovascular outcome; however central pressure may better represent the load imposed on the coronary arteries and thereby bear a stronger relationship to vascular damage and prognosis. The disparity between peripheral systolic blood pressure (pSBP) and central systolic blood pressure (cSBP), referred to as systolic blood pressure (SBP) amplification, is driven mainly by differences in vessel stiffness and wave reflection. The variation in the gradient between peripheral and central systolic pressure during 24-hour monitoring has not been examined so far, therefore our goal was to assess SBP amplification through day and night hours.

**Design and Method:** Twenty-five healthy individuals (11 women and 14 men) were included into the study (mean age 40.56 ± 12.53 year, BMI 25.36 ± 6.91 kg/m²). Analysis toonometry of the radial artery and “n-point forward moving average” method have been used to derive 24-hour cSBP and pSBP (BPro, HealthSTATS). Measurements were performed every 15 minutes. The difference between pSBP and cSBP, i.e. SBP amplification, was assessed.

**Results:** The mean office SBP was 127.32 ± 10.78 mmHg, and diastolic blood pressure was 84 ± 6.7 mmHg. Circadian profiles of pSBP and cSBP are shown on the graph. The mean 24-hour cSBP was 112.99 ± 14.97 mmHg, pSBP was 121.25 ± 16.26 mmHg (p = NS) and SBP amplification was 8.1 ± 3.27 mmHg. The mean daytime (6:00-22:00) cSBP was 116.16 ± 14.61 mmHg and nighttime (22:00-6:00) 106.65 ± 13.64 mmHg (p = 0.021). The mean daytime pSBP was 125.31 ± 15.61 mmHg and nighttime pSBP was 113.14 ± 14.41 mmHg (p = 0.006). The mean value of daytime SBP amplification was 9.03 ± 3.32 mmHg, and nighttime 6.48 ± 2.32 mmHg (p = 0.003).

**Conclusions:** This study has shown for the first time that the value of SBP amplification varies during twenty-four hours in healthy subjects and is significantly lower at night than in the day time. However, these findings require further confirmation to assess the clinical importance.
Characteristics of ABPM in Octogenarians

E. Podjarny1, E. Golan1, J. Bernheim2.
1Dept. of Nephrology and Hypertension, Meir Hospital, Kfar Saba-Israel, 2Faculty of Medicine, University of Tel-Aviv-Israel

Objective: Hypertension is very common in patients aged ≥ 80 y. ABPM is a valuable tool to evaluate hypertension. Yet, relatively few works concentrated on this population. Our aim was to identify and evaluate the characteristics of ABPM in very elderly hypertensive patients, aged ≥80 y, compared with hypertensive patients aged 60-69 y old.

Design and Methods: ABPMs performed between 11/2008 and 09/2010, were analyzed. Only those with at least 35 successful measurements and at least one measurement for each hour of sleep were included in this study.

Results: 585 ABPMs were analyzed: data on 197 patients aged 83.7 ±43 y, of G1 were compared with data on 388 patients, aged 64.5 ±3 y (Group 2), 43% of G1 men, vs. 52, 6% in G2, p = 0.04. Their BMI was 26.6 ±12 vs 27.8 ± 5, p = 0.01. DM rate was similar, 29.7 and 29.1%. In G1 the prevalence of cardiovascular comorbidities (dyslipidemia, CVA, IHD, MI, HF, PVD and CKD) and depression was higher. G1 pts used more anti-hypertensive drugs both as a group (90% vs. 80%, p = 0.004) and per patient (2.3 ± 1.3 vs 1.7 ± 1.3, p = 0.001). Office SBP was similar in both groups. ABPM results (G1 vs. G2): 24 h SBP: 137 ±43 vs 139 ± 7 mmHg, p = 0.001. awake SBP: 139 ± 15 vs 136 ± 12, p = 0.001 and asleep SBP: 134 ± 18 vs 123 ± 15, p = 0.001. Non dipping pattern was found in 73% pts in G1, vs 48% in G2, p = 0.001. Reverse dipping was 35% for G1 vs 14% for G2, p = 0.001. Masked hypertension rate was similar in both groups, while white coat hypertension was less frequent in G1 (10.4% vs. 18.6%, p = 0.01). In G1, only 30% had controlled BP (24 h ≤ 130/80) with a mean SBP of 121 ±7 mmHg. Setting the threshold to 140/80 increased the BP control to 60%, mean 126 ±9 mmHg. The number of cardiovascular comorbidities was similar in both settings. In G2, 44% had controlled BP (24 h ≤ 130/80, mean 122 ±6 mmHg (p = 0.001 vs. G1).

Conclusions: ABPM reveals specific patterns in G1. High rate of non dipping and reverse dipping pattern. BP control was achieved in only 30% of these pts, but the suggested “normal” threshold of 130/80 should be evaluated prospectively in pts ≥80y. 24 h ABPM is a valuable tool to evaluate BP control in hypertensive octogenarians.

Blood Pressure Measurement Certificate: A Need for Better Hypertension Care

B. Almustafa1, A. Almobarak1, E. Alsalm2, N. Alfaraj2, M. Hejlus1, N. Aleidi1.
1Qatif District Primary Health Care, Qatif-Saudi Arabia, 2Khobar District Primary Health Care, Khobar-Saudi Arabia

Background: Blood pressure (BP) control starts with accurate BP measurement (BPM). However, BPM technique is poor in all health workers, including community nurses. Our program tries to increase the accuracy of measuring techniques and awareness of health workers towards BP readings.

Method: Describe the process of development of BPM Certificate, implementation and trainees’ satisfaction.

Results: The educational needs of health workers in BPM have been identified, using Delphi Qualitative methods. Literature was reviewed to identify common errors of BPM, and effect of each error on the accuracy of BPM. Based on these results, training modules have been tailored and piloted. Furthermore, a checklist of the accurate BPM technique has been developed. Each technique was scored upon its effect on the accuracy of BPM. The modules are: A. Knowledge & Attitude module includes: 1. BP-related Morbidity & Mortality 2. Reported Accuracy of health workers in BPM 3. Types of BPM devices 4. Proper BPM technique 5. Factors interfere with accurate BPM 6. Proper care of BPM devices 7. BPM in specific populations 8. Classification of BP and diagnostic criteria 9. Target BP in different populations 10. Role of BP in estimating CV Risk B. Skills module guidelines: 1. Measuring skills 2. Maintaining the device 3. Reading of columns of numbers 4. Proper BPM technique 5. Factors interfere with accurate BPM 6. Proper care of BPM devices 7. BPM in specific populations 8. Classification of BP and diagnostic criteria 9. Target BP in different populations 10. Role of BP in estimating CV Risk

Conclusion: BPM certificate is a valid training program that is highly suggested for any worker involved in hypertension management.

Comparing the Systolic-Diastolic Variability Ratio Determined Using 24h Ambulatory with Gravity Generated Blood Pressure Variations in Response to Changing Arm Level

B. Gavishi1, M. Litvak1, J. Mekler1, M. Bursztyn1.
1Intercure Ltd., Lod-Israel, 2Hadassah-Hebrew University Medical Center, Mount-Scopus, Jerusalem-Israel

Background: The ratio between systolic BP (SBP) and diastolic BP (DBP) variability (BPVR), as determined from 24-hour ambulatory BP (24hABP), has both diagnostic and prognostic significance. We compared BPVR determined using 24hABP with that obtained from BP readings at different arm levels (Gravity method) - a test that requires 15-20 minutes.

Methods: Sixty-three patients, M/F 29/34; age 61 ± 13 years (median 62); mean 24hABP 129 ± 12 /76 ± 10 mmHg and 67% medicated. Gravity method included 9 consecutive BP readings performed simultaneously with the ABP device and sphygmomanometer at 4 cuff heights ranged from heart to head level. Measurements took place at the sitting position before or after the ABP monitoring and in both visits for 17 patients. SBP and DBP variability was expressed by the standard deviations SDs and SDd, respectively. BPVR, which is the SBP-on-DBP slope in the SBP-DBP relationship, was expressed by the ratio SDSD. The BP variability determined by the ABP device in the gravity method was calibrated by that obtained with the sphygmomanometer. Averaging applied to Gravity BPVR in case of 2 visits.

Results: BPVR (mean ± SD) obtained from 24hABP (BPVR24) and Gravity (BPVRG) were similar 1.35 ± 0.29 vs 1.34 ± 0.40 (p = 0.8). Similarity by method was found also in the subgroups of age above/below the median (p > 0.2/p > 0.2) and for males/females (p = 0.1/p > 0.5). Correlation between BPVR24 and BPVRG was r = 0.47 (2 outliers excluded), where the relationship did not differ significantly from identity. The BP-DBP correlation was 0.73 ± 0.11 for 24kABP and 0.94 ± 0.03 for Gravity. Using the resulting calibration estimated standard error of determination, 7 ± 2% for BPVR24 11 ± 4% for Gravity BPVR in case of 2 visits.

Conclusion: The ratio between SBP and DBP variability generated by employing the gravity effect at different arm levels during a short clinic visit is similar to the prognostically important one obtained using ambulatory BP measurements.

Influence of Circadian Blood Pressure Variations on Heart Rate and Pulse Pressure Level in Healthy and Hypertensive Subjects

A. Rekhviashvili1, B. Tsnamdzgishvili1, M. Nadareishvili2.
1Iv. Aravakhishvili Tbilisi State University, Tbilisi-Georgia, 2I. Chavchavadze State University, Tbilisi-Georgia

Objective: The link between increased pulse pressure, as well as heart rate and adverse cardiovascular events has been found in many studies. Therefore, little is known about relationships of pulse pressure and heart rate level with circadian blood pressure profile. Therefore, aim of this study was an investigation of influences of the circadian blood pressure profile on the heart rate and pulse pressure in hypertensive and normotensive population.

Design and Methods: 74 patients (mean age ± SD, 51.16 ± 3.74; 39 men and 35 women), 37 hypertensives and 17 normotensives, without cardiovascular, peripheral and cerebrovascular diseases, diabetes mellitus, obesity and secondary forms of hypertension who underwent 24-hour ambulatory blood pressure
monitoring were studied. Non-dipping patients were defined as those whose nocturnal decrease in systolic blood pressure, diastolic blood pressure, or both was less than 10% of the daytime blood pressure.

**Results:** Using "c" test for independence", we showed that circadian blood pressure pattern is dependent on the existence of hypertension. Similarly, "exact test" confirmed, that dipper circadian blood pressure profile is more frequent in normotensive population. Subjects with non-dipper circadian blood pressure pattern, compared with dippers have higher average night-time pulse pressure level in the general study population, as well as in hypertensive and normotensive populations (47.05 ± 1.63 vs. 39.25 ± 1.99; p = 0.000, 48.21 ± 2.03 vs. 44.9 ± 2.73; p < 0.05 and 42.84 ± 4.11 vs. 37.3 ± 1.39; p < 0.05, respectively).

Average heart rate was significantly higher in non-dipper hypertensive patients, compared with dippers (78.6 ± 3.68 vs. 74.14 ± 2.51; p < 0.05).

**Conclusions:** The study results point out significant relationships of non-dipper circadian blood pressure pattern with night-time pulse pressure level and average heart rate. Mentioned associations might be considered as an additional risk for future adverse vascular events.

**PP.31.75 NOCTURNAL BLOOD PRESSURE DECLINE, IF NOT ADJUSTED FOR ASCERTAINED SLEEP TIME, OVERESTIMATES THE ASSOCIATION WITH THE VASCULAR DAMAGE**

P. Nazzaro, G. Schirosi, V. Vulpis, L. De Benedictis, G. Grandolfo, F. Federico, University of Bari, Italy-Italy

**Introduction:** Many studies showed that a reduced nocturnal blood pressure (%) fall (DIP) is associate to the vascular damage in hypertensives (HTN). Aim of the study was to recognize if this association was confirmed when the "real sleep time" was determined.

**Methods:** We studied 22 normotensive (NTN:124 ± 1/77 ± 2), 20 hypertensive (HTN:151 ± 491 ± 2) with lower (Limit) and 21 HTN (149 ± 391 ± 2) with higher (Himt) carotid intima-media thickness (mm), untreated males. By ambulatory blood pressure monitoring and simultaneous actigraphy, the standard (STD = SBP 07.00-23.00 – 23.00-07.00) and tailored, personalized, DIP monitoring were studied. Non-dipping patients were defined as those whose "real sleep time" was determined.

**Results:** Significant differences were found (m ± s.e.m.; *p < .05, **p < .01, ***:p < .001 vs NTN; *^:p < .05, **^:p < .01, ***^:p < .001 vs HTN-Limt).

**Discussion:** The results show that the reduced sleep time may induce an overestimation of the association between nocturnal blood pressure fall, measured by standard time, and vascular damage in hypertensives, regardless their structural capillary rarefaction.

**PP.31.76 A NOVEL INDEX OF SODIUM-SENSITIVITY DERIVED FROM 24-HOUR AMBULATORY BLOOD PRESSURE RECORDINGS PERFORMED UNDER USUAL DIET**

P. Castiglioni1, G. Parati2, L. Brambilla3, V. Brambilla4, M. Gualerzi4, M. Di Rienzo1, M. Coruzzi2. 1Fondazione Don C. Gnocchi, Milan-Italy; 2Dept. Clinical Medicine & Prevention, University of Milano-Bicocca and Istituto Auxologico Italiano, Milan-Italy; 3Fondazione Don C. Gnocchi, Parma-Italy, 4Department of Clinical Sciences/University of Parma, Parma-Italy

**Objective:** Heart rate (HR) tends to increase and the nocturnal dipping pattern of blood pressure (BP), in particular of pulse pressure (PP), tends to disappear in sodium sensitive hypertensive subjects following high sodium diet. Aim of this study was to evaluate whether an index of sodium sensitivity (SSI) can be obtained from these parameters also when ambulatory BP monitoring (ABPM) is performed under patients' habitual diet, avoiding the time-consuming protocol necessary for conventional SSI assessment.

**Methods:** We performed 24-hour ABPM in 46 mild hypertensive subjects following their usual diet. PP was averaged over day-time (8AM –10PM) and night-time (0AM – 6AM) identified according to narrow-fixed intervals, and the PP night/day ratio (PPN/D) was calculated. Normalized HR (HR24H) was obtained by dividing the 24-h mean HR (HR24H) by a reference level of 70 bpm. We defined SSI-ABPM as PP/ND/HR24H. The traditional sodium sensitivity index (SSI) was calculated as ratio between difference in mean arterial pressure (mmHg) and difference in urinary sodium excretion rates (mol/day) at the end of a high-sodium and a low-sodium, diet each of 1-week duration. Correlation between traditional SSI and the proposed SSIABPM was assessed by Spermann’s rank R.

**Results:** SSI and SSIABPM are significantly (p < 0.006) associated with each other (see figure), with a rank order correlation coefficient R = +0.40.

**Conclusion:** SSI obtained under usual patients’ diet appears as a reliable and useful tool to more easily identify salt sensitive subjects as compared to the complex procedures for sodium intake control required to assess conventional SSI. Its possible association with increased cardiovascular risk needs to be explored in longitudinal ad hoc studies.

**PP.31.77 A COMPARISON OF OFFICE BLOOD PRESSURE, TELEMEDICAL HOME BLOOD PRESSURE AND AMBULATORY BLOOD PRESSURE MONITORING**

N. Hoffmann-Petersen1, T. Tambo2, K. Bejder2, E. B. Pedersen1. 1Holstebro Hospital, Denmark, Holstebro-Denmark, 2Institute of Business and Technology, Aarhus University, Herning-Denmark

**Background:** Hypertension is a well-established risk factor for cardiovascular disease and one of the leading causes of death worldwide. Telemonitoring of home blood pressure is a new advance in home blood pressure monitoring (HBPM) and is effective improving blood pressure control. The aim of this study was to compare the accuracy of office blood pressure and telemedical home blood pressure with 24-h ambulatory blood pressure (APMP).

**Design and Method:** 102 patients were consecutively recruited from a Renal Outpatient Clinic. Office blood pressure was measured three times with the HBPM equipment. Next patients used HBPM with telemonitoring three times daily for four consecutive days and finally ABPM on the following day.

**Results:** There was a significant difference between office blood pressure and ABPM (24-h and daytime); and between HBPM and daytime ABPM. HBPM was lower (-4.1 mmHg/-1.6 mmHg) than daytime ABPM (p < 0.05). The strongest correlations were seen between all HBPM readings day 2 and ABPM (24-h and daytime). There was no significant differences between the different HBPM schedules (three measures three times daily for four days, three measures twice daily for four days, three measures three times daily for three days or three measures twice daily for three days). There was no significant difference between HBPM and 24-h ABPM.

**Conclusion:** The telemedical HBPM reflected more accurately 24-h ABPM than office readings.
M. C. Pieraccioli, N. Nesti, L. Lambertucci, S. Zanieri, E. Mossello, M. Belladonna, A.M. Mello, N. Marchiouno, A. Ungar. Hypertension Centre, Unit of Geriatric Medicine, University of Florence and Aou Careggi, Florence-Italy

**Aim:** To evaluate in over-65 years old patients the role of different settings (nursing home, rehabilitation ward, hypertension centre, Alzheimer’s unit) and dementia diagnosis on the prevalence of white coat hypertension (OBP > 140/90 and ABPM < 135/85 mmHg) and masked hypertension (OBP < 140/90 mmHg and ABPM > 135/85 mmHg).

**Subjects and Methods:** Study population was composed by 377 patients enrolled in different settings: 100 patients enrolled into an Alzheimer’s Unit (AU); 100 institutionalized patients; 73 patients admitted in a rehabilitation ward; 100 patients enrolled into an Hypertension Centre (HC).

All patients underwent to a multidimensional geriatric assessment. Clinical and pharmacological data were collected for all patients as well as OBP and 24 hour ABPM, according the cut-offs and recommendations from 2007ESH guidelines.

**Results:** The prevalence of dementia was higher in nursing home (71%) than the other settings (55%, 6.8% and 0%). The prevalence of white coat hypertension was significantly higher in nursing home (67%) and in rehabilitation ward (55%) than AU and HC (p < 0.001). On the other hand, masked hypertension was prevalent in outpatients (57% in AU and 70% in HC) (p = 0.002).

In the multivariate analysis white coat hypertension resulted associated only with the nursing home setting, but not with dementia diagnosis.

**Conclusions:** Office blood pressure measurement represents an elevated risk of an over-diagnosis in nursing home setting and of an over-treatment in frailty elderly patients. Therefore ABPM is a useful method to diagnosis white coat hypertension in elderly patients with dementia, particularly in nursing home and also to diagnosis masked hypertension in elderly outpatients. ABPM resulted well tolerated in the elderly with cognitive impairment.

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E. Platonova, M. Bystrova, V. Gorbunov, A. Deev.

**Objective:** To compare and evaluate the use of ambulatory blood pressure monitoring (ABPM) in prevention and treatment of essential menopausal hypertension.

**Methods:** Essential hypertensive menopausal women (n = 21, age 55.7 ± 3.7) were included into open randomized cross-over trial. During 2 weeks of run-in period all previous antihypertensive therapy was discontinued. ABPM and HBPM were performed at baseline (end of each run-in period) and during 4 weeks after treatment with either diltiazem 180-360 mg/d or enalapril 10-20mg/d. HBPM (A&D-767 PC) was performed during all study period (90 ± 5 days). Ambulatory arterial stiffness index (AASI) and home arterial stiffness index (HASI) were calculated as 1- minus the regression slope of mean arterial pressure (mMAP), which also provides information about pulse pressure; the 24-hour mean Heart Rate (mHR), which is a recognized tool for measuring the cardiac autonomic activity; mMAP/mHR, named normalization quotient (NQ); SDmMAP/SDmHR, hereafter named Relationship of Variability (RV). An Pressure Index (PI) was obtained: NQ + (RV0.5), which, applied to group A has given the following Risk Equation (RE): 0.54xNQ + (0.27xRV) = 1.

**Results:** There is a significant difference (p < .0001) in the data of the various groups except for mHR and age. A patient with MAP > 90 and NQ > 1.26 is hypertensive and with major risk if the result of RE is higher than 1, with moderate, severe risk, and values up to 1.14, 1.23 or higher, respectively.

**Conclusion:** The PI is a number wich incorporates the different information by the ABPM test and avoids any interference from the sympathic tone. The PI and RE formula also assesses cardiovascular risk and hypertension degree.

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**PP.31.78**

**WHITE COAT HYPERTENSION AND DEMENTIA: ROLE OF AMBULATORY BLOOD PRESSURE MONITORING IN DIFFERENT SETTINGS**

**PP.31.80**

**HYPERTENSION AND CARdiovascular RISK EVALUATION WITH A NEW CRITERIA IN AMBULATORY BLOOD PRESSURE MONITORING**

G. Malgieri. Centro per L’ipertensione-ASL BN1, Sant’Agata Dei Goti-Italy

The aim of this study was to find a criteria and formula incorporating the entire range of information supplied by ambulatory blood pressure monitoring (ABPM) to avoid subjective interpretation and eliminate the incidence of the sympathetic tone connected to physical activity and/or daily emotions and stratify the cardiovascular risk also connected with blood pressure variability.

**Methods:** The results of 2171 ABPM tests were divided into 4 groups: A: BP < 135/85 mmHg; B: BP ≥ 135/80 mmHg; C: SBP > 140 mmHg; D: SBP > 150 mmHg. The mean, the standard deviation (SD), the confidence interval (CI) of the following were measured: the 24-hour mean arterial pressure (mMAP), which also provides information about pulse pressure; the 24-hour mean Heart Rate (mHR), which is a recognized tool for measuring the cardiac autonomic activity; mMAP/mHR, named normalization quotient (NQ); SDmMAP/SDmHR, hereafter named Relationship of Variability (RV). An Pressure Index (PI) was obtained: NQ + (RV0.5), which, applied to group A has given the following Risk Equation (RE): 0.54xNQ + (0.27xRV) = 1.

**Results:** There is a significant difference (p < .0001) in the data of the various groups except for mHR and age. A patient with MAP > 90 and NQ > 1.26 is hypertensive and with major risk if the result of RE is higher than 1, with moderate, severe risk, and values up to 1.14, 1.23 or higher, respectively.

**Conclusion:** The PI is a number which incorporates the different information by the ABPM test and avoids any interference from the sympathetic tone. The PI and RE formula also assesses cardiovascular risk and hypertension degree.

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**PP.31.79**

**IMPROVED HOME BLOOD PRESSURE LOGBOOK FOR USE IN INDIRECT TELEMONITORING**

J. Peleska. Eurozoom Centre, Institute of Computer Science as Cr and 3rd Dep. of Med., 1st Faculty of Medicine, Prague-Czech Republic

The current European Society of Hypertension Practice Guidelines for home blood pressure monitoring (HBPM) contain a standardized BP logbook structured according to the required monitoring schedule that is useful for ensuring the accuracy of data reporting and for improving adherence to measurements schedule. The aim of this presentation is both to make the use of this logbook in practice easier and to add other useful properties.

The logbook was transferred to Excel which enables an easy calculation of the average systolic and diastolic BP from several monitoring days, but also that of the morning and evening mean BP as well. This offers additional information for better BP control. Two boxes from the Guidelines with important instructions for patients concerning conditions of measurements and monitoring schedule are added to the Excel logbook.

Another modification of the logbook has more space for BP measurements during a daytime and their mean BP can be used for prevention of temporary hypotension due to a coincidence of maximal hypertensive effect of more anti-hypertensive drugs given simultaneously in the morning. It can be observed at home or more dangerously as sleepiness while driving, but it can be partially or totally neutralized as a result of BP increase in a GP’s office due to the white-coat effect.

The Excel logbook can be printed for a patient or e-mailed to those with basic knowledge of physiology and physicians can adjust medications according to reported BP values or schedule an additional office visit.

The logbook in the Excel form can contribute to unification of BP values reporting (also for purposes of research in practice), a better drugs’ titration, a greater involvement of the patient in the therapy of his/her disease, an increase of GPs’ effectiveness, especially due to the HBPM telemonitoring and thus for improving hypertension control in population.

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**PP.31.81**

**COMPARATIVE EVALUATION OF AMBULATORY AND HOME ARTERIAL STIFFNESS INDEXES IN TREATED HYPERTENSIVE MENOPAUSAL WOMEN**

E. Platonova, M. Bystrova, V. Gorbunov, A. Deev. National Research Centre for Preventive Medicine, Moscow-Russia

The aim of this study was to compare the values of arterial stiffness index by using home (HBPM) and ambulatory (ABPM) blood pressure in treated hypertensive menopausal women.

**Methods:** Menopausal hypertensive women (n = 21, age 55.7 ± 3.7) were included into open randomized cross-over trial. During 2 weeks of run-in period all previous antihypertensive therapy was discontinued. ABPM and HBPM were performed at baseline (end of each run-in period) and during 4 weeks after treatment with either diltiazem 180-360 mg/d or enalapril 10-20mg/d. HBPM (A&D-767 PC) was performed during all study period (90 ± 5 days). Ambulatory arterial stiffness index (AASI) and home arterial stiffness index (HASI) were calculated as 1- minus the regression slope of diastolic on systolic BP. Mean level of BP are expressed as m ± SD, AASI and HASI as m ± SD.
Results: Baseline means were 140.3 ± 1.6/84.5 ± 0.9 mm Hg for ABPM and 140.2 ± 1.6/85.3 ± 0.9 mm Hg and 152.4 ± 0.8/96.4 ± 0.4 and 152.2 ± 0.9/96.2 ± 0.5 mm Hg for HBPIM in each treatment arm. After 4 week of treatment they were 129.4 ± 2.2/78.5 ± 1.3 mm Hg and 149.2 ± 0.49/49.8 ± 0.2 respectively in diiltiazem group and 125.0 ± 2.5/75.7 ± 1.5 and 147.9 ± 0.49/57.7 ± 0.2 mm Hg in endapril group respectively. Baseline means of HASI were 0.60 ± 0.11 and 0.61 ± 0.10 and AASI were 0.42 ± 0.14 and 0.41 ± 0.14. After 4 weeks of treatment HASI were 0.58 ± 0.10 for diiltiazem/0.56 ± 0.11 for endapril vs AASI were 0.41 ± 0.110.37 ± 0.16 respectively.

Conclusion: Reproducibility of home arterial stiffness index was not inferior to ambulatory arterial stiffness index. Mean home arterial stiffness was higher than ambulatory arterial stiffness index, which could be attributable to different biological implication of the data. In long-term follow up home arterial stiffness index was higher than ambulatory arterial stiffness index, which could be attributable to ambulatory arterial stiffness index. Mean home arterial stiffness index was not significantly different between groups.

PP.31.82  IMPORTANCE OF AMBULATORY BLOOD PRESSURE MONITORING IN PATIENTS WITH TINNITUS

L. Gaspar1, M. Makovnik1, S. Hlinstakova1, E. Gasparova1, A. Dukat1, M. Fulleova2, 1University Hospital, Bratislava-Slovak Republic, 2Ent Department Novapharm, Bratislava-Slovak Republic

Objectives: 3: To evaluate the possible correlation between MBPV and PPV. 2: To assess the correlation between MBPV and PPV. 1: To determine the relationship between MBPV and PPV in hypertensive patients.

Methods: We analyzed BP values in the situations: 1 physician's office measured. Blood pressure was measured three times in KNHNES and the average was calculated.

Results: The average values of blood pressure during ABPM were 140/89 mmHg. In day-time period and night-time period the average values were 143/91 mmHg and 130/81 mmHg respectively. 12 persons (33%) had hypertension with the average blood pressure values more than 130/90 mmHg.

Conclusions: Our data confirm that in a group of patients suffering from tinnitus, arterial hypertension has very high prevalence (66%). Although diagnosis and treatment of arterial hypertension could not necessarily lead to cessation of intensity of tinnitus, treatment can decrease the risk of complications of hypertension, e.g. myocardial infarction, stroke, heart or renal failure. Tinnitus is a stresor which can significantly decrease the quality of life and it can cause serious medical disorders. Tinnitus then becomes a complex health problem and symptom becomes syndrome. ABPM is in patient with tinnitus therefore important and indicated.

PP.31.83  RELATIONSHIP BETWEEN BLOOD PRESSURE ELEVATION DURING EXERCISE TEST AND NIGHT-TO-DAY BLOOD PRESSURE VALUES IN AMBULATORY BLOOD PRESSURE MONITORING IN HYPERTENSIVE PATIENTS

S. Filipova1, D. Skulettyova1, P. Chmupa1, 1Faculty of Medicine, Slovak Medical University, Bratislava-Slovak Republic, 2National Institute of Cardiovascular Diseases, Bratislava-Slovak Republic

Numerous studies explained the predictive value of the day and night blood pressure (BP) difference by ambulatory BP monitoring (ABPM) for the evaluation of hypertension (HTN) control. During the exercise test (ET) the rise of systolic BP is one of the signs for clinical hypertensive status.

The objective of this study was to establish whether baseline-to-peak BP value ratio in ET and night-to-day BP value ratio in ABPM offers a better estimate of BP control in hypertensive patients.

Methods: We analyzed BP values in the situations: 1 physician's office measurement; 2 during ET (treadmill test, Bruce protocol), and 3 during standard ABPM. All readings were realised in 3 groups: Group 1 - normotensive patients without coronary artery disease (n = 34, age 48.8 SD ± 6.6 yrs, normal coronaryography, office BP 126.2 ± 10.4/78.5 ± 0.6 mm Hg), Group II - hypertensive patients without CAD and with casual BP optimal control in physician's office (n = 32, age 52.4 SD ± 5.7, BP 129.5 ± 8.1/80.2 ± 8.7 mmHg); Group III - hypertensive patients without CAD and with casual office hypertensive BP values (n = 40, age 55.1 SD ± 4.5, BP 145.2 ± 8.4/92.5 ± 6.9 mmHg).

Results: In uncontrolled HTN patients (gr.III) compared with norotmenotensive (gr.I) during the ET the baseline-to-peak systolic BP value differences were significantly higher (58.8 ± 9.5 mmHg vs. 34.1 ± 8.9 mmHg, p < 0.005), but the total exercise time was shorter (362.5 ± 40.7 sec vs. 547.2 ± 65.5 sec, p < 0.001). In all groups the night-to-day BP ratios were the highest in group II, but the differences between patients' groups were not significant (gr.I 0.76 ± 0.34, gr.II 0.70 ± 0.42, gr.III 0.69 ± 0.46, n.s.). The night-to-day systolic BP value in ABPM were the highest in gr.III vs. gr.II; this difference was significant (64.6 ± 10.2 mmHg vs. 39.8 ± 11.7 mmHg, p < 0.001). The ET parameters were significantly different between gr.II and gr. III, but the ABPM parameters were not significantly different.

Conclusions: According to our results: ET has the significant informative value for the assessment of the BP control in hypertensive and normotensive patients, compared with ABPM. ET gives better information than ABPM concerning to the differentiation between well-controlled HTN and unsatisfactory controlled HTN.
The definition of the AR in this study was the first blood pressure minus the second and/or the third blood pressure.

**Results:** Systolic and diastolic BP decreased substantially over repeated measurements within a visit. The systolic and diastolic AR between the first measurement and second measurement was $1.17 \pm 5.90$ (p < 0.0001) and $0.47 \pm 13.89$ mmHg (p = 0.012), respectively. And the systolic and diastolic AR between the first and third measurement was $1.78 \pm 6.236$ (p < 0.0001) and $0.63 \pm 13.82$ mmHg (p = 0.001), respectively. The prevalence of blood pressure of 140/90 mmHg or higher based on the first measurement ($n = 1240$, 22.6%) was different compared to estimates based on second ($n = 1115$, 20.3%) and third ($n = 1060$, 19.3%) measurement, respectively. The magnitude of the systolic AR is significantly correlated with age ($r^2 = .09$, p < 0.001), female gender ($r^2 = .04$, p = 0.008), initial systolic BP ($r^2 = .28$, p < 0.001), serum creatinine level ($r^2 = .03$, p = 0.036), fasting glucose level ($r^2 = .001$, p = 0.025), total cholesterol level ($r^2 = .008$, p = 0.001) and LDL cholesterol level ($r^2 = .001$, p = 0.038). The magnitude of the diastolic AR is significantly correlated with age ($r^2 = .002$, p = 0.004), female gender ($r^2 = .001$, p = 0.046).

**Conclusions:** The factors related to the alarm reaction involved in a nationwide survey are generally similar to white-coat effect. Age, gender and comorbidities are also important factors for cardiovascular prognosis suggesting that the first blood pressure might have substantial clinical significance and that first blood pressure needs further investigations.
**POSTER SESSION 32**

**HEALTH CARE STRATEGIES**

**PP.32.86** MEETING TARGET LIPID LEVELS IN PATIENTS ADMITTED TO PERCUTANEOUS CORONARY ANGIOPLASTY IN EAST-TALLINN CENTRAL HOSPITAL (ESTONIA)

E. Mäeots, K. Traumann, K. Tutt. East-Tallinn Central Hospital, Tallinn-Estonia

**Objective:** The aim of this study was to determine the extent to which lipid treatment targets in cardiovascular prevention guidelines are being implemented in Estonia.

**Design:** Data of patients admitted to PTCA in East-Tallinn Central Hospital in 2009 is analysed retrospectively.

**Method:** Extent of risk factor modification was recorded for consecutive patients undergoing PTCA. Data collected included lipid levels and blood pressure (BP). ESC guidelines on the prevention of cardiovascular disease in patients undergoing PTCA were used to determine the treatment target. Statin treatment before PTCA was analyzed, using the statin doses registered for use in Estonia as basis.

**Results:** A total of 326 patients (62% male; mean age ± SD 66.1 ± 11.0 years; mean BMI 28.0 ± 5.2) were included. In average 59% were receiving a statin. Mean values of serum lipids ± SD were for total cholesterol 5.0 ± 1.3 mmol/l, LDL-cholesterol 3.2 ± 1.2 mmol/l, HDL-cholesterol 1.2 ± 0.4 mmol/l and triglycerides 1.7 ± 1.0 mmol/l. Serum total cholesterol was <5 mmol/l in 54% and <4 mmol/l in 20% of all patients, 59% and 26% in patients treated with statins and 45% and 7.5% patients without statin treatment. The values for LDL-C was <2.5 mmol/l in 27% and <2 mmol/l in 15% in all patients, in 34% and 19% in patients treated with statins and 13% and 7.5% patients without statin treatment. In about 75% of statin-naïve and in 60% of statin treated patients total cholesterol values where above 4.5 mmol/l considered target for high-risk patients. The statins were used in the following average daily doses: rosuvastatin 15 mg, atorvastatin 20 mg, simvastatin 24 mg, pravastatin 22 mg.

**Conclusions:** A significant proportion of both statin-naïve and statin treated patients undergoing PTCA did not achieve the initial dose chosen.

**PP.32.87** INFLUENCE OF DIABETIC PATIENTS ON ANTIPHYERTENSIVE DRUG AMONG HYPERTENSION ON HYPERTENSION PREVALENCE BEFORE AND AFTER HYPERTENSION GUIDELINES IN 2003, KOREAN NATIONAL HEALTH AND NUTRITIONAL SURVEY (K-NHANES) DATA

J. Shin 1, Y Lim 1, S Kim 1, Y Kim 1, J Lee 1. 1Cardiology, Internal Medicine, Hanyang University College of Medicine, Seoul-South Korea; 2Preventive Medicine, Dong-A University College of Medicine, Busan-South Korea

**Background:** In 2003, 130/80 mmHg was firstly suggested as the target blood pressure in diabetic patients by Joint National Committee (JNC-7) and World Health Organization/International Society of Hypertension (2003 WHO/ISH guideline). Aim of the study is to investigate the influence of those guidelines on the prevalence of hypertension (HTN) and the proportion of diabetic patients taking anti-HTN drug.

**Methods:** In the K-NHANES, hypertension prevalence is defined by the proportion of blood pressure = 140/90 mmHg or the patient taking anti-HTN drugs in the populations older than 30 years. As the population before those guidelines, 2001 K-NHANES data (n = 5035) were adopted. K-NHANES data in 2005 (n = 4812), 2007 (n = 2694), and 2008 (n = 5937) were adopted as the population influenced by those guidelines. Population in 2005 was used for standardization.

**Results:** Weighted and standardized HTN prevalence were 30.9%, 28.0%, 25.3%, and 27.3% for the year 2001, 2005, 2007, and 2008, respectively. The proportions of diabetic patients taking anti-HTN drugs among HTN patients were 5.4%, 9.5%, 12.1%, and 13.1% for corresponding years. For corresponding years, prevalence of diabetes were 11.6(0.6)%; 8.9(0.5)%; 9.1(0.5)%; 9.5(0.8)%; and 9.7(0.5)%.

**Conclusion:** The proportion of DM patients with high normal blood pressure or hypertension increased with hypertension guidelines among hypertension subjects. This finding could be a potential explanation for resistant hypertension prevalence against national blood pressure lowering policies.

**PP.32.88** PHYSICIAN ATTITUDES TO BLOOD PRESSURE CONTROL IN ELDERLY HYPERTENSIVE PATIENTS (SHARE SURVEY)

R. Kretz1, S. Erdine2. 1Charité, University Medicine Berlin, Berlin-Germany; 2Istanbul University Cerrahpasa School of Medicine, Istanbul-Turkey

**Objectives:** To evaluate the levels of blood pressure (BP) that physicians are satisfied with, concerned with, and would take immediate action at in elderly hypertensive pts (> 65 years).

**Design and Methods:** The Supporting Hypertension Awareness and Research Europe-wide (SHARE) survey was conducted between May and December 2009 and 2629 European physicians involved in the treatment of hypertension responded. Relative frequency density (%/mmHg) curves were calculated which represented the percentages of physicians per category (satisfied, concerned, immediate action) in relation to BP in 1 mmHg increments within the specified ranges of 110–202 mmHg (SBP) and 70–115 mmHg (DBP).

**Results:** The BP levels in elderly hypertensive pts above which physicians would take immediate action varied widely (SBP:111–202mmHg [mean 167.5mmHg]; DBP:70–115mmHg [mean 98.5mmHg]) (Figure). Overall, 95.6% and 85.3% of physicians, respectively, would not take immediate action until SBP and DBP exceeded 140 and 90mmHg, respectively, compared with 95.0% and 90.1%, respectively for their general hypertensive populations. Wide variations were also noted in BP levels that physicians were satisfied with, or which would cause concern, in both groups of pts (Figure).

**Conclusions:** Many physicians would not take immediate action until BP in elderly hypertensive pts exceeds 140/90mmHg. Consequently, if such inertia delays action being taken until BP is markedly higher than recommended targets, elderly pts will be subject to increased CV risk.
PP.32.88
INTERVENTION STUDY IN A HIGH RISK POPULATION
M. Iurciuc1, L. Craciun1, C. Avram2, S. Ursoniu1, A. Rusu1, S. Iurciuc1, D. Gaita1. 1University of Medicine Timisoara, Timisoara-Romania, 2West University, Timisoara-Romania

Objectives: To expand lifestyle interventions carried out by the primary care physicians using European Prevention Guideline. To reduce risk factors through proper use of medications in order to achieve the European targets. To increase the recommendation of selective cardio protective medications by the primary care physicians in interdisciplin ary approach.

Design and Method: We conduct a prospective study of 18 months on 325 patients; 55.9 ± 8.7 years old, 38.2% males, who took part in EuroAspire III Primary Care. Identified by their drug treatment: antihypertensive drug therapy and/or; lipid-lowering drug therapy and/or; diabetes therapies (diet and/or oral hypoglycemic and/or insulin). The primary care physicians were trained by an interdisciplinary team (cardiologist, diabetologist, nephrologist) to reinforce lifestyle changes (European Prevention Guideline) and to optimize medication according to each patient. So, we define the “coaching model of primary care” as 3 consecutive patient visits (every 6 months) to the primary care physician offices, consisting in lifestyle advice and medical recommendation update.

Results: The systolic blood pressure has decreased from 146.98 to 136.75mmHg (p < .001); the diastolic blood pressure has decreased from 86.19 to 79.94mmHg (p < .001); the mean blood pressure has decreased from 106.45 to 98.41mmHg (p < .001); the pulse pressure has decreased from 61.12 to 56.67mmHg (p = .003); the heart rate has decreased from 73.51 to 70.91 b/min (p = .009); The ankle brachial index has decreased from 1.168 to 1.092 (p = .001); The% of patients who reached the target blood pressure has increased from 20% to 45% (from 21% to 49% for nondiabetics, and from 9% to 13% for diabetics). The number of patients, requiring treatment with beta-blockers, has changed from 166 to 165; patients with angiotensin converting enzyme (ACE) inhibitor from 172 to 153; patient with angiotensin receptor blocker (ARB) from 5 to 43; patients with calcium channel blocker from 64 to 79; patients with diuretics from 99 to 135.

Conclusion: Efficiency of interdisciplin ary approach of a patient with hypertension. The empowerment in primary care practice is the key of long term patients risk reduction. The necessity to find practical ways to improve lifestyle interventions has at least the same importance as cardiovascular drugs prescription. The study offers a model to approach to the high risk patients.

PP.32.90
HYPERTENSION GUIDELINES IMPLEMENTATION AND MULTIPLE CARDIOVASCULAR RISK FACTOR CONTROL IN GENERAL PRACTICE (HYGIA-GP STUDY)
A. Symeonidis1, A. Karotis1, V. Varla1, N. Karpettas1, G.S. Stergiou1, 1Greek Association of General Practitioners (Elegeia), Athens-Greece, 2Hypertension Centre, Third University Department of Medicine, Sotiria Hospital, Athens-Greece

The effective management of all modifiable cardiovascular risk factors has crucial importance for cardiovascular disease protection. This study assessed the performance of general practitioners in implementing the current guidelines. General practitioners recruited uncontrolled hypertensives with at least one additional modifiable risk factor (LDL-C, diabetes, smoking, obesity). Handouts with current guidelines summary on risk factor management were distributed to the general practitioners and follow-up data were obtained after 6 months. Twenty general practitioners provided 6-month follow-up data on 459 hypertensives (mean age 67.6 ± 10 years, men 38%, elevated LDL-C 77%, diabetes 30%, obesity 69% (BMI ≥ 30 kg/m²), smoking 25% (70% with 3 or more risk factors). After 6 months of intervention there was a significant blood pressure decline (p < 0.0001), the number of antihypertensive drugs and the use of diuretics was increased (p < 0.05) and hypertension control was achieved in 47% for systolic and 58% for diastolic blood pressure (p < 0.01). Among subjects with elevated LDL-C, there was a significant decline in LDL-C (p < 0.0001), an increase in the number on hypolipidemic drugs (p < 0.05) and LDL-C reached the recommended goal in 60.5%. Among diabetic subjects the number of anti-diabetic drugs was increased (p < 0.0001), HbA1c was reduced (p < 0.0001) and control (HbA1c < 7% or fasting glucose < 110 mg/dl) was achieved in 32%. Among smokers 18.7% have stopped. Among obese subjects there was a weight decline (p < 0.05) and the goal to lose ≥ 10% of body weight was achieved in 7.2%. These data suggest that in general practice, the multifactorial intervention for the control of major modifiable cardiovascular risk factors appears to be more effective for hypertension and hypercholesterolemia. Interventions for the control of diabetes, smoking cessation and particularly weight reduction are less effective. Further research is needed on strategies for multifactorial intervention aiming to improve the clinical effectiveness of the guidelines implementation for cardiovascular risk reduction in general practice.

PP.32.91
EFFECT OF ENVIRONMENTAL TEMPERATURE INCREASE ON TREATED HYPERTENSIVES
D. Gourlis 1, C. Grassos2, A. Pittaras3. 1Private Hypertension Office, Nea Erithrea-Greece, 2Hypertension Unit, Cardiovascular Department, Western Attika Hospital, Athens- Greece, 3Medion Medical Center, Athens-Greece

Objective: To investigate the possible need of decreasing the CCB – ARB medication of controlled hypertensive subjects during the warm summer months in Greece.

Design: The ambulatory blood pressure measurements of well controlled 170 hypertensive patients, who had been on stable CCB and ARB therapy (both separate tablets and single combination) for at least 6 months, were included in the analysis. The enrolled patients had reported over the phone or during refill visits, symptoms suggestive of hypotension during the last 2 months (until mid August 2010), a period which coincided with increase in the ambient temperatures (over 35 Celsius).

Method: We compared the summer visit ABPM with the previous ABPM 6 months before. We analyzed the mean BP using the unpaired t-test.
Background: There was no statistically important difference either for the mean Systolic blood pressure or the mean Diastolic blood pressure during the winter and summer period. In accordance to the ESH guidelines, there is no need to decrease the dose of the medication, unless there is validated symptomatic low blood pressure.

**PP.32.92** THE THERAPEUTIC INERTIA IN ARTERIAL HYPERTENSION TREATMENT

A. Radziemski, A. Niklas, A. Tykarski, Poznan University of Medical Sciences, Poznan-Poland

Arterial hypertension is a prevalent disease and powerful risk factor for cardiovascular complications. Although hypertension has accurate evidence based guidelines and many therapeutic options the efficiency of treatment is still unsatisfactory. Therapeutic inertia (TI) is one of possible reasons of this inef- ficiency and it’s defined as the provider’s failure to initiate or intensify therapy when the treatment goals are unmet. The aim of presented study is assessing TI in hypertensive patients on following 3 visits. We collected the data concerning 4915 hypertensive patients from 246 physicians (first contact doctors and cardiologists). On the first visit (V1) the increased systolic blood pressure (SBP) was found in 82.3\% patients and increased diastolic blood pressure (DBP) in 72.5\%. Change of pharmacological treatment was applied in 60\% patients. On the second visit (V2) the increased systolic blood pressure (SBP) was found in 49.4\% patients and increased diastolic blood pressure (DBP) in 34.9\%. Change of pharmacological treatment was applied in 25.8\% of patients. On the third visit (V3) the increased systolic blood pressure (SBP) was found in 24.6\% of patients and increased diastolic blood pressure (DBP) in 16.46\%. Change of pharmacological treatment was applied in 7.8\% of patients. We asked the physicians for the reason of the lack of changes in hypertension therapy and the answers were: good result of present treatment (V1-43.8\%, V3-11.6\%), improved RR values (still not at norm) (V1-12.5\%, V3-11.0\%), sufficiently decreased values of DBP (V1-11.7\%, V3-19.6\%), correct BP values at home measurements (V1-10.5\%, V3-14.4\%), sufficiently decreased values of SBP (V1-9.6\%, V3-17.3\%), necessary longer observation of patient before the change of therapy (V1-3.3\%, V3-2.4\%). The conclusion was that the therapeutic inertia is relatively common problem in hypertensive therapy that is responsible for significant percentage of uncontrolled hypertension.

**PP.32.93** DYSLIPOIDEMIC HYPERTENSIVES DO NOT ACHIEVE THE CHOLESTEROL GOAL


Background: Implementation of numerous guidelines remains a daunting goal for cardiologists. We assessed the hypothesis that the majority of treated hypertensives with elevated serum cholesterol levels, do not achieve the goals for Total Cholesterol (TC) and Low Density Lipoprotein Cholesterol (LDL-C).

Methods: We conducted a cohort study with retrospective chart review, at the electronic medical record of our outpatient an hypertensive unit. Total of 210 treated hypertensive adults (aged $57 \pm 11$ years, $55\%$ male), naive to previous lipid therapy with raised lipid levels and/or SCORE-risk $>5\%$ (using the low risk chart of the Fourth Joint Task Force), were included in the analysis from October 2007 to December 2008 (index me). Laboratory values of lipid panel were obtained right before and after the initiation of lipid pharmacotherapy, accompanied by verbal and written guidance for lifestyle modification.

Results: Mean monitoring duration me was 12 months. Average levels of TC and LDL-C were found 235 mg/dl and 170 mg/dl respectively. The majority of patients (92\%) received monotherapy with HMG-CoA reductase (statins). Within index me, 46\% (97210) a median optimal combined cholesterol levels. The remaining 54\% (113210) of the total population did not reach the cholesterol goal; among them 60\% (77113) was due to stringent target (established Cardio-Vascular Disease, Diabetes Mellitus, markedly increased lipid levels); another 20\% (23113) was due to inadequate treatment or low dose of statin for the raised cholesterol values; an 8\% (91113) quit treatment for personal beliefs and 4\% (51113) were intolerant.

Conclusions: Achieving op mal cholesterol goals among hypertensives is amenable to both scientific analysis and clinical intervention but remains an odyssey. Renewed research and communication efforts must optimize greater hope, confidence and increased access to treatment.
Conclusions: All the patients in the survey with grade I hypertension appeared to have from one to three risk factors, that were not considered previously (patients didn’t receive any regular antihypertensive therapy). In accordance with the 2007 ESH/ESC Guidelines we should recommend lifestyle changes, drug treatment should be initiated promptly in high cardiovascular risk (20%) patients and with moderate total cardiovascular risk (80%) drug treatment may be delayed for several weeks.

PP.32.96 COMPLIANCE TO TREATMENTS AMONG CORONARY HEART DISEASE PATIENTS IN THE BANJA LUKA REGION, REPUBLIC OF SRPSKA/BOSNIA AND HERZEGOVINA

D. Vulic1, S. Loncar1, Lj Sormaz1, B. Vulic1, J. Marinkovic1, M. Ostojevic2, 1Center For Medical Research, Banja Luka-Bosnia Herzegovina, 2Clinical center Banja Luka, Banja Luka-Bosnia Herzegovina, 3Health Care Center, Laktasi-Bosnia Herzegovina, Clinical center Belgrade, Belgrade-Jugoslavia

Background: Data are limited regarding quality of care, risk factor control in patients with heart disease in southeastern Europe, and lifestyle correlation to disease. We examined the extent of compliance to recommended treatments and risk factor goals in patients with known coronary heart disease (CHD) in the Banja Luka region, Republic of Srpska, Bosnia and Herzegovina.

Method: We studied 250 persons from the region of Banja Luka, including 125 patients with CHD (mean age 52.6, 23% female). Medical history interviews and risk factor measurements were conducted.

Results: Among those with known CHD, 60.8% were not at goal for blood pressure (BP) (< 140/90 mmHg), 81.6% not at goal for low density lipoprotein-cholesterol (LDL-C) (< 3mmol/l), 79.2% not at goal for body mass index (BMI) (< 25 kg/m²) and 34.6% not at goal for fasting glucose (< 6.1mmol/l) among those with diabetes. Also, only 20.8% were non-smokers. Antiplatelet therapy was administered to 92.0% of CHD patients, beta-blockers to 62.0%, ACE/ARBs to 64.2%, and lipid-lowering therapy to 41.0%.

Conclusion: Cardiovascular care and achievement of goals for risk factors in CHD patients in Bosnia and Herzegovina remain suboptimal.

PP.32.97 WHY TARGET BLOOD PRESSURE IS NOT REACHED IN HYPERTENSIVE TYPE II DIABETES PATIENTS: ANALYSIS OF REAL PRACTICE

M. Barabanschikova, L.S. Pak, E.A. Prokhorovich, A. Malikhina. Moscow State Stomatological University, Moscow-Russia

Objective: To investigate the real practice of treatment of hypertensive type II diabetes patients by the assessment of following factors: lifestyle modification, drug therapy, compliance.

Design and Methods: Clinical data, risk factors and prescribed treatment were retrospectively analyzed from records of 288 hypertensive type II diabetes patients attended Moscow city Cardiological out-patient clinic in 2005. The original telephone questionnaire was used to assess the compliance to recommended antihypertensive treatment in 2006.

Results: Baseline characteristics of the patients were 66.67% females in 2005 and 55.5% female participants in the completion telephone questionnaire in 2006. The mean age of population was 59.6 ± 9.6 years. Diabetes anamnesis was 4.1 ± 0.1 years, arterial hypertension duration was 10.2 ± 0.1 years. Average SBP was 145.9 ± 31.4 mm Hg and DBP 86.6 ± 17.4 mm Hg. Recommendations for lifestyle modification were not completely recorded in medical notes. The advice for smoking cessation was given in 1.7% among 19.4% of current smokers, modification of physical activity was recommended for 21.2% of all patients, among which 45.1% were patients with body mass index > 30kg/m². The level of blood pressure > 130/80 mmHg was registered in 95.6% of patients. At least the one class of antihypertensive drug was given in 94.4% of patients. The ACE-inhibitors were administered in 76.4% of patients, beta-blockers 54.5%, diuretics 47.9% calcium antagonists 30.9%, all receptor antagonists 0.9% respectively. The monotherapy was given for 51.8% of patients, two classes of antihypertensive drug was prescribed in 33.8% of attendees, more than 3 lines of therapy was given in 8.7% of patients. The administered dosage of analyzed ACE-inhibitors and for beta-blockers corresponds to recommended target dosage. The used dosage for fosinopril was 18.1 ± 2.6 mg/daily, perindopril 4.5 ± 0.1 mg/daily, atenolol 56.0 ± 5.2 mg/daily, metoprolol 51.4 ± 6.7mg/daily. The measurement of lipid panel was done only in 47.2% of attendees, among registered parameters 88% of patients have LDL more than 2.5mmol/l. 93.7% have cholesterol more than 4.5 mmol/l. The hypo-lipidemic drugs were recommended only for 28.8% of patients. Information on fasting glucose level was estimated in 65.6% of patients. The targeted ESC level of fasting glucose was observed in 12.2% of patients. The oral hypoglycemic drugs’ administration was registered in 59.4% of attends. A good compliance (defined as more than 70% of recommended antihypertensive treatment regularly taken over one year) was recorded in 79.2% of patients by telephone questionnaire. The main noncompliance drug factors in studied group were high cost of medications (55%), inconsistent regimes in 18%, side effects 7%. Moreover, regarding treatment management poorly compliance patients received more drugs, especially different classes of antihypertensive and hypoglycemic drugs (p < 0.001). The adherence to the hypoglycemic drugs was higher than to the antihypertensive treatment (95% vs. 79.2%).

Conclusion: The study demonstrates that the guidelines are not sufficiently implemented in real life. The main reasons influencing on the BP target achievement are: low rate of recommendation for lifestyle modification, prevalence of monotherapy, unaccepted attitude towards major risk factors’ correction as hyperlipidemia and hyperglycemia, and poor compliance.

PP.32.98 “SMS THERAPY”: A NEW APPROACH TO INCREASING COMPLIANCE TO ANTIHYPERTENSIVE TREATMENT

M.M. Ciuila1, R. Mezara2, P. Giagnoni3, C. Vecchiato1, G. Acquasapace1, C. Benfenati1, P. Niccolini1, P.L. Puccini1, F. Magrini1, 1Università degli Studi Dip. Torace Polmonare e Cardiocirculatorio, Milano-Italy, 2Fond. Ienca Ca’ Grandà Ospedale Maggiore Policlinico U.O. Medicina Cardiovascolare, Milano-Italy, 3Centro Interuniversitario di Fisiologia Clinica e Ipertensione, Milano-Italy

Objective: Poor compliance to antihypertensive treatment is a major determinant of unsatisfactory blood pressure control and is associated with increased morbidity and mortality. Forgetting to take prescribed drugs is one of the main causes of poor compliance and can be addressed by a number of strategies, from pill-boxes with alarms to medication reminder services involving e-mail or mobile phone alerts.

Aims of the Study Are: 1) to develop a remote bi-directional monitoring programme to improve the compliance to antihypertensive treatment 2) to evaluate its feasibility in a sample of hypertensive outpatients 3) to determine its impact on the achievement of blood pressure targets during a 6-month follow-up.

Design and Methods: A sample of 100 hypertensive outpatients (mean age 56 yrs) attending our Cardiovascular Medicine Unit were administered a questionnaire to inquire on their access to communication technology (internet/mobile phones) and on their willingness to participate to a medication reminder service. The information collected was used by a team of doctors and computer engineers to devise a bi-directional monitoring programme to improve the compliance to antihypertensive treatment.

Results: Mobile phones, unlike the Internet, were available to the vast majority of the sample (86%). Moreover, the rate of potential participants was reasonably high (about 30%). It was therefore decided to use mobile phone technology to improve compliance to antihypertensive treatment. We developed a computer-based programme by which text messages containing details on the antihypertensive treatment (name, dosages, time of intake of medications) would be sent to the patients’ mobile phones. Bi-directionality—i.e. communication between patient and centre in either direction—would be based on the delivery of two kinds of text messages, scheduled (with pre-set times and dates) and on-demand (at the patient’s request).

Conclusions: The preliminary stage of the study (aims 1 and 2) ended in the development of a bi-directional monitoring programme to improve the compliance to antihypertensive treatment. It was based on mobile phone technology because this was accessible to most of the sample and also fulfilled privacy requirements. Currently, a sample of 100 hypertensive outpatients has been recruited at our Cardiovascular Medicine Unit to determine the impact of such a programme on the achievement of blood pressure targets over a period of 6 months.

PP.32.99 EARLY BENEFIT OF AN EDUCATIONAL PROGRAM IN A POPULATION AT VERY HIGH CARDIOVASCULAR RISK

P. Delsart1, A. Noel, N. Vernet, P. Bocquet, L.-M. Gore, G. Claïse, C. Czyzmyremsch, M. Gouliji, G.L. Pucelli, C. Magrini, 1 Université des Studi, Lille, Hôpital Cardiologique, Lille-France
The management of hypertension and a high cardiovascular risk requires an educational support. Change in lifestyle habits has proved beneficial in terms of blood pressure reduction. It usually includes: weight loss, smoking cessation, regular physical activity, salt intake reduction and a reflexion on alcohol consumption. Studies on the effect of an educational support regrouping all those measures are rare. Our aim is to assess the early benefit of our educational program which involved a close partnership with the general practitioners (GP).

**Method:** From April 2009 to April 2010, the data of 27 patients were prospectively collected. The patients with high or very high cardiovascular risk were sent to our center from their GP for a blood pressure management. The EP included four steps: a consultation about healthy diets with a nutritionist, a Blood Pressure self-measurement Education, an explanation of their medical therapy and a stress management program. All patients benefited the four workshops. The population was compared with a control group similar in term of cardiovascular risk, age, gender, diabetes mellitus and a history of vascular diseases.

**Results:** After a mean follow-up period of 9 months, the two groups were compared with non-parametric tests. The EP improved weight loss by 3% (p = 0.012), a blood pressure target achievement optimisation (p = 0.029), a decrease in the frequency of metabolic syndrome (p = 0.014) and optimise the cardiovascular risk (p = 0.03).

**Conclusion:** The EP is an essential tool in the management of hypertension whatever the cardiovascular risk. Our local experience shows evidence of early benefit on different cardiovascular risk factors in a hypertensive population at high cardiovascular risk. This EP requires a large scale study.

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**THE EFFECTS OF A COMPREHENSIVE HEALTH EDUCATION PROGRAMME IN CHINESE PATIENTS AFTER PERCUTANEOUS CORONARY INTERVENTION**

Yuzhen Gao1, Y. Li1, Jie Zheng1, Ruying Wang1, Haiying Meng1, 1The Second Hospital of Shansi Medical University, Taiyuan-China, 2Shansi Medical University, Taiyuan-China

**Background:** The percutaneous coronary intervention (PCI) becomes more and more popular. However, the procedure does not stop the underlying process of atherosclerosis. In China, the strategies for cardiac rehabilitation after PCI including frequent follow-up, health diets, exercise, and education on lifestyle modification and behavior change are not widely spread. A comprehensive health education programme including such strategies for post-PCI patients was established.

**Objective:** To determine how this programme influences coronary heart disease (CHD) risk factors in Chinese patients after PCI, and to evaluate the effect on lifestyle change of the comprehensive programme compared with an ordinary education programme.

**Methods:** A consecutive series of patients was recruited and randomized to 2 groups: comprehensive health education and ordinary education. Patients were followed up by telephone or hospital visit. At 6 months and 12 months after PCI, the management of CHD risk factors in two groups was evaluated. χ2 test and a general linear model was used to assess and compare the effect of two interventions on controlling CHD risk factors.

**Results:** Finally, 136 patients were recruited in the study. They were randomly divided into comprehensive group (68 patients) and the control group (68 patients). A total of 4 patients in the comprehensive group and 5 in the control group were lost to follow-up or withdrew consent. When it was 12 months after PCI, patients in the comprehensive education group had more significant evaluated rates of goals of controlling all risk factors, compared with patients in the ordinary education group. At 12-months cutoff date, the reductions of blood pressure and blood glucose in comprehensive education group were significant (both p < 0.05) and more perfect. However, the procedure does not stop the underlying process of atherosclerosis. In China, the strategies for cardiac rehabilitation after PCI including frequent follow-up, health diets, exercise, and education on lifestyle modification and behavior change are not widely spread. A comprehensive health education programme including such strategies for post-PCI patients was established.

**Conclusion:** The EP includes four steps: a consultation about healthy diets with a nutritionist, a Blood Pressure self-measurement Education, an explanation of their medical therapy and a stress management program. All patients benefited the four workshops. The population was compared with a control group similar in term of cardiovascular risk, age, gender, diabetes mellitus and a history of vascular diseases.

**Results:** After a mean follow-up period of 9 months, the two groups were compared with non-parametric tests. The EP improved weight loss by 3% (p = 0.012), a blood pressure target achievement optimisation (p = 0.029), a decrease in the frequency of metabolic syndrome (p = 0.014) and optimise the cardiovascular risk (p = 0.03).

**Conclusion:** The EP is an essential tool in the management of hypertension whatever the cardiovascular risk. Our local experience shows evidence of early benefit on different cardiovascular risk factors in a hypertensive population at high cardiovascular risk. This EP requires a large scale study.

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**ECONOMIC EFFICACY OF FIXED COMBINATION OF PERINDOPRIL/INDAPAMIDE IN TREATMENT OF ARTERIAL HYPERTENSION (MODELLING SURVEY IN RUSSIA)**

M. Leonova, A. Bykov, Y. Churilin. Russian State Medical University, Moscow-Russia

The problem of arterial hypertension in Russia is most acute in connection with high prevalence and low treatment efficacy. Burden of arterial hypertension exceeds 1% of GDP; main direct expenses in Russia are expenses of public health budget. It demands the search of cost-saving treatment methods.

**Objective:** study of economic efficacy of fixed combination Perindopril/Indapamide (P/I) in patients with arterial hypertension for Russia.

**Design and Methods:** Markov model based on epidemiological studies of arterial hypertension in Russia (n = 33444) and results of multicenter randomized clinical study OPTIMAX on estimate efficacy P/I in treatment of patients with arterial hypertension (n = 17938); time horizon - 10 years. We select 3 age groups of patients – under 50, 55-60 years. The cost of the treatment arterial hypertension include direct costs (personal expenses of patients, expenses of public health budget) and indirect costs (loss of salary, collection of taxes, social expenses).

**Results:** In clinical practice in Russia the efficacy of treatment arterial hypertension is 21.5% (patients with goal blood pressure < 140/90 mm Hg). Direct costs for treatment arterial hypertension increase with patient age in consequence of growth complications and demands in medical assistance; indirect costs decrease in several times in consequence of lower labor activity among patients. If patients receive P/I (efficacy 68%), life expectancy is increasing till development complications, especially in patients of 50 years old (on 1.65 year) that prolongs working capacity. As result, despite the growth of patients personal expenses on this drug buying (more than twice), economy of public health service budget at expense of lower medical assistance demand is observed; and reduced indirect costs, especially in men 50 and 55 years old (cost-saving effect). Cost of 1 QALY shows cost-saving effect P/I in all men groups, while in women insignificant cost exceeding is indicated, but it doesn't exceed 3 GDPs per 1 person in Russia.
Conclusions: Therapy with fixed combination P/I is conducive to cost-saving effect for public health service budget and burden arterial hypertension in Russia.

**PP.32.103**

**PHARMACOECONOMIC EVALUATION OF DRUGS USED FOR THE TREATMENT OF HYPERTENSION**

A. Kochat, P. Meghana. Fortis and Inscrol Hospital, Chandigarh, Mohali-India

**Background and Objective:** To determine cost-effectiveness analysis and clinical outcomes of hypertensive patients who are taking Amlodipine or Telmisartan as antihypertensive treatment.

**Patients and Methods:** This was a prospective, multicenter and observational study of 250 patients taking either Telmisartan or Amlodipine as antihypertensive therapy during 2009. Patients who met the inclusion criteria were recruited from the outpatient department of the hospital. Data was collected for baseline and subsequent value. The prescribed dose of Amlodipine and Telmisartan was 5-10 mg and 40-80 mg per day respectively. Therapy was continued with addition of hydrochlorothiazide and other open-label antihypertensive drugs if warranted, to achieve a target blood pressure of <140/90 mmHg in non-diabetics and <130/80 mmHg in diabetic patients. All the drugs were prescribed by brand name and direct cost of prescribed brand drugs was taken into consideration. The distribution of additional antihypertensive drugs on top of study medication did not differ significantly between the two groups.

**Results:** The average age of the patients was 59.34 ± 11.6 years. The average annual costs per patient within 15 months of therapy were Rupees 2235 (972-4896) and 2718 (900-5208) in JNC VII stage 1 and stage 2 hypertension in Amlodipine group and Rupees 2467 (1944-5040) and 2712 (2088-4869) in stage 1 and stage 2 hypertension in Telmisartan group respectively.

**Conclusions:** There was significant reduction of blood pressure by either drug from baseline after 8 weeks of treatment without any significant difference between the efficacies of two drugs. Failure to reach the target blood pressure was more related to diabetic status and was not significantly different with the two drugs. The monthly and annual costs of medicine and treatment were not differing significantly in Amlodipine and Telmisartan groups, but cost-effective analysis result showed that Telmisartan was more cost effective compared to Amlodipine in both monotherapy and combination therapy for diabetic as well as non-diabetic patients. Age is a more important parameter than sex as at higher age mostly combination therapy was prescribed.

**PP.32.104**

**CLINICAL OUTCOMES OF TREATMENT WITH ANGIOTENSIN RECEPTOR BLOCKERS**


**Objective:** To examine cardiovascular clinical outcomes for patients treated with ARBs.

**Methods:** Retrospective claims from a large health plan were used to identify adult patients with hypertension who newly initiated ARB therapy, defined as non-diabetic patients. Age is a more important parameter than sex as at higher age mostly combination therapy was prescribed.

**Results:** A total of 118,700 patients initiated ARB treatment; 65,579 were on VAL, LOS, and IRB were at greater risk of developing a cardiac event compared to OM (Hazard ratio [HR] = 1.24, 1.17, and 1.17, respectively; p < 0.01). Conclusion: In this large, US managed care population, patients treated with OM had a significantly lower risk of cardiac events versus those treated with VAL, LOS, and IRB. Whether this is related to better BP control warrants further investigation.

**PP.32.105**

**TREATMENT APPROACH TO ARTERIAL HYPERTENSION IN DIFFERENT TYPES OF BULGARIAN CITIES: IS DIFFERENCE STILL IMPORTANT?**

S. Tomov 1, S. Torborov 2, S. Naydenov 1, N. Naydenova 2. ‘Medical University-Sofia, Department of Internal Diseases, Clinic of Cardiology, Sofia- Bulgaria, ‘Hypertension Excellence Center, Tokuda Hospital Bulgaria, Sofia-Bulgaria, ‘University Hospital St. Ekaterina, Sofia-Bulgaria

The data from the Bulgarian National Health Insurance Fund shows a different cost for treatment of the same disease in different cities: higher cost in the biggest cities. The aim of the our study was to assess if the treatment approach, respectively, the cost of the antihypertensive treatment in different type of cities is different.

**Methods:** A cross-sectional study was performed from July to October 2009. 1962 hypertensive patients – 866 males and 1090 females, mean at the mean age of 63.69 years were included. The cities were as follows: group 1, Capital of Bulgaria, Sofia with 1,200,000 residents (424 patients); group 2, Big cities with > 100,000 residents (804 patients); Group 3, Small cities: 10-50,000 residents (318 patients); Group 4, Villages: 10,000 residents (90 patients).

**Results:** The mean blood pressure (BP) of the patients from the different types of cities (1-5) were very close, respectively: 141/86 mmHg, 142/86 mmHg, 143/87 mmHg, 144/87 mmHg, 142/86 mmHg. There is no statistically significant difference among the studied groups of cities stratified by prescribed generic or original drugs. The prescribed antihypertensive drugs were as follows: RAAS blockers / ACE inhi/ARB and were prescribed in more than 55% of all patients (the Capital in 59%, Gr. 2 and 59%, Gr. 3 in 60%±9% vs of 65%–5% Gr. 5 in 57%). Calcium Channel Blockers were prescribed in very close percent for the cities Gr. 1 to 5 (34%, 29%, 30% 37% 38%). Diuretics were prescribed in about 50% of the all patients (Gr. 1. 50%, Gr. 2. 57%, Gr. 3. 49%, Gr. 4. 57%, Gr. 5. 53%). Each one from 5 Bulgarian hypertensive patient received Fixed –Dose Combination and in the groups it was as follows: Gr.1 28%, Gr. 2. 23%, Gr. 3.27%, Gr.4. and Gr.5. 23%. The treatment with statins were from 36% in the Gr.3. to 52% in the Gr. 1. the capital Sofia.

**Conclusions:** The treatment approach of arterial hypertension and the concomitant dyslipidemia in Bulgaria is according to the last European recommend-ations independently of the type of the cities - big or small. A tendency for higher proportion of the prescribed FDC as of the statins was established in the Bulgarian capital Sofia, but the differences were not statistically significant.

**PP.32.106**

**CHANGES OF CLINICAL, MORPHOLOGICAL AND DOPPLER CHARACTERISTICS IN HYPERTENSIVE PATIENTS DUE TO TREATMENT WITHIN ONE YEAR FOLLOW UP**

I. Burazov 1, S. Stefanovic 2, M. Burazov 1, V. Stefanovic 1. ‘Clinic for Cardiovascular Diseases, Clinical Center Niš, Niš-Serbia, ‘General Hospital, Knjazevac-Jugoslavija

**Objectives:** The relevance of hypertension, as important public health challenge, is increasing worldwide. We aimed to investigate changes in clinical, morphological and Doppler characteristics in patients suffer hypertension due to pharmacological treatment within one year follow up.

**Patients and Methods:** The study enrolled 167 patients (pts) with hypertension (60 ± 8.5 years of age, 55% males) without previous coronary artery disease. Patients’ data were noted, blood pressure was measured and ECG was recorded. Exercise test, lab analysis and echo study were each performed in one patient. The pharmacological treatment started and patients were selected to be treating by monotherapy (ACE inhibitors, Ca antagonists) or combination (ACE plus diuretics, BB, or Ca antagonists). We analyzed in details changes in left ventricular mass, its relation body surface, dimensions of septum, posterior wall, left atrium, left ventricle, and Doppler characteristics. E, A, e′, IVRT, deceleration time, pulmonary vein velocities etc in O, and after 3, 6, 9, and 12 months.
Results: The results of our study indicated that majority of our patients’ population were obese and were smokers. The significant blood pressure reduction was achieved after 3 months (quinapril 20 to 40 mg daily). Also, there was significant increase of IVRT. The reduction of left atrium diameter was noticed after 6 month. The significant reduction of left ventricular mass, end diastolic diameter and end diastolic pressure were noticed after 9 month of ACE inhibitors treatment. Similar changes were noticed in subgroup of patients who were treated by ACE inhibitors on hydrochlorothiazide. Amlodipin subgroup achieved the significant reduction in blood pressure after 3 months but first echocardiographic graphical changes were noticed after 9 and 12 months. In conclusion, treatment of hypertension with quinapril or quinapril plus hydrochlorothiazide is effective in blood pressure reduction but also cause the early changes in left ventricular geometry as additional benefit.

Conclusions: Dyslipidemia is one of the most important cardiovascular risk factors in the appearance and development of arterioesclerosis and therefore, of cardiovascular disease, the first cause of death among women and the second among men in the Basque Country.

The objective: of this study is to analyse the results and the economic expense of the treatment of the patients in our health area, with a detected prevalence of 15.56%.

Design and Method: Observational descriptive study before and after for which we have used the software OSABIDE. Our health area has 301,094 inhabitants. The study covers the first ten months of the year 2010. The economic data have been obtained from the Pharmaceutical Service of Osakidetza.

Results: The 45,26% of a target audience of 71,825 people aged 35 to 65 years old was screened, the 56,29% was requested an annual analytic determination, and the 50,61% had attention and annual periodic control which included: blood pressure measurement, treatment and secondary effects, advice on changes of lifestyle (tobacco, alcohol, diet, exercise) and Body Mass Index. The good control index (CT≥200) was achieved in the 38,24% patients. The pharmacoeconomic expense of hypolipidemic agents was only exceed by the bronchodilator drugs.

Conclusions: Despite the human and economic efforts, we believe the results of this study is to analyse the differences between the blood pressure control in the 2 arms of the Bulgarian part of the study – a group of outpatient high risk patients’ treatment and a group of coronary heart disease patients.

Methods: The EUROASPIRE III survey was carried out in 2006–2007. The hospital arm studying coronary heart disease patients was performed in 3 Bulgarian centers. Consecutive patients, with a clinical diagnosis of CHD, were identified retrospectively and then followed up, interviewed and examined at least 6 months after their index coronary event. The high risk asymptomatic patients in general practice survey was carried out in 2 regions of Bulgaria and high risk patients were identified, interviewed and examined.

Results: 711 medical records were reviewed and 538 patients were interviewed in the arm studying coronary heart disease patients after hospital treatment. The mean blood pressure values were 138.5/83.5 mmHg and 55.2% of all patients had blood pressure values ≥ 140/90 mmHg including patients with diabetes mellitus where BP values were ≥ 130/80. The theraeutic target was achieved in 41.1% of all patients with hypertension (87.9%). 43.9% among all patients using blood pressure lowering agents achieved the BP target. 82.3% of patients were treated with beta-blockers, 22.3% - with calcium channel blockers, 43.4% - diuretics and 66.2% - ACE-inhibitors or ARBs. In the group of asymptomatic high risk patients abnormal blood pressure was registered in 88.1% and 86.7% of these patients were on treatment. Out of all treated hypertensive patients the goal blood pressure values were achieved in 16% of nondiabetic patients and in 4.4% of the diabetic patients. Treatment strategy included also beta-blockers (27.6% of patients), ACE-inhibitor (66.6%) or ARB, on calcium channel blockers (26.3%), diuretic (28.5%) and for 0.3% of all treated patients other drug groups were used.

Conclusion: The EUROASPIRE III survey showed that majority of coronary heart disease patients and also high risk asymptomatic patients in Bulgaria did not achieve the BP target levels defined by the Joint European Societies’ guidelines on cardiovascular prevention despite the great number of used medications. The blood pressure target was achieved in 43.9% out of all CAD patients (4 times more than the percentage of patients achieving the target BP levels of the high risk group).
**POSTER SESSION 33**

**BASIC PHARMACOLOGICAL ASPECTS**

**PP.33.110 INHIBITORY EFFECT OF Mg**^2+**ON PHOSPHATE-INDUCED VASCULAR CALCIFICATION**

V. Jankowski1, S. Salem1, J. Paslick-Deetjen1, M. Peter1, W. Zidek1, J. Jankowski1, 1Charité, Med. Klinik Iv, Berlin-Germany, 2Fresenius Medical Care, Bad Homburg-Germany

**Background:** Vascular calcification is known as one of major factors leading to cardiovascular events in uremic patients. One of the major risk factors for vascular calcification in uremic patients is hyperphosphatemia. This study focuses on the potential protective effect of magnesium in the process of vascular calcification due to elevated serum phosphate levels.

**Methods:** Aortic segments from male Wister rats were incubated in Dulbecco’s Modified Eagle Medium (DMEM) in the presence of 5 Vol-% CO2/95 Vol-% O2 for 7 days. To induce calcification the phosphate concentration of the medium was elevated to 3.8 mM by adding either 10 mM beta-glycerophosphate (BGP) of NaHPO4. Alkaline phosphatase (3 U/ml) was added to inhibit release of pyrophosphate inhibiting calcification in presence of increased phosphate concentrations. The aortic segments were incubated in the absence and presence of 3 mM MgCl2. Calcification was quantified by both van Kossa staining and quantification of tissue calcium coulomètrical.

**Results:** Incubation of aortic segments in the presence of BGP caused an increased Ca
\(^{2+}\) amount in the aortic rings compared to control conditions (63 ± 11 nmol Ca
\(^{2+}\)/mg tissue vs. 21 ± 3 nmol Ca
\(^{2+}\)/mg tissue; N = 18). The Ca
\(^{2+}\) amount in the aortic rings was significantly decreased in the presence of Mg
\(^{2+}\) (54 ± 6 nmol Ca
\(^{2+}\)/mg tissue; N = 18).

**Discussion and Conclusion:** Medial calcification can be induced in intact rat aortic rings cultured with alkaline phosphatase in the presence of high phosphate concentration. Magnesium reduced vascular calcification despite increased phosphate concentrations. Therefore, magnesium may be a new option in the treatment and prevention of vascular calcification, most likely resulting in a reduction of cardiovascular events in uremic patients. However, clinical studies confirming these findings in clinical settings will have to be performed.

**PP.33.111 EFFECT OF CYCLOSPORINE A ADMINISTRATION IN PREGNANT RATS ON BLOOD PRESSURE IN THEIR OFFSPRING**

N. Slabik-Blaz1, M. Adamczak1, E. Ritz2, A. Wiecek1, J. Jankowski1, 1Charité, Med. Klinik Iv, Berlin-Germany, 2Fresenius Medical Care, Bad Homburg-Germany

**Background:** Successful kidney transplantation allows women with chronic kidney disease stage 5 to get pregnant. The immunosuppressive therapy may influence fetal and postnatal development in the offspring i.e. may cause the hypertension in adulthood. The aim of the study was to assess the effects of exposure to cyclosporine A (CsA) during gestation on blood pressure in the rat’s offspring.

**Methods:** Eight pregnant Sprague-Dawley rats were assigned into two groups. In the first group (n = 4) CsA (a dose 3 mg/kg/day) were administered. In the second group (n = 4) only the corresponding volume of solvent (0.9% NaCl 1 ml/kg/day) were given. The substances were administered from the 10th day after the fertilization till the 7th day after the delivery, subcutaneously, once a day. At 7 and 11 weeks of age in the offspring of both groups (n = 65) blood pressure was measured indirectly on tail artery, during isoflurane anesthesia. At the end of experiment (12 weeks of age) both albuminuria and plasma creatinine concentration were measured. Statistical analysis was performed using Student’s t-test.

**Results:** At 7 and 11 weeks of age systolic (SBP) and diastolic blood pressure (DBP) in the offspring of the females treated with CsA during gestation (n = 34) was higher compared to the offspring of those treated only with solvent control (n = 31) (7th week - SBP: 125 ± 5 vs. 117 ± 6 mmHg, p < 0.001; DBP: 82 ± 6 vs. 77 ± 6 mmHg, p < 0.001; 11th week - SBP: 132 ± 9 vs. 126 ± 7 mmHg, p < 0.05; DBP: 89 ± 8 vs. 83 ± 7 mmHg, p < 0.001).

**Conclusion:** The results suggest that treatment with CsA during pregnancy can lead to hypertension in the offspring.

**PP.33.112 DIURIDINE TETRAPHOSPHATE: A POTENT ENDOTHELIUM-DERIVED ANGIogenic FACTOR**


The secretion of angiogenic factors by vascular endothelial cells is one of the key mechanisms of angiogenesis. Here we report the isolation of a new potent angiogenic factor, diuridine tetraptosphate (Up4U) from the secretome of human endothelial cells.

The angiogenic effect of the endothelial secretome was partially reduced after incubation with alkaline phosphate and abolished in the presence of suramin. In one fraction purified to homogeneity by reverse phase and affinity chromatography, diuridine tetraptosphate (Up4U) was identified by MALDI-LIFT-fragment-mass-spectrometry (MALDI-TOF-TOF-MS), enzymatic cleavage analysis, and retention-time comparison. Beside a strong angiogenic effect on the yolk sac membrane and the developing rat embryo itself, Up4U increased the proliferation rate of endothelial cells in the presence of PDGF of vascular smooth muscle cells. Up4U stimulated the migration rate of endothelial cells via P2Y2-receptors and increased the ability of endothelial cells to form capillary-like tubes. This effect was additive to that of PDGF. Endothelial cells released Up4U after stimulation with shear stress. Mean total plasma Up4U concentrations of healthy subjects (N = 6) were sufficient to induce angiogenic and proliferative effects (1.34 ± 0.26 nmol L-1). In conclusion, Up4U is a novel strong human endothelium-derived angiogenic factor.

**PP.33.113 PARAMETER OF ARTERIES’ ELASTICITY FOR ELDERLY PATIENTS WITH ARTERIAL HYPERTENSION**

A. Pristrom1, T. Nechesova2, E. Gaishun3. 1Belorussian Medical Academy of Postgraduate Education, Minsk-Belarus, 2Research Scientific-Practical Center, Minsk-Belarus, 31st Minsk Clinical Hospital, Minsk-Belarus

**Objective:** To work out the parameter of arteries’ elasticity for elderly patients with arterial hypertension. Parameter should be weakly dependant on arterial pressure.

**Design and method:** A computer analysis of the set of “diameter- pressure” curves for arterial vessels of persons aged over 50 was performed.

**Results:** Diameter of large arteries of the elderly patients increases with increase of arterial pressure. This effect takes place if arterial pressure do not exceed approximately 190 millimeters of mercury. Above this threshold, growth of diameter almost stops, therefore diameter distensibility coefficient is proportional to function (190-p)/p with high accuracy, where p is pressure in the vessel (millimeter of mercury). Based on this observation, a new parameter of elasticity \( Y = [\text{Dd-De}]/[\text{Dd}(190-p)]^{1/2} \), was created; where Ps and Pd - systolic and diastolic arterial pressure, Ds and Dd- corresponding inner diameters of the vessel (mm), h - thickness of intima-media complex (mm). The studies showed that value of parameter \( Y \) practically does not depend on arterial pressure of persons aged over 50 with arterial hypertension.

**Results and Conclusions:** The suggested parameter \( Y \) is recommended to be used for elderly patients with arterial hypertension. It has a little dependence....
on arterial pressure and therefore gives more precise (in comparison to known parameters) evaluation of arteries’ elasticity.

**PP.33.114** ANTIHYPERTENSIVE AND CARDIOPROTECTIVE EFFECTS OF OLEA EUROPEA L. LEAF EXTRACT IN GENETICALLY HYPERTERTIVE RATS

Z. Miloradovic, N. Mihailovic-Stanojevic, J. Gracic Milanovic, M. Ivanov, D. Dekanski, D.J. Jovovic. Institute for Medical Research, Po Box 102, Belgrade-Serbia

**Objective:** The most antihypertensive drugs have significant side effects at common doses, which hardly open possibilities of natural products treatment known to have ameliorating effect on blood pressure. Olea europaea L. leaves have been used for the treatment of hypertension since ancient times. We have tried to elucidate acute effects of Olea europaea L.leaf extract (EFLA® 943) on blood pressure and cardiac haemodynamic components in genetically spontaneously hypertensive rats (SHR).

**Materials and Methods:** Adult male SHR, 6 months old (n = 9), were anesthetized with sodium pentobarbital (35mg/kg. b.m. i/p). Systolic (SAP), diastolic (DAP), mean (MAP) arterial pressure, pulse pressure (PP), heart rate (HR) and cardiac output (CO) were measured directly on CardioM III (Columbus Instruments, OH, USA). Olive leaf extract EFLA® 943, standardized to 18-26% of oleuropein was purchased from Fratramo Switzerland Ltd. (Wadenswil, Switzerland). EFLA® 943 was given by bolus injection (50mg/kg. b.m., dissolved in 0.2ml saline) in the jugular vein of SHR. The all mentioned haemodynamic parameters were measured 30 minutes after treatment again.

**Results:** Acute treatment with EFLA® 943 statistically reduced SAP (153.44 ± 32.70 vs. 240.67 ± 25.13 mm Hg), DAP (98.22 ± 20.64 vs. 149.67 ± 24.33 mm Hg) and MAP (121.44 ± 24.26 vs. 191.11 ± 25.29 mm Hg) in comparison to their start values. PP and HR were significantly lower after EFLA® 943 bolus (55.22 ± 17.56 vs. 91.00 ± 16.56 mm Hg and 369.56 ± 37.43 vs. 416.00 ± 37.43 beats/min). CO was significantly reduced after EFLA® 943 injection (171.60 ± 38.13 vs. 236.13 ± 41.31 ml/min/kg).

**Conclusion:** Both, blood pressure reduction and improvement of cardiac performance after Olea europaea leaf treatment expressed in this experimental model show potential for balanced therapy of severe human hypertension. These improvements can be connected to previously described nitric oxide stimulatory, angiogenesis converting enzyme inhibitory and calcium antagonistics properties of oleuropein (or its degradation products) the main constituent of the used extract.

**PP.33.115** EFFECT OF AGE AND GENDER ON BLOOD PRESSURE LEVELS, DEVELOPMENT OF RENAL HYPER TENSION AND BLOOD NITRIC OXIDE LEVELS IN WHITE RATS

V. Berdnikova, T. Amishchenko, O. Semychkin-Glushkovskaya, I. Semychkin-Glushkovsky, T. Sindyakova, S. Sinderev, O. Bikhova, A. Sjestnova. Saratov State University, Saratov-Russia

**Objective:** The aim of this study was to evaluate the level of blood pressure (BP), resistance to renal hypertension, and blood nitric oxide (NO) concentration in infantile, adult and old female and male rats.

**Methods:** Experiments were performed on rats of both sexes of the following groups: 6-week-old animals (n = 40), 7-month-old animals (n = 36), 25-month-old animals (n = 32). Renal hypertension in 50% rats was induced with catheter in the carotid artery for measuring of mean BP (BPm). The NO concentration was evaluated from the amount of nitrites in the blood (Griess reagent) by a spectrophotometric assay.

**Results:** The BPm levels depended on the age, but not on the gender of experimental rats. The BPm levels in infantile and, particularly, in old rats were higher than in adult animals. We didn’t find differences in BPm between females and males from various age groups. The resistance of animals from various groups to hypertension and age-related changes in this parameter depended on the gender of experimental rats. The degree of hypertension in infantile rats was higher than in the rats old animals. Both, blood pressure and hypertension rats were instrumented with catheter in the carotid artery for measuring of mean BP (BPm). The NO concentration was evaluated from the amount of nitrates in the blood (Griess reagent) by a spectrophotometric assay.

**Conclusion:** The BPm levels depended on the age, but not on the gender of experimental rats. The BPm levels in infantile and, particularly, in old rats were higher than in adult animals. We didn’t find differences in BPm between females and males from various age groups. The resistance of animals from various groups to hypertension and age-related changes in this parameter depended on the gender of experimental rats. The degree of hypertension in infantile rats was higher than in the rats old animals. Both, blood pressure and hypertension rats were instrumented with catheter in the carotid artery for measuring of mean BP (BPm). The NO concentration was evaluated from the amount of nitrates in the blood (Griess reagent) by a spectrophotometric assay.

**PP.33.116** PHALARIS CANARIANIS (BIRDSEED) REDUCES BLOOD PRESSURE IN SPONTANEOUSLY HYPERTENSIVE RATS: ROLE OF THE Tryptophan METABOLISM

C. Dos Santos Passos, O. Ykuta, L.N. Carvalho, R.R. Campos Jr, M.A. Boim. Federal University of São Paulo, São Paulo-Brazil

The birdseed Phalaris canariensis (Pc) has been popularly used as an antihypertensive agent. Pc is rich in tryptophan that can be metabolized by the indole-amine-2,3-dioxygenase (Ido) enzyme into kynurenine, a vasodilator agent. The aim of this study was to evaluate the effect of the aqueous extract of Pc (AEF) on arterial pressure and renal function in spontaneously hypertensive rats (SHR).

Also it was evaluated whether AEF treatment would be able to prevent the development of hypertension in SHR, by administering AEPI soon after weaning, i.e. before the establishment of hypertension. The effect of an Ido inhibitor (1-methyl-d-tryptophan) was also evaluated. Adult (3 months old) and young (3 weeks old) male SHR were used. Adult and young animals were divided into groups control (receiving water) and treated with EAPC (400mg/kg/day, p.o.) for 30 days. After this period treated groups were divided into 2 sub-groups: treated for another 30 days (EAPC 60) and a group which EAPC treatment was interrupted and animals received only water for 30 days (EAPC 30). The administration of the EAPC for 60 days produced significant reduction in mean arterial pressure (MAP, mmHg) in adult SHR (210 ± 1 vs 171 ± 4, p < 0.05) and minimized the increase in MAP in young SHR after 60 days (195 ± 4 vs 148 ± 4, p < 0.05). However, the interruption of treatment was followed by a gradual return of MAP to the baseline levels in both groups adult and young SHR. There was no significant change in renal function parameters or in the urinary sodium excretion among groups. Acute administration of Ido inhibitor prevented the reduction on MAP in adult SHR. Results suggest a vascular effect of Pc, and the metabolism of tryptophan by the Ido-lykurenene pathway may be involved in the hypotensive effect of Pc. Use of this natural product may be useful as adjuvant treatment of hypertension.
Results: Serum levels of AGE Abs in SHR increased significantly with age (p < 0.001). In WKY rats there were no significant differences between the 4- and 2-month old groups, only the comparison between the 8- and 2-month old groups showed significant differences (p = 0.017). In the 8 month old rats the level of AGE Abs in the SHR was significantly higher than in WKY (p < 0.001). The levels of AGE Abs in SHR and WKY correlated positively with age (r = 0.635, p = 0.005), (r = 0.420, p = 0.015). The same correlation was observed for the serum concentration of Fe and Cu in both strains. We didn’t find significant differences in CRP level in both groups.

Conclusions: These data show a positive correlation between increased levels of AGE Abs, as well as the serum levels of Fe and Cu as markers of oxidative stress, with increasing age and hypertension.

PP.33.118 ENDOTHELIN-CONVERTING ENZYME INHIBITOR PROMOTES RENOVASCULAR HYPERTENSION DEVELOPMENT IN RATS (ONE KIDNEY, ONE CLIP GOLDBLATT MODEL)

M. Ilatovskaya1, V.F. Pozdnev2, N.A. Medvedeva1. 1 Moscow State University, Faculty of Biology, Department of Human and Animal Physiology, Moscow, Russia; 2 Institute of Biomedical Chemistry of the Russian Academy of Medical Science, Moscow, Russia

Objective: Endogenous peptide endothelin-1 (ET-1) is known as a potential marker and probable participant of various cardiovascular disorders. The kidney is one of the structures where ET-1 synthesis is the greatest in the organism. It is believed that ET-1, excreted with urine, has renal origin. In kidneys, ET-1 inhibits water and Na reabsorption. Participation of ET-1 in renovascular hypertension pathogenesis has not been fully analyzed. Therefore, the aim of the present research was to determine whether ET-1 plays any role in the development of “1 kidney, 1 clip” experimental renovascular hypertension.

Methods and Design: Male Wistar rats (205 to 240 g) were used in the study. The procedures followed the FELASA/ICLAS guide. The rats were divided into 4 groups. The groups H and H-ECEI were subjected to right nephrectomy and the clip (0.26-0.27 mm) was placed on left renal artery. The groups Sham, Sham-ECEI underwent sham operation. After the operation groups H-ECEI and Sham-ECEI were administered to an endothelin-converting enzyme inhibitor (ECEI) PP-36 per os with drinking water in an amount 2.3 mg/kg a day for 4 weeks. ECEI underwent sham operation. After the operation groups H-ECEI and Sham-clip (0.26-0.27 mm) was placed on left renal artery. The groups Sham, Sham-clip underwent sham operation.

Conclusion: Together, these results suggest that the survival disadvantage of SHR cells to H2O2 stems from impaired antioxidant mechanisms and activated JNK proapoptotic signaling pathways. Supported by grant PIC/IC/83204/2007

PP.33.120 PHOSPHATIDYLCHOLINE-SPECIFIC PHOSPHOLIPASE C IS INVOLVED IN HYPOXIC PULMONARY VASOCONSTRICTION

I. Strielkov1, A. Khromov1, A. Solovev1, J. Ward1. 1 Institute of Pharmacology and Toxicology of Amurs of Ukraine, Kys-Kyure, King’s College, London-United Kingdom

Objective: The role of phosphatidylcholine-specific phospholipase C (PC-PLC) in hypoxic pulmonary vasoconstriction (HPV) has not been studied before, though there is ample indirect evidence of its involvement in this process [Witzenzhah M. et al., Europ. Resp. J. 2006; Cheng Y. et al., FEBS Lett. 2006]. The aim of the study was to determine the role of PC-PLC in HPV, and specifically to test the hypothesis that PC-PLC activation during hypoxia contributes to development of HPV.

Design and Method: Contractile force was measured using the wire myograph technique in rat small intrapulmonary arteries (IPA) preconstricted with an analogue of the prostaglandin PGH2, U46619 (20-220 nM), or in the absence of preconstriction. In vivo experiments were performed on rats with retrograde catheterization of the right ventricle and the left common carotid artery for systolic right ventricular pressure (RVP) and arterial pressure registration. Animals were anesthetized with chloralose/urethane (i.p.; 80 and 800 mg/kg respectively). In vivo experiments were approved by an ethical committee and conformed to The Rules of European Convention for the Protection of Vertebrate Animals used for Experimental and Other Scientific Purposes.

Results: Hypoxia (2-3 mmHg pO 2) provoked a biphasic contraction in preconstricted IPA. The first (transient) phase reached 44.2 ± 6.0% of the maximum contraction induced with 80 nM K+ (T0) (p < 0.01, n = 7), and the second (sustained) phase of HPV amounted to 16.4 ± 5.6% of T0 (p < 0.01). PC-PLC inhibitor, D609 (30 μM), reduced the transient phase of HPV by 67% (to 14.6 ± 1.8% T0, p < 0.01) and completely abolished the sustained phase (-6.6 ± 0.6% T0, p < 0.01) in preconstricted IPA. Hypoxia induced small but significant contraction in IPA in the absence of preconstriction, although phases were not clearly separable (to 5.0 ± 6.6% T0, p < 0.01, n = 7). D609 inhibited the development of HPV in the absence of preconstriction by 60% (2.0 ± 0.7% T0, p < 0.01). Phosphatidylinositol-specific phospholipase C inhibition with U73122 (3 μM) did not affect the tone of small intrapulmonary arteries in hypoxia in the absence of preconstriction (p > 0.05, n = 6). Hypoxic hypoxia in in vivo experiments was achieved by mechanical ventilation with gas mixture containing O2 = 10%, N2 = 90%. The RVP increase during hypoxia was biphasic. Peak RVP values during transient and sustained phase amounted to 140% and 132% of the initial level, respectively (41.7 ± 1.2 mmHg and 39.2 ± 1.3 mmHg vs. 29.7 ± 1.1 mmHg, p < 0.01, n = 10). Intravenous injection of D609 (5 mg/kg) 30 min before hypoxia prevented the development of pulmonary HPV (to 33.1 ± 1.8 mmHg, p < 0.05). D609 did not affect the decrease in arterial blood pressure in hypoxia.

Conclusions: The data obtained suggest the important role of PC-PLC in the development of both phases of HPV.

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PP.33.119 ENHANCED SUSCEPTIBILITY TO OXIDATIVE STRESS-INDUCED CELL DEATH IN HYPERTENSION IS LINKED TO REDUCED CATALASE ACTIVITY AND INCREASED JNK ACTIVATION

P. Gomes, S. Simão, J. Amaral, P. Soares-Da-Silva. Faculty of Medicine, University of Porto, Porto-Portugal

Objective: A growing body of evidence suggests that in hypertension there is an accumulation of reactive oxygen species (ROS), which may contribute to progressive cellular injury and renal dysfunction. Here we tested the hypothesis that sensitivity to exogenous hydrogen peroxide (H2O2) is enhanced in immunized renal proximal tubular cells from spontaneously hypertensive rats (SHR) as compared to its normotensive control Wistar Kyoto (WKY) rats.

Design and Method: Cells were treated with different concentrations of H2O2 for different periods of time to establish an oxidative stress model. The hydrolysis of calcine-AM by intracellular esterases was used as an index of cellular viability. Apoptosis was assessed by chromatin condensation, nuclear fragmentation, and caspase-3 like activation assays.

Results: We found that SHR cells were more sensitive to H2O2-induced cell death than were WKY cells. Lower survival in SHR cells correlated with increased chromatin condensation, DNA fragmentation, and caspase-3 activation, indicating apoptosis. WKY cells were able to degrade H2O2 faster than SHR, suggesting that higher antioxidant enzyme activity might be the basis for their resistance. In fact, catalase activity was downregulated in SHR cells, whereas glutathione peroxidase activity was similar in both cell types. We next examined whether MAPK signaling pathways contributed to H2O2-mediated apoptosis. Inhibition of c-Jun NHE-terminal kinase (JNK) with SP600125 was found to significantly decrease H2O2-induced apoptosis in WKY, but not in SHR cells. In addition, p54 JNK isofrom was robustly phosphorylated by H2O2, this effect being more pronounced in SHR cells.

Conclusions: Together, these results suggest that the survival disadvantage of SHR cells to H2O2 stems from impaired antioxidant mechanisms and activated JNK proapoptotic signaling pathways. Supported by grant PIC/IC/83204/2007
VASCULAR RESPONSE TO ATRIAL NUTRIETIC PEPTIDE CHRONIC TREATMENT IN HYPERTENSION


Abundant evidence indicates that high blood pressure is associated to endothe-
lial dysfunction and vascular damage. In previous studies we demonstrated that atrial natriuretic peptide (ANP) increases cardiac and renal nitric oxide synthase (NOS) activity in spontaneously hypertensive rats (SHR). The aim was to inves-
tigate vascular effects of chronic infusion with ANP in SHR and to compare this response in male (M) and female (F) rats.

Methods: 10 weeks-old M and F SHR were infused (14 days, subcutaneous osmotic pumps) with ANP (100 ng/hr/rat) or saline (S). Systolic blood pressure (SBP, mmHg) was recorded and nitrites and nitrates excretion (NOx, metabolic end products of NO, nmol/min/100g) was determined at the end of the experi-
mental period. The animals were sacrificed to perform morphological studies in thoracic aortic sections stained with haematoxylin-eosin (media thickness, μm; media/lumen ratio, μm/mm) and to determine fibrosis signs with picro-
sirius red and MassonsTrichromic (Score). Aortic NOS activity (μC L-arginine, pmol/g.tissue.min) was determined. Cardiac ventricle and kidney sections were stained by picrosirius red to evaluate perivascular collagen in coronary and renal arteries.

Results: *p < 0.01 vs M S. #p < 0.01 vs F S. Two-way ANOVA followed by Bonferroni’s post-hoc test. In coronary and renal arteries, perivascular collagen area was higher in male than in female SHR and ANP treatment reduced this parameter in both gender.

Conclusions: ANP treatment increased vascular NO system activity, improv-
ing aortic wall properties and modifying coronary and renal arteries remodel-
ing in SHR.

LEFT VENTRICULAR DIASTOLIC DYSFUNCTION AND NITRIC OXIDE LEVELS. EXPERIMENTAL STUDY IN SPONTANEOUSLY HYPERTENSIVE RATS

R. Cabrera Sole, L. Iturri, J. Cañas, M.J. Fernandez Martinez. Hospital General Universitario De Albacete, Albacete-Spain

Introduction: It is not well known all the mechanisms involved in the devel-
opment of diastolic dysfunction in the heart of hypertensive. Some researchers think that not only the hemodynamic aspect of hypertension are the cause of this situation, but also some biochemical aspects.

Objective: To determine nitric oxide levels (NO) and their relationship with the presence of left ventricular diastolic dysfunction (LVDD) in hyper-
tensive rats.

Material and Method: We studied 15 males spontaneously hypertensive rats (SHR) and compared with 10 males normotensive rats (WKY) (average weight of 250 gr, and 19 weeks old). All of them submitted to a cardiac catheterisa-
tion to measure the following parameters: aortic systolic and diastolic pressures (Ao SP, AoDP), and Dp/Dt index (Dp/Dt maximum, Dp/Dt minimum) to know diastolic function situation. Also, we took 4 cc of blood sample from the left ventricular cavity to measure levels of NO.

Results: Compared and expose here: Dp/Dtmax were 3513 ± 74 for WKY and 4198 ± 157 for SHR (p < 0.001) while Dp/Dt minimum were -3521 ± 773 and -4109 ± 175 respectively (p < 0.001). Ao sys Pres were 137 ± 16 for WKY versus 175 ± 20 for SHR (p < 0.001),while AoDiast Pres were 103 ± 1 and 133 ± 20 respectively (p < 0.001).Finally NO levels were 20.76 ± 16 for WKY and 10.75 ± 5.2* for SHR (p < 0.001).

Conclusions: Left hearts of SHR, present higher levels of NO comparing with those of WKY and also the former have more LVDD indicating that probably at least one of the mechanisms involved in the development of LVDD is the lower levels of NO in SHR.
left ventricle. In CoQ10 treated animals the same infarct foci (without aneurism) were located within left ventricle wall. In CoQ10 treated group CoQ10 level was raised two-fold in plasma (p < 0.01), 1.3-fold in myocardium (p < 0.02), 1.1-fold in liver (p < 0.001) in compare with saline group.

Conclusion: Single CoQ10 intravenous injection following chronic coronary occlusion elevates plasma and myocardial CoQ10 content, improves the survival rate, limits the infarct zone and the postinfarction hyper trophy of left and right ventricles in rats.

PP.33.125 MTOR INHIBITORS REDUCE THE IN VITRO MINERALIZATION OF VASCULAR SMOOTH MUSCLE CELLS

J. Prüfer1, M. Schuchardt1, M. Tölle1, M. Hönle1, W. Zidek1, M. Van Der Giet1. “Charité, Berlin-Germany, Novartis Pharma, Nürnberg-Germany

Objectives: Vascular disease like atherosclerosis and arteriosclerosis contributes to the high cardiovascular mortality among organ transplant recipients. The immunosuppressive regimes, necessary for preventing transplant rejection, have different side effects on the vascular system. The aim of this study was to investigate whether rapamycin (RAP), its synthetic analog (EVE) or its combination RPA/EVE diminished the mineralization of VSMCs in vitro. Therefore, it are also effective for the prevention of vascular calcification in an in vitro mineralization assay using vascular smooth muscle cells (VSMCs).

Methods: In vitro calcification in VSMCs were induced with calcification medium (CM: DMEM containing 4.5 g/L glucose supplemented with 15% FCS, 10 mM/L sodium pyruvate, 50 μg/mL Vitamin C, and 10 mM/L β-glycerophosphate) and dexamethasone (DEX, 100 nmol/L). Calcium deposition was quantified by O-cresolphthalein complexone method. Alkaline phosphatase (ALP) enzyme activity was measured by p-nitrophenol method.

Results: CM-induced mineralization of VSMCs could be enhanced in the presence of DEX. The calcification status was quantified by measuring the extra-cellular calcium content and visualized by Alizarin Red staining. CM ± DEX significantly induced extracellular calcium content in a time-dependent manner (21 days: 0.21 ± 0.02 vs. 0.07 ± 0.01 mg/dL). Pretreatment with RPA and EVE, respectively, could significantly and time-dependently decrease the mineralization of VSMCs by reducing extracellular calcium. For the precipitation of calcium phosphate, the activation of alkaline phosphate is necessary. CM and + DEX led to a significant and time-dependent increase in ALP enzyme activity (21 days: DEX 1.6-fold increase), which is significantly diminished by pretreatment with RPA/EVE (32/50% decrease).

Conclusions: In this study we were able to show that mTOR inhibitors like RPA/EVE diminished the mineralization of VSMCs in vitro. Therefore, it seems possible that RPA/EVE might be effective in the prevention of atherosclerosis after organ transplantation which would contribute to a better cardiovascular outcome of the patients.

PP.33.126 AGE- AND SEX-RELATED DIFFERENCES OF ATOVASTATIN EFFICACY DEMONSTRATED IN THE SUPERIOR MESENTERIC ARTERY OF RATS SUFFERING FROM HYPERTRIGLYCERIDEMIA AND HYPERTENSION

R. Sonikova1, B. Bacova1, J. Vlkovicova1, J. Navarova1, N. Tribulova1. 1Institute of Experimental Pharmacology and Toxicology, Bratislava-Slovak Republic, 2Institute For Heart Research, Bratislava-Slovak Republic

Background: Hypertriglyceridemia is an independent risk factor for coronary artery disease and it participates in the development of atherosclerosis and hypertension in humans. Hereditary hypertriglyceridemic rat (HTG) is a model of human hypertriglyceridemia. Statins are most widely prescribed drugs in treatment of dyslipidemia and they are effective in preventing vascular diseases. However, data about efficacy of statins in relation to age and gender are missing. The aim of this study was to compare the effect of atorvastatin (ATO) on endothelium-dependent relaxation of the superior mesenteric artery (SMA) of male vs female rats, as well as young vs old HTG rats.

Design and Methods: ATO was administered p.o. during two months to male, young and old HTG rats in the dose of 0.15mg/100g/day for 5-mth-old rats and 0.30mg/100g/day for 13-mth-old rats. Control rats (C) received vehicle. At the end of the experiment, blood pressure, body weight and plasma lipids were registered and endothelial function of SMA was tested in vitro under isometric conditions. We evaluated response of phenylephrine-precontracted rings to acetylcholine (ACH) before and after NO synthase inhibition with NG-nitro-L-arginine methyl ester (NO-resistant relaxation).

Results: We found that endothelium-dependent relaxation was greater in young female than in male SMA. However in old animals, the relaxation response of SMA to Ach was more pronounced in males than females. While responses of SMA to Ach of old male rats were not statistically different compared to young rats, responses of old female rats were much less than those of young ones. Administration of ATO resulted not only in improvement of lipid profile of HTG rats, but also it improved endothelium-dependent relaxation of animals. The most pronounced enhancement of Ach relaxation after the ATO treatment was recorded in old female rats. NO-resistant relaxation was not influenced either by gender and age of animals, or by treatment.

In Conclusion: Our results showed the influence of age and gender on endothelial function of SMA of HTG rats. It appears, the worse endothelial function the more effective ATO treatment. Supported by VEGA grants No. 2008608 and 20049889

PP.33.127 EFFECTS OF ALISKIREN ON BLOOD PRESSURE AND VENOUS THROMBOSIS IN RENOVASCULAR HYPERTENSIVE RATS

J. Hermanowicz, A. Mogielnicki, K. Kramkowski, W. Buszko. Medical University of Białystok, Białystok-Poland

Objective: High number of evidence links the RAS system with thrombosis. For example angiotensin converting enzymes inhibitors and angiotensin receptor blockers possess, independent on hemodynamic changes, antithrombotic activity. Aliskiren (AL), direct renin inhibitor belongs to a new very promising antihypertensive drug that effectively inhibits RAS.

The aim: of our study was to determine the influence of AL on stasis-induced venous thrombosis in renovascular hypertensive rats.

Design and Methods: Two-kidney one-clip (2K-1C) Wistar rats after six weeks developed hypertension systolic blood pressure (SBP) [156 ± 1.66 for 2K-1C vs 114 ± 8.02 mmHg in the sham-operated group; **p < 0.001]. Rats were treated with AL (10, 30 and 100 mg/kg) per os for 10 days. Venous thrombosis was induced by stasis of vena cava inferior. Group consisted of 5 to 7 animals.

Results: AL did not affect arterial SBP [164 ± 0.43, 163 ± 0.39, 164 ± 7.1 mmHg before vs 152 ± 5.42, 160 ± 3.92, 158 ± 4.78 mmHg after administration for doses 10, 30, 100 mg/kg respectively, no significant (ns), ns, ns] and diastolic blood pressure (DBP) [115 ± 3.56, 125 ± 4.8, 116 ± 7.53 mmHg before vs 109 ± 6.15, 117 ± 2.81, 122 ± 7.26 after administration for doses 10, 30, 100 mg/kg respectively; ns, ns, ns]. AL resulted in dose-dependent decrease of venous thrombus weight [0.39 ± 0.16, 0.31 ± 0.1 and 0.13 ± 0.09 mg for doses of 10, 30, 100 mg/kg respectively vs 0.6 ± 0.13 mg in the VEH treated group; ns, ns, *p < 0.05] and increase of t-PA plasma activity (1.56 ± 0.17, 1.62 ± 0.17, 1.93 ± 0.05 ng/ml for doses 10, 30, 100 mg/kg respectively vs 1.33 ± 0.14 in the VEH treated group; ns, *p < 0.05). No changes in PAI-1 activity was found (3.95 ± 0.33, 4.26 ± 0.21, 4.6 ± 0.41 ng/ml for doses 10, 30, 100 mg/kg respectively vs 4.06 ± 0.17 in the VEH treated group; ns, ns, ns).

Conclusion: Our results indicate that aliskiren possess similar to ACE-is the antithrombotic effects, not related to hemodynamic changes. This effect of aliskiren seems to be related to its fibrinolytic activity.

Acknowledgements: This work was supported by grant No:6277/B/ p01/2010/38 and POIG 01.02.02-00-069/09-00

PP.33.128 VASOPROTECTIVE EFFECTS OF PITAVASTATIN ON ENDOThelial PROGENITOR CELLS IN ISCHEMIC HINDLIMB

H. Takeshima1, N. Kobayashi1, W. Koguchi1, M. Ishikawa1, F. Sugiyama1, T. Ishimizu1, 1Dokkyo University School of Medicine, Tochigi-Japan

We investigate whether pitavastatin improves endothelial progenitor cells (EPCs) function via Rho-kinase, nitric oxide synthase (NOS), and PI3Kinase/Akt pathway in rat hindlimb ischemia. Unilateral hindlimb ischemia was surgically induced in rat hindlimb ischemia. Unilateral hindlimb ischemia was surgically induced in Wistar rats. After induced ischemia, rats received pitavastatin (P: 1 mg/kg/day), P plus L-NAME (NOS inhibitor) (PL: 100 mg/L), P plus fasudil (Rho-kinase inhibitor) (PP: 100 mg/kg/day), P plus wortmannin (PI3kinase inhibitor) (PW: 1 mg/kg/day), or vehicle for 3 weeks. Peripheral blood mononuclear cells were isolated, subjected to flow cytometric analysis to determine the number of circulating EPCs, and cultured to assess EPC colony formation. Blood perfusion by Laser Doppler Image was significantly higher in group P and PP than in group PL and PW. Capillary density by Isolectin-B4 stained of ischemic muscle was significantly increased in group P and PF compared with group PL and PW. Group P and PF significantly increased the number of colony formation of EPCs, but not group PL and PW. Levels of endothelial NOS (eNOS) and angiogenic factor such as VEGF, angiopoietin-1, and angiopoietin-2 protein expression by Western blot were sig-
EFFECTS OF PROXODOLOL AND CARVEDILOL ON BLOOD COENZYMES Q9 AND Q10 LEVELS IN ISCHEMIC RAT MODEL OF CONGESTIVE HEART FAILURE

O. Medvedev, D. Shashurin, E. Kalenikova. Faculty of Basic Medicine, Lomonosov Moscow State University, Moscow-Russia

Objective: It is known that certain β-adrenoceptor blockers in addition to their primary pharmacological effects have antioxidative activity. The substances with such additional activity usually demonstrate higher efficiency in treatment of congestive heart failure (CHF) due to increased inhibition of myocardial remodeling. The typical representative of such β-adrenoceptor blockers with antioxidative activity is carvedilol being a “gold standard” in CHF treatment.

The aim: of this study was to evaluate possible antioxidative activity of another representative of β-adrenoceptor blockers - proxodolol. Previous studies showed that this drug is also extremely efficient in CHF treatment and demonstrates similar rate of inhibition of myocardial remodeling with carvedilol. It was suggested that such comparable efficiency could be caused also by antioxidative activity of proxodolol.

Design and Method: CHF was modeled in rats by ligation of coronary artery. Operated animals were randomly divided into groups either treated by carvedilol or proxodolol either fake treated (control) group, also sham-operated group was formed. Each group included 10 animals. Carvedilol and proxodolol were administered in 2 mg/kg doses 6p twice daily for 28 days, control and sham groups were treated by 0.9% NaCl. Blood samples were collected from each animal at baseline (before surgery) and after 28 days treatment period. Plasma CoQ9 and CoQ10 concentrations were measured by HPLC with electrochemical detection. Statistical analysis was performed with two-tailed t-test. Animals with low size of infarct zones or visual signs of post-surgical infections were excluded from analysis.

Results: At baseline all experimental animals had comparable plasma CoQ9 and CoQ10 levels as well as CoQ9/CoQ10 ratio. After CHF modeling and experimental treatment CoQ9 concentrations decreased in all groups (p < 0.05 in proxodolol group) except carvedilol group where it remained at the same level. CoQ10 concentrations decreased equally in all groups (p < 0.01). CoQ9/CoQ10 ratio increased in all groups, but due to absence of CoQ9 fall described above the increase of this ratio in carvedilol group (p < 0.001) was higher than in other groups (p < 0.05 in control and sham groups and trend in proxodolol group).

Conclusions: No evidences of antioxidative activity of proxodolol were found. Antioxidative effect of carvedilol was confirmed by absence in carvedilol group of blood CoQ9 fall observed in other groups.

MODULATION OF NITRIC OXIDE PRODUCTION AND OXIDATIVE STRESS BY A LOW DOSE OF L-NAME IN RATS WITH GENETIC PREDISPOSITION TO HYPERTENSION

I. Bernatova1, A. Puzserova1, J. Kopincová1. 1Institute of Normal and Pathological Physiology, Slovak Academy of Sciences, Bratislava-Slovak Republic; 2Department of Physiology, Jessenius Faculty of Medicine, Comenius University, Martin-Slovak Republic

Nitric oxide synthase (NOS) inhibitor NG-Nitro-L-arginine methyl ester (L-NAME) activated NO production in Wistar rats (1) when administered in the low dose (1.5 mg/kg/day). Thus the question arises if NO production can be accentuated in vivo in order to reduce blood pressure (BP) in rats with genetically elevated BP. To test this hypothesis adult borderline hypertensive rats (BHR) were treated with L-NAME 1 mg/kg/day, in drinking water, for 4 or 10 weeks, respectively. Spontaneously hypertensive rats (SHR) were treated with 0.1 mg/kg/day L-NAME for 10 weeks. BP and heart rate were determined non-invasively by tail-cuff method. NOS activity was determined by conversion of [3H]-L-arginine in the hypothalamus, aorta, left ventricle (LV), liver and kidney. In BHR, four-week L-NAME administration significantly reduced NOS activity in the hypothalamus and aorta, without change in the LV. Ten-week treatment led to activation of NOS in the aorta without improvement of NO production in both hypothalamus and LV. In the liver and kidney, NOS activity was rather reduced after 4 weeks but it was significantly increased after 10 weeks of L-NAME treatment vs. control. In SHR, 10-week L-NAME administration led to reduction of NO production in the hypothalamus but elevation was observed in the LV, liver and kidney. No effect was observed in the aorta. Interestingly, 10-week L-NAME treatment reduced oxidative stress (determined as the level of conjugated dienes) in the LV, kidney and liver of both BHR and SHR. Despite it, L-NAME significantly elevated average BP and reduced average heart rate in both BHR and SHR after 4 and 10 weeks of treatment in both doses investigated. In conclusion, 10-week L-NAME treatment (1 and 0.1 mg/kg/day, respectively) increased NO production and reduced oxidative stress in the given peripheral tissues in BHR and SHR. However, these alterations failed to reduce BP, supposedly due to reduced central NO production. Supported by VEGA 2/0084/10, 1. Bernatova et al. (2007) Physiological Research 56(Suppl2), S17-S24.
POSTER SESSION

GENETICS/MOLECULAR BIOLOGY

PP.34.132 GENETIC POLYMORPHISM DETERMINES CORONARY ARTERY DISEASE (CAD) AND ACUTE CORONARY SYNDROME (ACS) IN HYPERTENSIVE PATIENTS: A DOUBLE-CENTRE STUDY OF TWO CANDIDATE GENES AND THEIR VARIANTS

J. Ursuliak, I. Sydorchuk, A. Sydorchuk, R. Sydorchuk, I. Sydorchuk. Bucovinian State Medical University, Chernivtsi-Ukraine

Objective: To determine probability of CAD and ACS appearance in relation to angiotensin converting enzyme (ACE I/D) and endothelial-NO-synthase (eNOS G894T) genes’ polymorphisms in Eastern European population.

Design and Methods: Double-centre West Ukrainian investigation involves 249 mildly severe hypertensive (AH) patients: 70 with CAD (27 with ACS, 43 with SA), 45 with severe hypertensive (AH) patients: 70 with CAD (27 with ACS, 43 with SA). Categorical results of genotypes compared with c². Genes’ CAD vs AH) was calculated with Bayes’ equation based on specificity, sensitivity. Analyses were performed. Probability of ACS and CAD gravity (ACS vs SA, SA vs AH) was estimated. Highly negative prognostic value for CAD (= 75%) in AH patients was in D-allele carriers of ACE gene and TT-genotype carriers of eNOS gene (p < 0.001). Non-significant correlations were estimated between PP and Aixao; r = 0.587, p < 0.001 between PP and Aixao; r = 0.475, p < 0.001 between PP and PWVao; r = 0.456, p < 0.001 between PP and PWVao. Non-significant correlations were estimated for PP and Aix (r = 0.077, p = 0.057 between PP and Aix; r = 0.078, p = 0.055 between PP and PWVao; r = 0.083, p = 0.055 between PP and PWVao).

Conclusions: SBPao, PP and PPao are moderately heritable. High significant correlations were estimated between arterial stiffness, SBPao and PPao suggesting a genetic background. (Supported by Medexpert Ltd, Twins Days Festival Committee, Hungarian Scholarship Board Office, Ministry for Foreign Affairs Republic of Italy.)

Table 1. Parameter Estimates and 95% CIs of the Best-Fitting Univariate Models

<table>
<thead>
<tr>
<th>Measure</th>
<th>h²</th>
<th>95% CI</th>
<th>c²</th>
<th>95% CI</th>
<th>e²</th>
<th>95% CI</th>
<th>Model fit (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBPao, mm Hg</td>
<td>0.455</td>
<td>0.105-0.600</td>
<td>0.078</td>
<td>0.000-0.388</td>
<td>0.467</td>
<td>0.382-0.546</td>
<td>0.1464</td>
</tr>
<tr>
<td>PP, mm Hg</td>
<td>0.466</td>
<td>0.298-0.580</td>
<td>0.000</td>
<td>0.000-0.027</td>
<td>0.534</td>
<td>0.432-0.625</td>
<td>0.2569</td>
</tr>
<tr>
<td>PPao, mm Hg</td>
<td>0.399</td>
<td>0.014-0.539</td>
<td>0.050</td>
<td>0.000-0.385</td>
<td>0.551</td>
<td>0.447-0.661</td>
<td>0.4399</td>
</tr>
</tbody>
</table>

h² indicates heritability; c², shared environmental variance component; e², unique environmental variance component; Model fit (p value)

PP.34.133 PRAISE A FAIR DAY WITH TWINS: CENTRAL BLOOD PRESSURE, PULSE PRESSURE AND ARTERIAL STIFFNESS

A. D. Tarnoki1, D. L. Tarnoki1, M. A. Stazi2, E. Medda2, F. Fanelli3, A. Lannert7, A. A. Molnar8, L. Littvay9, Z. Garami10, V. Berczi1. 1Department of Radiology and Oncotherapy, Semmelweis University, Budapest-Hungary, 2Department of 2-adrenergic receptor gene and essential hypertension among the Han Chinese population. "A META-ANALYSIS"

S. Wen1, Y. Lou1, Y. Liu2, H. Wu3, Z. Wang3, K. Liu4, Y. Li5, Z. Li6, 7Anzhen Hospital, Capital Medical University, Beijing-China, 8School of Life Sciences, Fudan University, Shanghai-China

Objective: To evaluate the relationship between A46G and C79G polymorphisms in the β2- adrenergic receptor gene and essential hypertension among the Han Chinese population.

Methods: We conducted a computerized literature search of PUBMED, EMBASE, CNKI, Wanfang Data and VIP databases (prior to May 2010). Fifteen articles studied on A46G polymorphism and ten on C79G polymorphism of Pharmacy, Budapest-Hungary, 2Department of Cardiology, State Health Center, Budapest-Hungary, 3Centennial European University, Budapest-Hungary, 4The Methodist Hospital Debakey Heart and Vascular Center, Houston-USA

Objective: Central blood pressure (SBPao), peripheral and aortic pulse pressure (PP, PPao) have consistently been shown to be a more powerful predictor of cardiovascular events than traditional cuff blood pressure measurements taken at the arm. Twin studies by comparing identical with non-identical twins produce information on the relative contribution of genes and environment, and how the two interact.

Design and Method: 230 monozygotic (MZ) and 159 dizygotic (DZ) (Italian, Hungarian and American) twin pairs underwent oscilometric arterial stiffness test (TensiMed Arteriograph, TensiMed Ltd., Budapest) to measure Augmentation index on brachial artery and aorta (Aixbra, Aixao), SBPao and pulse wave velocity on aorta (PWVao) which showed strong correlation with the invasively obtained values. Statistical analysis was conducted using MPlus Versions.010The Methodist Hospital Debakey Heart and Vascular Center, Houston-USA, 10Semmelweis University, Faculty of Pharmacy, Budapest-Hungary, 1Department of Cardiology, State Health Center, Budapest-Hungary, 2Centennial European University, Budapest-Hungary, 3The Methodist Hospital Debakey Heart and Vascular Center, Houston-USA, 7Semmelweis University, Faculty of Pharmacy, Budapest-Hungary, 8Department of Cardiology, State Health Center, Budapest-Hungary, 9School of Life Sciences, Fudan University, Shanghai-China, 10Semmelweis University, Faculty of Pharmacy, Budapest-Hungary.
phism were detected through literature search. The case-control studies of the β2-adrenergic receptor gene and essential hypertension among the Han Chinese population were identified according to the including criteria and the excluding criteria. The association between these two polymorphisms and essential hypertension was examined by RevMan4.2 software and publication bias was investigated by Stata7.0 software.

Results: Eight articles including 1078 hypertensive patients and 778 normotensive subjects studied on A46G polymorphism and six articles including 1367 cases and 1016 controls on C79G polymorphism were included in the current study. Meta-analysis showed that there was significant association between A46G polymorphism and essential hypertension in G/G (AA + AG) comparison (fixed-effect model, OR = 1.35, 95% CI: [1.04-1.74], p = 0.02) as well as in G/C comparison. A replication study for the V434M polymorphism was performed in 924 Chinese recruited from a workplace setting. Urinary 20-HETE concentration was determined by ELISA in a randomly selected subsample of 318 JingNing subjects.

Results: Despite that genetic associations were not significant (p = 0.12) in all JingNing participants, there was significant (p≤0.02) interaction of the V434M polymorphism with sex and pulse rate in relation to arterial wave reflections, as measured by augmentation indexes (AIx) in Chinese.

Methods: We performed arterial measurements by SphygmoCor and genotyped three CYP4F2 polymorphisms (V434M, rs3093089, and rs3093098) by PCR-RFLP in 1421 participants enrolled in the JingNing Population Study. A replication study for the V434M polymorphism was performed in 924 Chinese recruited from a workplace setting. Urinary 20-HETE concentration was determined by ELISA in a randomly selected subsample of 318 JingNing subjects.

Conclusion: Significant association was found between A46G polymorphism and essential hypertension in Han Chinese population, whereas no association could be found between C79G polymorphism and essential hypertension among Han Chinese population.

PP.34.135 PERIPHERAL AND CENTRAL AUGMENTATION INDEXES IN RELATION TO THE CYP4F2 POLYMORPHISMS IN CHINESE

B. Hu. Rui Hospital, Shangha-China

Objective: Cytochrome (CYP) 4F2 isoform is a key metabolizing enzyme for the renal 20-hydroxyeicosatetraenoic acid (20-HETE), which, as an endogenous vasoconstrictor, may influence properties of the peripheral muscular arteries and arterioles. We therefore investigated the CYP4F2 polymorphisms in relation to arterial wave reflections, as measured by augmentation indexes (AIx) in Chinese.

Methods: We performed arterial measurements by SphygmoCor and genotyped three CYP4F2 polymorphisms (V434M, rs3093089, and rs3093098) by PCR-RFLP in 1421 participants enrolled in the JingNing Population Study. A replication study for the V434M polymorphism was performed in 924 Chinese recruited from a workplace setting. Urinary 20-HETE concentration was determined by ELISA in a randomly selected subsample of 318 JingNing subjects.

Results: Despite that genetic associations were not significant (p ≤0.02) interaction of the V434M polymorphism with sex and pulse rate in relation to arterial wave reflections, as measured by augmentation indexes (AIx) in Chinese.
Results: No statistically significant differences were found between the compared groups in the polymorphisms of these genes. However, in the polymorphism C825T, the T allele carriers (CT / TT vs. CC) were associated with an increased BMI and those bearing the C allele appeared to belong more in non-dippers than in the dippers in the prehypertensive group. The HOMA index was higher in the hypertensive and prehypertensive versus in the control group (hypertensive vs. control p = 0.006, prehypertensive vs. control p = 0.016) and similar results were found for insulin (hypertensive vs. control p = 0.012, prehypertensive vs. control p = 0.001) without statistical significance between the first 2 groups (hypertensive vs. prehypertensive p = 0.522). Additionally there was a statistically significant difference between the control group and hypertensive and prehypertensive ones in cholesterol (control vs. hypertensive p = 0.001, control vs. prehypertension p = 0.018) and triglycerides (control vs. hypertensive p = 0.0001, control vs. prehypertension p = 0.007). Differences were also noted between control group versus hypertensive regarding to value of HDL (hypertensive vs. control p = 0.005) and LDL (hypertensive vs. control p = 0.013).

Conclusion: This study failed to demonstrate specific SNPs with blood pressure and insulin resistance in the 3 groups. However, T allele carriers of the polymorphism C825T have an increased BMI, and carriers of the C allele seemed to belong to the non-dippers. Similarly, increased insulin resistance and dyslipidemia more common in the hypertensive and prehypertensive population.

PP.34.139 -374 T/A POLYMORPHISM IN THE RECEPTOR OF ADVANCED GLYCATION END PRODUCT (AGER) GENE IS ASSOCIATED WITH ONSET OF DIABETES MELLITUS, ATHEROSCLEROSIS, AND RENAL DYSFUNCTION IN JAPANESE HYPERTENSIVES T. Kawai, K. Kamide, N. Katoh, Y. Tataru, R. Oguro, K. Sugimoto, T. Katsuya, M. Ohtsuki, H. Rakugi. Osaka University Graduate School of Medicine, Suita-Japan

Objective: Receptor of advanced glycation end product (AGER/RAGE) is reported to be linked to age-related or diabetes-related chronic inflammatory diseases such as atherosclerosis. Previous studies have investigated the correlations between -374 T/A polymorphism and diabetic nephropathy, diabetic retinopathy, and ischemic heart disease, but the impact of this polymorphism remains controversial. Our aim in this study was to show how -374 T/A polymorphism in AGER had an impact on systemic vascular damage and renal function in Japanese patients with hypertension.

Design and Method: Study subjects were a total of 468 essential hypertensive patients (mean age: 60.9 years) in whom their genotyping could be successfully performed from the NO-invasive Atherosclerotic evaluation in Hypertension (NOAH) study cohort. First, we examined prospectively the correlation of -374 T/A AGER and frequency of total mortality, cardiovascular events, and malignant neoplasm. Second, we investigated the correlation between -374 T/A AGER and multiple clinical parameters, including pulse wave velocity (PWV), ultrasonography for heart and carotid artery and fundus examination to evaluate the systemic atherosclerotic complications.

Results: In Kaplan-Meier analysis, we could not find significant effect of -374 T/A AGER on frequency of total mortality, onset of cardiovascular events or malignant neoplasm. Carriers with A allele showed significantly higher prevalence of diabetes mellitus (DM) and lower estimated glomerular filtration rate (eGFR) than subjects without A allele, but there were no significant difference in status of other diabetic complications. In subjects with DM, carriers with A allele showed significantly lower eGFR and higher PWV, however, there were no such significant correlation in subjects without DM. These significant correlations between -374 T/A AGER and various parameters were mostly seen in male subjects but not in female.

Conclusions: In Japanese hypertensive patients, carriers with A allele of -374 T/A AGER is thought to be a risk of atherosclerosis and reduced renal function, especially in male patients with DM.

PP.34.140 DYNAMIC EXPRESSION OF PROTEINS ASSOCIATED WITH ADVENTITIAL REMODELING IN ADVENTITIAL FIBROBLASTS FROM SPONTANEOUSLY HYPERTENSIVE RATS S. Guo, P. Gao, D. Zhu. Shanghai Key Laboratory of Vascular Biology, Shanghai-China

Aim: Vascular remodeling has traditionally been thought to occur through abnormalities in vascular endothelial and media cells. In recent years, however, evidence has emerged suggesting that the vascular adventitia is the “first responder” and that adventitial remodeling is the initiator of vascular remodeling in a variety of cardiovascular disease carriers (vascular adventitial fibroblasts (AFs) from spontaneously hypertensive rats (SHR)) was found to proliferate faster than that of Wistar Kyoto rats (WKY), and increased cell density in the adventitia of stroke-prone SHR was revealed by confocal microscopy. Moreover, we also found that the migration of SHR-AFs was always greater than that of WKY. This study was aimed to identify proteins that could potentially be involved in increased proliferation and migration in vascular adventitial fibroblasts (AFs) from SHR.

Methods: AFs were isolated from thoracic aortas of 4-, 8-, 16-, and 24-week-old male SHR and Wistar-Kyoto (WKY) rats and cultured to passage 4. Proteomic differential expression profiles between SHR-AFs and WKY-AFs were investigated using 2-D electrophoresis (2-DE), whereas gel image analysis was processed using Image Master 2D Platinum. Protein spots were identified using matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF-MS). Expression levels of annexin A1 in AFs and aortas from SHR and WKY rats were detected with Western blotting and immunofluorescence techniques.

Results: In 4-, 8-, 16-, and 24-week-old SHR-AFs, 49, 59, 54, and 69 protein spots were found to have significant differences from the age-matched WKY-AFs. Fourteen spots with the same changes in patterns were analyzed in 4-, 8-, 16-, and 24-week-old SHR-AFs with mass spectrometry. Except for cytoskeleton proteins such as tubulin beta 5, it was found that annexin A1, translation elongation factor Tu, endoplasmic reticulum protein 29 and calcium-binding protein 1 were expressed in vascular AFs and their levels changed significantly in SHR-AFs compared with those in WKY-AFs. A decrease in annexin A1 in SHR-AFs was confirmed with Western blotting and immunofluorescence staining at the cell and tissue levels.

Conclusion: The application of proteomic techniques revealed a number of novel proteins involved in adventitial remodeling of AFs from SHR, which provide new mechanisms responsible for the occurrence and development of hypertension and potential targets for influencing vascular remodeling in hypertension.

PP.34.141 GENETIC VARIATIONS SCREENING OF TNNT2 AND MYH7 GENE IN A COHORT OF PATIENTS WITH HYPERTROPHIC AND DILATED CARDIOMYOPATHY M. Jachymova, A. Muravskova, T. Palecek, P. Kuchynka, H. Rehakova, S. Magaye, A. Kral, Z. Zima, K. Horky, A. Linhart. First Faculty of Medicine and General Hospital, Charles University, Prague 2-Czech Republic

Objectives: The mutations in genes for β-myosin heavy chain (MYH7), and for troponin T (TNNT2) represent the majority of currently identifiable disease-causing mutations of hypertrophic (HCM) and dilated (DCM) cardiomyopathy. The aim of the study was to analyze both MYH7 and TNNT2 genes in patients with HCM and DCM diagnosis to improve the diagnostic and genetic counseling in affected families.

Methods: All of the 15 exons and their flanking regions of TNNT2 gene were analysed by DNA sequence analysis and mutations R403L, R403Q, R403W, R663S, R663C in MYH7 gene were screened by RFLP analysis in 174 patients with HCM and DCM diagnosis.

Results: We identified genetic variations in TNNT2 exon areas in 56 patients and genetic variations in TNNT2 intron areas in 164 patients. Two patients were found to carry unique mutations in TNNT2 gene.

Conclusions: The prevalence of malignant TNNT2 gene mutations in our study cohort of patients with HCM born in Central Europe was less than 2%. Nevertheless, specific genetic diagnostics of HCM is of marked value as it allows accurate family screening with identification of affected subject event with patientistic expression of the disease. The study was supported by research projects MZO 0000VFN2005 (0000064165).

PP.34.142 PHARMACOGENETICS IN ANTIDYSLIPIDEMIC TREATMENT: A TOOL TO PREDICT CREATINE KINASE ELEVATION DURING STATIN TREATMENT? M. Ferrari, L. Giusti, F. Marino, M. Serrati, L. Castiglioni, V. Macchi, S. Contini, G. Interlandi, M. Cosentino. University of Insubria, Faculty of Medicine, Department of Clinical Medicine, Varese-Italy

Objective: Statins are widely prescribed medications for reducing cholesterol biosynthesis and cardiovascular risk. Although rhabdomyolysis is a very unusual event, the use of statins may be associated with creatine kinase (CK) elevations above the upper normal limits (UNL). Genetic variations affecting genes involved in statin transport (such as: ABCB1 coding for p-glycoprotein; ABCG2 coding for...
for breast cancer resistance protein and SLCO1B1 coding for organic anion transporter protein) may alter duration and magnitude of drug exposure. However, role of single nucleotide polymorphisms (SNPs) in predicting side effects associated with statins remains to be established. The aim of present work is to correlate the finding of CK elevations during statin treatment with common SNPs, alone or in combinations, in genes involved in pharmacokinetics of these drugs.

**Methods:** We studied dyslipidemic patients treated with statins and followed by our Lipid Clinic. Patients with renal or liver disease, or untreated diabetes were excluded. Patients were genotyped for the following SNPs: ABCB1 C1236T, ABCB1 C3435T, ABCG2 C2412A and SLCO1B1 T521C all associated with reductions in transport activity. Genotyping was performed by Real Time PCR using TaqMan probe. Patients phenotype was defined according to specific SNPs combinations in genes involved in statin transport as follow: Low Transporters: patients carriers at least 6 polymorphic alleles (on 4 genes coding for statin transporter protein analyzed); Intermediate Transporters: patients carriers 4-5 polymorphic alleles and Extensive Transporters: patients carriers no more than 3 polymorphic alleles.

**Results:** So far 16 consecutive patients with CK elevations above the UNL (mean ± SD: 678 ± 88 UI/L) during statin treatment (simvastatin 9 patients; atorvastatin 5 patients and rosuvastatin 2 patients) were enrolled; 15 matched patients without CK elevation (mean ± SD: 78 ± 64 UI/L) during at least one year of statin treatment (simvastatin 8 patients; atorvastatin 6 patients and rosuvastatin 1 patient) were enrolled as controls. There is no correlation between individual SNPs and CK elevation. However 5 (32%) patients with CK elevation had Low Transporter phenotype, while 1 (6%) was Extensive Transporter; by contrast only one (7%) patient without CK elevation was Low Transporter, while 6 (40%) had a Extensive Transporter phenotype (χ² test: P = 0.041).

**Conclusions:** Preliminary results suggest that patients with Low Transporter phenotype(s) are at higher risk of CK elevation, suggesting that the genotyping strategy could be of considerable clinical interest for individualized statins treatment.

**PP.34.143** HV1 REGION OF MTDNA IS A POSSIBLE MARKER OF PREDISPOSITION TO ESSENTIAL HYPERTENSION IN UZBEK HYPERTENSIVE PATIENTS

G. Abdullaeva, A. Nagay, G. Khamidullaeva. Republican Center of Cardiology, Tashkent-Uzbekistan

**Aim:** to study a relationship of C344T polymorphism in CYP1B1 gene and M235T polymorphism in AGT gene with mutations in hypervariable region 1 (HV1) of mitochondrial DNA (mtDNA) in Uzbek hypertensive patients.

**Methods:** study included 50 Uzbek men with I-II grades of essential hypertension (EH) (ESH 2007) in the mean age of 49.1 ± 83 years. Mean duration of disease was 5.6 ± 2.3 years. Polymerase chain reaction restriction fragment length polymorphism analysis (PCR-RFLP) was used for evaluation of genes polymorphism: M235T of AGT, C344T of CYP1B1. Mutations in HV1 of mtDNA were identified by sequencing.

**Results:** identified combination of mytotype16129 and 16223 belongs to Caucasian haplogroup I. The presence of mutations in 16129, 16226, 16298, 16327 sites were associated with “damaging” T-allele of C344T polymorphism of CYP1B1 gene. The combination frequency of T-allele of C344T polymorphism in I-II grades of EH was 50% in 16129 position of mtDNA, G→T substitution in 16126 position of mtDNA, G→T substitution in 16223 position of mtDNA, T→C substitution in 16228 position of mtDNA and C→T substitution in 16327 position of mtDNA was 62.5%, 66.7% cases, 80% cases, 87.5% cases and 75% cases respectively. The C→T mutation in 16223 position was associated with “damaging” T-allele of M235T polymorphism of AGT gene in 53.8% cases.

**Conclusion:** This results testify that revealed mutations in HV1 of mtDNA (16129, 16126, 16223, 16298, 16327) might have effect on development of EH which demands further investigation.

**PP.34.144** C285T POLYMORPHISM OF GNB3 GENE AND SALT SENSITIVITY IN PATIENTS WITH ESSENTIAL HYPERTENSION

A. Nagay, G. Khamidullaeva, G. Abdullaeva. Republican Center of Cardiology, Tashkent-Uzbekistan

It is well known that many genetic factors underlie the manifestation of essential hypertension (EH) which is partly due to the influence of nuclear DNA, as well as specific individual salt-sensitivity.

**Objective:** to investigate the distribution of C285T polymorphism of GNB3 gene and salt-sensitivity in patients with EH of Uzbek nationality.

**Method:** 148 representatives of Uzbek nationality suffering from arterial hypertension with I-II degree (WH0/ISH, 2003) have been studied, average age was 48.2 ± 9.2 years. Investigation of the gene GNB3 was produced by PCR-RFLP method. Determination of salt-sensitivity was performed by the method of R. Henkin.

**Results:** the analysis took into account concentration of NaCl from all samples used in evaluating of taste sensitivity to salt (STS). The study noted the association of CC genotype of the gene GNB3 with low STS in patients with EH. Analysis of patients with EH showed, that the average concentration of NaCl in carriers of CC genotype was 2.2 times higher compared with native CT-genotype 1.29 ± 0.8% vs. 0.58 ± 0.3% (p = 0.001) and 9.9 times higher as compared with carriers of TT genotype 1.29 ± 0.8% vs. 0.13 ± 0.1% (p = 0.013). In this case, there was a tendency to increase the concentration of NaCl in combination with C-allele of GNB3. Low taste sensitivity to salt and excess salt regime is more common in patients with EH with the C-allele (CC and CT genotype) of the gene GNB3.

**Conclusion:** the association between carriage of C-allele (CC genotype) of the gene GNB3 and low salt-sensitivity to salt in patients with EH was found.

**PP.34.145** THE A640G POLYMORPHISM OF CYBA ASSOCIATES WITH PHAGOCYTIC NADPH OXIDASE AND SUBCLINICAL ATHEROSCLEROSIS IN TYPE 2 DIABETES

M.U. Moreno1, G. San José1, A. Fortuño1, J. L. Miguel-Carrascó2, Ó. Beloqui3, J. Diez4, Guillermo Zalba2. ‘Centre for Applied Medical Research, University of Navarra, Pamplona-Spain, 1Department of Internal Medicine, University Clinic, University of Navarra, Pamplona-Spain

**Objective:** Oxidative stress is implicated in diabetes. The reduced nicotinamide adenine dinucleotide phosphate (NADPH) oxides are the main source of superoxide anion in phagocytes and vascular cells. The p22phox subunit is a key component of the NADPH oxidase systems. Genetic variants of CYBA, the human p22phox gene, associated with cardiovascular disease. We investigated the association of the A640G polymorphism with diabetes and its impact on phagocytic NADPH oxidase-dependent superoxide production and subclinical atherosclerosis.

**Design and Methods:** We studied 1212 subjects from the general population in which clinical parameters including carotid intima-media thickness (cIMT) were assessed. The A640G polymorphism was genotyped by TaqMan probes. Besides, in a subset of 496 subjects, the NADPH oxidase-dependent superoxide production in peripheral blood mononuclear cells was assessed by chemiluminescence.

**Results:** The prevalence of the GG genotype of the A640G polymorphism was significantly higher in type 2 diabetic patients than in non-diabetic subjects, even after adjusting for confounding factors. Moreover, peripheral blood mononuclear cells from diabetic GG patients presented higher NADPH oxidase-dependent superoxide production than those of diabetic AA/AG patients. Furthermore, within the diabetic group, GG patients presented higher cIMT levels than AA/AG patients.

**Conclusions:** The A640G CYBA polymorphism may be a marker of oxidative stress risk and may be indicative of subclinical atherosclerosis in type 2 diabetes.

**PP.34.146** PATTERN IDENTIFICATION/SYNDROME DIFFERENTIATION: GENETIC ASSOCIATION OF CODING REGION POLYMORPHISM OF PON1 AMONG KOREAN STROKE PATIENTS

J. H. Lim1, M. H. Cha1, M. M. Ko1, B. K. Kang1, H. Y. Ko2, O. S. Bang1. ‘Korea Institute of Oriental Medicine, Daejon-South Korea, 1Department of Internal Medicine of Oriental Medical College, Semyung University, Chungju- South Korea

Subjects with stroke have various syndromes and symptoms. Korean Oriental Medicine (KOM) combines the several syndromes and symptoms occurred in stroke patients and classify four pattern identification/syndrome differentiation (PS), Heat and fire, Dampness and phlegm, Yin-deficiency and Qi-deficiency. Among of them, dampness and phlegm (DP) relates with obesity and hyperlipidemia. Paraoxogenase 1 (PON1) has known to play a role in the development and progression of atherosclerosis.

**Objective:** To evaluate the association between PON1 polymorphisms and different stroke syndromes in Korean stroke patients.

**Method:** 114 Korean stroke patients were recruited in this cross-sectional study. DNA was collected from the peripheral blood samples and genotyped for the A55M, M192I, and L55M polymorphisms of PON1 using polymerase chain reaction (PCR) and restriction fragment length polymorphism (RFLP). The associations between these SNPs and the four stroke syndromes were assessed using logistic regression analysis.

**Results:** The frequency of the A55M polymorphism was significantly higher in the DP syndrome compared to the other three syndromes (p = 0.001). The M192I polymorphism was not associated with stroke syndromes. The L55M polymorphism was significantly associated with the HS syndrome (p = 0.001) but not with the DP, DS, and NS syndromes.

**Conclusion:** The A55M polymorphism of PON1 may be a marker of HS syndrome, while the L55M polymorphism may be associated with the DP syndrome. Further studies are needed to confirm these findings.
(p = 0.015, p < 0.001, respectively) and total cholesterol and triglyceride in serum were also higher in DP group. Relation of PON1 polymorphisms on DP among hypertensive subjects, fifty nine in DP group and one hundred forty in non-DP group, showed that frequency of M allele in DP group was significant higher than non-DP group [OR = 4.032 (95% CI, 1.595-10.204), p = 0.0032], and subjects with M allele was also larger in DP group than non-DP group [OR = 3.023 (95% CI, 1.512-10.701), p = 0.0032]. But other SNPs in promoter region and Q192R in coding region were not different between DP and non-DP group. To confirm the association of L55M polymorphism with DP, we replicated the genetic association among large scale stroke subjects, three hundred nineteen in DP group and five hundred thirty five in non-DP group. The frequency of subjects with M allele was also higher in DP group than non-DP group [OR = 1.704 (95% CI, 1.059-2.742), p = 0.028]. These results showed that PON1 polymorphisms may be related to Korean stroke PS type.

PP.34.147
ASSOCIATION OF CHROMOSOMAL REGIONS 8P21.2 AND 20Q22 WITH URINARY ALBUMIN EXCRETION IN SPANISH GENERAL POPULATION

F. Martínez1, M.L. Mansego2, P. Rentero3, E. Solaza4, FJ Chaves2, I. Redondo2, 1Hypertension Unit, Clinical Hospital of Valencia and Ciberos, Valencia-Spain, 2Genotyping and Genetic Diagnosis Unit and Ciber of Diabetes and Associated Metabolic Diseases, Valencia-Spain, 3Genotyping and Genetic Diagnosis Unit, Hospital Clinico Research Foundation and Incliva, Valencia-Spain, 4Hypertension Unit, Clinical Hospital of Valencia, Valencia-Spain

Objective: To replicate the genetic susceptibility variants for hypertension associated microalbuminuria found by means of a GWAS.

Methods: We selected a panel of 140 polymorphisms, one set of 95 markers from our GWAS and other set of 45 selected based on previous association in the literature, to test in one general Spanish population. UAE was considered as a qualitative trait as well as a continuous trait based on the average of two 24 hour urinary measurements. The genotyping was made by SNPlex, an oligo-ligation assay. The association was evaluated by means of logistic or linear regression models unadjusted or adjusted by important clinical covariables under an additive inheritance genetic model. Bonferroni correction was used to address for multiple comparison. The association analyses were made with StatAC 11 and with PLINK.

Results: 1502 subjects were included (50% females; mean age 54.4 ± 19.3 yr; 18% obese; 42% hypertensives; 7% DM). There were 82 patients with 30 ≥ UAE < 300 mg/day and 13 with UAE ≥ 300 mg/day. The mean of UAE was 19.8 ± 131.5 mg/day. There was not significant association with the qualitative trait for none of the tested polymorphisms. Regarding to the analysis with UAE as continuous trait, although there was not association with the untransformed variable, we found a significant association of two SNPs with the base-ten logarithmic of UAE. One of them is the rs3739216 which is located in the 3 prime extreme of the adrenaling, alpha-1A-, receptor (ADRA1A) gene on chromosome 8p21.2. This polymorphism was associated even when adjusted by clinical covariables. The other, rs1550388, was close to the significance even in the adjusted analysis. This SNP is located in an intronic region of the ankyrin and armadillo repeat containing (ANKAR) gene on chromosome 2q32. Interestingly, polymorphisms on region 2q32 were the most associated with microalbuminuria and also with UAE in the majority of the analyses but non significant after Bonferroni correction. Whereas the marker of ADRA1A was selected from the literature, several markers on 2q32 were associated with microalbuminuria after adjusted for clinical covariables in our previous GWAS although none of them did reach the genome wide significant.

Conclusions: Two chromosomal regions, 8p21.2 and 2q32.2, might act as a quantitative trait loci (QTL) for UAE in a Spanish population. Further studies and replication in other populations could confirm or reject these results.

PP.34.149
DAYTIME AND NIGHTTIME URINARY STEROIDS IN THE SWISS KIDNEY PROJECT ON GENES IN HYPERTENSION

D. Ackermann1, G. Ehret2, I. Guessous2, B. Ponte1, M. Pajumi3, B. Dick1, M. Burrier1, F. Frey3, P.Y. Martin4, F. Paccaud5, M. Bochud5, 1Inselspital, Bern-Switzerland, 2Institute of Social and Preventive Medicine, Lausanne-Switzerland, 3Hopital Universitaire De Geneve, Geneva-Switzerland, 4Centre Hopital Des Universites Vaudoises, Lausanne-Switzerland

Objectives: Genome wide association studies (GWAS) identified a robust association between elevated systolic blood pressure and a single nucleotide polymorphism at the 10q24 locus. This locus encodes for the enzyme CYP17A1, that mediates steroid 17α-Hydroxylase and 17,20-Lyase activity, thus regulating steroid synthesis. The phenotype characterization of the urinary steroid profile (the metabolites of steroid synthesis that are excreted in the urine) at the population level is therefore of major interest to further our understanding of physiological mechanisms involved in blood pressure control.

Design and Methods: Participants of the Swiss Kidney Project on Genes in Hypertension (SKP0GH), a population-based study of hypertension in Swiss families, collected urine during day- and nighttime. Steroid metabolites were analyzed by gas chromatography mass spectrometry. Distributions were assessed using medians, percentiles 25 and 75, means and standard deviations.

Conclusions: This is the first study to describe the distribution of urinary steroid metabolites separately for day and night in participants from the general population. We found large differences in the daytime ratio across metabolites, which suggests that circadian rhythms differ across groups of steroids.

PP.34.150
ASSOCIATION OF ALPHA-1-A ADRENERGIC RECEPTOR ARQ437CYS POLYMORPHISM WITH BLOOD PRESSURE LEVELS IN A LATINO-AMERICAN POPULATION

J.E. Ochoa1, M.M. Correa2, J.A. Gallo3, J.G. Mcwene4, G. Bilo5, D. Aristizabal6, G. Parati1, 1University of Milano-Bicocca & Istituto Aulologico Italiano, Milan-Italy, 2Centro Clinico Y De Investigacion, Sicor, Medellin-Colombia, 3School of Medicine, University of Antioquia, Medellin-Colombia, 4School of Medicine, University of Antioquia, Medellin-Colombia, 5Corporacion Para Investigaciones Biologicas, Medellin-Colombia, 6Dept. Cardiology, Ospedale San Luca, Istituto Aulologico Italiano, Milan-Italy

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Objective: Of the three subtypes of alpha 1-adrenergic receptor, alpha-1A (ADRA1A) prevails in vascular smooth muscle and was implicated in vascular resistance and blood pressure (BPI) regulation. The ADRA1A polymorphism most often studied in hypertension is the Cys347Arg; however, results on its association with BP are inconclusive due to the striking differences in allele frequencies between ethnic groups.

Aim: of our study was to test the association between Arg347Cys polymorphism and BP levels in an admixed sample of subjects from Colombia.

Methods: In the frame of the Medellin’s Heart Study, (Colombia), 800 individuals from the general population (M:46%, 30-65y) were recruited. Arg347Cys polymorphism was genotyped by a competitive allele-specific PCR SNP genotyping system (KASP chemistry). Blind duplicates and Hardy-Weinberg equilibrium (HWE) tests were used as quality control tests. Conventional sitting BP measurements were performed in the left arm with a standard mercury sphygmomanometer (2007 ESH-ESC Guidelines) by two trained physicians at five min intervals. Systolic (S) and diastolic (D) BP levels were averaged; pulse pressure (PP) was calculated as SBP-DBP, and mean (M) BP was calculated as DBP plus 1/3 of PP.

Results: Arg347Cys polymorphism was in HWE. In a co-dominant model, analysis of variance adjusting for age, sex, smoking, and BMI (ANCOVA) showed significantly higher SBP and PP levels among genotype categories for SBP and PP levels. In a recessive model, carriers of Arg/Arg genotype also showed significantly higher SBP levels than carriers of Arg/Cys or Cys/Cys genotypes.

Conclusion: Thus genetic variation in the ADRA1A could modulate vascular tone and BP levels in humans. In particular, the presence of an Arg homozygous genotype of the Cys347Arg polymorphism is associated with higher SBP and PP levels in subjects of Latin-American origin.

Objective: Reactive oxygen species (ROS) are involved in the pathogenesis of cardiovascular diseases for which effective pharmacological treatment is necessary to understand the mechanisms of interaction between ROS and intracellular signaling systems. ROS stimulate the accumulation of second messengers in cells and may themselves act as signaling molecules. This study examines the role of ROS in the regulation of contractile activity of smooth muscle cells.

Design and Methods: Contractile responses of rat aorta strips triggered by depolarization and activation of x1-adrenergic receptors with high K+ medium and Phénylèphrine, respectively, were measured as increments of isometric tension. Production of ROS was evoked by Hydrogen peroxide (500 μM). Cytoskeleton elements were modified with Colchicines (10 μM), Cytochalasin D (0.5 μM) and Nocodazole (10 μM). Sodium nitroprusside was used as a donor of nitric oxide.

Results and conclusions: Microfilaments are involved in the formation of the initial mechanical tension of rat aortic smooth muscle, involving reduction induced high K+ medium and Phénylèphrine. Relaxing effect of nitric oxide on smooth muscle cells under the action of high K+ medium is implemented by the participation of microfilaments, the action of Phénylèphrine is dependent on the state microtubule and microfilament cytoskeleton. Hydrogen peroxide independently of the endothelium modulates contractile responses of smooth muscle: decreases the value of the contractile response under the action of Phénylèphrine, but increases the contraction of smooth muscles of aorta caused by high K+ medium. Strengthening contractions of the depolarized smooth muscle cells localized due to the influence of hydrogen peroxide on the potential-independent mechanisms of activation and maintenance of smooth muscle contraction of the aorta. Reduction of hydrogen peroxide contractile responses of rat aortic smooth muscle under the action of Phénylèphrine is carried out with the predominant participation of microfilaments, whereas the activating effect of hydrogen peroxide to reduce induced high K+ medium does not depend on the state of the cytoskeleton. The study was supported by the Federal Program (contract P445).

Conclusion: We have not confirmed the putative association between the FTO gene tagging variants and smoking dependence. FTO is unlikely to be a major and important genetic determinant of smoking dependence. This work was supported by Institute for Clinical and Experimental Medicine (MZ0 00023001) and by grants No. 1M0510 (Ministry of Youth, Sport and Education of the Czech Republic).
Objective: This study attempted to determine whether there existed crosstalk between vascular endothelial cells and smooth muscle cells and the role of IL-8 in the communication by the means of three-dimensional (3-D) co-cultured model.

Methods: 3-D co-culture model was constructed by transwell and type, collagen gel. Umbilical artery smooth muscle cells (HUASMCs) were suspended with the gel and dropped to the upper compartment of the transwell. Umbilical vein endothelial cells (HUVECs) were then seeded on the gel surface. Growth of HUASMCs was tested by CFDA SE cell proliferation kit. Changes of IL-8 and other bioactive substances among different culture conditions were documented by Elisa and real-time PCR. Alterations of p-ERK influenced by IL-8 were also examined by western blotting.

Results: Compared with single culture, the growth rate of HUASMCs in 3-D co-cultured model was 0.679 ± 0.057. Secretion and transcription of VEGF, e-PA, NO (HUVECs) and VCAM-1 (HUASMCs) were varied with the way of culture. IL-8 released by HUVECs was nearly doubled (2.35 ± 0.16) (P<0.05) when 3-D co-cultured and diminished the expression of VCAM-1 from HUASMCs(0.55 ± 0.09). Increasing or blocking IL-8 changed the level of p-ERK and VCAM-1. Reduction of VCAM-1 result from IL-8 could be blocked by MEK inhibitor PD98059.

Conclusion: HUVECs and HUASMCs functioned more similarly to normal arteries when 3-D co-cultured. Crosstalk between them existed and maybe mediated by IL-8, which exerted anti-inflammatory effects on SMCs by increasing the level of p-ERK.

PP.34.156 ASSOCIATION BETWEEN THE INSERTION-DELETION POLYMORPHISM IN THE MONOCYTE CHEMOATTRACTANT PROTEIN 1 GENE AND ESSENTIAL HYPERTENSION


Objective: Essential hypertension (EH) is a common disease with severe consequences. It is known that inflammation plays an important role in the pathophysiology of EH. In our laboratory was analyzed expression of 84 genes of cytokines and their receptors. It was revealed that the transcriptional activity of the monocyte chemoattractant protein 1 gene CCL2 is lowered. The aim of the present study was to detected the expression and investigate the associations between CCL2 gene polymorphisms and EH in Tatar ethnic group residing in Bashkortostan Republic.

Subjects and methods: The total group comprised 248 hypertensive patients and 176 healthy controls. DNA was isolated from whole venous blood using phenol-chloroform extraction by standard method. The expression was consistered of 20 male patients with EH (aged from 35 to 50) and 20 age-matched healthy individuals. Total RNA was isolated from peripheral blood leukocytes. Quantitative real-time PCR was performed using RT2 SYBR Green Fluorescein qPCR Master Mix and microarrays, containing primers for 84 cytokines and cytokine receptors genes (RT2ProfilerTM PCR Array, SuperArray Bioscience Corporation, USA). Also we tested g.5796A>T (rs11860190) and g.7319979 _7319992del14(rs3917887) CCL2 gene polymorphisms. The SNP and ins/del polymorphisms was detected by polymerase chain reaction (PCR).

Results: We found that hypertensive patients had altered expression profile of 21 genes. CCLI6, CCL17, CCLI8, CCL19, CCL23, CCL8, CCR6, CCR8, CX3CR1, CXCL1, CXCL13, ICEBERG, IL13, IL17C, IL1F10, IL1P6, IL9, SPP1, CD40LG, XCR1 gene expression was shown to be increased and CCL2 gene expression was slightly decreased. Our data sug- gest a role for cytokines in the pathogenesis of essential hypertension. The study polymorphic variants showed that CCL2 gene -5796A > T genotypes and allele distribution did not significantly differ in patients and controls. But ins/del polymorphisms has association with EH. In all investigated groups genotype CCL2I/D meets more often then other. In group of man who have more then 40 years old genotype CCL2I/D in patients with EH rarer than controls (45.7% versus 71,4%, P = 0.005). Therefore, people with CCL2I/D genotype have decreased risk of EH (OR = 0.34; CI: 0.12-0.93).

Conclusion: The insertion-deletion polymorphism CCL2 gene has association with essential hypertension.
decreased the thrombin-induced fluorescence increase detected via fluorescence microscopy and measurement in a multimode-reader. Superoxide is rapidly converted in H2O2, which we measured in H2DCFDA-labeled VSMCs. Here, MPA also diminished the thrombin-induced H2O2 production dose-dependently and significantly. A predominant source of reactive oxygen species (ROS) in the vasculature is the NADPH oxidase. We measured the NADPH consumption rate in VSMCs. Thrombin increased NADPH consumption, whereas pretreatment with MPA reduced this effect. To gain further evidence pointing to NADPH oxidase as target, we measured Rac1 activation. MPA significantly diminished the thrombin-induced Rac1 activation significant.

Conclusions: Thrombin is a potent stimulator of MCP-1 production in VSMCs in a ROS-sensitive way. MPA is able to significantly attenuate this thrombin-induced MCP-1 production indicating direct anti-inflammatory effects of MPA. The vascular NADPH oxidase is involved in the signal transduction pathway. In summary, MPA is not only an immunosuppressant substance but might also play a relevant role in anti-inflammatory response.

Objective: To find connection of arterial hypertension (AH) and abdominal obesity (AO) with genetic polymorphism of ACE (I/D) and PPAR-γ2 gene (Pro12Ala).

Design/Methods: 249 patients with AH I-III participated in this study: AH I – 26.5% (66); AH II – 45.8% (114); AH III – 27.7% (69); women – 48.2% (120), men – 51.8% (129), age 50.5 ± 10.4 years. Alleles of analyzed genes of ACE (I/D) and PPAR-γ2 (Pro12Ala) were studied with PCR. AO signs determined according to ATP III/NCEP criteria: waist circumference for men/women >102/88 cm; body mass index (BMI) 25-29.9 kg/sq m was interpreted as increased, > 30 kg/sq m as obesity.

Results: AH II-III grades appeared more often in D-allele carriers of ACE gene (84.0% and 76.9%, accordingly, P < .01) and Pro-allele of PPAR-γ2 gene (50.0% and 87.0%, accordingly, P < .001). The left ventricle hypertrophy was more frequently revealed in male carriers of D-allele of ACE gene (P = 0.014), women carriers of ProPro-genotype of PPAR-γ2 gene (P < .001). Mean office Systolic Blood Pressure (BP) was certainly higher in D-allele carriers (P < .05) and Pro-allele (P < .05); office Diastolic BP prevailed in ProPro-genotype carriers of PPAR-γ2 gene (P < .05), without reliable distinctions between ACE gene genotypes. Waist circumference and BMI did not differentiate certainly between ACE gene genotypes and were “increased” (25-29.9 kg/sq m); in ProPro-genotype carriers BMI was 32.87 ± 1.88 kg/sq m, reliably higher than in AlaAla-patients (P < .05). Mean office Systolic Blood Pressure (BP) in patients with AA variant was 17.1 ± 3.4 (44), with AC 14.3 ± 3.1 (19) and with CC 11.6 ± 2.8 (24). Patients with AA variant had significantly higher prevalence of left ventricular hypertrophy (33 subject (44%)) than with AC variant (6 subjects (21.4%)). The mean pulse wave velocity (PWV) in subjects with AA variant was 7.1 ± 3.1 (44), with AC 7.3 ± 1.6 (19) and with CC 7.25 ± 1.06. PWV was lower than 12 m/s in all subjects. Subjects with AA variant in 25% ± 1.062. had thickening of the IMT versus 21% ± 0.003 and was absent in AlaAla-carriers.

Conclusion: ProPro-genotype of PPAR-γ2 gene is associated with greater number of metabolic disorders in AH patients.

PP.34.158 ASSOCIATION OF DISMETABOLIC DISORDERS IN HYPERTENSION WITH POLYMORPHISM OF PPAR-GAMMA2 (PRO12ALA) AND ACE (I/D) GENES

A. Sokolenko, L. Sydorchuk, A. Sydorchuk, I. Ursuliak, R. Sydorchuk.

Bacovian State Medical University, Chernivtsi-Ukraine

Objective: To find connection of arterial hypertension (AH) and abdominal obesity (AO) with genetic polymorphism of ACE (I/D) and PPAR-γ2 gene (Pro12Ala).

Design/Methods: 249 patients with AH I-III participated in this study: AH I – 26.5% (66); AH II – 45.8% (114); AH III – 27.7% (69); women – 48.2% (120), men – 51.8% (129), age 50.5 ± 10.4 years. Alleles of analyzed genes of ACE (I/D) and PPAR-γ2 (Pro12Ala) were studied with PCR. AO signs determined according to ATP III/NCEP criteria: waist circumference for men/women >102/88 cm; body mass index (BMI) 25-29.9 kg/sq m was interpreted as increased, > 30 kg/sq m as obesity.

Results: AH II-III grades appeared more often in D-allele carriers of ACE gene (84.0% and 76.9%, accordingly, P < .01) and Pro-allele of PPAR-γ2 gene (50.0% and 87.0%, accordingly, P < .001). The left ventricle hypertrophy was more frequently revealed in male carriers of D-allele of ACE gene (P = 0.014), women carriers of ProPro-genotype of PPAR-γ2 gene (P < .001). Mean office Systolic Blood Pressure (BP) was certainly higher in D-allele carriers (P < .05) and Pro-allele (P < .05); office Diastolic BP prevailed in ProPro-genotype carriers of PPAR-γ2 gene (P < .05), without reliable distinctions between ACE gene genotypes. Waist circumference and BMI did not differentiate certainly between ACE gene genotypes and were “increased” (25-29.9 kg/sq m); in ProPro-genotype carriers BMI was 32.87 ± 1.88 kg/sq m, reliably higher than in AlaAla-patients (P < .05). Mean office Systolic Blood Pressure (BP) in patients with AA variant was 17.1 ± 3.4 (44), with AC 14.3 ± 3.1 (19) and with CC 11.6 ± 2.8 (24). Patients with AA variant had significantly higher prevalence of left ventricular hypertrophy (33 subject (44%)) than with AC variant (6 subjects (21.4%)). The mean pulse wave velocity (PWV) in subjects with AA variant was 7.1 ± 3.1 (44), with AC 7.3 ± 1.6 (19) and with CC 7.25 ± 1.06. PWV was lower than 12 m/s in all subjects. Subjects with AA variant in 25% ± 1.062. had thickening of the IMT versus 21% ± 0.003 and was absent in AlaAla-carriers.

Conclusion: ProPro-genotype of PPAR-γ2 gene is associated with greater number of metabolic disorders in AH patients.

PP.34.159 MYOSPRYN K2960N GENE VARIANT AND DAMAGE OF HEART AND LARGE ARTERIES IN RUSSIAN PATIENTS


Objective: Myospryn, Z-line and desmin associated protein, have been recently shown to be an important protein in cardiac hypertrophic response and it’s K2960N polymorphism (A allele) was shown to be associated with higher degree of LVH in Japanese population, but no any data regarding arterial stiffness and atherosclerosis of large arteries. The aim of our study was to assess the association of myospryn AA, AC or CC gene variants with damage of heart and large arteries.

Design and Methods: 106 subjects were examined. Echocardiography and carotid vascular ultrasound were performed (Vivid 7). Left ventricular mass index (LVMI) and carotid intima-media thickness (IMT) were calculated. Myospryn genotyping was performed by RFLP analysis using NlaIII restriction enzyme. The arterial stiffness was assessed by SphygmoCor device. Anthropometry and blood pressure (BP) measurement were performed.

Results: Distribution of genes: the AA-44, AC-19, CC -2 subjects. 21.5% (14) of subjects were hypertensive, levels of BP in all groups were similar. The mean value of LVMI in AA variant was 112.94 ± 16.5 (75), in AC 116.5 ± 19.0 (28) and in CC 111.8 ± 14.5 g/m². Patients with AA variant had significantly higher prevalence of left ventricular hypertrophy (33 subject (44%)) than with AC variant (6 subjects (21.4%)). The mean pulse wave velocity (PWV) in subjects with AA variant was 7.1 ± 3.1 (44), with AC 7.3 ± 1.6 (19) and with CC 7.25 ± 1.06. PWV was lower than 12 m/s in all subjects. Subjects with AA variant in 25% ± 1.06 had thickening of the IMT versus 21% ± 0.003 cases with AC variant. In patients with AA variant LVMI correlated with peripheral BP (r = 0.39 p < 0.005) and with AC variant LVMI correlated with Augmentation Index (r = 0.59 p < 0.005), with systolic BP in aorta (r = 0.55 p < 0.005)

Conclusions: Subjects with of AA variant of K2960N gene of myospryn gene had higher prevalence of LVH than AC variant. No difference in the arterial stiffness and intima-media thickening was revealed.
artery compliance (C1 and C2), and pulse wave velocity did not significantly differ between CsA and Tac, augmentation index (AI75) was significantly lower in patients treated with Tac. This finding was consistent as assessed by two different measurement systems (p < 0.05).

Conclusion: Compared to CsA, Tac has a favorable impact on augmentation index, a strong independent predictor for cardiovascular mortality.

**PP.35.162** VALIDATION OF A NEW NON-INVASIVE TONOMETER FOR DETERMINING AORTIC PULSE WAVE VELOCITY IN RATS

E. Tartagni1, G. Simon2, N. Sloboda2, C. Laba1, C. Borghi1, L. Joly3, P. Salv1, A. Benetto1, P. Lacolley2. 1Dept. of Internal Medicine, University of Bologna, Bologna-Italy, 2Inserm U 961, University of Nancy, Nancy-France, 3Inserm U 961 and Dept. of Internal Medicine and Geriatrics, Nancy-France

Carotid-femoral pulse wave velocity (PWV) is an established method for characterizing aortic stiffness. At present, to determine PWV in rats, the gold standard method is a surgical invasive measurement: inevitably this leads to the animal’s death. The objective of this study is to validate a new device for determining non-invasive PWV measurements which allows longitudinal studies in rats. The PulsePenLab (DiaTecne), the device validated in this study, was derived from the PulsePen model, a validated high-fidelity tonometer, currently used to assess PWV non-invasively in humans. Two PulsePen tonometers recorded simultaneously carotid and femoral blood pressure pulse wave. The probes were positioned and fixed on the arteries by means of mechanical arms. The acquisition sample rate was 1KHz. Carotid- femoral PWV was determined by two operators, and measurements were repeated after a week. Immediately after this second test, a surgical invasive measurement of PWV was performed. The real sternum-carotid and sternum-femoral distances were compared with the external distances previously acquired by the two operators. Now we present the preliminary data concerning the early 8 rats (Zucker fa/fa and Fa/Fa) included in this study. PWV determined by the PulsePenLab was compared with the traditional invasive measurement: the difference between the values of two measurements was 0.13 ± 0.66 m/s, R = 0.71. All values of difference were < 1.0 m/s. Reproducibility of measurements was determined by inter-operator coefficient of repeatability (0.92 m/s) and coefficient of variation (9.79%). These preliminary data suggest that PulsePenLab is an efficient device for determining a non-invasive measurement of PWV in rats.

**PP.35.163** AGE-RELATED EFFECTS OF POSTURAL CHANGES ON AORTIC PULSE WAVE VELOCITY

K. Xu, M. Butlin, A. Avolio. Macquarie University, Sydney-Australia

Objective: The assessment of arterial stiffness by carotid-femoral pulse wave velocity (PWVcelf) is conventionally done in the supine position with uniform mean distending pressure along the aortic trunk. However, humans spend a large part of their time in the upright position, where effects of gravity produce a graded distending pressure, in addition to mean arterial pressure (MAP). This study investigates the effect of posture on PWV independent of changes in MAP in two groups of young and elderly subjects.

Methods: PWVcelf and MAP were measured during head-up tilt in 4 positions (0°, 30°, 60° and 90°) in 14 young male subjects (25-37 yrs) and in 8 male subjects (47-67 yrs) Transit time for PWVcelf was obtained with applanation tonometry (Sphygmocor, Atcor Medical, Sydney) and MAP was obtained with a brachial cuff at heart level for all tilt positions. Pressure due to gravity was determined at the mid-point of the carotid-femoral path in relation to the position of femoral artery (MAPcalf).

Results: Results for the different tilt angles showed proportional graded changes. There was an average increase in PWVcelf of 25% from supine to upright position in the young cohort and 24.6% in the old. When corrected for changes in MAP and heart rate this changed to 26.8% increase in the young group and 22.1% (a reduction of 4.7%) in the older group, with only a 1.2% difference in MAPcalf. *Comparison between age groups for PWV increase from supine to upright position.
Conclusions: This study quantifies the age-related hydrostatic effects of gravity on measurements of arterial stiffness as assessed by PWVcf. Postural changes are associated with increases in arterial stiffness due to the additional gravitational effects on arterial distending pressure. This effect is reduced with age, possibly due to reduced aortic distensibility with age as is seen by higher PWVcf.

PP.35.164
PRESSURE-INDEPENDENT ASSOCIATION BETWEEN AORTIC STIFFNESS AND LEFT VENTRICULAR CONCENTRIC GEOMETRY

G. Schillacci, G.ucci, L. Settimo, M. Pilati, A. Baroni, E. Mannarino. Università Di Perugia, Perugia-Italy

Background: It is uncertain whether arterial stiffness and central hemodynamics are related to left ventricular (LV) mass and geometry independently of blood pressure (BP) level.

Methods: 744 consecutive never-treated subjects with uncomplicated essential hypertension free from overt cardiovascular disease (men 59%, age 49 ± 11 years, BP 149/93 ± 16/10 mmHg) underwent M-mode echocardiography and 24-hour BP monitoring. Carotid-femoral pulse wave velocity (cPWV) and aortic augmentation were evaluated by applanation tonometry.

Results: With LV hypertrophy (LV mass >51 g/m²) there was a higher cPWV (10.5 ± 3 vs 9.3 ± 2 m/s, p < 0.001), augmentation (21 ± 7 vs 16 ± 7 mmHg, p < 0.001) and heart rate-corrected augmentation index (.37 ± .08 vs.34 ± .12, p = 0.04). Similar data were reported in men. LV relative wall thickness (RWT) but not LV mass index was significantly associated with cPWV independent of age and brachial, central or 24h mean arterial pressure (MAP; see Table). The association of aortic augmentation with LV mass and RWT was no longer significant after adjustment for age and MAP. In a multiple regression model, 24h MAP, LV mass and cPWV (all p < 0.05) independently predicted LV-RWT when a consistent number of risk factors was simultaneously controlled for.

Conclusion: The impact of aortic PWV on LV concentric geometry is independent and additional to that of peripheral, central or 24hp BP.

Table. Correlation of cPWV and aortic augmentation with LV mass and RWT

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PP.35.165
AORTIC STIFFNESS IN BLACK-AFRICAN PATIENTS WITH HUMAN IMMUNODEFICIENCY VIRUS INFECTION

D. Lemogoum1, W. Ngatchou1, P. Ndobo2, M. Leeman1, L. Van Bortel1, J.P. Baguet1, L. Boggetto-Graham1, O. Chavanon2, J.L. Pepin1, G. Barone-Rochette1, E. Vautrin1. 1Cardiology Department, University Hospital, Grenoble-France, 2Cardiac Surgery Department, University Hospital, Grenoble-France

Objective: To investigate whether aortic stiffness (AS), an early marker of atherosclerosis as assessed by aortic pulse wave velocity (PWV), is increased in Cameroonians individuals living with human immunodeficiency Virus (HIV) infection, even un-treated and, or treated.

Design and Method: We recorded aortic PWV (ComplioR), brachial systolic (SBP) and diastolic (DBP) blood pressures (BP) and lipid profile in 108 untreated HIV patients, and in 130 HIV patients under antiretroviral therapy (ART), carefully matched for age, height and gender to 97 healthy controls.

Results and Conclusions: Body mass index and waist circumference were lower in HIV patients compared to control (both P < 0.05). Both BFP and DBP were greater in HIV treated patients than in untreated and controls groups (all p < 0.001). Total cholesterol and LDL cholesterol were higher in HIV-treated and Control groups than in HIV-un treating (P = 0.03). HIV untreated and treated patients exhibited faster PWV as compared with controls (7.46 ± 2.24 vs. 7.20 ± 1.55 m/s, and 6.86 ± 1.55, respectively, P = 0.02), that was more pronounced in untreated group, suggesting an increase atherosclerosis risk that may be partly attenuated by ART (P = 0.03, between untreated compared to treated patients). In multivariate analysis, only LDL cholesterol emerged as an independent determinant of aortic PWV (p = 0.03) in the whole study population. In conclusion HIV infection increases arterial stiffness in black-African patients, mainly as a result of the effects chronic inflammation. ART may improve partly arterial distensibility, without blunting totally the atherosclerosis risk, probably because treatment induced hypercholerolemia.

PP.35.166
PREDICTIVE PARAMETERS FOR PROGRESSION OF AORTIC DIAMETER AFTER SURGERY FOR TYPE A AORTIC DISSECTION OR HAEMATOMA

J.P. Baguet1, L. Boggetto-Graham1, M. Rodiere2, O. Chavanon1, F. Thony2, J.L. Pepin1, G. Barone-Rochette1, E. Vautrin1. 1Cardiology Department, University Hospital, Grenoble-France, 2Cardiac Surgery Department, University Hospital, Grenoble-France, 3Sleep Laboratory, University Hospital, Grenoble-France

Objective: Surgery for type A aortic dissection (AD) or aortic haematoma (HA) more often than not results in a dissected aorta. The aim of our study was to determine the influence of blood pressure (BP) levels together with biological, respiratory and imaging parameters on the progression of aortic diameter.

Methods and Results: We conducted a study on a cohort of 311 patients operated on for type A AD or HA within our establishment, at least 6 months previously, between January 1990 and October 2009. Sixty-nine patients underwent measurement of haemodynamic (clinical BP and ambulatory BP monitoring) for 24 hours, biological (including hs-CRP), respiratory (polysonnography or polygraphy, N = 52) and imaging parameters. The maximum rate of progression of aortic diameter was calculated by comparing the longest standing postoperative imaging examination (CT or MRI) with the examination closest to the date of inclusion. We analysed the results obtained for the 69 patients with full imaging recordings: 60 AD and 9 HA, 77% male subjects, mean age = 67 ± 11 years, apnoea-hypopnoea index = 26 ± 20/hour. Mean clinical BP was 143 ± 20 / 79 ± 12 mmHg and mean ambulatory BP over 24 hours 129 ± 14 / 72 ± 11 mmHg. The patients were divided into three groups according to the maximum rate of progression of aortic diameter: group 1 (no progression, N = 25), group 2 (rate < 2 mm/year, N = 27), group 3 (rate > 2 mm/year, N = 17). A circulating false lumen was present more often than not among patients in group 3 (p = 0.01). Among patients showing progression of aortic diameter (groups 2 and 3, N = 44), analysis of the bivariate correlations shows that the maximum rate of progression of aortic diameter correlates positively with 24-hour systolic BP (p = 0.026) and hs-CRP (p = 0.005) and negatively with mean nocturnal SaO2 (p = 0.026). This relationship persists for 24-hour systolic BP (p = 0.046) and hs-CRP (p = 0.038) in the multivariate analysis.

Conclusions: The factors associated with progression of aortic diameter after surgery for type A AD or HA are as follows: presence of a circulating false lumen, systemic inflammation, high BP values, and low nocturnal SaO2. Patients displaying these characteristics should receive optimum care (BP management, regular radiological monitoring, and treatment of any existing obstructive sleep apnoea).

PP.35.167
AORTIC STIFFNESS AFTER SURGERY FOR TYPE A AORTIC DISSECTION OR HAEMATOMA

J.P. Baguet1, L. Boggetto-Graham1, O. Chavanon1, S. Bottari1, G. Barone-Rochette1, P. Faure1, H. Pierre1, O. Ormezzano1, E. Vautrin1. 1Cardiology Department, University Hospital, Grenoble-France, 2Cardiac Surgery Department, University Hospital, Grenoble-France, 3Sleep Laboratory, University Hospital, Grenoble-France

Objective: Aortic stiffness, a predictive parameter for cardiovascular events, has never been studied in patients operated on for type A aortic dissection (AD) or aortic haematoma (HA). The aim of our study was to assess the extent of aortic stiffness in these patients and to determine the predictive parameters for substantial aortic stiffness.

Methods and results: We conducted a study on a cohort of the 311 patients operated on for type A AD or HA within our establishment, at least 6 months previously, between January 1990 and October 2009. One hundred and seventeen patients (117 deaths, 28 lost to follow-up, 27 outside the Rhône-Alpes region, 22 refusals to take part in the study) underwent measurement of haemodynamic parameters (clinical BP and ambulatory BP monitoring over 24 hours, carotid-to-femoral pulse wave velocity (PWV)) and biological parameters.
parameters [including plasma PIIINP (a collagen synthesis marker) in 79 patients, and CCL22 (a pro-inflammatory chemokine) in 40 patients]. We analysed the results obtained for 87 patients without Marfan syndrome: 75 AD and 12 HA, 77% male subjects, mean age = 67 ± 11 years. The patients were divided into two groups according to level of aortic stiffness (median): group I (PWV < 12 m/s, N = 44) and group II (PWV > 12 m/s, N = 43). Mean clinical BP was 144 ± 22/80 ± 12 mmHg and ambulatory BP over 24 hours, 129 ± 14 / 72 ± 10 mmHg. Mean PWV was 12.6 ± 3.5 m/sec. The patients in group 2 showed a higher heart rate (HR) (p = 0.017), mean 24-hour systolic BP (p = 0.001), serum creatinine (p = 0.028) and CCL22 (p = 0.020), and more frequently underwent aortic arch replacement or endovascular aortic stent graft implantation (p = 0.042). PWV correlates with serum creatinine (p = 0.004) and PIIINP levels (p = 0.016) and with mean 24-hour systolic BP (p < 0.001) in the univariate analysis. PWV correlates with serum creatinine (p = 0.026) and mean 24-hour systolic BP (p = 0.002) in the multivariate analysis.

Conclusions: In our population, aortic stiffness became more pronounced as renal function was altered and systolic BP, HR, systemic inflammation and plasma PIIINP were elevated, and the amount of stent-graft material in the aortic channel increased. Patients displaying these characteristics should therefore be identified so as to achieve optimum care and monitoring.

**PP.35.168 PLASMA ENDOTHELIN-1 IS ASSOCIATED WITH AORTIC STIFFNESS IN ESSENTIAL HYPERTENSION**


**Background:** Experimental studies documented that endothelin-1 (ET-1) contributes to arterial stiffness and recently, in patients with chronic kidney disease, it has been observed that selective endothelin-A receptor antagonism reduces arterial stiffness, in part independently of blood pressure lowering. It is known about the relationships between ET-1 plasma levels and aortic distensibility in subjects with essential hypertension.

**Objective:** The aim of our study was to analyse the relationships between plasma concentrations of ET-1 and carotid-femoral pulse wave velocity (c-f PWV), as an index of aortic stiffness, in a group of hypertensive patients with or without overt renal insufficiency [estimated glomerular filtration rate (eGFR) < 60 ml/min/1.73 m2].

**Methods:** We enrolled 216 pharmacologically untreated hypertensive patients (mean age 46 ± 10 years, males 62%). In all the subjects routine biochemical parameters and ET-1 plasma values, measured by a solid-phase specific sandwich enzyme-linked immunosorbent assay (Amersham kits), were obtained. Moreover, ambulatory blood pressure monitoring and measurement of c-f PWV, by a computerized automatic method (Complor), were performed.

**Results:** The patients (n = 41) with elevated values of c-f PWV (>12 m/sec) showed significantly higher ET-1 plasma levels than those of subjects with PWV <12 m/sec (3.43 ± 0.43 vs 3.18 ± 0.42 pg/ml; p = 0.001 and p = 0.01, before and after adjustment for age and mean arterial pressure). A statistical significant correlation was found between ET-1 and c-f PWV in the whole study population (r = 0.29; p < 0.001). This association held even after adjustment for age, gender, mean arterial pressure, smoking, total cholesterol, glycaemia, waist circumference, HLD cholesterol, triglycerides and eGFR (beta = 0.17; p = 0.01). The correlation between ET-1 and aortic stiffness was equally significant in both sexes and stronger in diabetic patients (r = 0.17; p = 0.06) when compared to non diabetic subjects (r = 0.26).

**Conclusions:** Our results seem to suggest that in hypertensive men and women, and especially in those with diabetes, an independent relationship exists between ET-1 plasma levels and aortic stiffness.

**PP.35.169 ARTERIAL STIFFNESS IN HYPERTENSIVE PATIENTS IN NORMAL AND DECREASED GLOMERULAR FILTRATION RATE**

A. Troshina, Y. Kotelovskaya, Z. Kobalava. Russian Peoples Friendship University, Moscow-Russia

**Objective:** To check whether mild decrease in glomerular filtration rate (GFR) is associated with increased arterial stiffness in untreated hypertensive patients.

**Methods:** Central pulse wave analysis and pulse wave velocity (PWV) measurements (Sphygmocor, AcCor, Australia) were done in 101 hypertensive pts (49 men, age 52.3 ± 10.2 years) with serial creatinine measurements within 3-6 months and absence of microalbuminuria. The pts were classified by their MDRD-estimated GFR according NKF KDOQI Guidelines 2002 as having normal (GFR > 90ml/min/1.73m2, n = 45) or decreased parameters [GFR 60-90 ml/min/1.73 m², n = 56] kidney function. Between groups comparisons were done after age-adjustments. Spearman correlation analysis was performed to establish correlation between kidney function and arterial stiffness indices. The data are shown as Mean ± SD. P < 0.05 was considered significant.

**Results:** No significant difference was found between pts with GFR 60-90 ml/min/1.73 m² and GFR > 90 ml/min/1.73 m² in terms of brachial systolic/diastolic BP (respectively, 156.9 ± 10.2/100.9 ± 3.4 and 158.7 ± 10.7/99.8 ± 3.6 mmHg in central systolic/diastolic BP (138.9 ± 15.5 and 136.0 ± 19.0 mmHg, respectively) and pulse pressure (46.4 ± 12.4 and 45.2 ± 13.0, respectively). Pulse pressure amplification (123.6 ± 17.2 and 130.6 ± 20.8%, respectively) augmentation Index &75 beats/min (25.1 ± 10.3 and 20.2 ± 14.7%, respectively), reflection wave time (139.8 ± 11.7 and 145.8 ± 19.2 ms, respectively) and PWV (12.0 ± 2.4 and 11.5 ± 4.2 m/s, respectively). No significant correlation between arterial stiffness indices and kidney function (serum creatinine, GFR) was found.

**Conclusion:** There is no association between arterial stiffness indices and kidney function measures in subjects with GFR higher than values used as cut-off for target organ damage in untreated hypertensive subjects.

**PP.35.170 ARTERIAL STIFFNESS INCREASE IN POSTMENOPAUSAL WOMEN WITH ARTERIAL HYPERTENSION AND SUBCLINICAL HYPOTHYROIDISM**

O. Ryabytseva, Z. Blankova, T. Chazova, F. Aggry, I. Orlova. Russian Cardiology Research Center, Moscow-Russia

**Background:** Subclinical hypothyroidism (SCH) is associated with increased risk of cardiovascular events. Its impact on arterial function is less clear. The association between arterial stiffness increasing and mortality in patients with arterial hypertension (AH) is well recognized. As many as 10% of postmenopausal women have SCH and AH. The aim of the present study was to examine if subclinical hypothyroid postmenopausal women had increased arterial stiffness.

**Methods:** 40 females with AH (20 pts with normal thyroid function (control) and 20 with SCH) underwent brachial-ankle pulse wave velocity (PWVba) measurements for evaluation of arterial stiffness. Mean thyroid-stimulating hormone (TSH) and FT4 were respectively 6.9 ± 2.9 mU/ml and 15.2 ± 2.8 pmol/L in SCH pats. Results: Hypothyroid patients demonstrated higher PWVba (15.0 ± 2.4 m/s vs 13.3 ± 2.3 m/s, p = 0.016). There were no differences in age (65.1 ± 6.9 years vs 64.5 ± 6.7 years, p = 0.397) and systolic pressure (135.7 ± 19.0 vs 137.2 ± 18.2, p = 0.401) between SCH patients and controls.

**Conclusion:** Hypothyroidism, even in subclinical stage, is associated with changes in arterial stiffness. Significant changes of arterial stiffness were observed in subjects with TSH range 4.01-10.0 mU/ml suggesting that even early stage of mild thyroid failure is associated with increased cardiovascular risk.

**PP.35.171 HYPERTENSION AND HIGHER LEFT VENTRICULAR END-DIASTOLIC PRESSURE INFLUENCE THE AORTIC DISTENSIBILITY**

M.S. Shin1, B.R. Kim2, K.H. Lee1, W.J. Chung2, W.C. Kang2, T.H. Ahn1, I.S. Choi1, E.K. Shin1, 2Gachon University, Gil Hospital, Incheon-South Korea, 1Seoul Medical Center, Seoul-South Korea

**Background:** There is rare study about the relationship between aortic stiffness and the left ventricular (LV) end-diastolic pressure and diastolic dysfunction. In this study, we evaluated the relation between aortic stiffness and LV diastolic dysfunction in patients with hypertension (HTN).

**Methods:** A total 234 patients (103 men) were divided into four groups according to the degree of E/eA and HTN. Group I (n = 50) is composed of the patients with normal E/eA (≤ 8) without HTN, group II (n = 51) is composed of those with elevated E/eA (＞8) without HTN, group III (n = 29) is composed of the patients with normal E/eA (≤ 8) with HTN, and group IV (n = 104) is composed of the patients with elevated E/eA (＞8) with HTN. Aortic distensibility (AD) was calculated by using the formula: 2 x (pulsatile change in aortic diameter) / (diastolic aortic diameter x aortic pulse pressure). And brachial-ankle pulse wave velocity (baPWV) was measured.

**Results:** The mean value of AD was lower in group III compared to group I (3.8 ± 2.0 vs 5.1 ± 2.4, p = 0.03). Group IV showed lower AD compared to group II (3.0 ± 1.8 vs 4.3 ± 2.4, p < 0.01). However, mean AD was not
Conclusions: Patients with hypertension showed lower AD and higher baPWV compared to those with normal blood pressure, independent of E/Ea ratio. Negative correlation between AD and baPWV was present only in the condition of lower E/Ea, regardless of HTN. These results suggest that HTN and higher LVEDP may influence the aortic distensibility.

PP35.172 OFFICE AND AMBULATORY HEART RATE AS MARKER OF ARTERIAL STIFFNESS

L. Garcia-Ortiz, A. Garcia-Garcia, E. Rodriguez-Sanchez, J.I. Recio-Rodriguez, C. Agudo-Conde, A. De Cabo-Laso, B. Sanchez-Salgado, J. Prieto-Mateos, P. Delgado-Benito, M.A. Gomez-Marcos. Primary Care Research Unit La Almudalleda, Salamanca-Spain

Objectives: To analyze the relationship between office and ambulatory heart rate, and its variability, and arterial stiffness in patients with primary arterial hypertension.

Methods: A cross-sectional study was conducted in a primary care setting, with the inclusion of 356 hypertensive patients aged 30–80 years. Office and ambulatory blood pressure and heart rate (HR) and the corresponding standard deviation (SD) were determined. Arterial stiffness was assessed according to carotid intima media thickness, pulse wave velocity, the central, and peripheral augmentation index (AIx), and the arterial barouss stiffness index (AASI).

Results: Carotid intima media thickness, central and peripheral AIx, and AASI were negatively correlated to office and ambulatory HR and its standard deviation, and positively correlated to the night/day HR ratio. Pulse wave velocity showed a negative correlation to 24 hours standard deviation HR and a negative correlation to nocturnal HR and the night/day HR ratio. For each 10 bpm increment in 24 hours HR, the pulse wave velocity increased 0.42 m/s (95%CI: 0.37-0.48) compared to group II. But group III and IV (patients with HTN) showed comparable E/A ratio and LA volume index.

Conclusions: The correlation between the arteriole/venule ratio and retinal vessel diameters with arterial stiffness markers was poor. 24-hour blood pressure, ankle/arm index and IMT are the only parameters that remain as predictors of the retinal vessels diameters.

PP35.173 RELATIONSHIP BETWEEN RETINAL VESSEL DIAMETERS AND ARTERIAL STIFFNESS IN HYPERTENSIVE PATIENTS


Objective: To evaluate the relationship between retinal vessel diameters from digitized fundus photographs and arterial stiffness in hypertensive patients.

Methods: A cross-sectional study was conducted in a primary care setting, with the inclusion of 353 hypertensive patients aged 30–80 years. Office and ambulatory blood pressure were determined. Arterial stiffness was assessed according to carotid intima media thickness (IMT), pulse wave velocity (PVW), ambulatory arterial stiffness index (AASI) and ankle/arm index. Retinal vessel diameters was evaluated with semiautomatic software from digitized fundus photographs and calculated the arteriole/venule ratio (AVR).

Results: Mean aged 55.13(SD:11.85) years, men 217 (61.5%). We found negative correlation between AVR with systolic (r = -0.164, p = 0.002) and diastolic (r = -0.117, p = 0.030) 24 hours blood pressure and office blood pressure (r = -0.135, p = 0.012; r = -0.117, p = 0.029). We found positive correlation between AASI and IMT with retinal arterial diameters (r = 0.018, p = 0.28, r = 0.109, p = 0.043) and retinal venular diameters (r = 0.111, p = 0.039; r = 0.181, p = 0.001) respectively and negative correlation between ankle/arm index and arteriolar diameters (r = 0.187, p < 0.001) and venular diameters (r = 0.198, p < 0.001). At last with PVW only has correlation with retinal venular diameters (r = 0.050, p = 0.095). In multiple linear regression (stepwise method) with the AVR as dependent variable, the variables remain in equation was 24 hour systolic blood pressure, with retinal arteriolar diameters, the ankle/arm index and 24 hour systolic blood pressure, and with venular diameters, ankle/arm index and IMT.

Conclusions: The correlation between the arteriole/venule ratio and retinal vessel diameters with arterial stiffness markers was poor. 24-hour blood pressure, ankle/arm index and IMT are the only parameters that remain as predictors of the retinal vessels diameters.

PP35.174 CHANGES OF ARTERIAL STIFFNESS AND CENTRAL BLOOD PRESSURE DURING LONG-TERM ANTIHYPERTENSIVE THERAPY

V. Ivanenko, O. Rotar, I. Emelyanov, A. Konradi. Almazor Federal Center Heart, Blood and Endocrinology, Saint-Petersburg-Russia

Objective: The study addresses changes of pulse wave velocity (PVW) and central blood pressure (CBP) in hypertensive patients during long-term antihypertensive therapy with different types of drugs.

Design and Methods: Patients with newly diagnosed and untreated hypertension were recruited for the study during regular visit to out-patient department. Antihypertensive medications were prescribed by GP according to modern guidelines. Patients were examined after 3 and 12 months of regular medication. Only patients on monotherapy were included into final analysis. PVW, CBP and augmentation index (AI) were measured by Sphygmorec device (Australia).

Results: The first group was formed with patients on angiotensin converting enzyme inhibitors (ACEI, enalapril or perindopril) (56 patients), the 2nd group – in beta-blockers (BB, bisoprolol) (26 patients) and the third group on calcium antagonists (CA, amlodipine) – 10 patients. PWV slightly decreased during therapy in all groups (from 7.7 ± 1.7 to 6.4 ± 1.2 m/s in ACE group, from 7.4 ± 1.6 to 6.9 ± 1.28 m/s in BB group and from 6.1 ± 1.46 ± 1.1 m/s in CA group (all changes not statistically significant). Changes of peripheral BP were similar in all treatment groups. Systolic CBP and pulse pressure (PP) decreased significantly in CA group from 144.2 ± 18.6 to 117.4 ± 13.2 mm Hg (p < 0.05) and from 49.5 ± 10.7 to 47.1 ± 10.6 mm Hg respectively. At the same time, in BB group slight elevation of aortic PP was documented (from 37.2 ± 8.8 to 38.7 ± 8.5 mm Hg, p > 0.05).

Conclusions: Antihypertensive treatment seems to cause similar changes in PWV associates with BP reduction. But vasodilating agents (in particular CA) can significantly reduce central BP, while BB treatment can reduce peripheral BP with no significant changes in CBP.

PP35.175 ELASTIC AND MUSCULAR ARTERIAL STIFFNESS IN PATIENTS WITH ARTERIAL HYPERTENSION AND METABOLIC SYNDROME

S. Kurschin, Y. Sirenko. Institute of Cardiology, Kiev-Ukraine

Objective: Arterial stiffness is independent risk factor for target organ damage in patients with AH and metabolic syndrome.

Patients and Methods: We observed 153 patients with AH. All patients were provided office measurement of blood pressure (BP), ambulatory BP monitoring, and measurement of pulse wave velocity (PWV) (Complior SP) on elastic (a. carotis – a. femoralis) and muscular (a. carotis – a. radialis) arteries; body mass index (BMI) measurement; biochemical blood analysis; SSPS 13.0 multivariate regression analysis. All patients were divided into 2 groups: 124 patients (1st group) with AH and without MS (mean age 50,7±1.1) with mean office SBP 160,6 ± 1.7 mmHg and DBP 96,0 ± 0.9 mmHg, mean ambulatory systolic BP 133,7 ± 1.4 mmHg, DBP 79,5 ± 1.0, mean carotis – femoral PWV 9.6 ± 0.2 m/s, carotis – radialis PWV 10.5 ± 0.2 m/s; 29 patients (2nd group) with AH and MS (mean age 52,4 ± 2.8) with mean office SBP 164.6 ± 2.9 mmHg and DBP 96,7 ± 1.9 mmHg, mean ambulatory systolic BP 137,4 ± 4.2 mmHg, DBP 80,7 ± 2.5, mean carotis – femoralis PWV 10,7 ± 0.4 m/s, carotis – radialis PWV 10,8 ± 0.3 m/s. The glucose, TG levels and carotis – femoralis PWV were significantly higher in 1st group.

Results: During the correlation analysis in patients with AH and MS we found the significant correlation with level glucose (r = 0.198, p = 0.007), BMI (r = 0.184, p = 0.015). In addition increased TG level significantly correlated with PWV elastic level (r = 0.643, p = 0.018), but it was not independent factor.
Conclusions: Higher level of PWV in patients with AH and MS witness about worsening of elastic state of arteries in this patients. MS sighs were not significantly correlated with PWV, but the most important sighs were glucose level and BMI alone.

**PP.35.176** ESTIMATION OF MEAN ARTERIAL PRESSURE AT BRACHIAL LEVEL IS NOT INFLUENCED BY REGIONAL ARTERIAL STIFFNESS

S. Graf1, D. Craiem1, R. Armentano1, H. Baglo2, R. Sanchez2. 1Favaloro University, Buenos Aires-Argentina, 2Favaloro University Hospital, Buenos Aires-Argentina

Objectives: Mean arterial pressure (MBP) is required for peripheral resistance calculation as well as for central blood pressure calibration procedures. MBP is usually estimated at the brachial arm using systolic and diastolic sphygmmomanometers pressure values, as k = 0.33 of pulse pressure (PP) above diastolic pressure.

Aim: To evaluate the accuracy of the formula used to calculate MBP, when assessing subjects with a wide range of blood pressure and pulse wave velocity (PWV) levels.

Methods: In 73 subjects (56 ± 10 years, range: 27-82; pulse pressure: 59 ± 12 mmHg; range: 43-96; PWV: 10 ± 2 mm/s, range: 8-17) arterial pressure waveforms were obtained at the left brachial artery by application tonometry. Diastolic (DBP) and systolic (SBP) brachial pressure were obtained with oscillometric validated device (Dinamap,Critikon). True MBP (MBPbra_Real) was defined as the average arterial blood pressure during a single cardiac cycle, computed from numerical integral of the tonometric brachial waveform. Brachial-radial PWV was obtained at the same arm using mechano-transducers.

Results: MBPbra_Real obtained from calibrated tonometer brachial waveforms was 100 ± 17 mmHg. The average k value resulted in 0.38 ± 0.03 and did not correlate with the pulse wave level and with pulse wave velocity. When mean blood pressure was calculated using the traditional formula (k = 0.33) we obtained a value of MBP_0.33 of 97 ± 16 mmHg, resulting in an underestimation of 2.8 ± 19 mmHg (3 ± 2%, p < 0.05). The absolute error in calculating mean blood pressure using k = 0.33 increases with increasing pressure levels (r = -0.42, p < 0.05). By using k = 0.38 we obtained a value of MBP_0.38 of 100 ± 16 mmHg, resulting in a non significant underestimation of 0.0 ± 1.8 mmHg (0.0 ± 1.9%). The pressure dependency disappears when k = 0.38 was used. PWV significantly increased with MBPbra_Real levels (r = 0.33, p < 0.05), as well as with MBP, 0.38 levels (r = 0.34, p < 0.05). However, the absolute error in calculating mean blood pressure using k = 0.38 was not related to PWV.

Conclusion: MBP computed as 38% of PP above diastolic pressure, introduces an error of only 0.1% in brachial MBP estimation, independent of pressure and brachial-radial PWV levels.

**PP.35.177** HIGHER FREQUENCY OF RENAL CYST AND HYPERTENSION IN PATIENTS WITH AORTIC ANEURYSM

T. Hashizume1, M. Arita1, S. Shiyouji, T. Akasaka1. 1Minami Nishiyama Medical Center, Tanabe-Japan, 2Nishiyama University Medical, Nishiyama-Japan

Background: The patients with aortic aneurysm (AoAN) (abdominal aortic aneurysm (AAA), thoracic aortic aneurysm (TAA)) may seem to have an increased frequency of renal cysts (RC) on computed tomography (CT) in our empirical observation. To clarify this potential relationship, we compared the frequency of RC on CT scan in patients with AoAN to those without AoAN.

Methods: We compared the frequency of RC on CT scan in 108 patients (76.0 years old, 80.6% male) with AoAN (73 AAs, 35 TAs) to 288 control patients (75.4 years old, 58.7% male) without AoAN.

Results: Univariate analysis and multivariate logistic regression were performed to evaluate the relationship between AoAN and the presence of RC. Patients with AoAN, 73.1% had RC compared to only 26.2% in the control patients (p < 0.0001). Compared to the control patients, the AoAN group had a higher frequency of hypertension (53.6% vs. 31.0%, p < 0.0001), coronary artery disease (30.0% vs. 13.3%, p < 0.005), chronic obstructive pulmonary disease (COPD) (10.3% vs. 3.9%, p < 0.01), but there was no significant frequency of dyslipidemia and diabetes mellitus between 2 groups. On multivariate logistic analysis, there were three independent predictors of AoAN: hypertension (p < 0.001; odds ratio = 3.39), COPD (p = 0.032; odds ratio = 2.81) and RC (p < 0.0001; odds ratio = 3.88).

Conclusion: These results indicate that there is a significantly higher frequency of RC in patients with AoAN compared to patients without AoAN. Close relationship between AoAN and RC may exist, and coincidental RC could be a potential indicator for AoAN screening.

**PP.35.178** DETERMINATION OF THE BEST ANKLE BRACHIAL INDEX THRESHOLD VALUES FOR THE ROUTINE DETECTION OF A SIGNIFICANT LOWER LIMB ARTERIAL STENOSIS USING AN AUTOMATED DEVICE

D. Rosenbaum1, S. Rodriguez-Carranza1, P. Laroch2, E. Brucker1, P. Giral1, X. ireld1, 1Chu Pitié Salpêtrière, Paris, France, Paris-France, 2Statis, Paris-France

Objectives: The aims of our study were to assess the prevalence of significant lower limb arterial stenosis and also to determine the best ankle brachial index (ABI) threshold value for its detection in a population of patients with an increased cardiovascular risk.

Methods: In patients with treated hypertension and/or another cardiovascular risk factor (dyslipidemia, current smoking, diabetes), ABI was measured using an automated oscillometric device with 2 synchronized cuffs (SCVL®, Healthworksglobal, Paris). The presence of atherosclerotic plaques was assessed independently by a Doppler/ultrasound exam.

Results: We included 201 patients. Fifty two percent were men of 58 ± 13.4 years old. Fifty percent were treated for hypertension, 72% had dyslipidemia and 23% were treated for diabetes. Twenty one percent were current smokers and 33%, previous smokers. A clinical peripheral arterial disease (PAD) was noted in 7% of the patients and the presence of a femoral stenosis >50% in 7.7%. The prevalence of an ABI < 0.9 was 19.7% and 16.6% for an ABI < 0.85. The ABI performance to detect a significant femoral plaque or a clinical PAD is detailed in the table below. The best ABI threshold values for the detection of PAD or of a significant plaque were the 3 following: < 0.85 or > 1.30 or a missing signal.

Conclusion: In patients with increased cardiovascular risk, the prevalence of a significant inferior limb stenosis is 7.7%. The ABI is easily and quickly measured by the automated SCVL® device. Our study attests the feasibility of this approach to detect PAD and arterial stenosis in daily practice in this population.

<table>
<thead>
<tr>
<th>Sensibility (%)</th>
<th>Specificity (%)</th>
<th>Positive predictive value</th>
<th>Negative predictive value</th>
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<tbody>
<tr>
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<td>83.3</td>
<td>84.5</td>
<td>26.3</td>
</tr>
<tr>
<td>ABI &lt; 0.9 or &gt; 1.3</td>
<td>93.3</td>
<td>83.4</td>
<td>31.8</td>
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<tr>
<td>ABI &lt; 0.85</td>
<td>83.1</td>
<td>87.3</td>
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<tr>
<td>ABI &lt; 0.85 or &gt; 1.35</td>
<td>93.3</td>
<td>87.3</td>
<td>37.8</td>
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**PP.35.179** PARAMETERS OF PRESSURE WAVE REFLECTION ARE ASSOCIATED WITH ANKLE-BRACHIAL INDEX IN THE GENERAL POPULATION

J. Seidlerová1, J. Filipovský2, R. Cifková3, P. Wohlhaftr1, A. Krajčoviečková1, 1Faculty of Medicine In Pilsen, Pilsen-Czech Republic, 2Center for Cardiovascular Prevention, Thomayer University Hospital, Prague-Czech Republic, 3Department of Preventive Cardiology, Institute for Clinical and Experimental Medicine, Prague-Czech Republic

Background: Pressure augmentation has been associated with greater risk of cardiovascular events. We investigated whether aortic augmentation index (AIX) and augmentation pressure (AP), parameters of wave reflection, were associated with peripheral arterial disease (PAD).

Method: We randomly recruited 852 Czech subjects (mean age, 54.1 years; 55.5% women; 34.1% on antihypertensive treatment) to assess whether AIX and AP were associated with ABI, independently of conventional risk factors.
Results: Mean values were: AIX, 144.2 ± 26.8%; AP, 13.2 ± 8.5 mm Hg, and ABI, 1.16 ± 0.10. After adjustment for sex, age, body mass index, MAP, pulse rate, total cholesterol, blood glucose, smoking, use of antihypertensive drugs, the AIX was negatively associated with AIX and AP (P for both < 0.0001). We observed a significant interaction (P < 0.0001) between pressure reflection measures and age in the prediction of ABI. The inverse association of AIX and AP with ABI was stronger in subjects older than 55 years.

Conclusion: AIX and AP, the measures of wave reflection, were independently negatively associated with ABI in a random sample from the general population, and this association was modified by age.

PP.35.180
AGE RELATED SHIFT OF THE REFLECTION POINT FROM PERIPHERAL TO CENTRAL ARTERIES IN HYPERTENSIVES: A MYTH OR A FACT?


Introduction: Stiffening of arteries with age widely accepted but this process has not been fully characterized at different levels of the arterial tree and clinical conditions.

Objective: To evaluate the behavior of different arterial parameters according to age, sex and the presence or not of hypertension.

Design and Methods: We evaluated 3277 p. derived for non-invasive vascular evaluation (NIVEI) (Dec 2006/Dec 2009) comprising: IMT; PWV and FMD; atherosclerotic plaque (AP) characterization; Aortic and Peripheral pulse pressure (CPP and PPP) and Augmentation indexes (CAix and PAix). After applying exclusion criteria (diabetes mellitus, secondary HTN, previous CV events/secondary prevention) and the availability of data on arterial function, 1903 p. were analyzed according to age (from 20 to 80 years old in decimals) and sex (75% men). A normotensive control group was already considered (281 p.).

Results: We observed a progressive increase of all the arterial parameters with age (from 20 to 80 y.o., rank of total population means): PWV (8,8 ± 2 to 14 ± 4 mm/sec), CPP (from 43 ± 15 to 59 ± 17 mmHg), PPP (from 49 ± 12 to 58 ± 13 mmHg), CAix (from 12 to 36%) and PAix (from -40% to 13%). In the 51-60 age group we calculated a cross over of PP values (Central > Peripheral) and an increase of PAix was observed suggesting a shift of the reflection point from peripheral to central arteries. This cross over was smoother in control subjects and more pronounced in women, appearing at earlier ages and with a steeper increase.

Conclusions: The arterial stiffening with age involves a progressive shift of the reflection point from peripheral to the central arteries and the phenomenon is more marked in women and in hypertensive patients. This analysis of a large cohort of patients, in a single center, comparable to the findings of the general population, has not been fully characterized at different levels of the arterial tree and clinical conditions.

PP.35.181 SYMMETRIC DIMETHYL-L-ARGININE LEVEL IS POSITIVELY CORRELATED WITH CAROTID-FEMORAL PULSE WAVE VELOCITY IN HYPERTENSIVE SUBJECTS

L. Klima¹, K. Stolarz Skrzypczyk¹, J. Menne¹, A. Olszanecka², W. Wogaczowska¹, G. Bilov³, K. Kawecka-Jasecz². ¹1st Department of Cardiology and Hypertension Jagiellonian University, Krakow-Poland, ²Klinik Fur Nieren- Und Hochdruckerkrankungen, Hannover-Germany, ³Dept. of Cardiology, Istituto Auxologico Italiano, Milan-Italy

Objective: Oxidative stress raises considerable interest in pathophysiology of cardiovascular disease. The objective of the study was to evaluate oxidative stress markers (dimethyl L-arginine (ADMA), symmetric dimethyl-L-arginine (SDMA), oxidized low density lipoproteins (Ox-LDL) and advanced oxidation protein products (AOPPs)) in essential hypertension and search for possible relations between oxidative stress markers and arterial stiffness.

Design and Methods: We recruited 50 families of hypertensive subjects followed at the Outpatient Hypertension Clinic (index person with at least 3 first-degree relatives, at least one relative hypertensive). For the current analysis we included 185 subjects; M/F 89/96. Blood pressure was measured with validated oscillometric device, on two separate occasions (2 x 3 consecutive measurements). Hypertension was defined as use of antihypertensive drugs, the ABI was negatively associated with AIX and AP (P for both < 0.0001). We found a significant positive correlation between SDMA and age (r = 0.20; p = 0.005), BMI and AOPP (r = 0.15; p = 0.043) and negative correlation in normotensive group between oxLDL and age (r = 0.3; p = 0.039). We did not find any relationship between gender and smoking status with oxidative stress markers. In general linear model analysis we did not observe any association between oxidative stress markers and hypertension (ADMA: 0.57 vs 0.58, p = 0.89; SDMA: 0.72 vs 0.70, p = 0.42; ox-LDL: 390.81 vs 335.55, p = 0.57; AOPPs: 53.6 vs 50.50, p = 0.77). There was a significant positive correlation between SDMA and PWV for both hypertensives (r = 0.19; p = 0.031), and for the whole study cohort (r = 0.20; p = 0.006).

Conclusion: The observed significant positive association between SDMA and pulse wave velocity in both hypertensive subjects and whole cohort might suggest role of the oxidative stress in the pathogenesis of arterial stiffness.

PP.35.182 LEVELS OF METALLOPROTEINASES MMP-2 AND MMP-9 IN UNTREATED PATIENTS WITH ESSENTIAL HYPERTENSION AND RELATIONSHIP WITH INDICES OF ARTERIAL STIFFNESS

E. Okaiagkousi, S. Douma, M. Doumas, K. Vogiatzis, E. Gavrilaki, P. Anyfanti, A. Triantafyllou, K. Petidis, C. Zamboulis. 2nd Prop. Department of Cardiology and Hypertension Jagiellonian University, Krakow-Poland, 2Klinik Fur Nieren- Und Hochdruckerkrankungen, Hannover-Germany

Objective: Metalloproteinases MMP-2 and MMP-9 are endopeptidases which degrade the extracellular matrix components, namely elastin and collagen. Elastin is the main structural protein which is responsible for the elastic properties of the arteries and therefore is directly related to the development of arterial stiffness. Increased expression and activity of MMPs have been implicated in the pathophysiology of vascular remodelling and in the growth of atherosclerotic lesions. Moreover, plasma levels of MMP-9 are considered a novel marker of cardiovascular risk in patients with coronary artery disease and stroke. However, the association between MMP-9 and arterial stiffness is under investigation as there are studies which have shown controversial results in either healthy subjects or patients with essential hypertension. The aim of the study was to investigate whether the levels of MMP-2 and MMP-9 are increased in patients with newly diagnosed untreated essential hypertension (UH) as compared to normotensive otherwise healthy volunteers (NT) and to investigate if there is any correlation between the levels of MMPs and the degree of arterial stiffness in UH.

Design and Methods: 50 UH patients (Blood Pressure, BP: 142.5 ± 25.5 / 90.0 ± 12.8 mmHg) and 32 NT volunteers (BP: 117.5 ± 11.4 / 70.0 ± 9.4 mmHg) were studied. The measurement of MMP-2 and MMP-9 levels was performed by Enzyme-linked immunosorbent assay (ELISA). Furthermore, in the above group which was consisted of the UH patients and the NT volunteers, we examined if there is any correlation between the levels of sMMPs and the well established indices of arterial stiffness (Pulse Wave Velocity (PWV), Central Augmentation Index (AI), Central Pulse Pressure (CPP), and Central Systolic and Diastolic BP).

Results: MMP-9 was found significantly increased in UH as compared to NT volunteers (133.26 vs 87.92 ng/ml, p < 0.05), while MMP-2 was found no different between the two groups (255.93 vs 255.55 ng/ml, p = NS). In addition, no correlation was found between the levels of MMPs and all the indices of arterial stiffness.

Conclusions: In the early stages of essential hypertension, where there are no clinically detectable vascular complications, the levels of MMPs are not associated directly with the development of arterial stiffness. However, the increased levels of MMP-9 in UH patients as compared with NT volunteers, may be used in the future as a novel predictor of cardiovascular risk and early atherosclerosis in such patients.

PP.35.183 DIFFERENT IMPACT OF AGE ON ARTERIAL STIFFNESS PARAMETERS IN HYPERTENSIVE PATIENTS

E. Troitskaya, S. Villevalde, Y. Kotovskaya, Z. Kobalava. Russian Peoples, Friendship University, Moscow-Russia

Objective: Parameters of arterial stiffness are independent predictors of cardiovascular (CV) morbidity and mortality. Aged exerts deleterious changes on the large arteries. Significant increase of pulse pressure only after the fifth decade suggests that stiffening of the large arteries occurs predominantly in later life. The aim of the study was to investigate the effects of age on arterial stiffness and to determine the most sensitive markers of subclinical vascular injury in different age groups in non-treated hypertensive patients.
Methods: In 129 hypertensive pts (65 male, 38 diabetic) parameters of arterial stiffness using method of application tonometry were evaluated according 5 age groups: 30-39 years (n = 21), 40-49 years (n = 28), 50-59 years (n = 29), 60-69 years (n = 31), ≥70 years (n = 20). Mann-Whitney test, Spearman and multiple regression analysis were performed. p < 0.05 was considered statistically significant.

Results: Augmentation pressure (AP) and augmentation index (AIx) correlate with age and the parameters were higher in women in all age groups (AIX 17 ± 13% in the group 30-39 years vs 23 ± 15% in the group ≥70 years in men, 28 ± 12% vs 40 ± 9% in women, respectively, p < 0.05 for trend). AP increased from 14 ± 5 mmHg to 23 ± 5 mmHg in men and from 16 ± 5 mmHg to 28 ± 5 mmHg in women, respectively; p < 0.05 for trend. The correlation was linear for AP and age while changes of AIx were nonlinear and more impressive in the age ≥55 years. There was nonlinear correlation between the reflected pressure wave (Tr) and age with more significant changes in the elderly. Tr was significantly higher in men in all age groups (152 ± 21 ms in the group of 30-39 years vs 135 ± 12 ms in the age ≥70 years in men and 140 ± 16 ms vs 127 ± 12 ms in women, respectively; p < 0.05 for trend); these changes reduced after height adjustment. There was no significant PWV difference between men and women. PWV correlated with age (PWV varied from 7.0 ± 3.1 m/s in the group of 30-39 years vs 12.3 ± 6.9 m/s in the group of ≥70 years in men and 6.8 ± 4.3 m/s vs 12.2 ± 5.2 m/s in women, respectively; p < 0.05 for trend). The changes of aortic PWV were nonlinear and more significant in the age ≥55 years. There was a significant correlation between aortic PWV and Tr (r = 0.49, p < 0.1), AP (r = 0.68, p < 0.001) and AIx (r = 0.58, p < 0.01). Revealed patterns were independent of the presence of diabetes mellitus.

Conclusion: In hypertensive patients the age-related changes in AIx and PWV were non-linear suggesting that AIx might be a better measure of arterial stiffening in subjects <55 years old while increasing of carotid femoral PWV is a more sensitive marker in older individuals. Therefore, differented use of AIx and PWV depending on age may be reasonable for risk stratification and the assessment of efficacy and safety of antihypertensive treatment.

Background: Arterial stiffness evaluation in dynamic conditions could enhance the characterization of vascular elastic properties. The aim of this study was to evaluate the feasibility of these assessment of carotid artery elasticity during exercise in terms of reproducibility.

Methods: Eighteen healthy volunteers underwent a maximal exercise testing on a graded semi-supine cycle ergometer. Ultrasound B-mode image sequences (DICOM format, high frame-rate) of right common carotid arteries were acquired at different steps (60%, 70%, 80% and 85% of maximal heart rate), and analysed by an automatic system (Carotid Studio, IPC-CNR) for the measurement of arterial diastolic diameter (D) and distension (ΔD). In addition, central pulse pressure (PPa) was estimated by tonometry (radial-aortic transfer function, Sphygmocor, AtcorMedical). Cross-sectional compliance (CC) and distensibility (DC) coefficients were then obtained for each step of the examination. Subjects were analysed in two different sessions 3 days apart, in order to evaluate intersession reproducibility of the measurements; variability was expressed as coefficient of variation (CV) for each step of the examination.

Results: At rest, CV were: 3 ±% for D, 8 ±% for ΔD and PPa, 8 ±% for CC and 8 ±% for CC and 8 ±% for CC. At exercise peak, CV were: 7 ±% for D, 12 ±% for ΔD, 10 ±% for PPa, 19 ±% for CC and 24 ±% for CC. The reproducibility of the evaluation during the entire examination resulted in kappa value = 0.48 for CC and kappa value = 0.40 for DC.

Conclusions: The reproducibility of carotid parameters, which is excellent at rest, remains more than satisfactory during exercise. Hence, the proposed approach might be used for investigating the dynamic behavior of arterial elasticity.
PP.35.187 OMEGA 3 DIET SUPPLEMENTATION AND ARTERIAL STIFFNESS IN AN EXPERIMENTAL MODEL OF MENOPAUSE

P. Losurdo, E. Panzino, M. Jevnikar, L. Macaluso, B. Fabris, B. Tofoli, M. Bardelli, G. Biolo, M. Zanetti, S. Mazzucco, G. Gortan Cappellari, R. Caretta. Clinical Dept of Medical Technologies and Translational Sciences; University of Trieste, Trieste-Italy

Introduction: Menopause is associated with an increased wall stiffness of large arteries and endothelial dysfunction. Diet supplementation with omega-3 polyunsaturated fatty acids may have protective effects on wall function of the large vessels.

Aim: To investigate the effects of the diet supplementation with omega-3 in the mechanics of large arteries in an experimental model of surgical menopause.

Materials and Methods: Thirty, 6-months-old, Wistar-Kyoto rats were equally divided into 3 groups: a) control: sham surgery - normal diet (CTRL)-, b) ovarioectomy - normal diet (OVX) - and c) ovarioectomy + Ω3 (0.8g/Kg/day - daily gavages administration) - supplementation diet (OVX + Ω3). Two months after surgery, carotid-femoral Pulse Wave Velocity (c-f PWV) and arterial pressure were directly measured, by aortic and femoral catheter.

Results: Erythrocyte membrane Ω3 index was significantly lower in OVX compared to CTRL rats (2.53±0.07 vs. 3.19±0.14; p<0.01). It was higher in OVX + Ω3 compared to CTRL and OVX (5.18±0.2 vs. 3.19±0.14; p<0.001 vs. 2.53±0.07; p<0.0001). Mean BP was significantly higher in OVX compared to CTRL and OVX + Ω3 (125±3 vs. 105±2.3; p<0.002 vs. 111±4.7mmHg; p<0.05). Carotid-femoral PWV was significantly increased in OVX compared to CTRL and OVX + Ω3 (565±1.1 vs. 378±2.2; p<0.0001 vs. 369±5.2 mm/sec; p<0.0001). Superoxide anion generation, in aorta rings, (SOD-inhibitable cytochrome C reduction assay) assessed VOS. Erythrocyte membrane Ω3 were measured by gas-chromatography.

Conclusion: Omega 3 diet supplementation reduces arterial blood pressure and restores mechanical arterial properties in a post menopause experimental model, likely by treating endothelial dysfunction.

PP.35.188 PARAMETERS OF COMMON CAROTID ARTERY ELASTICITY ASSESSED BY ECHO-TRACKING TECHNOLOGY IN YOUNG MEN WITH ARTERIAL HYPERTENSION GRADE 1

A. Zaurova, A. Rogoza, E. Oschepkova. Russian Cardiology Research Center, Moscow-Russia

Aim: To study parameters of common carotid artery (CCA) elasticity in young men with arterial hypertension Grade 1 using echo-tracking technology.

Materials and Methods: 30 men aged 20-40 years, 29.5±6.5 years (M±SD), with arterial hypertension Grade 1 (SBP/DBP = 144.6±15.4/85.4±8.8 mm Hg) were examined with echo-tracking technology by ALOKA Prosound α 7. The elasticity of bilateral CCA was studied by assessment of β (stiffness index), Ep (elastic modulus) and AC (arterial compliance) in distal part of artery in 2 cm from bifurcation. 3 consecutive measurements of elasticity parameters for each CCA were made. Mean values of 10-12 cycles in each measurement were analysed.

Results: The mean values of elasticity parameters in 30 patients were: right CCA: β = 6.3±0.28, Ep = 95.9±38 kPa and AC = 1.0±0.4 mm3/kPa; left CCA: β = 6.5±2.7, Ep = 97.0±33 kPa and AC = 0.97±0.2 mm3/kPa. Correlation analysis revealed the very strong correlation between β and Ep (r = 0.94, p < 0.0001), moderate correlation between age and all elasticity parameters: β (r = 0.65, p = 0.0001), Ep (r = 0.59, p = 0.0007), AC (r = -0.62, p = 0.0002) (table 1).

Conclusion: In young men with arterial hypertension Grade 1 assessment of common carotid artery elasticity revealed the very strong correlation between β and Ep. All elasticity parameters have moderate correlation with age. The best correlation with blood pressure level, heart rate and common carotid artery diastolic diameter have Ep.

PP.35.189 LIFETIME FIBRE INTAKE AND ITS MAJOR DIETARY SOURCES ARE FAVOURABLY ASSOCIATED WITH ARTERIAL STIFFNESS IN YOUNG ADULTHOOD: THE AMSTERDAM GROWTH AND HEALTH LONGITUDINAL STUDY

R.J.J. Van De Laar1, C.D.A. Stehouwer1, B.C.T. Van Bussel1, S.J. Te Velde1, M.H. Prins2, J.W.R. Twisk3, I. Ferreira1. 'Maastricht University Medical Centre +, Maastricht-The Netherlands, 'VU University, Amsterdam-The Netherlands

Objective: To investigate whether fibre intake, as well as its major dietary sources – i.e. fruits and vegetables (F&Vs) and whole grain products - between adolescence and young adulthood are associated with arterial stiffness in young adults.

Design and Methods: Longitudinal data on dietary intake (2.8 follow-up measures; ages 13-36), and other lifestyles and biological variables, were retrieved for 373 subjects in whom carotid stiffness was ascertained by means of ultrasonography at age 36. We used generalized estimating equations to compare the mean intake of fibre, F&Vs and whole grain products throughout the 24-y period between subjects across the sex-specific tertiles of the distensibility (DC) and compliance (CC) coefficients -inversed- and the Young’s elastic modulus (YEM).

Results: After adjustment for sex, height, MAP, total energy intake, physical activity, smoking and alcohol intake, subjects in the lowest (T1) tertiles of the DC3, CC1, and YEM (i.e. stiffer vs. less stiff arteries) had consumed, on average, less fibre: -1.8 g/d (95%CI: -3.0; -0.5), -2.2 g/d (-3.4; -1.0) and -1.2 g/d (-2.4; -0.0), respectively. Notably, these differences emerged in adolescence (Figure). Qualitatively similar differences were found for lifetime intake of F&Vs and whole grain products [e.g. -55 g/d (-92; -19) and -18 g/d (-33; -3), respectively, between subjects in T3 vs. T1 of the DC3], which were explained to a great extent (up to 100%) by fibre intake.

Conclusion: Lifetime intake of fibre is favorably associated with carotid stiffness in young adults. Promoting higher consumption of F&Vs and whole grain products among the young may offer a means to prevent the development of arterial stiffness later in life.

PP.35.190 WEAK CARDIAC EJECTION PATTERNS RESULTS IN INCREASED CENTRAL TO PERIPHERAL PULSE PRESSURE AMPLIFICATION

B. Westerhof1, B. Van Den Bogaard2, B.J. Van Den Born3, J.P. Van Den Wijngaard4, F. Mattace-Raso1. 'Bimey, Amsterdam-The Netherlands, 'Department of Internal Medicine, Academic Medical Centre, Amsterdam-The Netherlands, 'Departments of Vascular Medicine, Academic Medical Centre, Amsterdam-The Netherlands, 'Department of Biomedical Engineering and Physics, Academic Medical Center, Amsterdam-The Netherlands, 'Erasmus University Medical Center, Rotterdam-Netherlands Antilles

Background: The amplification of pulse pressure (PPA) from central to peripheral arteries decreases with reduced arterial compliance and increases with heart rate. In an anatomically accurate model of the arterial system we determined the major cardiac and vascular parameters contributing to PPA.

Table 1: Correlations of common carotid artery elasticity parameters

<table>
<thead>
<tr>
<th>β</th>
<th>Ep</th>
<th>AC</th>
<th>Age</th>
<th>SBP</th>
<th>DEP</th>
<th>HR</th>
<th>CCA distolic diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>r</td>
<td>r</td>
<td>r</td>
<td>r</td>
<td>r</td>
<td>r</td>
<td>r</td>
<td>r</td>
</tr>
<tr>
<td>0.94</td>
<td>0.79</td>
<td>0.65</td>
<td>0.21</td>
<td>0.38</td>
<td>0.42</td>
<td>0.24</td>
<td>0.85</td>
</tr>
<tr>
<td>0.94</td>
<td>0.78</td>
<td>0.59</td>
<td>0.51</td>
<td>0.64</td>
<td>0.42</td>
<td>0.57</td>
<td>0.77</td>
</tr>
<tr>
<td>0.77</td>
<td>0.78</td>
<td>0.66</td>
<td>0.38</td>
<td>0.44</td>
<td>0.4</td>
<td>0.19</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Conclusion: Even when high reproducibility in PWV measurement is succeeded single PWV measurements provide quite variable results in terms of the extrapolated CVR and the classification of aortic stiffness as normal. The average of the first 2 PWV measurements provides similar results with the average of the 3 consecutive PWV measurements.

Conclusions: Even when high reproducibility in PWV measurement is succeeded single PWV measurements provide quite variable results in terms of the extrapolated CVR and the classification of aortic stiffness as normal. The average of the first 2 PWV measurements provides similar results with the average of the 3 consecutive PWV measurements.
Methods: As input to the model a flow wave was used. To assess contribution of the heart to PPA, the flow wave shape was changed from convex to concave, with the width as a parameter for changing the time to 1.13 to 0.8 relative to control flow. Heart rate was changed from 50 to 150 BPM for control flow. In the model itself, compliance was changed over a range of 0.5 to 3 times control. PPA was expressed as the ratio of radial to aortic pulse pressure.

Results: Changing the flow wave shape from convex to concave resulted in an increased PPA at maximal compliance from 1.46 to 1.54; at minimal compliance from 1.09 to 1.27. With increasing heart rate, PPA increased from 1.29 to 1.58 at control compliance. PPA decreased with increasing compliance, from 1.57 to 1.13 for control flow.

Conclusion: The model of the arterial system predicted changes in PPA with compliance and heart rate as known from the literature. Additionally, we showed a relation with flow wave shape. A more concave flow wave shape, as seen in weak hearts, resulted in increased PPA, particularly in the presence of reduced compliance.

**PP.35.191 SYMPATHETIC ACTIVITY CONTRIBUTES TO ABDOMINAL AORTIC COMPLIANCE AND WALL DISTENSIBILITY IN RATS**

G. Lindsey, K. Viegas, M. Butlin, A. Avolio. Macquarie University, Sydney-Australia

Objective: The magnitude of the contribution of sympathetic tone to stiffness of large arteries varies with anatomical location in the arterial tree. In this study, the direct contribution of the sympathetic nervous system to abdominal aortic compliance and wall distensibility in the rat was quantified.

Methods: Local abdominal aortic compliance (Ca) and wall distensibility (Wd) were quantified in 5 male Wistar-Kyoto rats before and following sympathectomy (Ca = (Ds-Dd)/PP; Wd = Ca/Dd; 0.8x10-4 mmHg-1, p < 0.05) and high blood pressure (Intact: 3.5x10-4 ± 1.0x10-4 mmHg-1; Sympathectomy: 6.6x10-4 ± 0.8x10-4 mmHg-1, p < 0.05) and high blood pressure (Intact: 3.5x10-4 ± 0.8x10-4 mmHg-1, p < 0.05). Inspection of the pressure-independent β stiffness index confirmed these findings.

Conclusions: Sympathetic input to the abdominal aorta of rats contributes to the tone of the vessel, causing a decrease in Ca and Wd at pressures typical of intestinal aortic tone at low (65-75 mmHg), resting anaesthetized (85-120 mmHg), and high (130-140 mmHg) mean blood pressure. Ca and Wd were determined from systolic (Ds) and diastolic (Dd) diameters and pulse pressure (PP); Ca = (Ds-Dd)/PP; Wd = Ca/Dd.

**PP.35.193 CAROTID-FEMORAL PULSE WAVE VELOCITY: AGE ADJUSTED DISTANCE ESTIMATION**

S. Huybrechts1, D. Devos2, S. Vermeersch1, D. Mahieu1, T. De Backer1, P. Segers1, L. Van Bortel1. ‘Heymans Institute of Pharmacology, Ghent University Hospital, Ghent-Belgium,’ Ghent Institute for Functional Magnetic Resonance, Ghent University Hospital, Ghent-Belgium, 2Ibitech-Rimodma, Ghent University, Ghent-Belgium

Objective: The tape measure distance from the carotid artery (CA) to the femoral artery (FA) multiplied by 0.8 (CA-FA)x0.8), provides a good approximation of the real travelled arterial path length for calculation of pulse wave velocity (PWV) (Huybrechts et al. Artery Research 2010). However, this distance estimation does not take into account the age associated elongation of the aorta. This study aims to validate a - for clinical practice easy to use - age-adjusted correction of (CA-FA)x0.8 formula, adding or subtracting 1 mm/year to the formula in subjects older and younger than 50 years, respectively.

Methods: Real travelled carotid-femoral path length (= reference distance Lref) was measured with MRI in 98 healthy males/females (50% men, age 21-76y). The mean differences between Lref and either (CA-FA)x0.8 either (CA-FA)x0.8 + (0.1 ×(age - 50) % of Lref) was measured with MRI in 98 healthy males/females (50% men, age 21-76y). The mean differences between Lref and either (CA-FA)x0.8 either (CA-FA)x0.8 + (0.1 ×(age - 50) % of Lref) was measured with MRI in 98 healthy males/females (50% men, age 21-76y).

Results:

<table>
<thead>
<tr>
<th>Reference distance (Lref)</th>
<th>CA-FA)x0.8</th>
<th>CA-FA)x0.8 + (0.1 ×(age - 50) % of Lref)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &lt; 50 N = 52</td>
<td>49.0 (±2.0)</td>
<td>49.6 (±2.1)</td>
</tr>
<tr>
<td>Age &gt; 50 N = 46</td>
<td>52.5 (±4.4)</td>
<td>53.7 (±4.5)</td>
</tr>
</tbody>
</table>

% Difference between Lref and (CA-FA)x0.8

7.5% Difference: T = (CA-FA)x0.8 + 1.0x(age - 50) % of Lref

Conclusion: The age-corrected distance estimation performed better on a population level, but on an individual level only performed better in subjects up to 50 years old. This illustrates the importance of validation in individuals as well as on a population level.

**PP.35.194 DETERMINANTS OF PULSE WAVE VELOCITY IN HYPERTENSIVES**

D. Terentes-Printzios, C. Vlachopoulos, G. Vyssoulis, K. Aznouridis, N. Ioakeimidis, P. Pietri, P. Xaplanteris, N. Alexopoulos, E. Christoforatou, A. Samentzas, C. Stefanadis. 1Cardiology Department, Hippokration Hospital, Athens Medical School, Athens-Greece

Objective: Acute controlled increase in heart rate (HR) as obtained by cardiac pacing have been shown to be associated with increase in aortic PWV as measured between the carotid and femoral sites. In the absence of any active neurogenic influence on smooth muscle tone, the dependency of PWV on HR has been suggested to be due to the passive dynamic and viscoelastic properties of the arterial wall. This study investigates this phenomenon by simulating pulse wave propagation in a model of the aortic trunk where wall viscoelasticity is described by a complex elastic modulus and where both the real and imaginary parts are frequency dependent.

Methods: The model of the aortic trunk consisted of 5 segments simulating the effective path length over which aortic PWV is conventionally measured. The input flow is determined by a cardiac pump simulated by a time varying elastance. Each segment is described in terms of transmission line components with non-linear frequency (ω) dependent capacitance and resistance which simulate the complex elastic modulus (β(ω)) in terms of a dynamic elastic modulus (Ed(ω)) and a viscous dissipation term (η(ω)) (Ed(ω) = Ed(0) + η(ω)). Initial values for Ed(ω) and η(ω) were obtained from early studies of Leroy and Taylor [2] and model parameters were optimized by using the pacing data of Lantelme et al [1] for HR values of 60, 70, 80, 90 and 100 b/min.

Results: An increase in PWV of 10.9% between HR of 60 and 100 b/min as found in the pacing studies, was simulated by an average increase of 5.9% in Ed(ω) and 20.2% increase in η(ω) over the physiological frequency range (0-15Hz). No HR dependency of PWV was found when a real and frequency independent value of elastic modulus was used for the aortic segments.

Conclusions: Simulation studies show that HR dependency of PWV is regulated by both the frequency dependency of the dynamic elastic modulus as well as the viscoelastic dissipative constant. For given change in HR, the wall viscoelasticity has a 3 fold contribution to the change in PWV compared to the wall elastic modulus.


Objective: Hypertension is associated with increased arterial stiffness. We compared the effects of classic cardiovascular risk factors (RF), Framingham risk score (FRS) and circulating biomarkers on arterial stiffness in never-treated hypertensives.

Design and Method: We enrolled 1225 consecutive hypertensive patients (mean age 52.9 ± 11.7 years, 728 men). Arterial stiffness was determined with carotid-femoral pulse wave velocity (PWV) using the Compilor® device. FRS was used in order to calculate the 10-year risk of developing cardiovascular disease. Levels of C-reactive protein (CRP), D-dimers, plasminogen-activator inhibitor type 1, lipoprotein(a), fibrinogen were measured. The classic RF included age, sex, systolic blood pressure (SBP), total cholesterol, LDL, triglycerides, heart rate (HR), smoking, BMI, blood glucose and estimated glomerular filtration rate by Cockcroft-Gault formula.

Results: In stepwise multivariable regression analysis, PWV was significantly associated with FRS, SBP, CRP, age, glucose, HR, triglycerides and presence of diabetes after adjustment for all the aforementioned confounders (p = 0.005, p < 0.001, p < 0.001, p < 0.05, p < 0.01, p < 0.05 and p < 0.05, respectively; adjusted R2 of the model = 0.419). In further analyses, we employed dichotomous outcome variable (PWV ≥ 75th percentile [9.1 m/s]). Receiver operating characteristic curves were generated to evaluate the ability of the best 5 predictors of PWV according to the model, namely FRS, SBP, CRP, age and glucose, to discriminate subjects with and without increased arterial stiffness (PWV ≥ 75th percentile [9.1 m/s]). (Table)

Conclusions: Our findings reinforce age and BP as being strongly associated with PWV. However, FRS, SBP, CRP and glucose are also strongly associated with PWV. In fact, FRS and SBP have the best diagnostic performance for increased arterial stiffness, implying that the role of classic RF, as those incorporated in FRS, might be incremental to age and BP in higher PWV levels.

Table. Diagnostic performance of Framingham risk score, systolic blood pressure, age, C-reactive protein and glucose for indentifying subjects with pulse wave velocity >9.1 m/s

<table>
<thead>
<tr>
<th>Variable</th>
<th>AUC</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Framingham risk score</td>
<td>0.74**</td>
<td>0.67 - 0.81</td>
</tr>
<tr>
<td>Systolic blood pressure</td>
<td>0.72**</td>
<td>0.65 - 0.79</td>
</tr>
<tr>
<td>Age</td>
<td>0.70**</td>
<td>0.62 - 0.77</td>
</tr>
<tr>
<td>C-reactive protein</td>
<td>0.63**</td>
<td>0.57 - 0.70</td>
</tr>
<tr>
<td>Glucose</td>
<td>0.63**</td>
<td>0.56 - 0.70</td>
</tr>
</tbody>
</table>

*p < 0.001 compared to the audi hypothesis that the AUC is 0.5 and the examined variables cannot discriminate subjects with low and high pulse wave velocity values

Table: Diagnostic performance of Framingham risk score, systolic blood pressure, age, C-reactive protein and glucose for indentifying subjects with pulse wave velocity >9.1 m/s

PP.35.196 ASSOCIATION BETWEEN CAROTID ARTERIES STRUCTURAL CHANGES AND SERUM URIC ACID IN ESSENTIAL HYPERTENSIVE PATIENTS

O. Gulkervych. Institute of Cardiology, Kyiv-Ukraine

Objective: To investigate the relationship between parameters of carotid structure, blood flow in medium cerebral arteries and serum uric acid level in patients with essential hypertension (EH).

Design and Methods: In 52 pts with EH (average age 57.8 ± 0.9; 41 males) and 22 age- and sex-matched healthy pts we measure ultrasonographically carotid diameter and intima-media thickness (IMT), blood flow velocities (BFV) in medium cerebral arteries (MCA). Morning fasting venous blood samples were obtained from all subjects for uric acid assays, as well as other laboratory tests (C-reactive protein, lipid profile, glucose). Blood laboratory values were related to parameters of carotid structure and BFV in MCA by bivariate correlation analysis.

Results: Carotid diameter and IMT were increased in pts with EH compared with the normotensive pts (accordingly: 7.89 ± 0.13 vs 6.73 ± 0.17 mm, p < 0.001 and 1.14 ± 0.03 vs 0.61 ± 0.05 mm, p < 0.001). The mean blood flow velocity in MCA was significantly low in pts with EH compared with normotensive pts (accordingly: 0.85 ± 0.05 vs 0.70 ± 0.05 m/sec). Carotid diameter, IMT values correlated positively with serum uric acid level (r = 0.46, p < 0.001 and r = 0.37, p < 0.007 accordingly). Negative association existed between BFV mean in MCA and serum uric acid level (r = -0.46, p < 0.007). Adjustment for age, blood pressure and gender did not abolish positive association between serum uric acid level and carotid diameter, IMT but did it for BFV in MCA. Multiple regressions analysis have shown that serum uric acid is independent predictor of carotid structure damage in pts with EH.

Conclusion: Our data suggested that increased level of serum uric acid associated with severity of the carotid structure damage in pts with EH. Serum uric acid is an independent risk factor of cerebrovascular damage in pts with EH.

PP.35.197 NON-INVASIVE MEASUREMENT OF ARTERIAL STIFFNESS USING THE ANALYSIS OF OSCILLOMETRIC WAVEFORM DURING CUFF-INFLATION

M. Takata1, A. Shimakura1, T. Kusakabe2, K. Ide2.

University of Shiga Medical School, Toyama, Japan; 2Panasonic Electric Works Co., Ltd, Osaka-Japan

Objective: It is known that arterial stiffness is assessed by aortic pulse wave velocity (aPWV) or cardiac ankle vascular index (CAVI). However, the application of the device measuring home blood pressure to arterial stiffness has not been established yet. We examined a new parameter using the cuff pressure pulse waves (oscillations) during a blood pressure measurement with the cuff-oscilometry and compared it with CAVI and heart-ankle PWV (haPWV).

Design and Method: The cuff pressure pulse waves from 31 subjects during linear cuff inflation were extracted by blood pressure measurement device EW3122 (Panasonic Electric Works Co., Ltd) which cuff was attached around upper arm. The paired values were cumulatively added cuff oscillation amplitudes and the corresponding cuff pressure values were stored in the device during the measurement. Each of the cumulative addition value was exchanged to the ratios between 0.3 and 0.7 was defined as vascular stiffness index (VSI). The average index value of three times for each subject was calculated. These index values were compared with CAVI and haPWV, blood pressure independent and dependent parameters of arterial stiffness, measured by VaSera VS-1000 (Fukuda Denki Co., Ltd.)
Results: Mean age of subjects was 60 y/o. The VSI, CAVI, and haPWV were 11.6 ± 3.7, 8.2 ± 1.3 and 780.6 ± 115.9 cm/sec, respectively (mean ± SD). VSI was significantly correlated with CAVI and haPWV (r = 0.74, 0.79; p < 0.01, 0.01). VSI, CAVI, and haPWV were significant correlations with the age (r = 0.64, 0.75, and 0.51, respectively) and with the pulse pressure (r = 0.89, 0.63, and 0.80, respectively). On the other hand, the index of dividing VSI by systolic pressure (VSI / SP) was significantly correlated with CAVI and with haPWV (r = 0.78, 0.67; p < 0.01, 0.01). "Estimated CAVI" using the multiple regression of VSI / SP, age and body mass index was significant correlated with CAVI (r = 0.88, p < 0.01). Bland-Altman analysis indicated a good agreement in prediction of the "estimated CAVI" for CAVI.

Conclusions: These results suggested that the vascular stiffness index using the analysis of oscillometric waveform pattern during blood pressure measurement with cuff-inflation is an easy and accurate index to determine blood pressure-independent arterial stiffness.

PP.35.198 CENTRAL BLOOD PRESSURE IN TYPE 2 DIABETIC AND PREDIABETIC PATIENTS: CORRELATION WITH PERIPHERAL BLOOD PRESSURE

A. Oliveras1 J. Segura2 C. Suarez3 M. Gomez-Marcos4 L. Garcia-Ortiz4 N. Martell-Claron5 M. Abad1 L. Vigil6 D. Ferrero6 L. Sans1 J. De La Cruz7 Lm. Ruilope2 A. De La Sierra2, On Behalf of The Prescen Study, Spain. 1Hospital Clínico San Carlos, Madrid-Spain, 2Hospital Univ. De Móstoles, Móstoles-Spain, 3Univ. Autónoma De Madrid, Madrid-Spain, 4Centro Salud La Alamedilla, Salamanca-Spain, 5Hospital Clínico San Carlos, Madrid-Spain, 6Hospital 12 De Octubre, Madrid-Spain, 7Hosp. La Princesa, Madrid-Spain, 8Hosp. Mútua De Terrassa, Terrassa-Spain

Impaired glucose homeostasis is associated with arterial stiffness, but differences among relationship with central or peripheral blood pressure are unknown.

Objective: to assess the relationship between estimates of both peripheral BP (office BP, 24h, daytime, and nighttime BP) and central (c) BP in patients with impaired glucose metabolism.

Design and Methods: Cross-sectional study in subjects with type 2 DM or prediabetes (3% of the following: triglycerides > 150 mg/dl and/or drug treatment; HDLc < 40 mg/dl in men (M) or < 50 mg/dl in female (F) and/or drug treatment; waist circumference > 88 cm (F) or > 102 cm (M); plasma fasting glucose > 100 mg/dl and/or drug therapy; BP ≥ 140/85 mmHg and/or drug treatment). Clinical data, laboratory analyses and EKG were recorded. Office BP, 24h-ABPM and central BP by radial artery application tonometry (Sphygmocor®) were measured.

Results: There were 506 patients (diabetics: 75%; pre-diabetics: 25%); age: 64 ± 10y; 62% M/38% F; BMI: 30.9 ± 4.3 Kg/m²; waist circumference: 106 ± 10 cm (M), 103 ± 11 cm (F); Prevalence of other risk factors was: hypertension: 91%; dyslipidemia: 72%; current smokers: 14%. Office BP (mmHg): cSBP 142.3 ± 20.9; DBP 80.5 ± 12.3. ABPM (mmHg): 24h-SBP: 127.4 ± 14.5; 24h-DBP: 72.9 ± 9.1; day-SBP: 130.4 ± 15.0; day-DBP: 75.7 ± 9.6; night-SBP: 120.4 ± 16.1; night-DBP: 66.6 ± 9.3. Central BP (mmHg): cSBP: 127.4 ± 19.5; cDBP: 80.0 ± 12.6; cPP: 47.6 ± 15.2. Augmentation pressure: 15.2 ± 8.5. Augmentation index: 30.3% ± 11. Pulse wave velocity: 10.3 ± 3.3 m/s. After age- and sex- adjustment, the following correlations (Pearson’s “r”; p < 0.001 for all correlations) were found: cSBP correlated with office-SBP (r = 0.818), 24h-SBP (r = 0.581), day-SBP (r = 0.594) and night-SBP (r = 0.506), whereas cDBP correlated with office-DBP (r = 0.819), 24h-DBP (r = 0.695), day-DBP (r = 0.703) and night-DBP (r = 0.553). ROC curves were performed to determine the thresholds of central BP better correlated with normal ranges of different peripheral BP measurements. The cutoff for central SBP better associated with office hypertension was 121 mmHg, with very high sensitivity (91.1% (95%CI: 88.1 – 94.2)) and high specificity (75%), whereas obtained cutoffs for ABPM estimates showed less sensitivity and specificity.

Conclusions: In type 2 DM and prediabetic patients, the best correlations of non-invasively determined central BP were with office BP, as compared to other peripheral BP estimates. Moreover, central SBP of 121 mmHg is the threshold that better discriminates the occurrence of hypertension as diagnosed by office BP assessment.

PP.35.199 CENTRAL BLOOD PRESSURE AFTER MENTAL STRESS IN OBESE ADOLESCENTS

M. Rovina1, G. Tonini2, E. Faleschini2, B. Fabris1, M. Bardelli1, F. Fischetti1, R. Carretta1, 1Clinical Dpt of Medical Technological and Translational Sciences; University of Trieste, Trieste-Italy, 2Endocrinological Outpatient Pediatriac Clinic; Irccs Burlo Garofolo, Trieste-Italy

Introduction: Obese children (O) are at approximately a 3-fold higher risk for hypertension than non obese children (C). Central systolic blood pressure (CSBP) represents an index of left ventricular load more thorough than brachial systolic blood pressure (BSBP). Stress causes a different blood pressure response in O compared to C children.

Purpose: To measure central (CBp) and brachial (BSBp) blood pressure in obese (O) and normal-weight adolescents (C), in basal conditions and after acute mental stress.

Materials & Methods: Twenty-one O (11 boys), aged between 9 and 15 years (average age: 11, 9 ± 1.7 years) and 15 C (8 boys), aged between 10 and 15 years (average age: 12.6 ± 1.6 years), were recruited. CBp was measured by carotid applanation tonometry (PulsePen, DiaTecne SRL, Milano) while BSBp was measured with a validated oscillometer (Omron M6). Then, a mental stress, lasting 10 minutes, was caused, in all the subjects, by an arithmetic calculation. During the test, BBp was monitored. At the end of the test, CBp and BSBp were measured again.

Results: Baseline CBp was higher in O compared to C (111 ± 16 vs. 101 ± 15 mmHg; p = 0.06). After the mental test, CBp in O was still higher compared to C (110 ± 19 vs. 102 ± 14 mmHg; p = 0.05) while BSBp was not different (110 ± 21 vs. 111 ± 11 mmHg; p = 0.71). Either central and peripheral diastolic blood pressure were similar in O and in C, in all the study phases except at the end of the mental stress, when brachial diastolic blood pressure was higher in O compared to C (86 ± 17 vs. 79 ± 9 mmHg; p < 0.05).

Conclusions: Central systolic blood pressure differentiates Obese children from Controls more accurately than Brachial systolic blood pressure. Moreover, left ventricular load in young Obeses is higher than in Controls, either before and after an acute mental stress.
PREVALENCE AND CORRELATES OF ECHOCARDIOGRAPHIC LEFT ATRIAL ENLARGEMENT IN HYPERTENSIVE OUTPATIENTS IN CLINICAL PRACTICE


Background and Aim: Prevalence of left atrial enlargement (LAE) in hypertension has been mostly assessed in population-based samples and selected hypertensive groups. A few data are available in clinical practice. We examined LAE prevalence and severity in a cohort of hypertensive patients referred by general practitioners to a routine echocardiographic examination.

Methods: A total of 2170 hypertensive individuals (mean age 62 years, 53% men) referred by practitioners to 17 out-patient echocardiographic laboratories across Italy for detection of hypertensive cardiac disease were included in the study. LAE was defined as: A) absolute LA diameter > 4.0 cm in men and > 3.8 cm in women; B) LA diameter normalized to body surface area (BSA) > 2.3 cm²/m² in both sexes. LAE was graded as mild, moderate and severe according to Lang’s report.

Results: Patients with LAE were 38% by criterion A, and 20% by criterion B. A moderate/severe increase in LA size was present in 34% (A) and 32% (B) of patients with LAE. Severe LAE was 3.3-fold (A) and 2.6-fold (B) more frequent in women than in men LV mass was the strongest correlate of absolute LA diameter as well as of normalized LA diameter, after age.

Conclusion: LAE defined either by absolute or normalized LA diameter is a frequent cardiac phenotype in hypertensive patients referred to echo-labs in clinical practice. This cardiac parameter is closely related to LV mass and its severity is highly prevalent in women.

MITRAL DECELERATION INDEX IS ASSOCIATED TO AORTIC ROOT DILATATION AND NOT TO BIVENTRICULAR STRUCTURAL CHANGES IN ESSENTIAL HYPERTENSION

F. Negri1, C. Cuspidi2, C. Sala3, G. Mancia1. 1Dep of Clinical Medicine and Prevention University of Milano-Bicocca - Istituto Auxologico Italiano, Milano-Italy; 2Thoraco-Pulm & Cardiociric: Dep Fond Policlinico - Fisiot Clinica E Ipertensione University of Milano, Milano, Italy

Background and Aim: The ratio of deceleration time to early mitral wave velocity (mitral deceleration index, MDI) has recently been shown to predict cardiovascular events more precisely than deceleration time alone in human hypertensin. Data, however, about the relationship of this parameter with cardiac structure are scanty. In the present study we investigated such an association in uncomplicated essential hypertensins.

Methods: A total of 329 hypertensive subjects categorized in tertiles of MDI were considered for the analysis. All patients underwent the following procedures: 1) physical examination and clinic blood pressure measurement; 2) routine laboratory investigations; 3) M-mode, two-dimensional and Doppler echocardiography aimed to a comprehensive assessment of left- and right-sided chambers.

Results: Unadjusted left ventricular (LV) mass, right ventricular (RV) and aortic root diameter were significantly higher in the upper MDI tertile, but only aortic root diameter remained significantly after adjustment for covariates. A progressive, non-significant increase in biventricular hypertrophy occurred across the MDI tertiles. In a multivariate analysis, MDI was significantly associated with age (b = 0.229, p = 0.001) and aortic root diameter (b = 0.226, p = 0.001); this was not the case for deceleration time alone. No association between MV and LV as well as RV structural parameters was found.

Conclusion: Our findings indicate that MDI is unrelated to LV and RV structural changes. Altered LV diastolic function, as assessed by MDI but not by deceleration time alone, is independently associated to aortic root dilatation, a phenotype predictive of incident cardiovascular morbidity and mortality.

ECHOCARDIOGRAPHIC ALTERATIONS IN MASKED HYPERTENSION


Objective: To determine if there is a greater prevalence of echocardiographic alterations in subjects with masked hypertension (MH).

Methods: We have selected normotensive subjects, with at least two office blood pressure measurement <140/90 mm Hg, that were relatives of first-degree from hypertensive outpatients, proceeding from hypertension units throughout Spain. All the subjects underwent an ambulatory blood pressure monitoring and anthropometric data, as blood and urine analysis, and an echocardiogram were collected. Echocardiographic data were also collected if they were available. Masked nocturnal hypertension was defined when activity blood pressure on ABPM was >135/85 mmHg.

Results: Data from 438 subjects were collected (50.9% men) with a mean age of 45.3 ± 10.9 years, MH prevalence was 30.2%. Subjects with MH were older (47, with a greater proportion of men, and with a greater body mass index, with higher office blood pressure levels, with a lower gPGR, higher albumin to Creatinin ratio, worsen lipid profile and a higher proportion of office BP >130/80. In 175 subjects a recent echocardiographic examination was available, and in these subjects prevalen of MH was of 36%. There was not a difference related to the presence of ventricular hypertrophy defined as left ventricular mass index criteria between subjects with MH and subjects without it. Subjects with MH had, compared to those without MH, a bigger posterior wall thickness (9.83 ± 1.3 vs. 9.12 ± 1.5; p = 0.001) and a bigger interventricular wall thickness (9.71 ± 1.3 vs. 9.24 ± 1.4; p = 0.031) and bigger relative wall thickness (0.439 ± 0.06 vs. 0.407 ± 0.08; p = 0.004).

Subjects with MH had a bigger proportion of left ventricular remodelling (57% vs 37%) defined as RWT >0.42 that was statistically significant (p = 0.012).

Conclusions: In subjects with MH there are signs of early myocardial damage defined as left ventricular remodelling. These findings deserve new studies to be confirmed.

DETECTION OF SUBCLINICAL DIASTOLIC DYSFUNCTION IN HYPERTENSIVE PATIENTS USING DIASTOLIC STRESS ECHOCARDIOGRAPHY

M. Deljanin Ilic, S. Ilic, V. Stoicov, V. Ilic. Institute of Cardiology, Niska Banja, University of Nis-Serbia

Background: Left ventricular filling pressure can be estimated from ratio of transmural and annular velocities (E/E’). An increased resting E/E’reflects elevated filling pressure and may identify patients (pts) with diastolic dysfunction. However, the value of E/E’ after exercise echocardiography in detecting subclínical diastolic dysfunction in hypertensive patients has to be determined.

Objective: To assess whether noninvasive assessment of left ventricular filling pressure during stress echocardiography may detect subclinical diastolic dysfunction in hypertensive patients.

Design and Method: Fifty-five hypertensive patients (H group) and 30 controls (C group), with normal global systolic and diastolic left ventricular function, determined by standard 2D and Doppler echocardiography, and without echocardiographic or electrocardiographic evidence of myocardial ischemia with exercise, were investigated. In all pts and controls mitral inflow and mitral annulus velocities (using Tissue Doppler Imaging) were measured at rest and during bicycle exercise stress echocardiography (25W, 3-min increments).

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Results: Although baseline values of E/E′ in H and C group were in normal limits (< 8), compared to controls H patients had higher E/E′ ratio at rest (5.5 ± 0.77 vs. 4.25 ± 0.83, p < 0.001). In C group E/E′ ratio did not increase during exercise. Out of 55 hypertensive pts 38(69%) had no increase in E/E′ during exercise, while exercise E/E′ rised in 17(31%) pts (from 6.2 ± 0.48 to 10.1 ± 1.06, p < 0.0001; difference 63%). The percentage of dyspnea as a primary reason for stopping exercise was similar in hypertensive pts with and without those without exercise increased E/E′. However, exercise duration was sig-
ificantly shorter in hypertensive pts with than in pts without raised exercise E/E′ (p < 0.025).

Conclusion: In hypertensive patients with preserved global LV diastolic function at rest, increased E/E′ during diastolic stress echocardiography may uncover those with subclinical diastolic dysfunction.

PP.36.204 CAN THE SILENT MYOCARDIAL ISCHEMIA BE DETECTED IN ATHEROTROPIC HYPERTENSIVE PATIENTS WITH LEFT VENTRICULAR REMODELING?

S. Gurgenyan, S. Vatinyan, K. Nikoghosyan. Institute f Cardiology, Yerevan-Armenia

Objective: Left ventricular (LV) hypertrophy often accompany with myocardial ischemia (MI). The aims of present study is to demonstrate that the symptoms of MI substi in arterial hypertensive (AH) patients (pts) with LVH without clini-
cally coronary arterial disease (CAD).

Design and Method: We studied 43 pts with moderate AH (24 male and 19 female, mean age 52.1 ± 9.1 years). In all pts were performed 24-h ECG Holter monitoring, in 40 - bicycle exercise ECG (begun with 25 W, increasing by 25 W every 4 min), in 39 were evaluated the changes of wall motion score index (WMCI) at rest and at peak by the dobutamine stress-echocardiography (SE), in 26 - the myocardial scintigraphy by use of 99mTc-pyrophosphate and in 17 - 17-18TL and in 19 – coronary angiography.

Results: Fifty (34.8%) pts had an episode of SI in 24-h ECG Holter monitor-
ing. Twenty (46.5%) pts had > 0.1 mV of ST-segment depression and negative T wave in V5 and V6 in exercise ECG relative to the rest. The WMCI was observed in 9 (20.9%) pts at rest and in 27 (62.7%) – at peak (was deter-
mined by new wall motion abnormalities). In 22 (51.1%) pts the myocardial scintigraphy reveal the myocardial ischemic injuries. In 19 AH pts with LV remodeling and SI parameters with clinic diagnosis of the attendant CAD were performed coronary angiography. In 15 pts were excluded CAD events and only in 4 of them was confirmed the CAD diagnosis.

Conclusions: In the absence of CAD the MI events in AH pts are presented as a result of LV remodeling and as possible is related with anomalies of coronary microcirculation. Non-invasive diagnostic tests for detect of CAD are not always adequate in AH pts. If diagnostic doubt preserves after the loaded test or a myocardial scintigraphy in AH pts coronary angiography can be necessary.

PP.36.205 PROGNOSTIC VALUE OF LEFT VENTRICULAR HYPERTROPHY AND BLOOD PRESSURE VARIABILITY

S. Cinza Sanjurjo1, A. Hermita Amejeiras2, J. López Paz3, M. Pena Seijo4, G. Calvo González5, M. Romero Miguez2, V. Martínez Durán3, A. Pascual Montes6, J.M. Paz Fernández7, C. Calvo Gómez6, Multipsic Health Centers, Málaga-Spain, University Hospital Complex of Santiago, Santiago Diego De Compostela-Spain

Introduction and Objectives: Left Ventricular Hypertrophy (LVH) is the earli-
est manifestation of cardiac effect in hypertensive patients and is an independent risk factor for cardiovascular complications. The objective of this study was to determine the prognosis cardiovascular (CV) of hypertensive patients with LVH, based on the variability of blood pressure (BP) assessed by ABPM.

Methods: Cohort study in a sample of 432 hypertensive patients (218 women, 55.5 years) and without cardiovascular disease (CV) prior. In all cases, clinical assessment and biological, ABPM-24h and echocardiography (Pen conven-
tion, with calculation of left ventricular mass index-LVMI, normalized for body surface area and height-SC-AL). The monitoring of patients was per-
formed by review of medical history, recording the type of event (peripheral arterial disease, PAD, Coronary Disease-CD, heart failure-HF or stroke) and recording the event date.

Results: Completed follow-up 405 patients (218 women, mean age 55.5 years). Patients with LVH have more events, IT = 5.99 compared to 3.06 for those without LVH (IRR: 1.96 [1.42 to 2.72]). The Kaplan-Meier curve shows less free time events in the LVH group. Concentric LVH has a worse prognosis:

Conclusions: The loss of the depth of blood pressure is the parameter that is associated with poor CV prognosis in hypertensive patients. The presence of LVH determined a higher incidence of cardiovascular events. Although eccen-
tric LVH is the most common, the concentric LVH is associated with increased cardiovascular risk.

PP.36.206 ASSOCIATION BETWEEN EAS INDEX BY TISSUE DOPPLER IMAGING AND VENTRICULAR STIFFNESS INDEX OR VENTRICULARARRTERIAL INTERACTION

H. Sako, S. Miura, K. Saka. Fukuoka University Hospital. Fukuoka-Japan

Objectives: Aortic stiffening contributes to cardiac afterload. Left ventricular (LV) hypertrophy and substrate of cardiac function. We previously reported that Eas Index by tissue doppler imaging (TDI) was associated with aortic stiffness by transesophageal echocardiography and augmentation index. The purpose of this study was to evaluate the association between Eas index and LV elastance or ventriculararterial interaction.

Methods and Results: We evaluated cardiac function by both conventional echocardiography and TDI velocities from 2 mitral annular sites in consecu-
tive 300 patients. TDI velocities were quantified by Eas index of diastolic and systolic performance: e′ (a′a′x′). We also examined LV diastolic elastance index (Ed), arterial elastance index (Ea), LV end-systolic elastance index (Ees) and ventricular-vascular coupling index (10xEes/Ea). The Eas index was significantly correlated with Ed (r = -0.470, p < 0.0001), Ea (r = -0.198, p = 0.035) and total stiffness index (r = -0.272, p < 0.0003). However, Ees and ventricular-vascular coupling index were not associated with Eas index. Finally, multivariate logistic regression analysis showed that plasma levels of brain natriuretic peptide were most closely correlated with Ed (p = 0.004).

Conclusions: The Eas index for TDI may be a helpful tool for evaluating aortic stiffness, cardiac afterload and diastolic LV function.

PP.36.207 TISSUE DOPPLER INDEXES OF LEFT VENTRICULAR SYSTOLIC FUNCTION IN RELATION TO THE PULSATILE AND STEADY COMPONENTS OF BLOOD PRESSURE IN A GENERAL POPULATION

T. Kuznetsova1, W. Sakiewicz2, M. Klock-Badeleck1, J. Dhooge1, A. Ryabikov4, K. Kunica2, E. Swierbelswa1, L. Thijs1, S. Malyutina4, K. Stolarz-Skrzypek1, K. Kawecka-Jaszcz3, K. Narkiewicz2, J.A. Staessen1. University of Leuven, Leuven-Belgium, Medical University of Gdańsk, Gdańsk-Poland, Jagiellonian University Medical College, Cracow-Poland, Institute of Internal Medicine, Novosibirsk-Russia

Objective: To our knowledge, no population study described the association of the radial and longitudinal components of left ventricular (LV) strain with blood pressure (BP) in continuous analyses. We therefore investigated these associa-
tions in subjects randomly recruited from the general population in the frame-
work of the family-based European Project on Genes in Hypertension.

Design and Method: In 303 subjects (51.5% women; mean age, 43.0 year), using Tissue Doppler Imaging (TDI), we measured:1 end-systolic longitudi-
nal strain (mean, 21.0%) and peak systolic strain rate (SR) (1.29 l/s) from the basal portion of the LV inferior and posterior free walls;2 and radial strain (51.1%) and SR (3.40 l/s) of the LV posterior wall. Models included in addition to covariables and confounders both systolic and diastolic BP or both pulse pressure (PP) and mean arterial pressure (MAP). Effect sizes were expressed per 1-SD increase in BP.

Results: Longitudinal strain (r = -0.72%; P = 0.003 and -0.76%; P = 0.005), but not SR, decreased with diastolic BP and MAP. Radial strain (r = -3.5%; P = 0.001) and SR (0.36 l/s and -0.21 l/s; P = 0.003) independently increased with systolic BP and decreased with diastolic BP. Accordingly, radial strain (3.1%; P = 0.0001) and SR (0.22 l/s; P = 0.0007) increased with higher PP, but were not related to MAP.

Conclusions: In the general population, BP is an independent determinant of LV systolic function as measured by TDI. Radial function increased with PP,
the pulsatile BP component, whereas longitudinal function decreased with the steady component of BP as expressed by MAP or diastolic BP.

**PP.36.208** TEN-YEAR DYNAMICS OF CARDIAC STRUCTURE AND LEFT VENTRICULAR DIASTOLIC FUNCTION IN HYPERTENSIVE PATIENTS WITH AND WITHOUT INITIAL LEFT VENTRICULAR HYPERTROPHY

O. Matova, S. Pavlenko, O. Chervonopiskaya, L. Mishchenko

1 National Scientific Center the M.D. Strazhesko Institute of Cardiology, Kyiv-Ukraine, 2 Oberig, Kyiv-Ukraine

**Objective:** To estimate the association between changes in left ventricular (LV) structure and diastolic function with hemodynamic and humoral factors in treated hypertensive outpatient pts (pts) after a mean period of 10 years.

**Method:** 104 pts were examined initially and after 10 years. All pts were done echocardiography (tissue Doppler imaging was used only at the end of study), ambulatory blood pressure (BP) monitoring and measurement of plasma insulin after 60 and 120 min oral administration of 75g glucose by radioimmunoassay, epinephrine (EP) and norepinephrine (NEP) levels by fluo-"

**Results:** There were no significant differences in age, sex, and EP, NEP, insulin levels between the groups at the end of study. After 10 years in both groups average 24-hour BP was reduced, but were not achieved ABPM target goals. During 10 years in 1st group LVM increased from 99.5 ± 2.7 to 130.5 ± 3.5 g/ m² (p < 0.001), relative wall thickness (RWT) - from 0.40 ± 0.01 to 0.46 ± 0.01 (p < 0.001) and ejection fraction (EF) decreased from 65.4 ± 1.1 to 61.0 ± 1.2% (p < 0.05), early filling velocity/late filling velocity (E/A) from 0.98 ± 0.04 to 0.91 ± 0.03 (p < 0.05), but left atrial diameter (LA) did not change. In 2nd group LA increased from 4.1 ± 0.07 to 4.3 ± 0.07 cm (p < 0.05), RWT - from 0.42 ± 0.01 to 0.47 ± 0.01 (p < 0.01), E/A- from 0.78 ± 0.03 to 0.82 ± 0.03 (p < 0.05) and LV end-diastolic volume index decreased from 78.2 ± 3.4 to 68.2 ± 2.6 ml/m² (p < 0.05), although LVM has not significantly changed after 10 years. Among all pts significant correlations between E/A with age (r = -0.391, p < 0.01) and parity (r = 0.378, p < 0.01) were also detected.

**Conclusions:** After a mean period of 10 years LVM has increased only at hypertensive pts without initial LHV although LV diastolic function decline has occurred in both groups. Abnormalities in LV diastolic function are associated with age, body mass index, cardiac remodeling, 24-h systolic and pulse blood pressure. Humoral factor insulin may participate in delayed relaxation LV in pts with initial LHV, norepinephrine - in decrease of EF in pts without initial LHV.

**PP.36.209** MORPHO-FUNCTIONAL HEART PECULIARITIES OF YOUNG SWIMMERS WITH SMALL ANOMALIES OF HEART EVOLUTION.

A. Smolensky, O. Belichenko, A. Maichalova

Sports Medicine Institution, Moscow-Russia

Small anomalies of heart evolution (SAHE) mean changes of heart structure and arterial vessels which are not resulted in cardiac and vessel function abnormali-

ties. Among the SAHE there are the most often met and the best learnt mitral valve prolapse (MVP) and anomalously located ventriculus cordialis chords. Among the SAHE there are clearly recognized for 63% of those examined. In the structure of SAHE there were: mitral valve prolapse (MVP) - 24%, anomalously located ventricu-

las cordialis (VCC) - 16.7%, tricuspid valve prolapse (TVP) - 5.6%, X: the atrium cavity - 1.9%, combination of MVP + TVP - 3.7%, MVP + ALC - 7.4%, ALC + rudimentary valve - 1.9%, MVP + dilation of Valsava sinuses - 1.9%. Later on all the young sportsmen were divided into two groups: those with SAHE - 34 and those without SAHE - 20 persons. Young sportmen with SAHE much more often suffered from astigmatism, low level of myopia, accommodation cramp, chronic tonsillitis, nasal septum deviation; their electrocardiogram (EKG) showed atrial repolarization process abnormality (both in dormancy and against a background of physical activity), ventricular extrasystole. While carrying out tests against a background of physical activity (velocimetry) the sportmen with SAHE demonstrated low indices of exercise performance. Besides, young sportmen with SAHE were characterized by lower indices of ventriculus systen myocardium mass which proves abnormality of cardiovascular system long duration adaptation for exercise stress.

**PP.36.210** LEFT VENTRICULAR HYPERTROPHY (LVH) IN CHILDREN WITH CHRONIC KIDNEY DISEASE (CKD)


M. Drozdî. 1 Dialysis Unit, Jagiellonian University Medical College, Krakow-Poland, 2 Dept. of Pediatrics, Jagiellonian University Medical College, Krakow-Poland. 3 Dept. of Nephrology, Jagiellonian University, Medical College, Krakow-Poland, LVH is a major risk factor for cardiovascular complications. The aim of the study was an assessment of LVH progression in children with CKD during 1 year observation.

**Material and Methods:** The study was conducted in a group of 39 children (11 girls and 28 boys), aged 2 - 18 years with CKD in stage 2 to 5. The serum levels of albumin, creatinine and hemoglobin were evaluated and GFR was calculated. A triple BP measurements were performed, followed by ABPM measurements performed at home. With the use of electrical bioimpedance, phase angle was measured. Echocardiography examinations were carried out with HP 5500 device and S4 ultrasound probe of variable frequency. Diastolic and systolic LV dimension, LV ejection fraction (EF) and LV mass (LVM) were evaluated. The patients were divided into 3 groups according to change in left ventricular mass (LVM) z-score: group A with decrease, B - stable and C - with increase > 1 z-score.

**Results:** During 12 months of follow-up decrease of LVM z-score > 1 was observed in 6 children (group A) and increase in LVM z-score > 1 in 9 children (group C). At the beginning of the study children with LVH regression had lower GFR (group A vs. B vs. C = 10 vs. 36 vs. 48 ml/min/1,73 m²), lower Hb level (11.2 vs. 12.5 vs. 12.4 g/dl), lower albumin level (40 vs. 45 vs. 46 g/l; p = 0.01), lower phase angle (4.3 vs. 5.3 vs. 7.4), higher SBP (130 vs. 112 vs. 116), DBP (89 vs. 68 vs. 71), MAP (101 vs. 83 vs. 83 mm Hg) and increased LVM z-score (2.4 vs. 0.0 vs. 0.6). 12 months treatment of anemia, overhydration and hyper-

tension resulted in better control in group A: Hb level (11.8 vs. 12.9 vs. 12.8 g/ dl), albumin level (44 vs. 45 vs. 44 g/l), phase angle (5.5 vs. 5.4 vs. 5.3), SBP (121 vs. 111 vs. 119 mm Hg), DBP (79 vs. 67 vs. 74 mm Hg), MAP (92 vs. 81 vs. 82 mm Hg), LVMass z-score (0.8 vs. 0.4 vs. 0.7). In children with LVH progres-

sion - 3 mm Hg higher systolic (113 vs. 116) and diastolic blood pressure (74 vs. 71 mm Hg) resulted in LVM z-score increase after 12 months follow-up.

**Conclusion:** During the 12-month observation in 25% of CKD children a progression of LVH was revealed. Hypertension, anaemia and overhydration constitutes a major risk factors of cardiac injury. All children with CKD in stage 2-5 require a complete, periodical echocardiographic evaluation.

**PP.36.211** FACTORS ASSOCIATED WITH A PROLONGED QT INTERVAL IN HYPERTENSIVE PATIENTS


1 University of Medicine and Pharmacy Victor Babes, Timisoara-Romania/Military Hospital, Timisoara-Romania

**Objective:** QT interval prolongation is associated with sudden cardiac death risk. It was our aim to identify factors associated with a prolonged QT interval in hypertensive patients.

**Methods:** A total of 72 hypertensive patients and 56 age and sex matched healthy controls were enrolled in the study. The QT interval (QTmax), QTC (heart rate corrected QT interval), the QT interval in lead II (QTII), QTm (mean QT interval) and QTd (QT dispersion) were determined manu-

ally, using 12-lead ECG. Additional laboratory tests were also performed: complete blood count, lipid profile, renal function tests, glycemia and transaminases.

**Results:** QTmax (437 ± 54 ms) and QTC (474 ± 53 ms) were significantly pro-

longed (p < 0.01), in 44% and 33% respectively, of the hypertensive patients compared to healthy controls. Multiple regression analysis revealed a significant
association between QTmax, QTc, QTII and white blood cell count (WBC), neutrophils and lymphocytes (significance P < 0.01). QTc, QTII and QTm were also significantly associated with MCHC (mean corpuscular hemoglobin concentration). Serum glucose, transaminases, total cholesterol and creatinine were significantly associated with QTmax, QTc, QTm and QTII. QTd was significantly associated only with serum cholesterol (p < 0.01) and neutrophils and lymphocytes (R = 0.92; significance P < 0.01).

Conclusions: A prolonged QT interval is very prevalent in hypertensive patients. Increased WBC, MCHC, transaminases, creatinine and hyperglycemia are significantly associated with QT prolongation in hypertensive patients.

PP.36.212 EFFECTIVENESS OF THERAPY USING BETA-BLOCKERS IN PATIENTS WITH ESSENTIAL HYPERTENSION AND STABLE EFFORT ANGINA

S. Vatianin, S. Gurgenyan, K. Nikogosyan. Institute of Cardiology, Yerevan-Armenia

Objective: Arterial hypertension and stable, effort-induced angina contribute synergistically to high cardiovascular risk. The aim of this study was to compare the efficacy of various beta – blockers in patients with essential hypertension (EH) and stable effort angina (SEA).

Methods: Sixty nine patients with mild to moderate EH,SEA and documented coronary artery disease (CAD), aged 52 – 61 years, were randomly assigned to Atenolol 100 mg daily (group A-23 patients), or Metoprolol 100 mg daily (group B-23 patients), or Nebivolol 10 mg daily (group C-23 patients). Treadmill exercise tests were performed at baseline and after 12 months of therapy. Differences in the efficacy parameters were analyzed using 2-tailed Student’s t test for quantitative parameters.

Results: At the end of the study blood pressure was lowered in all groups to less than 140/90 mm Hg. At baseline there were no significant differences between the groups with respect to exercise test duration, total workload, time to 1 mm ST segment depression, time to onset of angina, maximum ST segment depression, grade of anginal pain, anginal attacks per week. At the end of the study time to 1 mm ST segment depression compared to baseline increased by 12.7% in group A(p < 0.01), by 13.3% in group B(p < 0.01) and by 22.4% in group C(p < 0.001). Time to onset of angina increased by 12.1% in group A(p < 0.01) by 13.7% in group B (p < 0.01) and by 23.1% in group C (p < 0.001). Maximum ST segment depression compared to baseline passed by 6.8% in group A(p < 0.01), by 7.7% in group B (p < 0.01) and by 15.4% in group C (p < 0.001). At the end of this investigation beneficial changes were observed in anginal attacks. Mean number of anginal attacks per week decreased by 23.7% in group A(p < 0.01), by 26.8% in group (p < 0.01) and by 40.4% in group C(p < 0.001). There was no significant difference between groups for grade of anginal pain.

Conclusions: Treatment with beta-blockers induced qualitative anti-hypertensive effect in all patients. Significant improvements were found 12 months after beginning of therapy in exercise stress tests, but therapy with Nebivolol was significantly superior to both Atenolol and Metoprolol therapies.

PP.36.213 ASSOCIATION OF INAPPROPRIATE LEFT VENTRICULAR MASS WITH CARDIOVASCULAR RISK FACTORS IN HYPERTENSIVE PATIENTS

M. Vorobeyeva, S. Villevalde, A. Safarova, Z. Kobalava. Russian Peoples’ Friendship University, Moscow-Russia

Objective: Inappropriately high left ventricular mass (LVM) is a syndrome which includes structural, functional and electrophysiological changes of myocardium, associated with poor prognosis regardless of the criteria for left ventricular hypertrophy (LVH). Predictive factors of inappropriate LVM are still undetermined. The aim of the study was to investigate the relationship between inappropriate LVM and cardiovascular risk factors or parameters of cardiac damage in uncomplicated hypertensive patients.

Methods: In 201 hypertensive pts without established cardiovascular or renal disease (90 male, 57±6.5 years (M±SD), 28% smokers, 11% diabetic, office BP 133±78/77±6 mmHg) appropriateness of LVM was assessed after ≥1 year of antihypertensive treatment with achieved BP target. The appropriateness of LVM was calculated by the ratio of observed LVM to the value predicted for individual sex, height and stroke work at rest. The observed to predicted LVM ratio (appropriateness ratio - AR) was expressed as a percentage and inappropriate LVM was defined as AR > 128%. Mann-Whitney test, Spearman and Χ2 analyses were performed. p < 0.05 was considered statistically significant.

Results: Patients with inappropriately high LVM (n = 153) in comparison with pts with appropriate LVM (n = 48) had higher BMI (30.4 ± 3.4 vs 28.1 ± 3.7 kg/m², p < 0.05), total cholesterol (5.8 ± 1.1 vs 5.5 ± 1.0 mmol/L, p < 0.01), triglycerides (TG) (1.8 ± 0.7 vs 1.4 ± 0.6 mmol/l, p < 0.05), fasting plasma glucose (FPG) (5.9 ± 0.6 vs 5.3 ± 0.8 mmol/L, p < 0.05), LVM index (227.2 ± 18.5 vs 170.8 ± 14.6 g/m²). Prevalence of abdominal obesity, LVH, diabetes mellitus was significantly higher in pts with inappropriately high LVM compared with pts with appropriate LVM. There was positive correlation between observed to predicted LVM ratio and BMI (r = 0.19, p < 0.05), FPG (r = 0.16, p < 0.05). Inappropriately high LVM positively correlated with BMI ≥ 30 kg/m² (r = 0.20, p < 0.03), TG > 1.7 mmol/L (r = 0.18, p < 0.05), FPG > 6.1 mmol/L (r = 0.20, p < 0.05).

Conclusions: In hypertensive patients inappropriate LVM is associated with cardiovascular risk factors and markers of cardiac damage. Odds ratio of inappropriately high LVM is higher in pts with abdominal obesity, impaired fasting glucose, hyperglycemia and Echo-criteria of left ventricular hypertrophy.

PP.36.214 ASSOCIATION BETWEEN SERUM URIC ACID AND LEFT ATRIUM SIZE IN HYPERTENSIVE IS INDEPENDENT OF GLOMERULAR FILTRATION RATE

C. Esis, M. Bracho, E. Silva, A. Gonzalez, S. Briceno, J. Villasmil. Instituto De Enfermedades Cardiovasculares - Universidad Del Zulia, Maracaibo-Venezuela

Objective: To evaluate the relation between left atrium (LA) size in patients with hypertension older than 55 years and serum uric acid (SUA) concentration and whether this association is affected by kidney function.

Material and Methods: This was a cross-sectional study conducted with 165 subjects (29 males and 136 females), aged between 55 to 87 years (mean = 65.65 ± 7.42 years). In all patients, anthropometric and office blood pressure (BP) measurements, an echocardiogram and a collection blood samples were performed. Planimetered LA area was measured from the apical four-chamber-view. Hypertricemia (HU) was defined as SUA level > 7.0 mg/dl in men or 6.0 mg/dl in women. Kidney function was assessed by estimated glomerular filtration rate (eGFR) using the Cockcroft-Gault equation. Impaired renal function with low GFR was defined as eGFR < 60 ml/min/1.73 m². Recruited patients were classified according to the observed combination of HU and low GFR: Group A: absence of both HU and low GFR (n = 114); Group B: presence of HU but not low GFR (n = 17); Group C: presence of low GFR but no HU (n = 28); and Group D: presence of both HU and low GFR (n = 6). ANOVA test was used to compare the means LA area between the groups. An Analysis of Pearson correlation was used for determine the association between SUA and LA area. The Multivariate Analysis of Variance was used to evaluate the effect of gender; SUA and GFR on LA size. P < 0.05 was considered statistically significant.

Results: We detected 23 patients with HU (13.9%) and 34 patients with impaired kidney function with low GFR (20.6%). The overall mean of LA area was 14.06 ± 3.11 cm², in male was 15.93 ± 4.38 cm² and female 13.65 ± 2.90 cm² (P = 0.002). LA area was significantly correlated with SUA (r = 0.288; P < 0.001). The LA area was higher in subjects with HU than those without HU (16.08 ± 3.91 vs. 13.70 ± 3.08 cm², P = 0.003). The mean LA area in Group A was 13.76 ± 3.00, Group B: 16.07 ± 4.55, Group C: 13.48 ± 3.44 and Group D: 16.09 ± 2.06 cm² (P = 0.030). In the Multivariate Analysis of Variance, both groups categorized according SUA as gender independently have an effect on LA area (P < 0.05).

Conclusions: In this study, the SUA independently influences LA size. LA enlargement is associated to development of cardiovascular outcomes in the general population.

PP.36.215 NOVEL APPROACH FOR DIAGNOSTICS OF LEFT VENTRICULAR HYPERTROPHY BY ELECTROCARDIOGRAPHY

V. Kuznetsova, E. Martynyova, V. Soloyev, L. Eivalpineva, V. Todossiychuk, D. Krinochkin, S. Vdovenko, E. Gorbatenko, I. Isayaeva, A. Naimushina. Tyumen Cardiology Center, Tyumen-Russia, Tyumen State University, Tyumen-Russia

Background: Diagnostics of left ventricular hypertrophy (LVH) is very important in patients with arterial hypertension (AH). The objective of the present study was to evaluate the diagnostic efficacy of new electrocardiographic criteria for LVH compared to echocardiographic data.
Methods: 99 patients (mean age 47.9 ± 0.86 years): 19 without cardiovascular pathology, 41 with AH and 39 with a combination of AH and coronary artery disease examined using automatic computer ECG analysis. Patients with ventricular conduction abnormality, cardiac defect and hypertrophic cardiomyopathy were not included in the study. Calculation comprised 101 electrocardiographic indices showing amplitude and ECG intervals in 12 leads. The criterion for LVH was left ventricular mass index > 134 g/m² by echocardiography.

Results: A mathematical model for LVH recognition was calculated (binary logistic regression) and showed 70% diagnostic sensitivity, 84% diagnostic specificity, 77% efficacy, 81% positive predictive value, 74% negative predictive value (equation function: P = 1/1 + e⁻ʸ, where y = -8.62 + 2.04*RV1 - 1.51*ST + 0.013*QT - 5.60*RV3; e = 2.72 – mathematical constant and if function P ≥ 0.41 there is LVH, if P < 0.41 no LVH; p < 0.001). This model was compared with well-known indices (Sokolow, Sokolow-Lyon, Gubner-Underleider, Grant, Mc Phee, Lepeschkin) on random sampling including 53 persons (mean age 52.3 ± 19 years) showing satisfactory sensitivity level of 52%, 67% efficacy, 63% negative predictive value, highest levels of 81% specificity and 73% positive predictive value. Diagnostic specificity and positive predictive value was higher than similar operational characteristics of some other well-known indices.

Conclusions: The mathematical model based on automatic computer ECG analysis allows revealing LVH with satisfactory diagnostic efficacy better than some other ECG indices.

**PP.36.216** HYPERTENSION-RELATED LEFT VENTRICULAR HYPERTROPHY IS ASSOCIATED WITH RIGHT VENTRICULAR DYSFUNCTION

V. Katsi, C. Aggelis, I. Felekos, L. Raptopoulos, G. Souretis, I. Vlasseros, C.H. Stefanadis, I. Kallikazaros. Hippokration Hospital, Athens-Greece

Background: Le ventricular hypertrophy is a common echocardiographic finding of hypertensives. The functional interdependence of the two ventricles e leads to right ventricular dysfunction. We assessed the hypothesis that Tissue Doppler Imaging (TDI) may help us study the subtle alterations of the right ventricular function in patients with hypertension related le ventricular hypertrophy.

Methods: We studied 55 subjects (aged = 51 ± 6 years, 44 men) with newly diagnosed, never treated, stage I-II essential hypertension and 34 age and sex adjusted control subjects. Standard transthoracic echocardiographic measurements as well as pulsed wave tissue Doppler from tricuspid annulus were obtained.

Results: Age and heart rate were similar between the two groups. Hypertensives exhibited significantly increased le ventricular (LV) diastolic septal and posterior wall thickness, le atrial diameter, LV mass, LV mass index and relative wall thickness. Right ventricular TAPSE and RVOTfs (%) were similar between the two groups. All of the diastolic measurements were altered in hypertensives [early diastolic velocity (cm/sec) 13 ± 4 vs 18 ± 4, p < 0.01, late diastolic velocity (cm/sec) 20 ± 3 vs 14 ± 4, p < 0.01, early to late diastolic velocity rao 20 ± 4 vs 14 ± 3, p < 0.01]. Systolic velocity did not differentiate between the two groups (16 ± 3 vs 17 ± 3, p = NS).

Conclusions: Right ventricular functional alterations can be identified by TDI imaging in hypertensives with le ventricular hypertrophy. TDI imaging unmasks subtle changes in the diastolic function of the right ventricle.

**PP.36.217** CARDIAC AQUAPORIN 1 DURING OSMOTIC STRESS INDUCED BY WATER RESTRICTION


Aquaporin 1 (AQPI) is an ubiquitous water channel protein involved in the maintenance of cellular osmotic environment and body fluid balance. However, little is known about AQPI in the heart, which is a target organ for the physiological alterations induced by osmotic stress, particularly during postnatal life.

Objective: The aim of the present study was to evaluate ventricular AQPI protein levels and localization in rats subjected to hypovolemic state following water restriction.

Method: Male Sprague-Dawley 25 days old rats were divided in the following groups: R: water restriction during 3 days; C: water ad libitum for 3 days; RsoL: water restriction during 3 days + oral rehydration salts (according to WHO) for 3 days. At the end of each experiment, we determined: hematocrit, body weight, systolic blood pressure (SBP) and heart rate (HR); animals were then sacrificed to evaluate ventricular AQPI protein levels (Western Blot) and localization (Immunohistochemistry).

Results: AQPI immunohistochemical staining of the left ventricle revealed its presence in vascular endothelium and endocardium, this pattern being similar among the studied groups of animals. Western Blot analysis showed that water restriction increased non-glycosylated AQPI compared to C (P < 0.05), whereas hydration with oral salts increased glycosylated AQPI compared to both C and R (p < 0.01).

Conclusion: Water restriction induced a hypovolemic state characterized by significantly decreased body weight and elevated hematocrit, accompanied by hemodynamic alterations. The results suggest that cardiac AQPI may be involved in the process of tissue homeostasis during osmotic stress, showing a differential expression pattern in response to hydration status, without changing its localization.

**PP.36.218** IN CHILDREN AND ADOLESCENTS WITH WHITE COAT HYPERTENSION: IS LEFT VENTRICULAR MASS INDEX ASSOCIATED WITH NEW-ONSET HYPERTENSION?

M. Bracho, C. Essi, E. Silva, A. Gonzalez, J. Villasmil, S. Briceno, G. Bermudez, G. Calmon. Instituto De Enfermedades Cardiovasculares-Universidad Del Zulia, Maracaibo-Venezuela

Objective: To determine the association between Left Ventricular Mass Index (LVMI) and New-Onset Hypertension (NHT) in children and adolescents with White Coat Hypertension (WCH).

Method: A prospective study was carried out in 202 patients (103 boys and 99 girls, aged 10-19 years, mean 14.27 ± 1.8 years). At baseline, office blood pressure (BP) measurements, an echocardiogram and an ambulatory BP monitoring (ABPM) were performed to all patients. After follow-up (3.71 ± 1.8 years), they were re - evaluated for identify NHT. An Analysis of correlation of Spearman was used for determine the association between LVMI and NHT.

Results: We detected 22 patients with WCH (10.9%). During follow-up, 9 of 22 patients with WCH became normotensive, and 13 developed NHT. Patients with NHT had higher baseline office systolic BP (141.03 ± 6.81 vs. 131.70 ± 6.49 mmHg; P = 0.002), baseline ambulatory systolic BP daytime values (128.53 ± 5.73 vs. 121.33 ± 4.63 mmHg, P = 0.005) and a tendency to higher left ventricular mass index (85.48 ± 29.12 vs. 57.30 ± 9.30 gm/m², P = 0.056). The gender (r = 0.52; P = 0.01), baseline office systolic BP (r = 0.64; P = 0.001), baseline ambulatory systolic BP daytime values (r = 0.53; P = 0.01) and LVMI (r = 0.57; P = 0.02) were significantly correlated with NHT.

Conclusion: In children and adolescents with WCH, HTN is associated with higher systolic BP and LVMI at baseline.

**PP.36.219** EFFECTIVENESS OF NUCLEAR SCAN STRATEGY IN CHEST PAIN PATIENTS PRESENTING WITH HYPERTENSION


Background: Myocardial perfusion imaging (MPI) is effective in stratifying patients (pts) with chest pain (CP), nondiagnostic EKG and low to intermediate likelihood of short-term coronary events. We sought to evaluate the role of nuclear scan strategy eventually in patients with or without hypertension.

Methods: Patients with negative first-line work-up including clinical evaluation, serial EKGS and serial Troponins underwent stress-MPI. Those with positive testing underwent angiography, whereas the remaining patients were discharged and followed up. Endpoint was coronary stenoses ≥ 50% at angiography (CAD) or coronary events (CE) at follow-up.

Results: Overall out of the 1,089 patients enrolled in the study, 276 (25.3%) had high stress-MPI and 155 (56.2%) achieved the endpoint. Patients with nor-
Conclusions: In low to intermediate risk CP pts a nuclear scan strategy with stress-MPI is safe and effective in separate pts at high-risk of CAD and CE from those who can be safely discharged. In pts presenting with hypertension, PPV was significantly higher as compared to others. Thus, a nuclear scan strategy could be cost-effective in the subset of patients with hypertension.

### Results:

**Hypertensive pts**

- PPV: 62.2

**Non-Hypertensive pts**

- PPV: 50.5

**PP.36.220 NINE YEARS FOLLOW-UP OF PATIENTS WITH HYPERTENSIVE LEFT VENTRICULAR HYPERTROPHY AND PREDICTIVE VALUE OF NON-INVASIVE PARAMETERS**

D. Djordjevic1, J. Tasic1, B. Stamenkovic1, M. Lovic1, D. Lovic1, B. Lovic1

1Institute for Treatment and Rehabilitation Niska Banja, Niska Banja-Serbia, 2Inter Medica Dr Lovic, Nis-Serbia

**Objective:** Left ventricular hypertrophy is associated with an increased risk of cardiovascular complications independently of other known risk factors. Predicting outcome for every patient at the first examination is an important aspect of the treatment. The aim of the study was to examine the correlation between non-invasive parameters and outcomes in patients (pts) with essential arterial hypertension (AH) and left ventricular hypertrophy (LVH) during nine years of follow-up.

**Design and Method:** Ninety pts were examined (55.2 ± 8.3 years; 56 male and 34 female) with AH and LVH. All pts were examined by means of eco-cardiography, exercise testing, 24-h Holter monitoring, 24-h ambulatory blood pressure monitoring, heart rate variability, ventricular late potentials, spectral turbulence analysis and QTc interval dispersion. Patients had regular medical therapy during period of follow-up. The outcome was examined according to parameters at the beginning of the study.

**Results:** Average left ventricular mass index (LVMi) was 171.9 ± 32.4 g/m² and duration of hypertension was 12.3 ± 7.9 years. During eight years of follow-up in 25 (38.5%) pts occurred cardiovascular and cerebrovascular adverse events (AE). At the beginning of the study pts with AE had greater LVMi than other pts (183.3 ± 34.8 g/m² vs. 168.3 ± 30.6 g/m²; p < 0.05). There was no difference between groups according to medicament therapy during the nine years of follow-up. In pts with AE, QTc dispersion was greater than in pts without AE (68.6 ± 21.4 ms vs. 56.1 ± 20.2 ms; p < 0.02). The QTc dispersion greater than 60 ms was found in 19 (76.0%) pts with AE and in 27 (41.5%) pts without AE (p < 0.01). All other examined parameters did not achieve statistical significance between group with and without adverse cardiovascular and cerebrovascular events. Using multiple linear regression analysis, the best predictor of bad prognosis were greater QTc dispersion (standardized coefficient beta for QTc dispersion 0.266; p < 0.02, and for model: R = 0.266, R² = 0.071, adjusted R² = 0.060, standard error of the estimate = 0.437).

**Conclusions:** Patients with greater QTc dispersion, especially greater than 60 ms, have worse outcome during nine years in spite of regular medical treatment than the ones without.

**PP.36.221 IMPACT OF DIABETES IN CARDIAC STRUCTURE AND FUNCTION IN HYPERTENSIVE PATIENTS**

A. Banushi1 E. Zaimi1 E. Petela1 A. Deljana1 S. Qirko1

1University Hospital Centre Mother Teresa, Tirana-Albania, Faculty of Medicine, Tirana-Albania

**The Aim:** of the study was to evaluate the relationship between left atrial volume (LAV), left ventricular hypertrophy (LVH), and left ventricular filling pressures (LVFP) in hypertensive patients with or without diabetes.

**PP.36.222 INTERRELATIONS OF PULSE ARTERIAL PRESSURE, MITRAL REGURGITATION AND LEFT HEART REMODELING IN PATIENTS WITH ARTERIAL HYPERTENSION AND ISCHEMIC HEART DISEASE**

L. Zhuravlyova, I. Ilchenko, A. Yankevich.

Kharke National Medical University, Kharkiv-Ukraine

**Objectives:** To investigate the impact of daily pulse pressure (DPP) on degree of mitral regurgitation (MR) and left heart remodeling in patients with arterial hypertension (AH) and ischemic heart disease (IHD).

**Methods:** 69 patients (32 females and 37 males, age 52.5 ± 0.5 years) with AH and IHD were investigated. Baseline characteristics of patients included history of IHD (10.5 ± 0.5 years) and history of AH (8.5 ± 0.5 years). Patients with acute coronary syndrome were excluded from study. All patients underwent 24-hour ambulatory blood pressure monitoring, electrocardiography, coronary angiography, echocardiography.

**Results:** According to level of DPP, all patients were divided into three groups: 1st group (N = 22) – DPP < 45 mm Hg, 2nd group (N = 24) – DPP 45-65 mm Hg, 3rd group (N = 23) – DPP > 65 mm Hg. Degree of MR, systolic and diastolic function of left ventricle and diameter of left atrium had not significant differences in patients from 1st and 2nd groups. Meanwhile, in 3rd group the reliable changes (p < 0.05) of MR (Δ, Spt/Δ), systolic and diastolic function of left ventricle and diameter of left atrium were found compare to 1st and 2nd groups.

**Conclusions:** The elevated DPP higher then 65 mm Hg has significant impact on MR, function and changes of the left heart in patients with AH and IHD. These changes indicate compensatory mechanisms for maintaining of effective hemodynamics in response to vascular remodeling in patients with cardiovascular pathology.

**PP.36.223 PREDICTORS OF DEVELOPMENT FATAL CARDIOVASCULAR COMPLICATIONS IN HYPERTENSIVE PATIENTS WITH INITIALLY CONCENTRIC LEFT VENTRICULAR HYPERTROPHY (IN 20 YEARS)**

L. Zelenenka.

M. Strachensko Institute of Cardiology, Kyiv-Ukraine

**Objective:** The aim of the study to determine hemodynamics and humoral factors of development fatal cardiovascular complications in hypertensive patients (pts) with initial concentric left ventricular hypertrophy (CLVH).

**Design and Method:** At the initial investigation 49 hypertensive pts with initially CLVH were examined. At the reinvestigation (in 20 years later) in 29 alive pts echocardiography was performed repeatedly and these persons were included into the first group (1 gr.). Other 20 (40.8%) pts were died from fatal cardiovascular complications: 60% persons from stroke, 35% - acute myocar- dium infarction and 5% - sudden death and they were included into second group (II gr.). At the baseline examination these groups were identical for age (approximately 44 years).

**Results:** Comparative analysis of initial data in pts of these groups are demonstrated in table. INITIAL PARAMETERS IN PATIENTS WITH INITIALLY CLVH PARAMETERS I gr. (n = 29) II gr. (n = 20) Heart rate, bpm 66.9 ± 1.7
Objective: To investigate the relationship between lung function and cardiac function in a population-based cross-sectional study.

Methods: Data from 1026 individuals, aged between 50-92 years, from the Anglo-Cardiff Collaborative Trial, were available for the current analysis. Spirometry was performed (Vitalograph) to assess the degree of airways obstruction by measuring forced expiratory volume in 1 second: forced vital capacity ratio (FEV1:FVC). Peripheral blood pressure was recorded (Omron 711) in the supine position according to BHS guidelines. Cardiac function was examined in hypertensive patients with LVH in the presence of septal hypertrophy (LVMI > 170 g/m²) in the pts of the 2nd gr. – 55% against 27.6% in the 1-st gr. 85% pts of 2nd gr. had overweight and obesity 1st at against 29% pts in 1-st gr. with normal BMI.

Conclusions: Development of fatal cardiovascular complications in hypertensive pts with initially CLVH associated LVH (LVMI > 170 g/m²), presenting of obesity, increased relative wall thickness and level of cytometry of blood in more two times.

Electrophysiology Data in Hypertensive Patients With and Without Hypertrophy


Objective: To investigate the results of electrophysiology study (ES) in hypertensive patients.

Design and method: The study cohort consisted of 34 patients with proved essential hypertension. The average age was 56.1 ± 10.6 years. All patients were examined with the use of intracardiac ES in the electrophysiological laboratory. The histogram intervals such as PA, AH, HV, and characteristics of atrioventricular (AV) conduction system such as Wenckebach point in antegrade and retrograde directions, antegrade and retrograde AV-node effective refractory period (ERP) were evaluated. The patients were divided into two groups. The first group (n = 12) included the patients without left ventricular hypertrophy (LVH); the second group (n = 22) - with LVH. LVH was diagnosed with myocardial mass index (MMD) > 125/m² for male and > 110/ m² for female.

Results: Average values of histogram in the first group were: PA - 34.5 ± 20.3; AH – 83.8 ± 16.5; HV - 65.3 ± 13.9 ms. In the second group the histogram results were: PA -36.5 ± 20.7; AH – 84.5 ± 22.4; HV – 79.1 ± 17.9 ms. HV interval duration was different in the groups. The second group patients HV interval duration exceeded the one in the first group (p = 0.03). Antegrade Wenckebach point in the first group was 169.8 ± 26.6; in the second group - 155.7 ± 25.5 imp/min. Retrograde Wenckebach point (median) in the first group was 125.7 (103; 163.5); in the second group - 86 (0;140) imp/min. AV-node ERP in the first group was 230 ± 64.4; in the second group - 310 ± 64.8 ms. Retrograde AV-node conduction was different in the groups: in the second group retrograde AV-node conduction was absent in 36.4% of patients (p = 0.01). All these patients had septal hypertrophy more than 12 mm: the average values were 13.8 ± 1.24 mm. Pearson’s correlation coefficient between left ventricular MMD and HV interval duration was 0.44 (p = 0.01) and the one between thickness of interventricular septum and HV interval duration was 0.35 (p = 0.04).

Conclusions: 1. Prolongation of HV histogram interval is detected in hypertensive patients with LVH 2. Worsening of retrograde AV-node conduction is recorded in hypertensive patients with LVH in the presence of septal hypertrophy.
assessed by measuring stroke volume (SV), using a non-invasive, inert gas rebreathing technique (InnoCor, Innovention A/S, Denmark).

**Results:** After entering all confounding factors of FEV1:FVC ratio (age, height, gender, smoking status, body surface area, heart rate, peripheral vascular resistance and mean arterial pressure) into a stepwise multivariate linear regression model, SV remained independently related to lung function (R = 0.28, P = 0.025).

**Conclusion:** Stroke volume is independently associated with impaired lung function in this population based study, suggesting a mechanism whereby impaired lung function may increase CV risk. Increased arterial stiffness, which is associated with impaired lung function, may be an important mechanism mediating the relationship between cardiac function and lung function.

**PP.36.228 GEOMETRICAL CHANGES OF LEFT VENTRICLE IN HYPERTENSIVE WOMEN**

D. Lovic1, V. Stojanov2, B. Jakovljevic3, 1Clinic For Internal Diseases -Intermedica -Dr Lovic, Nis-Serbia, 2Clinical Centre of Serbia, Belgrade-Serbia, 3Institute of Hygiene and Medical Ecology, School of Medicine, Belgrade-Serbia

**Objectives:** The aim of this study was to explore geometrical changes of left ventricle among women with obesity and arterial hypertension.

**Design and Methods:** The study was conducted on the sample of 64middle-aged women, diagnosed with arterial hypertension and treated longer than 10 years in the absence of other chronic diseases or heart failure. Body mass index (BMI) was used to define them as overweight (BMI between 25 and 29.9 kg/m^2 years) or obese (BMI over 30 kg/m^2) in the absence of other chronic diseases or heart failure.

**Results:** Based on anthropometric parameters, 14 women (21.9%) had BMI within normal range, 17 (26.6%) were overweight, and 33 (52.5%) were obese. The prevalence of LV hypertrophy was 7.1% among normal-weight hypertensive women, 41.2% among overweight and 66.7% among obese women. Compared to normal-weight women, overweight and obese hypertensive women had higher mean values of all ECG and Echo parameters. The strong correlation between BMI, WHR, PBF and left ventricle parameters was observed. Multivariate analysis showed that percent of body fat (Odds Ratio = 1.23; 95% Confidence Interval = 1.01–1.49) was an independent predictor of left ventricular hypertrophy. Being obese was identified as predictor for the development of eccentric LV hypertrophy (OR = 3.14; 95% CI = 1.22–8.26; 85), and for concentric left ventricular remodeling (OR = 20.76; 95% CI = 1.12–385.03).

**Conclusions:** Geometrical changes of left ventricle occurring in arterial hypertension in conjunction with obesity include left ventricular hypertrophy, eccentric hypertrophy and concentric remodeling. These findings support weight control and the regulation of blood pressure for prevention of left heart abnormalities.

**PP.36.230 POSSIBILITIES OF TRADITIONAL DOPPLER AND TISSUE DOPPLER IMAGING IN DETECTION OF SYSTOLIC AND DIASTOLIC HEART FUNCTION IN VARIOUS FORMS OF PULMONARY HYPERTENSION**

Y.A. Andreeva1, M.A. Saidaov1, T.V. Martyunkov1, V.P. Masenko1, K.A. Zikov1, A.V. Volkov1, I.Ye. Chazova1, 1Russian Cardiology Research Complex, Moscow-Russia, 2Russian Rheumatology Center, Moscow-Russia

**The Aim:** To compare Traditional Doppler (TD) and Tissue Doppler Imaging (TDI) possibilities in detection of early myocardial functional changes in pts with different forms of pulmonary hypertension (PH).

**Materials and Methods:** 29 pts with idiopathic PH (IPH), 15 pts with chronic thromboembolic disease (CTD), 18 pts with systemic sclerosis (SS), 13 pts with chronic obstructive respiratory disease (CORD), 15 pts with congenital heart disease (CHD), 12 pts with residual PH with FC I-III (WHO) and 21 healthy volunteers in control group (CG) were included in the study. Echocardiography, complete conventional and TDI were operated (Vivid 7, G.E.).

**Results:** Velocity of systolic myocardial movement Sm corresponded to ventricular ejection fraction (EF) in PH pts. EF in pts were characterized by the most decreased EF and Sm of right ventricle (RV) accordingly to elevated systolic pulmonary artery pressure (SPAP) (table 1). EFs of left ventricle (LV) in PH pts and in CG were comparable, as Sm of LV. TD parameter E/A was <psuedonormal> in all PH groups. Em of RV value in IPH pts was significantly less than in other groups, accordingly to high DT values measured by TD. The lowest parameter Em of LV was detected in CORD pts as E/A value. The largest parameter Em of LV was defined in IPH pts. The CTD and SS pts with moderate parameters of systolic function and SPAP had marked diastolic dysfunction (DD) of RV by TDI. Parameters Em of RV in these groups were rather small. We found the higher prevalence of TDI-findings of early RV DD as compared with TD in different forms of PH (90 vs 59% in IPH, 87 vs 47% in CTD, 78 vs 56% in SS, 100 vs 27% in CORD, 87 vs 27% in CHD, 42 vs 17% in RPH pts). Conclusion: TDI could be the useful tool for detection systolic and diastolic heart dysfunction in different forms of PH. Values of Sm by TDI compared to ventricular EFs in all PH groups. Quantity of pts with DD of RV revealed by TD was significantly less than detected by TDI in all PH groups.
Echocardiographic Assessment of the Thickness of Left Part of Interventricular Septum and Its Association with Arterial Hypertension Severity

V. Kuznetsov, D. Krinochkin, L. Gapon, A. Vershchina, N. Shurkevich.
Tyumen Cardiology Center; Tyumen-Russia

Objective: To develop a method for measuring the thickness of the left and right parts of interventricular septum (IVS) using echocardiography and to study the influence of arterial hypertension (AH) on these parameters.

Methods: In 50 subjects aged 19-55 years the thickness of the left and right parts of IVS was measured by 2-D echocardiography with the use of a novel method. All subjects were divided into three groups: 29 healthy subjects (Group 1), 16 patients with mild AH (Group 2) and 5 patients with moderate AH (Group 3). The thickness of the left part of IVS was analyzed in relationship with 15 clinical, ECG and echocardiographic parameters.

Results:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>P1-2</th>
<th>P1-3</th>
<th>P2-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left (mm)</td>
<td>8.0 ± 2.7</td>
<td>9.7 ± 2.4</td>
<td>12.2 ± 1.3</td>
<td>0.038</td>
<td>&lt; 0.001</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Right (mm)</td>
<td>5.7 ± 1.4</td>
<td>5.8 ± 1.3</td>
<td>6.2 ± 1.6</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

The thickness of the left part of IVS significantly correlated with age (r = 0.46; p = 0.001), systolic blood pressure (r = 0.45; p = 0.001), diaastolic blood pressure (r = 0.40; p = 0.004), left ventricular (LV) hypertrophy by echocardiography (r = 0.46; p = 0.001), LV hypertrophy by ECG (r = 0.37; p = 0.02), hypertensive retinopathy (r = 0.37; p = 0.013), weight (r = 0.64; p = 0.001), and AH severity (r = 0.50; p = 0.001). Multivariate analysis showed that an independent correlation of thickness of the left part of IVS was only with the severity of AH (p = 0.0016).

Conclusions: The suggested method enables separate measurement of the thickness of the left and right parts of IVS. The thickness of the left part of IVS is associated with the severity of AH.

Reference Values for Left Ventricular Strain by Two Dimensional Strain Imaging in Normal Individuals: Impact of Technical and Clinical Confounders

M. Chinaili1, G.P. Aurigemma1, N. Metha1, Z. Zachittella1, H. Pokrel1, G. De Simone2, J.H. Hill1, D. Tighe1.
1Umass Medical School, Worcester-USA, 2Federico Ii University Hospital, Naples-Italy

Background: Left Ventricular Strain Imaging by 2D Strain Imaging (LVI-2DSI) is a novel angle-independent technique to evaluate systolic function by echocardiography. Previous reports have shown that in diseased hearts LVI-2DSI is reduced as compared to normal controls. However there is paucity of data on LVI-2DSI reference values and on the impact of possible confounders influencing LVI-2DSI analysis. The aim of the present work was to evaluate the impact of possible technical and clinical confounders of LVI-2DSI in order to provide reference values in normals.

Methods: 100 normal individuals free of prevalent cardiovascular events, valvular disease and/or cardiac rhythm abnormality were studied by standard echocardiography using commercially available machines. LVI-2DSI was obtained on all three planes (circumferential, radial and longitudinal) by commercially available software (Tomtec Corporation, Germany). Technical confounders were considered: image quality (poor/fair vs good/excellent), frame rate and echocardiography vendor. Clinical confounders evaluated were: age, gender, heart rate and LV geometry (by relative wall thickness). Reference values were derived from 5th and 95th percentiles are reported.

Results: Technical confounders did not influence LVI-2DSI. In particular there was no significant impact on frame rate (mean value 60fps, range 26-120fps) on either longitudinal, radial or circumferential strain (all p = NS). No difference could be observed in LVI-2DSI parameters when comparing participants with good/excellent image quality to those with poor/fair quality (p = NS). Furthermore differences in vendors used to acquire the echocardiographic image did not affect mean Longitudinal (21.1 ± 3.5 vs 20.2 ± 3.5%), Radial (33.3 ± 9.0 vs 32.0 ± 11.2%), or Circumferential Strain (31.8 ± 6.5 vs 30.5 ± 7.5%; all p = NS). As shown in figure, there was no significant difference in strain parameters when comparing men and women (p = NS). Similarly, neither age, heart rate nor relative wall thickness were significantly and independently related to measures of LVI-2DSI. Mean values and 5th and 95th percentiles are presented below for the definition of normative reference values.

Conclusions: LVI-2DSI is a novel technique to evaluate systolic function which is independent of age, gender, heart rate and LV geometry. Our findings also show that LVI-2DSI can be applied in the presence of low image quality and low frame rate, independently of the specific vendor used to acquire the images. We provide normal reference values for LV strain in all planes.
PROTECTIVE EFFECT OF VALSARTAN FOR STROKE IN JAPANESE SUBJECTS: AN ANALYSIS OF JIKEI HEART STUDY

M. Shimizu1, H. Yoshida1, K. Ikekaw1, I. Taniguchi4, M. Yoshimura3, G. Jikei University School of Medicine, Minato-Ku-Japan, 4Irccs San Raffaele Pisana, Rome-Italy, 5Sahlgrenska University Hospital/Östra, Göteborg-Sweden

Aim: Evidence from experimental and clinical studies is accumulating about the possible cerebral protective properties of angiotensin receptor blockers (ARB). In JIKEI HEART Study (Lancet 2007 369:1431, number of patients = 3081), we compared the effect of valsartan treatment reduced the incidence of stroke compared with conventional treatment. Our aim was to evaluate what types of stroke were protected by ARB.

Methods: We analyzed consecutive patients with first-event stroke admitted to hospital. Stroke was diagnosed using CT or MRI with typical neurological symptoms.

Results: Patients taking valsartan had lower rates of stroke than those not on ARB [HR: 0.66 (CI: 0.48–0.94); P = 0.022]. Those taking valsartan had lower rate of cerebral infarction than those without ARB [21 (1.4%) vs. 24 (2.0%); HR: 0.86 (CI: 0.62–1.21); P = 0.37]. However, there was no significant difference in the incidence of brain bleeding [valratan 3 (0.2%) vs. non-ARB 3 (0.2%); HR 1 (CI: 0.37–2.94) = 0.7069] and transient ischemic attack [0.5% vs. 0.6%; HR 0.9 (CI: 0.32–2.97) = 0.2722].

Conclusion: Our study suggests that valsartan treatment may be reduced cerebral infarction. In addition, the effect did not depend on blood pressure lowering effect.

RISK FACTORS ANALYSIS BY SUBTYPES IN ISCHEMIC AND HEMORRHAGIC STROKE

K. Suzuki1, K. Yoshimura2, 1Research Institute for Brain and Blood Vessels-Akita, Akita-Japan, 2Keio University, Tokyo-Japan

Objective: Stroke includes three subtypes, and what’s more, subtypes were divided according to pathological regions or genesis for the purpose of knowing the magnitude of diseases. The risk factor analysis by these detailed classifications may contribute a close prevention of stroke. The objective of this study is to clear the characteristic of risk factor by detailed classification, and providing the basic idea for planning the best strategy of stroke prevention in the community.

Design and Method: The inhabitants (156892 cases) who used mass screening examination of circulatory diseases that were performed from 1990 to 1999 were observed the occurrence of stroke event less than 3 years after exam. Cerebral hemorrhage was divided into putamen, thalamus and subcortical area. Cerebral infarction was divided into lacuna, cortical infarction with atrial fibrillation (af) and that without af. Multivariable logistic regression analysis by SPSS was used for detecting risk factors.

Results and Conclusions: The number of cerebral hemorrhage is 1323, including 128 putaminal hemorrhages, 128 thalamic hemorrhages and 128 subcortical hemorrhages. Hypertension, obesity, BMI > 30, low serum total cholesterol (less than 160mg/dl) and drinking are the risk for putaminal hemorrhage. Hypertension and age are the risk for thalamic hemorrhage. Only age is the strong risk for subcortical hemorrhage. The number of ischemic stroke is 739, including 296 lacunar infarct cases, 99 cortical infarct with af cases and 188 cortical infarct without af cases. Age and male are the risk in all ischemic subtypes. Hypertension, smoking and diabetes mellitus are the risk for lacunar infarct and cortical infarct without af. Control the blood pressure is very effective to decline putaminal hemorrhage, thalamic hemorrhage, lacunar infarct and cortical infarct without af. Subcortical hemorrhage and cortical infarct with af have not controllable risks but age. The knowledge from this study is useful for estimating the effect of prevention strategy.
Objective: To study influence of hypertensive crises on dynamics of latent structural changes of a brain in hypertensive patients during 5 years observation.

Material and Methods: Sixty eight essential hypertensive patients aged between 30-59 years were observed within 5 years. General clinical investigation, 24-h ABPM and brain MRI were performed in all patients at the onset of the study and after 5 years observation. Composite presence and severity of periventricular leuкоaraiosis (PL), lacuna infarcts (LI) and focal white matter lesions (FWML) were scored by integrating index graded 0-4 in all patients. Four grades of leuкоaraiosis were used according to the classification of Fukuda H. (1994).

Results: We studied dynamics of structural changes of a brain in two groups of the patients during 5 years observation: with history of hypertensive crises (group I, 41,2%) and without hypertensive crises (group II, 58,8%). There were no significant differences in age, body mass index, duration of hypertension and parameters of blood pressure between I and II groups. After 5 years prevalence of the patients with LA increased significantly in group I (c2 = 7,4; p = 0,007) and in group II (c2 = 4,07; p = 0,04). However at patients with hypertensive crises there was statistically significant increase of prevalence of the cases with 2nd and 3rd degree of PL (c2 = 5,0; p = 0,03). In group I there was statistically significant increase of prevalence of the patients with FWML (c2 = 13,7; p = 0,000). Prevalence of the patients with FWML in group II also increased by 24,0%; however, this increase did not reach statistical significance (c2 = 3,27; p = 0,07). In patients of group I lacunar infarcts were more often registered after 5 years observation (35,7% and 12,5%) than at patients of group II (c2 = 5,16; p = 0,023).

Conclusions: Our study demonstrates that hypertensive crises lead to progressing of latent structural changes of a brain in hypertensive patients. Hypertensive crises lead to development of more severe grades of periventricular leuкоaraiosis and lacunar infarcts (best predictors of strokes in hypertensive patients).

PP.37.239 RELATIONSHIP BETWEEN LEFT VENTRICULAR MASS INDEX (LVMI), WHITE MATTER HYPERINTENSITY (WMH) AND COGNITIVE PERFORMANCE IN HYPERTENSIVE STROKE PATIENTS

S. Kapianidze, M. Janelidze, M. Beridze, N. Lobjaniidze, N. Akhiasvili, T. Maisuradze, M. Kapianidze, N. Kvirikvelia. Khevhnishivili Medical University Clinic, Tbilisi-Georgia

Background: Cardiovascular risk factors in cognitive decline were extensively studied during the past years. Blood pressure (BP) is a predictor of concurrent and subsequently measured white-matter hyperintensity (WMH), but interaction between LVMI, WMH and cognition has not been established yet.

Aim: To identify, how the LVMI index (LVMI) is correlated with WMH and cognitive decline in hypertensive stroke patients.

Patients/Methods: The hypertensive 134 stroke patients (mean age 68 ± 5.2 male/female ratio 76/58) were divided into 3 groups: I group(54)- mild LVMI, II group(42)- moderate LVMI, III-severe LVMI(38). In acute stage after stroke and 3 months later the depression symptoms and cognitive profile were evaluated by Hamilton Depression and Anxiety Rating Scale, neuropsychological battery tests (executive function, visuospatial, verbal and visual memory, reasoning, recall, digit span and etc.) Neuroradiological assessment of WMH have been done.

Results: There was not any relationship between LVMI and WMH and cognitive decline in hypertensive stroke patients.

Conclusions: Our study demonstrates that hypertensive crises lead to progression of latent structural changes of a brain in essential hypertensive patients aged between 30-59 years.

PP.37.240 LONG-TERM OUTCOMES WITH EARLY INITIATION OF ANTIHYPERTENSIVE TREATMENT IN ISCHEMIC STROKE


Objective: To investigate the relation of cerebral hypertensive crises to development of structural changes of brain in hypertensive patients. Hypertensive crises lead to development of more severe grades of periventricular leuкоaraiosis and lacunar infarcts (best predictors of strokes in hypertensive patients).
Objective: The optimal timing to initiate antihypertensive therapy in ischemic stroke patients is still under debate. The aim of this study is to communicate our experience on long-term cognition, functionality, recurrence and mortality when hypertension treatment is started within 72 hours of onset of stroke.

Design and Method: Stroke patients were included in PROTEGE-ACV, a multidisciplinary secondary prevention program aimed to improve adherence to clinical practice guidelines. Antihypertensives, statins and antiplatelet agents were initiated or continued, if previously prescribed, during the first 72 hours of acute ischemic stroke. Adherence to program goals was assessed through scheduled visits and electronic records follow-up. Patients with severe functional impairment (Rankin ≥ 4), severe dementia or life expectancy < 3 years were excluded.

Results: 267 (50.6%) of 528 stroke patients (20% TIA) with two years of follow-up were included.

Mean age was 74.7 ± 11.1 years with 48% males. Mean length of stay was 4.1 ± 3.1 days. At emergency room, mean SBP was 154.3 ± 25.7, DBP 85.6 ± 13.4, PP 67.9 ± 19.8 mmHg, glycaemia 115.2 ± 38.3 mg/dL, NIMSS 3.4 ± 2.9. There was a significant increase in the use of all drugs after stroke, and maintained after two years with optimal vascular risk factor control. After two years of follow-up, the recurrence was 10.8% (29 patients) and total mortality 13.8% (37 patients). The table shows the data of cognition and functionality one month and two years after stroke.

Conclusion: No harmful effect was observed on long-term cognition and functional status in stroke patients with the early institution of antihypertensive therapy.

Objective: Hypertension is a main risk factor (RF) for stroke, and its control is essential for recurrence prevention. It is known that beta-blockers (BB) have deleterious metabolic effects, mainly on HDL cholesterol. We aimed to evaluate the impact of BB on lipid profile and long-term recurrence and mortality in stroke patients receiving BB.

Design and Method: Ischemic stroke patients were included in PROTEGE-ACV, a multidisciplinary program aimed to meet secondary prevention goals. Patients with severe functional impairment (Rankin ≥ 4), severe dementia or life expectancy less than three years after stroke were excluded.

Results: 267 (50.6%) of 528 stroke patients (20% TIA) included between December 2006 and October 2010 had two years or more of follow-up. Mean age was 74.7 ± 11.1 years with 48% males. The main VRF were hypertension (80%), hyperlipidemia (69%); overweight (49%); diabetes (15%); previous stroke or transient ischemic attack (23%); history of CHD (16%), history of AF (12%), 15% were smokers and 29% former smokers. Most patients achieved optimal VRF control as well as very high adherence to drug therapy (VRF control).

Conclusion: A multidisciplinary approach significantly improves adherence to treatment and Narrows the gap between evidence-based guidelines and clinical practice. A team-work strategy could be the key factor to improve compliance over long-term follow-up, with high impact on mortality and recurrence.

### Table: Pre-stroke and Post-stroke Lipid Profile

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total cholesterol (mg/dL)</th>
<th>HDL-C (mg/dL)</th>
<th>LDL-C (mg/dL)</th>
<th>Triglycerides (mg/dL)</th>
<th>Bad outcome (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-stroke</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BB (n = 104)</td>
<td>187.7 ± 3.5</td>
<td>45.6 ± 1.1</td>
<td>110.6 ± 3.4</td>
<td>125 ± 5.1</td>
<td>12.5 ± 5.5</td>
</tr>
<tr>
<td>No BB</td>
<td>197.6 ± 3.2</td>
<td>48.2 ± 1.2</td>
<td>115.5 ± 3.1</td>
<td>113.7 ± 5</td>
<td>11.7 ± 5.5</td>
</tr>
</tbody>
</table>

| 1 month Post-stroke | |
| BB (n = 113) | 158.0 ± 3.1 | 41.7 ± 1.1 | 84.6 ± 2.6 | 113.8 ± 4.8 | 20 |
| No BB | 153.6 ± 2.8 | 46.5 ± 1.3 | 82.2 ± 2.2 | 100.5 ± 3.6 | 25 |

| 1 year Post-stroke | |
| BB (n = 94) | 165.1 ± 4.2 | 47.5 ± 1.3 | 96.3 ± 3.6 | 114.9 ± 6.5 | 9 |
| No BB | 165.5 ± 3.1 | 49.2 ± 1.3 | 93.5 ± 2.7 | 104.9 ± 4.9 | 11 |

| 2 year Post-stroke | |
| BB (n = 77) | 163.1 ± 4.4 | 46.4 ± 1.5 | 93 ± 3.4 | 119.5 ± 8.5 | 9 |
| No BB | 162.1 ± 3.7 | 47.4 ± 1.5 | 94.2 ± 2.8 | 99.9 ± 5.2 | 11 |

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**PP.37.241**

**MIGHT ANTIHYPERTENSIVE-DRUG CHOICE NEGATIVELY INFLUENCE LONG-TERM OUTCOMES IN STROKE PATIENTS UNDER STATIN THERAPY?**


**Objective:** hypertension is a main risk factor (RF) for stroke, and its control is essential for recurrence prevention. It is known that beta-blockers (BB) have deleterious metabolic effects, mainly on HDL cholesterol. We aimed to evaluate the impact of BB on lipid profile and long-term recurrence and mortality in stroke patients under statin therapy.

**Design and Method:** ischemic stroke patients were included in a stroke secondary prevention program. Data on vascular RF control and antihypertensive drugs and statins use pre and post-stroke were analyzed in a group of patients with two or more years of follow-up. Bad outcome (BO) was defined as a combined end-point of stroke recurrence and/or all-cause mortality.

**Results:** 267 ischemic stroke patients (48% males) were included. Mean age was 77 ± 9 years for women and 72 ± 12 years for men (p = 0.0001). There was a significant increased in the use of statins (45% pre-stroke vs 92% two years after, p = 0.0001). Before stroke 39% (n = 104) were receiving BB. Over the two years of follow-up, the total cohort had an optimal blood pressure control. Except for a mild early deleterious effect on lipid profile, there was no difference on long-term outcomes in patients receiving BB. (table)

**Conclusion:** The early deleterious effect of BB on HDL cholesterol and triglycerides was not harmful, neither in the period with higher risk of stroke recurrence and mortality nor in the long-term. Improvement on HDL cholesterol along time could be explained by the intensification of healthy life-style behavior.
In rural areas primary care physicians (PCP) have a central role in the initial management of strokes. We aimed to evaluate PCP’s knowledge and adherence are needed.

Conclusions:
The errors correlated directly with the years of practice (p = 0.005), and 57.1% vs 58.2% (p = NS) did not know what treatment to use. Sublingual captopril and parenteral furosemide were often treatment of choice. In 80% vs 85% of PCPs did not know when to treat HG (p = NS). The errors correlated directly with the years of professional exercise (p = 0.02 and p = 0.015, respectively) in the first survey but not in the second.

Conclusions: PCPs’ errors in handling HT and HG in acute stroke patients in our rural area are common. This ignorance has remained and even worsened but not in the second.

Objective: To know that arterial hypertension accelerates the internal remodeling of small arteries. Carotid artery intima-media thickness (carotid IMT) assessed by B-mode ultrasound, is a reliable, non-invasive marker of pathological arterial wall changes. Mini-Mental State Examination is a useful tool for assessing cognitive function and documenting subsequent decline. The purpose of this study was to analyze the correlation between the progression of carotid atherosclerosis and cognitive decline in a group of hypertensive patients.

Design and Method: Our prospective study comprised 30 consecutive hypertensive patients (60% women and 40% men) with vertiginous syndrome aged between 50-85 years. A mini mental state examination (MMSE) was then performed with the score recorded. Carotid intima-media thickness (IMT) was assessed by high resolution B-mode ultrasound imaging according to the Mannheim Consensus.

Results: The mean IMT values were 1.18 ± 0.26 mm. The mean MMSE scores were 21 ± 5.15. After MMSE examination, the patients were divided in four groups: the first group with severe cognitive impairment (MMSE between 0 and 19), the second group with mild-moderate cognitive impairment (MMSE between 11 and 23), the third group with mild cognitive impairment (MMSE between 24 and 27) and the forth group with normal cognitive function (MMSE > 24). The prevalence of mild-moderate impaired cognitive function (MMSE 11-23) was 50%. The prevalence of mild impaired cognitive function (MMSE 24-27) was 13%. We found significant higher scores for MMSE in patients with carotid IMT < 0.9 mm (25 ± 3.77) compared to those with carotid IMT > 0.9 mm (19 ± 3.42). p < 0.01. A negative correlation was found between carotid IMT values and MMSE scores (r = -0.66).

Conclusions: Our study revealed a negative correlation between progression of carotid atherosclerosis evaluated by carotid intima-media thickness and cognitive decline assessed by mini mental state examination in hypertensive elderly patients.

Objective: Different forms of cognitive impairment can be found in elderly patients, from mild to moderate dementia syndromes. Arterial hypertension may cause structural and functional brain changes. Cognitive function can be evaluated easily by mini mental state evaluation (MMSE). The aim of our study was to find factors associated with impaired cognitive function in hypertensive elderly patients.

Material and method: We included in our study a total of 153 consecutive elderly patients new diagnosed with type II arterial hypertension hospitalized in our Department from September 2009 to October 2010. All the patients enrolled in the study underwent clinically and paraclinically investigations (serum lipid profile and renal function) and MMSE was performed. We divided the patients in two groups considering the score obtained at MMSE. The first group consisted of 108 elderly hypertensive patients with a MMSE score ≥ 24 (63 ± 9 years, 46% women) and the second group consisted of 45 elderly hypertensive patients with a MMSE score < 24 (65 ± 10 years, 51% women).

Results: No statistically significant differences were obtained between the two groups in terms of systolic blood pressure, diastolic blood pressure, total cholesterol, triglycerides, LDL cholesterol, serum uric acid, serum creatinine, BMI, even if the values were higher in the second group. HDL cholesterol was significantly lower (p = 0.010) and microalbuminuria values significantly higher (p < 0.001) in the second group.

Conclusions: The results of our study showed that microalbuminuria and reduced HDL-cholesterol levels were significantly associated with an impaired cognitive function in elderly hypertensive patients.

Objective: Increased aortic stiffness, reflected by elevated carotid-femoral pulse wave velocity (CF-PWV) has been shown to be higher in patients with acute ischemic stroke than in controls. It is also known that ischemic stroke is associated with hypertensive response. Time-dependent changes in CF-PWV, and their relationship with blood pressure alterations after acute phase of stroke are unknown.

Methods: 24 patients (age 60.7 ± 8.9 years, NIH stroke scale 6.4 ± 1.5, mean ± SD) with ischemic stroke, admitted within the first 48 hours from stroke onset, were enrolled to the study. CF-PWV was measured noninvasively with applanation tonometry (SphygmoCor®) at day 7 and at day 30 after stroke. Relative brachial SBP and CF-PWV changes were calculated using the following formula: (baseline – final)/ baseline. The correlation between examined variables was assessed by Pearson’s coefficients.

Results: At day 30, both the mean CF-PWV (9.0 ± 2.0 versus 9.9 ± 2.2 m/s; p = 0.02), and SBP (135.8 ± 20.0 versus 146.1 ± 22.6 mmHg; p = 0.02) were significantly lower than on day 7 after stroke. Relative change of CF-PWV was strongly associated with relative change of SBP (r = 0.65; p = 0.001).

Conclusion: Our findings suggest that carotid-femoral PWV is higher in the early phase of ischemic stroke than 30 days after stroke onset. The decrease of aortic stiffness seems to be associated with the parallel decrease of SBP.
Objective: Silent cerebral infarction (SCI) is quite frequent in elderly people. SCI is an independent risk factor for stroke. Incidence and severity of SCI are related to hypertension and to insulin resistance. This study was one of the objectives of the “PATTI for stroke” assistance model (Profile di Assistenza e Terapia Territorio Integrato) and it was considered the relation between silent cerebral ischemia and Metabolic syndrome (MS).

Design and Methods: We have studied 84 elderly subjects (37 male, 46 female 78.03 ± 7 years of age) admitted to the Geriatric ward and Critical Area of the same Department and followed them for twelve months (January-December 2010). Our Stroke Team is composed of doctors, nurses, physiotherapists, occupa- tional therapists, and its main purpose is to assess patients at admittance, to establish the care treatment, the rehabilitation steps, to chose the right setting of care and to check the clinical and care processes by using international rec- ognized scales (MMSE, GDS, BADL, IADL, CIIRS, RANKIN SCORE).

The group we investigated was composed of: 1) 6 subjects affected by carotid ath- erothrombosis (group A); 2) 9 with cardioembolic stroke (group B); 3) 36 with lacunar stroke (group C); 4) 8 with brain haemorrhage (group D); 5) 25 with non-descript heart-failure (group E). The design of the study included: 1) blood tests; 2) clinical blood pressure measurement BP; 3) Body Mass Index (BMI); 4) CAT cranial scan with application of a Scale for vascular classification of ischemic harm.

Results: From CAT Scan we detected that subjects in groups A-B-C-E had: ischemic infarctions 32.5%, ischemic harm 21.7%, hypodensity of white paren- tricular substance 74.3%. Depending on the size and amount of ischemic harm showed by the CAT scan subjects were thus divided: 16 had several cerebral ischemic harm (Vascular Class 3); 23 had moderate ischemic harm (Vascular Class 2); 7 had leucoaraiosis (Vascular Class 1). Patients with a prevalence of Cerebral ischemic harm had higher SBP values (152 ± 22 vs 137 ± 15 mmHg, p < 0.01), they even had higher glucose values (116 ± 38 vs 105 ± 14 mmHg, p < 0.01). The relation between uncontrolled hypertension and prevalence of silent ischemic cerebral harm was more consistent in obese subjects (18.2%, p = 0.009) compared to non obese subjects (10.2%, p = 0.316).

Conclusion: Prevalence of multifacrtual cerebral ischemia is more frequent in subjects with both uncontrolled hypertension and diabetes mellitus. Obesity can also increase the risk for hypertension and insulin resistance on the number of cerebral ischemic disease.

Objective: Considerable part of old people is suffering from cognitive disor- ders (CD). Arterial hypertension plays a large part in development of CD. It was revealed that significant CD and stroke in past history correlates with disor- ders of brain perfusion (Br.PD). In our research we studied correlation of CD to Br.PD in non-complicated AH patients.

Design and Method: 78 non-complicated with stroke AH patients have under- gone neuropsychological testing (NT) of memory, attention and mental effi- ciency and spiral computed tomography (for study of Br.P) before and after antihypertensive treatment using normodipine, diroton, teveten. All patients had been disturbed for 4 groups of expression CD. Also dynamics of CD was estimated, which correlated with change of expression CD.

Results: It hasn’t been revealed direct correlation between disorders of Br.P and expression of CD. But it was found a certain correlation between Br.PD (temporal lobe white matter) and dynamics of memory. Although it hasn’t been revealed any correlation between Br.PD and another brain section and dynamics of CD.

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PP.P3.249 TREATED AND NON-TREATED HYPERTENSION: COMPARISON OF LOBAR AND DEEP INTRACEREBRAL HAEMORRHAGE

T. Maisuradze, M. Jamelidze, M. Beridze, S. Kaptanidze, N. Kvirvelia, N. Gulidava, I. Ursashidze, N. Akashvili, M. Kaptanidze. Kheinchashvili Medical University Clinic, Tbilisi-Georgia

Background: Hypertension is a primary cause of hemorrhagic stroke and blood pressure management can reduce the risk of hemorrhage, though, during the hypertension treatment hemorrhages may occur. The aim of the study was to establish the risk-factors and neuroradiological peculiarities during the course of hypertension treatment.

Material and Methods: A total of 84 patients, mean age was 69.7 ± 7.5 years, (34F/58M), have been researched from Neurovascular Division and Neurointensive Care Unit with Intracerebral Hemorrhage (ICH). The ICH patients were classified into 2 groups: 1st group- patients with treated hypertension on admission and 2nd group- patients with non-treated hypertension. All patients underwent CT or MRI investigations to establish the hemorrhage volume and location. Systolic blood pressure and neurological signs were recorded hourly on the flow sheets, using Glasgow Coma Scale (GCS), NIHSS. Rankin and Barthel Index were established as the baseline data, after 1 week and 1 month later. Non- modifiable and modifiable risk factors were registered including age, gender, and race; diabetes mellitus, smoking status, alcohol use, and anticoagulation medica- tions. Obtained data were statistically evaluated by SPSS-11.0.

Results: In 1st group (41 patients) neuroradiological findings revealed the prevalence 28 (68.2%) of deep lobar hemorrhage, with associated hemithomata volume spreading in 2 patients. Mean baseline SBP in admission was 132 ± 13 mmHg. In 2nd group (43)- neuroradiological findings revealed deep lobar hem- orrhage in 31 patients (72%), among them five thalamic hemorrhages with associ- ated ventricular enhancement of the blood. Epileptic seizures were recorded in 3 patients without radiological deterioration. Mean baseline SBP and MAP were 182 ± 13 and 165 ± 12 mmHg respectively. NIHSS, Barthel Index and Rankin Scale were significantly worse in II group. Risk factors for non-treated hemor- rhages revealed significant share of diabetes mellitus, age and frequent alcohol use. In the II group the risk –factors included: untreated hypertension, previous stroke and frequent alcohol use.

Conclusion: In treated and non-treated hypertension groups the main brain structure, which is under the risk of hemorrhages is the deep brain structure.

PP.P3.250 DISORDER OF BRAIN PERFUSION IN NON- COMPLICATED ARTERIAL HYPERTENSIVE PATIENTS IMPACTS NEGATIVELY ON RECOVERY OF MEMORY UNDER ANTIHYPERTENSIVE TREATMENT

A. Kadykov1, Y. Varakin2, E. Oschepkova2, G. Gornostayeva1, M. Prokopovich1, A. Fonyakin1, N. Lazareva2. Research Center of Neurology Rams, Moscow, Russia, Russian Cardiology Research-and-Production Complex, Moscow-Russia

Objective: To determine correlation between arterial hypertension (Br.H) and disorders of brain circulation (Br.C) in non-complicated AH patients.

Methods: 204 patients with arterial hypertension (76 men and 128 women, mean age 48 ± 10 years, duration of hypertension 13 ± 7 years) were classified into 3 groups: group A- patients with mild arterial hypertension (stage Ⅰ); group B- patients with moderate arterial hypertension (stage Ⅱ); group C- patients with severe arterial hypertension (stage Ⅲ). All patients were examined by the following methods: medical history; physical examination; neurological diagnostics; laboratory tests; functional and structural diagnostics of the brain; other additional diagnostics. The following parameters were determined in all patients: duration of hypertension; blood pressure; heart rate; body mass index; presence of arterial hypertension complications; smoking history; alcohol use; regular physical activity; educational level. All patients underwent TCD investigations to establish the cerebral blood flow (CBF) and cerebrovascular disorders (CVD). Arterial hypertension plays a large part in development of CD. It was revealed that significant CD and stroke in past history correlates with disor- ders of brain perfusion (Br.PD). In our research we studied correlation of CD to Br.PD in non-complicated AH patients.
Conclusions: Our research revealed that study of brain perfusion in non-complicated AH patients with CD may be used as predictor of recovery of memory.

**PP.37.251** EFFECT OF AMLODIPINE ON CAROTID STRUCTURE AND CEREBRAL BLOOD FLOW IN PATIENTS WITH ESSENTIAL HYPERTENSION

O. Galkovych. Institute of Cardiology, Kyiv-Ukraine

**Objective:** To investigate the influence of amlodipine on carotid structure and cerebral blood flow in essential hypertension patients

**Design and Methods:** Doppler ultrasonography and 24h blood pressure monitoring were performed in 30 untreated essential hypertensive pts (58.5 ± 1.9 years, 11 female) before and after 12 weeks amlodipine (2.5-5 mg/day) treatment. Diameter of the common carotid artery (CCA) and internal carotid intima-media thickness (CCIMT), systolic (Vmax) and diastolic (Vmin) blood flow velocity in CCA and medium cerebral (MCA) arteries were measured. The cerebrovascular resistance index (CVRI) was calculated using measurements from Doppler ultrasonography of CCA, MCA, and systemic blood pressure. Statistical analysis was performed by pair variant method.

**Results:** Amlodipine significantly decreased systolic, diastolic, mean blood pressure and CCA intima-media thickness (CCA-0.49 ± 0.05 mm, p < 0.05). We observed significant decreasing CCIMT from 0.98 ± 0.03 to 0.92 ± 0.03 mm, p > 0.05. Amlodipin treatment did not change blood flow velocity (Vmax and Vmin) in CCA but in MCA increased initially low Vmin (from 0.48 ± 0.02 to 0.63 ± 0.02 mm/sec, p < 0.05). Amlodipine significantly decreased CVRI of CCA and MCA (accordingly: CCA – from 588.2 ± 10.4 to 429.1 ± 10.1 mmHg*sec/m, MCA – from 129.9 ± 5.1 to 105.3 ± 4.9 mmHg*sec/m, p < 0.05).

**Conclusion:** Amlodipin significantly reduced blood pressure and improved cerebral hemodynamics by decreasing common carotid artery diameter, cerebral vessels resistance and increasing initially low diastolic blood flow velocity in MCA.

**PP.37.252** VASCULAR REACTIVITY OF BRAIN IN HYPERTENSIVE PATIENTS WITH OBSTRUCTIVE SLEEP APNEA BY HYPOXIA

T. Ripp1, V. Mordovin1, S. Zapolovnikov2, E. Ripp1. Institute of Cardiology, Tomsk-Russia, 2Siberian Medical University, Tomsk-Russia

**Objectives:** The aim of this study was evaluate state cerebrovascular reactivity in condition of oxygen-induced 0%-02 in hypertensive patients (HP) with obstructive sleep apnea (OSA).

**Methods:** All participants of research have given the informed agreement. We used ultrasonography of transcranial Doppler’s method in the study of middle cerebral arteries (MCA) from temporal window. We studied the changes of flow velocity mean (FV) starting, during hypoxia (inhalation 3min 100% oxygen) and FV in period of recovery (rec) after air-inhalation 3min. We compare 2 groups: 1 group -26 healthy volunteers and 2 group - 16 patients with essential HP of grade II-III and OSA (apnea-hypopnea index > 5 events/h) without cerebral stroke during of the life history (age 38.3 ± 12.5 years). Secondary hypertension were excluded by clinical and biochemical tests. At the time of vascular evaluation, none of the patients had a history or clinical evidence of peripheral vascular disease, coagulopathy, or any disease predisposing them to vasculitis. We used index of FV: IFV = (V0-V2)/V0*100, coefficient modification of flow velocity CFV = V2/V0 and new coefficient with control of modification BP - normalized to BP autoregulation answer NBPA = (V2-V0)/V0*100 (BP2-BP0), and index of recovery IR = V0/ Vrec.V0 and BP0 are starting parameters, V2 and BP2 are inhalation and Vrec - after inhalation parameters.

**Statistical analysis:** descriptive, t-test independent by groups.

**Results:** Patients and healthy volunteers had not distinctions of anthropometrical parameters. Significant difference was found between 1 and 2 groups: BP: P = 126 ± 10/82 ± 12 and 156 ± 18/50 ± 10mmHg (p = 0.00), IFV = 17.8 ± 6.91% and 7.65 ± 1.38 p = 0.00; CFV = 0.81 ± 0.009 and 1.028 ± 0.138 p = 0.000; NBPA = 0.49 ± 0.19 and -0.22 ± 0.04 p = 0.03 respectively. But IR had not difference between groups 1.12 ± 0.13 and 1.07 ± 0.23 p = 0.35.

**Conclusion:** HP with OSA and without cerebral stroke have decrease in intensity, force but not speed of the answer of a artery of a brain in reply to hypoxia. Ultrasonography transcranial Doppler’s method in the middle cerebral arteries in hypoxia does possible the quantitative and qualitative description of functional changes of the cerebrovascular reserve.

**PP.37.253** HISTORY OF HYPERTENSIVE CRISIS IS ASSOCIATED WITH MORE SEVERE CLINICAL SYMPTOMS OF BRAIN INVOLVEMENT AND PROGRESSIVE IMPAIRMENT OF BIOELECTRICAL ACTIVITY OF A BRAIN IN ESSENTIAL HYPERTENSIVE PATIENTS

G. Semke, V. Mordovina. Tomsk Research Institute of Cardiology, Tomsk-Russia

**Objective:** To study whether hypertensive crises are associated with more severe clinical symptoms of brain involvement and stable impairment of bioelectrical activity of brain in hypertensive patients.

**Methods:** A hundred forty one essential hypertensive patients, aged between 30-60 years, were included in the study. General clinical investigation, evaluation of the neurologist, 24-h ABPM and brain bioelectrical activity were performed in all patients. Selective mapping of power of EEG rhythms (delta-1 Hz, theta-5-7 Hz, alpha-8-13 Hz, beta-14-20 Hz) across the brain (in microV/Hz/0.5) was performed using Fourier spectral analysis. Four distinctive types of the EEG maps were identified: type I was defined as normal (17.0%), types 2-4 were defined as consecutive stages of progressive impairment of bioelectrical activity of the brain – from mild (type 2 – 27.0%) to severe (types 3, 4 – 56.0%). Clinical brain involvement was classified as no involvement (n = 41), mild (rare 1-2 times a week headaches and dizziness) (n = 59) and severe (frequent severe headache, dizziness, photopsies, anxiety with minor local deficit) involvement (n = 41). Then we compared brain bioelectrical activity and clinical manifestation of brain involvement between the patients with history hypertensive crises (group I - 29.1%) and without hypertensive crises (group II – 70.9%).

**Results:** There were no significant differences in age, duration of hypertension, frequency and weight of atherosclerotic deficit of cerebral, total cholesterol and parameters of blood pressure between groups I and II.

Prevalence of the patients with severe clinical brain involvement was observed significantly more often while no involvement significantly less frequently in group I than in group II (c2 = 13.7; p = 0.000 and c2 = 11.8; p = 0.001 accordingly). Severe impairment of bioelectrical activity of the brain (3rd and 4th types of the EEG) also were observed significantly more frequent in group I than in II (c2 = 6.9; p = 0.008). The index of spectral powers (ISP) of alpha rhythm was significantly less (32.6 ± 10.5 and 37.1 ± 8.4; p = 0.002) and index of spectral powers of beta rhythm - significantly greater (26.6 ± 6.1 and 23.6 ± 6.4; p = 0.01) in group I than in group II.

**Conclusion:** Our study demonstrates that hypertensive crises lead to development of severe clinical brain symptoms and stable impairment of bioelectrical activity of the brain in hypertensive patients. These changes can reflect initial stages of hypertensive encephalopathy.

**PP.37.254** HYPERTENSION AND MULTIPLE BRAIN DAMAGE INTEGRITY IN LATE-LIFE DEPRESSION

N. Lobjanidze, M. Janelidze, M. Beridze, N. Kvirkvelia, N. Akiashvili, S. Kapanidze, I. Urushadze, T. Maisuradze, M. Kapanidze. Khechinashvili Medical University Clinic, Tbilisi-Georgia

**Objective:** With the long lasting history of hypertension often complain of multiply silent ischemic damage, state that can lead to cognitive retardation, which is due to the injured microcirculation of frontal-subcortical areas, basis,vascular, mood circuit. Hypertension, which causes the lipohyalinosis of small cerebral vessels, may become the main risk-factor for vascular depression. Goal: The aim of the study was to establish the impact of the hypertension on the induction of depression.

**Material and Methods:** 136 hypertensive patients, aged 68.5 ± 7.5 years, have been investigated. Global cognitive function was evaluated by MMSE. Executive function was researched by neuropsychological test battery (letter fluency, stroop Test, Wisconsin Card Sorting Test, digit span, letter member sequencing). Hamilton depression scale (HAM-D) was applied. Due to data patients were divided into two groups: I group - 66 patients with treated hypertension and II group, 66 patients with untreated and uncontrolled hypertension. CT or MRI scan were performed in MCI patients to exclude another cause of cognitive decline. Two groups were compared in regard of hypertension and its treatment, vascular risk factors, demographic and radiological variables. Statistical evaluation was performed by SPSS-11.0.

**Results and Conclusion:** In I group depression was established in 11(16.1.8%) of hypertensive patients. In 2nd group depression was established in 17(25.7%) patients. Comparison of these two groups revealed that patients with untreated hypertension have significantly higher incidence of depression, and the more damage from multiple brain lesions, especially in frontal lobes (p > 0.5). Multiple
linear logistic regression analysis revealed the significant share of untreated hypertension on development of mild cognitive impairment in late life (p < 0.05). Detection of prehypertension state and treatment of hypertension in early state may prevent the depression and mild cognitive impairment in late life and improve the quality of life in elderly.

**PP.37.255 PHEOCHROMOCYTOMA AND STROKE**

G. Potapova, I. Chazova, N. Kuznetsov, V. Stitina, E. Popov, I. Gavrilov. "Cardiology Research Complex, Moscow-Russia, Endocrinological Scientific Center, Moscow-Russia"

**Objective:** To determine frequency and peculiarities of stroke in pheochromocytoma (Pheo).

**Design and Methods:** 130 pheo pts (66 male and 64 female, mean age 40.4 ± 10.8 y) were retrospective studied. Tumors localized in adrenals (right - 63, left - 58, both - 3, extraadrenal - 6). All pts were hypertensive during from 0, 5 to 30 years. All pts were operated and pheo was verified as benign (68) and malignant (62) by histology, 10 pts had recurrent pheo in what follow. 

**Results:** Before tumor removal in 10 (1 male and 9 female, mean age 43.0 ± 8.5 y, duration of hypertension 7.8 ± 6.1 y, 3 benign and 7 malignant) of 130 pheo pts stroke was diagnosed following clinical examination. All 10 pts had severe systolic (220-300 mm Hg) and diastolic (120-180 mm Hg) BP in crises. Patient had transient ischemic attack (TIA). In follow up from 5 to 8. 8 y, 7 pts had transient stroke and 3 - hemorrhagic stroke because of severe hypertension. Patients diagnosed with and without the stroke did not demonstrate any differences in gender and size, type and level of catecholamines secretions, character and duration of hypertension. After pheo removal in the others 120 pts (follow up from 1 to 20 y) repeated severe strokes were diagnosed in 1 case with recurrent pheo.

**Conclusion:** Stroke was diagnosed in 10 of 130 pheo pts (7.7%) before tumor removal. Most of them (7 of 10.70%) had transient stroke, but 3 pts (30%) had severe stroke with persevering residual effects. In follow up after pheo removal most of them (7 of 10.70%) had transient stroke, but 3 pts (30%) had severe stroke with persevering residual effects. In follow up from 5 to 15 y no one of them had recurrent pheo.

**PP.37.256 COGNITIVE IMPAIRMENT IN UNSUFFICIENTLY CONTROLLED GRADE-I HYPERTENSIVES**

P. Nazzaro, M.F. De Caro, C. Spinelli, G. Schirotti, G. Grandolfo, L. De Benedictis, F. Federico. "University of Bari, Bari-Italy"

**Introduction:** Different studies showed that cognitive and vascular functions may decline along with hypertension. Aim of the study was to highlight the changes in cognitive profile and pre-clinical vascular damage in mild hypertensives scarcely controlled by the therapy.

**Methods:** By office (off) and ambulatory blood pressure (day-night) measurements, 20 normotensives (NTN), 63 hypertensives with adequately (AC-HTN) and 61 with inadequately (UC-HTN) lowered blood pressure, with similar age, sex, metabolic assessment and history of hypertension (156 ± 290 ± 2 vs 154 ± 1/88 ± 3, n.s.) underwent a neuropsychological evaluation by tests for executive functions (FAB, STROOP), selective attention (MATRIX), verbal short memory (DIGITSPAN), working memory or ability of monitoring of learned information (SPANBACK) and lexical fluency (FAS). The SBPoff-day% served as surrogate measure of "white-coat effect" (WCoef) and carotid intima-media thickness (IMT) was used as index of vascular damage.

**Results:** Differences (m ± s.e.; ^p < .05, **p < .01, ***p < .001 vs NTN; ^^p < .05, ^^^p < .01, ^^^^^p < .001 vs AC-HTN) in hemodynamic and cognitive functions occurred.
SIDESTREAM CIGARETTE SMOKE EFFECTS ON BARORECEPTOR REFLEX

L.C. De Abreu1, C. Ferreira1, P.H.N. Saldiva1, V.E. Valenté1, 2Departamento De Medicina, Disciplina De Cardiologia, Universidade Federal De São Paulo Unifesp, São Paulo–Brazil, 3Departamento De Patologia, Faculdade De Medicina Da Universidade De São Paulo (Fmusp), São Paulo–Brazil

Objective: We evaluated short term effects of sidestream cigarette smoke (SSCS) exposure on baroreflex function in spontaneously hypertensive rats (SHR).

Results: There was no significant difference between control and SSCS groups regarding basal MAP and HR, bradycardic peak, and TBG. However, we noted that the HB group presented higher BBG (+1.25 ± 0.09 bpm/mmHg vs. -0.61 ± 0.06 bpm/mmHg; p < 0.0001), increased HR range (218.14 ± 18.4 bpm vs. 162.45 ± 15.7 bpm; p = 0.0375) and increased tachycardic peak (519.7 ± 11.7 bpm vs. 471.1 ± 9.2 bpm; p = 0.00048). With respect to LT vs. HT groups, there was difference only regarding TBG, the HT group presented higher TBG (-1.96 ± 0.16 bpm/mmHg vs. -3.93 ± 0.4 bpm/mmHg; p = 0.0001).

Conclusion: There is significant alteration regarding baroreflex sensitivity between SHR of the same laboratory. We should be careful when interpreting studies employing SHR. Grants: Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP).

THE ROLE OF THE CARDIAC AUTONOMIC BALANCE IN THE EARLY STAGES OF ESSENTIAL HYPERTENSION


Introduction: Recently, Charkoudian et. al.1 found an inverse relation between muscle sympathetic nerve activity and cardiac output in humans, suggesting that an autonomic mechanism induced by the stroke volume is responsible of blood pressure control. This balance could be altered from the pre-hypertensive (PH) state.

Objectives: a) To study associations between cardiac sympathetic (CSR) and parasympathetic (CPR) responsiveness and the cardiac index (CI) in PHs (JNC7).b) To evaluate the relationship between CSR and CPR, and with the systemic vascular resistance index (SVRI) in PHs, normotensives (NTs), and hypertensives (HTs).

Design and Methods: Observational, parallel groups, prospective study. 100 male patients, fasted, without drugs or smoking history, were studied in the morning, in a quiet room, at 22°C (NTs, n = 20, 114.4 ± 6.8/83.5 ± 6.2 mmHg, 44.4 ± 8.6 years old); (HTs, n = 30, 149.6 ± 10.5/92.0 ± 6.0 mmHg, 45.0 ± 8.9 years old). Impedance cardiography was used to evaluate CI, SVRI and CSR (pre-ejective period (PEP); msec), taking into account for the correlation analysis that the CSR is inverse to the PEP values. CPR was determined with the deep breathing test (expiration-inspiration difference(E-I) 30 sec;beats). Pearson’s test and multiple regressions were performed.

Results: In PHs, CSR and CPR presented a linear association with CI (PEP: r2 = 0.45, p = 0.005; E-I: r2 = 0.36, p = 0.01), showing both -unexpectedly- a strong direct relation between them (PEP vs E-I: r2 = -0.52, p = 0.0001). In NTs, CSR and CPR were inversely related to SVRI (PEP: r2 = 0.47, p = 0.005; E-I: r2 = -0.52, p = 0.001). In HTs, only CPR was inversely related to SVRI (r2 = -0.70, p = 0.0001). Multiple regression analysis showed a predictive value of PEP for SVRI (p = 0.016) in PHs; and of E-I for SVRI (p = 0.004) in HTs. In NTs, CSR and CPR had no relation or predictive value for SVRI.

Conclusions: To the best of our knowledge, this is the first time that a parallel increase in CSR (an expression of β-adrenergic responsiveness) and CPR is demonstrated in PHs. The parasympathetic tone in PHs could be acting as a “brake” to the hyperdynamic circulation, and may be exhausted over time. This phenomenon, linked to a progressive blunting in β adrenergic responsiveness -evidenced as a decrease in CSR - could be triggering the transition to vasoconstriction, characteristic of HT. 1- Charkoudian N, et. al.1 Found an inverse relation between muscle sympathetic nerve activity and cardiac output in humans, suggesting that an autonomic mechanism induced by the stroke volume is responsible of blood pressure control. This balance could be altered from the pre-hypertensive (PH) state.
Objective: Stress appraisal, particularly defensive active coping (AC) responses, have been associated with behavioral and physiological control eliciting β-adrenergic central cardiac responses. It is also well-known that mental or emotional stress can precipitate left ventricular dysfunction usually caused by disturbed vascular function and myocardial ischemia. We aimed to evaluate vascular responses, the ischemic profile and a marker of left ventricular dysfunction, i.e. ECG left ventricular hypertrophy (LVH) in AC males.

Design and Method: A target population comparative study included 202 black African and Caucasian males, aged 44.9 ± 9.6 yrs. After an overnight fast the Stroop and Cold pressor mental tasks were completed and blood samples drawn during baseline for biochemical analyses. BP, ECG and ischemia data involved 24h Cardiotone® monitoring (validated by the British Hypertension Society) and Finometer continuous assessments during stress testing.

Results: β-adrenergic responses were evident in AC Caucasians opposed to α-adrenergic responses in AC Africans. AC Africans further revealed increased ischemic events and LVH values. In stepwise regression analyses α-adrenergic responses predicted 24h ischemic events [Adjusted R²: 0.21 (β = 1.07 (0.29 to α)] and ischemic events predicted LVH [Adjusted R²: 0.12, (β = 0.35 (0.11 to 0.59)] in AC Africans. No associations existed were evident for Caucasian AC males.

Conclusions: Dissociation between behavioral and physiological β-adrenergic AC responses implies a possible sensitization of the defensive pathway and loss of control in African. Thus, disturbed vascular function, ischemia and a sensitized defensive pathway could drive left ventricular dysfunction in AC Africans.

Figure 1: Prevalence of aggregated mental stress blood pressure responses in active black African and Caucasian males.

Design and Method: Tilt-induced orthostatic hypotension (fall in SBP from resting values > 35 mmHg) was observed only in one subject. At the same time SBP paradoxically increased by > 20 mmHg in 3 hypertensives (9.7%). Abnormal decrease of HR (< 10 in patients under 35 and < 3 min-¹ for 35-70 years old) was revealed in 3 persons (9.7%). In 5 cases (16.1%) the synchronous unit-directional BP-HR oscillations occurred during TT (all Spearman correlation coefficients between SBP, DBP and HR were > 0.35). The CWT analysis was performed in 8 patients. The most stable oscillatory activity at TT times was revealed within 0.03-0.06 Hz frequency range and was characterized by marked amplitude oscillations (n = 8; 100%). In 7 patients (87.5%) oscillatory activity was found over a VLF span from 0.0021 to 0.03 Hz. This band was the greatest amplitude at the beginning of the TT. The oscillatory frequency changes in LF range were characterized by evident fragmentation. We did not discover the stable oscillatory activity in the range of HF.

Conclusions: Tilt testing in hypertensive patients younger than 70 was infrequently accompanied by profound orthostatic hypotension. On the contrary, the significant SBP increase and inadequate small rise of HR were discovered. In 16.1% of cases the TT was accompanied by synchronization of inotropic, chronotropic and vasomotorial functions of cardiovascular system, which can be evidence for regulatory systems abnormal exertion. By continuous wavelet analysis we found out only three stable oscillators of heart rhythm structures localized in LF-VLF range, which might reflect chronotropic regulatory response to TT in hypertensive patients.

**PP.38.262** CAROTID ENDARTERECTOMY IMPROVES BARORECEPTOR SENSITIVITY IN MOLATERAL CAROTID STENOSIS

L. A. Dalla Vecchia1, M. Piscatelli2, T. Porrettu2, R. Gornati2, R. Furlan3.

Objective: While the beneficial effect of carotid endarterectomy (CE) on the recurrence rate of ischemic stroke in selected patients is well known, the effects induced by CE on autonomic nervous system (ANS) are not completely understood. Aim of the present study is to assess the modification of the ANS profile and baroreceptor sensitivity in patients undergoing CE for monolateral significant carotid stenosis.

Design and Method: We enrolled 18 consecutive patients (women and 13 men, age 72 ± 2 years) undergoing elective CE for monolateral (8 left, 10 right), severe (> 70%), symptomatic carotid stenosis. Arterial baroreflex sensitivity (BRS) was evaluated in the frequency domain by assessing the instantaneous relationship between arterial pressure and RR interval oscillation, thus providing a quantitative estimate of the efficiency of baroreceptor mechanisms, the index alpha. Spectral analysis of heart rate (HR) and systolic arterial pressure (SAP) variability provided indices of the parasympathetic and sympathetic activities. A time domain analysis was also performed using the modified Oxford technique to assess cardiac vagal BRS. Recordings were acquired the day before surgery and 126 ± 9 days after, during rest and tilt test.

Results: Post-operatively, at rest, compared to pre-operative, patients were characterized by a significant reduction of LF[RR] (39 ± 5 vs 53 ± 6 μm²), a significant increase of HF[RR] (73 ± 3 vs 39 ± 5 μm²) and HP [RR] (14 ± 2 vs 36 ± 5 μm²), in LF[HF] (8.9 ± 2.1 vs 1.4 ± 2.1) and LF[SAP] (19 ± 5 vs 3 ± 1 mmHg²) compared to resting values, while pre-operatively, tilt induced no significant changes in LF[RR] and HP[RR] and in LF[SAP]. Comparing pre-and post-operative delta change of spectral variables from rest to tilt, difference of LF[RR] and LF[SAP] were also significant. Both index alpha and BRS were significantly higher after surgery (index alpha: 9 ± 1.4 vs 5.9 ± 0.9 mmHg·s⁻¹; BRS: 2.46 ± 0.64 vs 5.65 ± 1.1 mmHg·s⁻¹); *p < 0.02.

Conclusions: Patients with monolateral severe carotid stenosis show a decreased baroreceptor sensitivity. CE seems to improve baroreceptor sensitivity and restore the ability to respond to orthostasis.

**PP.38.263** AUTONOMIC NERVOUS SYSTEM AND HAEMODYNAMIC CHANGES INDUCED BY A HALF MARATHON

L. A. Dalla Vecchia1, E. Traviss2, D. Lucini1, M. Malacarne1, M. Pagani1.

Objective: Strenuous exercise is accompanied by haemodynamic and sympathovagal changes. Their complex relationship is not well established in part
because evaluations are usually reproduced in a laboratory. Aim of the present study is the "on-site" assessment of haemodynamic and autonomic modifications induced by an intense bout of prolonged aerobic activity during a regular competition.

**Design and Method:** We studied 35 healthy, amateur athletes (31 M, 4 F, age 42 ± 7 yr, BSA 1.8 ± 0.12 sqm) soon (<30 min) after running a half marathon (day 1), and later (30 ± 8 days) after the competition (day 2). Runners were allowed to continue their regular training but were asked to avoid competitions during the period between day 1 and day 2. In both conditions, we obtained a complete echocardiographic and color Doppler study including a two dimen- sional strain analysis, and continuous ECG recording for HRV assessment in standing and supine position. All subjects agreed to blood testing for cardiac Troponin (cTns) on day 1.

**Results:** Left Ventricular End Diastolic Volume was significantly smaller on day 1 (108 ± 18 ml) when compared to day 2 (119 ± 22 ml), while Left Ventricular End Systolic Volume, Aortic Diameter, Left Atrial Size, and Left Atrial Performance were not different, as well as strain analysis on a segment-based approach. cTn dosage was also normal. Heart rate was significantly higher on day 1 (86 ± 14 bpm) than on day 2 (62 ± 12 bpm), conversely RR variance was lower on day 1 (1567 ± 272 and 1670 ± 312 msec in rest and standing respectively) compared to day 2 (3874 ± 656 and 3044 ± 374 msec2); LF[RR] at rest was significantly higher on day 1 (76 ± 13 mmHg) than on day 2 (58 ± 22 mmHg), while HF[RR] was lower on day 1 (14 ± 38 mmHg) than on day 2 (37 ± 22 mmHg). The ability to respond to standing was preserved on both days.

**Conclusions:** This study shows that the strenuous exercise of a half marathon produces a reduction in left ventricular end diastolic volume and modification of diastolic filling pattern together with clear signs of elevated sympathetic cardiac drive, both outlasting the performance. On the other end, this kind of intense and prolonged aerobic activity did not produce an increase of cardiac Troponin, abnormalities of segmental wall motion, systolic and diastolic function.

**PP.38.264 CARDIAC AUTONOMIC REGULATION AFTER ACUTE LUNG EXPOSURE TO CARBON NANOTUBES: AN EXPERIMENTAL STUDY IN CONSCIOUS RATS**

J. M. Legramante, S. Sacco, P. Crobeddu, A. Pietroisi, A. Magrini, F. Valenti, G. Palleschi, G. Galante. University Tor Vergata, Roma-Italy

There is strong evidence that episodic high levels of airborne particulate matter (PM) are associated with stroke, heart attacks, heart arrhythmias, and sud- den death precipitated, at least in part, by alterations in the autonomic input to the heart. There are also reports showing that higher levels of ambient air pollutants increase the risk of emergency department (ED) visits for cardiac arrhythmia. Moreover, the cardiac autonomic drive, both outlasting the performance. The instability of a vascular plaque or initiate cardiac. It has been reported that pollutants increase the risk of emergency department (ED) visits for cardiac arrhythmia. Moreover, the cardiac autonomic drive, both outlasting the performance. The instability of a vascular plaque or initiate cardiac. It has been reported that pollutants increase the risk of emergency department (ED) visits for cardiac arrhythmia. Moreover, the cardiac autonomic drive, both outlasting the performance. The instability of a vascular plaque or initiate cardiac. It has been reported that pollutants increase the risk of emergency department (ED) visits for cardiac arrhythmia. Moreover, the cardiac autonomic drive, both outlasting the performance.

**Conclusion:** In subjects with high BP levels, it is possible to predict patterns of response to stress with a high probability (>50%), based on LLCA analysis of hemodynamic and autonomic reactivity to gravitational and physical stressors.

**PP.38.265 IMPACT OF BARORECEPTOR SENSITIVITY ON PULSE WAVE VELOCITY**

F. Michas1, E. Manios1, K. Stamateopoulos1, E. Koroboki1, V. Chouzouri1, A. Dimitriou1, R. Paner1, N. Zakopoulos1. 1Department of Clinical Therapeutics, University of Athens, Athens, Greece, 2Department of Cardiology, University of Athens, Athens-United Kingdom

**Objective:** Recent studies have clearly demonstrated that hypertension, even in early stages, is associated with impaired baroreceptor reflex sensitivity (BRS). However, the influence of BRS on systolic and diastolic blood pressure (SBP and DBP) is still not fully understood. The present study was conducted to investigate the impact of BRS on systolic and diastolic blood pressure (SBP and DBP).

**Conclusion:** In the present study, we have shown that SBP and DBP were significantly lower in patients with higher BRS than in patients with lower BRS. This finding suggests that BRS is a determinant of blood pressure regulation and that interventions aimed at improving BRS may have a beneficial effect on blood pressure control.

**PP.38.266 CHARACTERIZATION OF HEMODYNAMIC AND AUTONOMIC RESPONSE TO STRESS IN HYPERTENSIVE PATIENTS: A LATENT CLASS ANALYSIS APPROACH**

J. Gallo1, D. Aguirre-Acevedo2, J.E. Ochoa1, M. Correa3, G. Bilo1, D. Aristizabal2, G. Parati4. 1Centro Clinico Y De Investigacion, Sicor, Medellin- Colombia, 2School of Medicine, University of Antioquia, Medellin-Colombia, 3Department of Cardiology, S. Luca Hospital, Istituto Auxologico Italiano, Milano-Italy, 4Department of Cardiology, S. Luca Hospital, Istituto Auxologico Italiano and Department of Clinical Medicine and Prevention, University of Milano-Bicocca, Milano-Italy

**Purpose:** Hypertensive patients are characterized by different hemodynamic and autonomic patterns of stress response phenotypes. Aim of our study was to use a latent class cluster (LCC) analysis to identify these patterns based on hemody- namic and autonomic response to orthostatic stress and cold pressure test (CPT).

**Methods:** In the Medellin’s Heart Study (Colombia), 800 individuals (30-65 y) from the general population were recruited. Untreated subjects with a dia- stolic BP = 70th percentile of distribution curve (=85mmHg) were selected (n = 92). Ambulatory 24-h BP monitoring was performed. Beat-to-beat BP, stroke volume, and ECG were recorded in supine (SU, 10 min), standing (ST, 10 min) and during CPT (1 min). Hemodynamic variables (cardioimpedance) and indices of autonomic CV modulation (LF/HF RR interval powers from heart rate variability analysis) were derived. Nine indicators of an increased sympathetic response were included for LCC analysis: 1) 24h PP > 50 mmHg; 2) 24h SBP > 140 mmHg + 24h HR > 90 bpm; 3) Increase in SBP while ST; 4) changes in HRV LF/HF ratio while ST > 75th percentile (>75P); 5) Change in LF/HF with CPT > 75P; 6) Change in cardiac index (CI) while ST > 75P; 7) Increase in total peripheral resistance index (TPRI) during CPT > 75P; 8) Increase in CI during CPT > 75P; and 9) Increase in TPRI during CPT > 75P.

**Results:** LCC analysis (bootstrap p value of > 0.05) identified three clusters: 1)(Cardiac response (26.8% of individuals, 4th and 6th criteria); 2)Vascular response (23.5%), 9th criterion; and 3)Indeterminate (49.7%) with a low-to moderate probability of having all criteria. See figure.
combined a-index. Arterial stiffness was evaluated by means of carotid-femoral PWV measurements. Subjects with office BP ≥140/90 mmHg were defined as hypertensives.

Statistical analysis was performed by means of x2 test, independent t-test and linear regression analyses.

Results: Our study consisted of 42 (24%) normotensive and 134 (76%) hypertensive subjects. Hypertensives presented significantly higher (p<0.01) a-index (3.604 ms/mmHg) and PWV (9.502 m/sec) values than their normotensive counterparts [a-index (4.459), PWV (8.368)]. The multivariate linear regression model revealed age (β = 0.288, p < 0.001), office systolic BP (β = 0.331, p = 0.001) and a-index (β = -0.141, p = 0.043) as independent determinants of PWV.

Conclusions: Our finding suggests that impaired BRS is independently associated with increased PWV values.

PP.38.267 AN ARTERIAL BAROREFLEX INDEX DERIVED FROM AMBULATORY BLOOD PRESSURE IS ASSOCIATED WITH HYPERTENSION-RELATED SUBCLINICAL TARGET ORGAN DAMAGE

H. Li, P.J. Gao, S.I. Chu. Shanghai Institute of Hypertension, Shanghai-China

Objective: 24-hambulatory blood pressure-RR interval relation as calculated from ambulatory blood pressure monitoring (ABPM) yield an index, indicated for brevity as theta index. Recently, theta index was thought to be helpful in characterizing baroreflex sensitivity (BRS). We hypothesized that theta index could be linked to cardiovascular variability and associated with hypertension-related subclinical target organ damage.

Methods: The design was a cross-sectional study. Subjects included 203 hypertensive patients with and without antihypertensive treatment (mean age 52 ± 14 years, 63.1% men, 74.7% taking or 2 more combined antihypertensive drugs). All subjects underwent 24-h ambulatory BP monitoring, with simultaneous assessment of heart rate (HR). Theta index was defined as the slope (ms/mmHg) of the regression of RR interval on SBP over 24-h. Nocturnal BP and HR fall were defined as daytime value minus nighttime value. Daytime and nighttime BP and HR variability were defined as SD of mean value in the according period of time. Left ventricular mass index (LVMI) and ejection fraction (LVEF), intima-media thickness (IMT) and glomerular filtration rate estimated by the CKD-EPI (eGFR) were assessed as indices of cardiac, vascular and renal damage, respectively.

Results: Linear correlation between R-R intervals and SBP readings were detectable in 1287(64%) patients (1211 with negative theta index, 76 with positive theta index), but undetectable in the rest 736(36%) patients (mean theta index -0.73 ± 1.47 ms/mmHg). 99% of extreme dippers and dippers, but only 49% of reverse dippers, had negative theta indices. Of those with positive theta index, 77% were reverse dippers, 20% were non-dippers. Theta index significantly related to all of the BP and HR variability indices, except for nighttime DBP variability. Subclinical measures of target organ damage, including LVMI, LVEF, IMT and eGFR, were significantly different across the quartiles of theta index for trend <0.01). After adjusting for age, gender, body mass index, smoking and drinking, diabetes mellitus, history of cardiovascular disorder, serum LDL-cholesterol, triglyceride, antihypertensive treatment and 24-h SBP, multivariable logistic regression analysis identified theta index as an independent predictor of left ventricular hypertrophy (OR = 1.32, 95% CI 1.15-1.52), depressed LVEF (OR = 1.59, 95% CI 1.03-2.46) and subclinical renal damage (OR = 1.32, 95% CI 1.08-1.62), but not of carotid atherosclerosis (OR = 1.06, 95% CI 0.89-1.26).

Conclusion: Theta index, an arterial baroreflex index derived from ABPM, is linked to cardiovascular variability and associated with hypertension-related cardiac and renal damage.

PP.38.268 SYMPATHETIC NERVOUS SYSTEM ACTIVITY AND CIRCULATING SERUM CYTOKINES RELATED TO DIPPING STATUS IN HYPERTENSIVE PATIENTS

V. Popov1, V. Vizir2, I. Voloshyna1. 1Moscow Medical Academy Named After L.M. Sechenov, East Site Management & Research, Moscow-Russia, 2Zaporozhye State Medical University, Zaporozhye-Ukraine

Objective: To reveal the relationship of sympathetic nervous system activity markers – LF/HF ratio and noradrenaline level with circulating serum cytokines concentrations related to night dipping status in hypertensive patients.

Design and Methods: Seventy seven hypertensive patients (46 men, 31 women) aged 53 ± 4.2 years were prospectively enrolled for this study. All patients gave written, informed consent. Twenty-four hour blood pressure monitoring was performed to all patients. Serum IL-4, IL-6, IL-10 and gamma-interferon concentrations were measured using a high-sensitivity, quantitative sandwich enzyme immunoassay method in all participants. Sympathetic nervous system activity had been determined on noradrenalin plasma level as also as on LF/HF ratio used in heart rate variability power spectral analysis.

Results: Dipper blood pressure profile were revealed in 24 patients (31%), non-dipper profile – in 23 patients (30%), reverse-dipper profile – in 17 cases (22%), extreme-dipper profile – in 13 participants (17%). Great number of reverse- and extreme-dipper patients were explained by concomitant ischemic stroke in anamnesis of 16 people. Reverse-dippers had significant elevation of noradrenalin, gamma-interferon levels and LF/HF ratio compared with dippers while anti-inflammatory IL-10 serum level was highest in dippers. Interleukin-6 and IL-4 serum concentrations were comparable in all subgroups. Linear regression analysis had shown that only in reverse-dippers autonomic balance LF/HF was depended on noradrenalin (k = 0.02; p < 0.005), inflammatory IL-6 (k = 0.03; p < 0.002) and negatively related with gamma-interferon serum values (k = -0.07; p < 0.02). Dipper, non-dipper and extreme-dipper patients had not shown any correlation with serum circulating cytokines. Noradrenalin plasma level was associated with night blood pressure fall in non-dippers.

Conclusions: Noradrenalin plasma level, serum concentrations of IL-6 and gamma-interferon are strongly related to sympathetic nervous system activity in reverse-dipper hypertensive patients. We supposed participation of this catecholamine and inflammatory cytokines in formation of prognostically unfaorable reverse-dipper blood pressure profile.

PP.38.269 EFFECTS ON BAROREFLEX SENSITIVITY AND RENAL RESISTIVE INDEX OF DAILY SESSIONS OF MUSIC GUIDED SLOW-BREATHING

C. Bazzini, A. Ferrari, M. Boddì, G. Costanzo, M.S. Romano, L. Massetti, G. Tartiscetto, G. Piggia, P.A. Modeli. 1Department of Critical Care Medicine, University of Florence, Florence-Italy, 2National Research Council of Italy (CNR), Institute of Clinical Physiology (IFC), Pisa-Italy.

Objective: Daily sessions (30 min) of music guided slow-breathing exercises (6 breaths/min) induced a significant reduction of 24-h ambulatory blood pressure. The antihypertensive effect persisted after a 6-month interruption of sessions so that a stable change of autonomic cardiovascular regulation can be hypothesized. The present study was designed to investigate the effects of daily sessions of music-guided slow breathing exercises on baroreflex sensitiviy and on renal resistive index in hypertensive patients.

Design and Method: Twenty-four patients with essential hypertension grade I (32.75 years) untreated or treated with stable medication from at least three months, were assigned to non pharmacologic treatment with daily sessions (30 min) of slow breathing exercises (4-6 breaths/min; inspiration:expiration = 1:2) synchronized with music listening. At baseline, and after 1, 4, and 8 weeks, subjects underwent 24-h ambulatory blood pressure monitoring (SpaceLabs 90207) and measurement of the baroreflex gain in supine position using two validated standard methods beat-sequence, and spectral analysis methods with θ-index obtained in high (HF) and low frequency (LF) band: Renal resistive index was investigated by Doppler Sonography in the subgroup of untreated patients (n = 10). A linear mixed-effect model (SAS version 17) was fitted to explore the effect of time.

Results: The significant reduction of 24h systolic BP at the 2-month visit (120 ± 8 vs 128 ± 8, p = 0.02) was found to be associated with a significant increase of baroreflex gain at both beat-sequence method (12 ± 3.5 vs 9.3 ± 3.6 mmHg, p < 0.05) and spectral analysis (13.9 ± 4.9 vs 9.8 ± 3.8 for θ-HF, p<0.001 and 7.4 ± 2.8 vs 5.5 ± 3.7 for θ-LF, p<0.05). At the same time, a mild although significant reduction of renal resistive index was observed in patients not treated with antihypertensive drugs (p<0.05).

Conclusions: Daily slow-breathing exercises sessions induce important stable change of autonomic cardiovascular regulation with enhancement of the baroreflex gain and reduction of renal resistive index.
POSTER SESSION

ENDEROCINE ASPECTS

PP.39.270 AGING IN THYROID DYSFUNCTION: ARE CAVEOLINS PROTEINS INVOLVED IN THE CARDIOVASCULAR NITRIC OXIDE PRODUCTION?
L. I. Sarati, C.R. Marinez, N. Artes, A.M. Balaszczuk, A.L Fellet. Department of Physiology, School of Pharmacy and Biochemistry; University of Buenos Aires. Equinoga, Buenos Aires-Argentina

Objective: Caveolins, the structural proteins of caveolae, modulate numerous signaling pathways including nitric oxide (NO) production. Among the caveolin family, caveolin (cav) -1 and -3 are mainly expressed in endothelial and muscle cells, respectively. In this study, we investigate whether (i) changes in caveolins abundance occur during cardiac aging in thyroid dysfunction, and (ii) the process could influence NO synthase (NOS) activity.

Methods: We studied protein levels of cav-1 and 3 (by western blot (UA)) and NOS activity (by conversion of [14C (U)]–L-arginine to [14C (U)]–L-citrulline (pmol.103/g.h)) in right atria (A), left ventricle (V) and aorta (AO) tissues in 2-mo-old and 12-mo-old euthyroid (Eu), hyperthyroid (H) and hypothyroid (h) rats. Data are mean ± S.E.M. One way analysis of variance (ANOVA) followed by post-hoc Tamhane test or Student’s t-test was used for multiple comparisons. The % probability level was used as a criterion for significance.

Results: A NOS activity in Eu decreased with aging (20.22 ± 0.61 vs 5.10 ± 30.30*) and it was associated with an increased of cav-1 and 3 (1.27 ± 0.02 vs 1.72 ± 0.01*, 0.39 ± 0.01 vs 0.62 ± 0.01*)). NOS activity in H rats did not change with aging (1.47 ± 0.30 vs 1.58 ± 0.40*); h rats showed an increased of it with aging (0.29 ± 0.15 vs 1.47 ± 0.21*). In both groups cav-1 showed an increased (H:1.35 ± 0.02 vs 1.50 ± 0.01*; h:1.82 ± 0.01 vs 2.51 ± 0.03*) and cav-3 showed a decrease with aging but cav-3 did not change. V showed an increased of NOS activity with aging in all experimental group (Eu 0.15 ± 0.07 vs 1.63 ± 0.1*; H 2.15 ± 0.07 vs 2.56 ± 0.05*; V 2.47 ± 0.13 vs 4.40 ± 0.18*). This result was associated with a decrease of cav-1 (Eu 1.58 ± 0.01 vs 1.04 ± 0.01*; H 1.44 ± 0.04 vs 1.24 ± 0.01*; V 1.7 ± 0.02 vs 1.28 ± 0.02* and cav-3 (Eu 1.61 ± 0.02 vs 0.46 ± 0.04*; H 0.53 ± 0.02 vs 0.52 ± 0.01*; V 0.912 ± 0.03 vs 0.664 ± 0.02*). AU NOS activity decreased with aging in all experimental groups (Eu 1.78 ± 0.07 vs 1.6 ± 0.06*; H 3.37 ± 0.2 vs 0.4 ± 0.06*; V 2.01 ± 0.06 vs 0.54 ± 0.04*). Eu rats did not change protein levels of cav-1 with aging but decreased cav-3 (1.4 ± 0.02 vs 0.85 ± 0.03*, h 1.3 ± 0.02 vs 0.85 ± 0.03*). Cav-1 and cav-3 increased in H (1.2 ± 0.02 vs 1.64 ± 0.01*; V 0 ± 0.153 ± 0.02*). h rats had decreased cav-1 with aging (1.24 ± 0.03 vs 1.49 ± 0.04*) but decreased cav-3 (2.07 ± 0.05 vs 1.38 ± 0.02*).

Conclusion: Cardiovascular NO production is affected by aging, and thyroid hormones have an important and differential role of enzyme activity modulators. The actions of the latter seem to be tissue specific.

PP.39.271 SUBTLE HYPERPARATHYROIDISM: A NOVEL FEATURE OF PRIMARY ALDOSTERONISM THAT IS CORRECTED BY ADRENALECTOMY
C. Momnero1, A. Fassina1, T. M. Secci1, G. Alberti1, R. De Carol1, L. Calo1*, A.C. Pessina1, G. P. Rossi1. Department of Clinical and Experimental Medicine “G. Patrassi”-University of Padova, Padova-Italy; 1Chair of Pathology (Section of Cytopathology)-University of Padova, Padova-Italy; 1Department of Human Anatomy and Physiology, University of Padova, Padova-Italy

Objective: The pathophysiological mechanisms underlying primary aldosteronism (PA), the most common endocrine cause of secondary hypertension, are unknown. In vitro studies showed that PTH concentration-dependently increases aldosterone secretion from human adrenocortical cells; hence, hyperparathyroidism could be a mechanism driving aldosterone excess in PA.

Design and Method: To test this hypothesis we measured prospectively the plasma levels of intact (1-84)-PTH, total and ionized calcium, inorganic phosphorus, magnesium, potassium, PRA, aldosterone (PAC), 1,25(OH)2D, and the 24-hour urinary excretion of deoxyypyridinoline (U-DPD), calcium and phosphorus in 109 consecutive hypertensive patients. Of them 49 had PA (due to aldosterone producing adenoma (APA), diagnosed by the “four corner criteria” in 40, and to idiopathic hyperaldosteronism (IHA) in 9); 60 had primary hypertension (PH). In adrenalectomized patients the aforementioned indexes were measured again post-adrenalectomy. We also sought for the PTH receptor expression in APA tissue by immunohistochemistry and RT-PCR.

Results: As compared to PH, the PA patients showed lower potassium, higher PAC, ARR, and PTH (APA 114 ± 6 vs PH 79 ± 32 ng/L, p < 0.001). 25(OH)D showed similarly deficient levels in both PA and PH; no between- group differences were found for all other biochemical indexes of calcium and phosphorus metabolism. Follow-up evaluation post-adrenalectomy evidenced, besides the normalization of PAC, ARR, and potassium, a significant reduction of PTH (from 115 ± 50 to 80 ± 39 ng/L, p = 0.01) with an increase of ionized calcium levels (from 1.16 ± 0.04 to 1.21 ± 0.03 mmol/L, p < 0.05). RT-PCR and immunohistochemistry showed the transcript and protein of the type 1 PTH receptor in APA.

Conclusions: Mild hyperparathyroidism can contribute to maintaining hyperaldosteronism acting on type 1 PTH receptor in APA despite suppression of...
the renin-angiotensin system. The 25(OH)D deficiency, while not explaining the mild hyperparathyroidism in PA, could play a role in raising PTH by interacting with genetic predisposition and/or environmental factors that remain to be identified.

**Results:** As the PRR is expressed in the human zona glomerulosa (ZG) and in aldosterone-producing adenoma (APA), we investigated in vitro the effect of PRR activation with Prorenin on ERK phosphorylation using human adrenocortical carcinoma cell lines as model.

**Conclusions:** These results, along with our previous findings evidencing the high level expression of PRR in APA, are consistent with a functional role of PRR in the pathophysiology of Primary Aldosteronism.

**References:**

1. C. Recarti, T.M. Seccia, L. Lenzini, G. Skander, B. Caroccia, G. Ceolotto, L. Petrelli, A.S. Bellomi, A.C. Pessina, G.P. Rossi. 1Department of Clinical and Experimental Medicine, Internal Medicine 4, University of Padua, Padova-Italy, 2Human Anatomy and Physiology, Section of Anatomy, University of Padua, Padova-Italy

**Objective:** The detection of prorenin in plasma, despite the suppression of renin, in patients with Primary Aldosteronism (PA) suggests a pathophysiological role of prorenin acting via the Pro-Rein Receptor (PRR). As we found that the PRR is expressed in the zona glomerulosa (ZG) and in aldosterone-producing adenoma (APA), we investigated in vitro the effect of PRR activation with Prorenin on ERK phosphorylation using human adrenocortical carcinoma cell lines as model.

**Design and Method:** After confirming the presence of the PRR mRNA by using Real time RT-PCR in two adrenocortical carcinoma cell lines (H295R and HAC15), we sought for the expression of the PRR at the protein level with immuno blotting, confocal microscopy and immuno-gold electron microscopy. To investigate the functional relevance of this receptor, stimulation experiments in human adrenocortical carcinoma cell lines were then performed. We next studied ERK 1/2 activation in these cell lines with immuno blotting experiment after stimulation with angiotensin II (100 nM) and Prorenin (50 nM) in presence or absence of the angiotensin II AT(1) receptor antagonist irbesartan (5μM).

**Results:** As the PRR was found to be highly expressed at the protein level in H295R and HAC15, these lines represent a good model for functional experiments of PRR in adrenal gland. Stimulation with Prorenin and angiotensin II induces ERK 1/2 phosphorylation in HAC15 cells. The angiotensin II induced phosphorylation was abolished by preincubation with irbesartan; by contrast, Prorenin induced ERK 1/2 phosphorylation was unaffected by preincubation with irbesartan.

**Conclusions:** With a high statistical power this study shows that the release of cortisol and CHA is not subjected to tonic D2 dopaminergic inhibition. Therefore, the usefulness of acute metoclopramide administration for enhancing the assessment the selectivity of blood sampling during AVS with use of either cortisol or CHA assay is not supported.

**References:**

1. D. Screpanti, I. F. Pizzolo, K. Kitamura, R. Raffaelli, L. Consoli. High level expression of PRR in APA, are consistent with a functional role of PRR in adrenal gland. Stimulation with Prorenin and angiotensin II H295R and HAC15, these lines represent a good model for functional experiments of PRR in adrenal gland. Stimulation with Prorenin and angiotensin II induces ERK 1/2 phosphorylation in HAC15 cells. The angiotensin II induced phosphorylation was abolished by preincubation with irbesartan; by contrast, Prorenin induced ERK 1/2 phosphorylation was unaffected by preincubation with irbesartan.

**Objective:** The objective of this study was to investigate whether the activity of the Prorenin Receptor (PRR) can be modulated by natriuresis in normotensive individuals, it remains to clarify if this modulation is normally regulated in hypertensive patients.

**Design and Method:** We compared the adrenal vein and infrarenal inferior vena cava levels of cortisol and CHA at baseline and after acute D2 antagonism with metoclopramide in 34 consecutive patients undergoing AVS. With this sample size the study power to detect a mean difference of 3.8 μg/dl for PCC and 15 μg/l for CHA between baseline and post-metoclopramide values was 99% and a 96%, respectively.

**Results:** Metoclopramide increased plasma aldosterone in the inferior vena cava (from 27.86 ± 4.56 to 41.20 ± 6.76, p < 0.0001) and in the adrenal vein blood (right: from 818.30 ± 474.83 to 2484.94 ± 915.97, p < 0.002; right: from 939.93 ± 159.22 to 2850.90 ± 807.55, p < 0.001), but failed to increase PCC or CHA levels. Therefore, it did not increase the selectivity index based on measurement of either hormone.

**Conclusions:** With a high statistical power this study shows that the release of cortisol and CHA is not subjected to tonic D2 dopaminergic inhibition. Therefore, the usefulness of acute metoclopramide administration for enhancing the assessment the selectivity of blood sampling during AVS with use of either cortisol or CHA assay is not supported.

**References:**

O. Belichenko, A. Vorontsova, I. Averkheva, V. Vladimirova, A. Smolenskiy, A. Mikhailova. 1Russian Cardiology Research Center, Moscow, Russia, 2Russian Endocrinology Research Center, Moscow, Russia, 3Russian State University of Physical Education, Sport, and Tourism, Moscow-Russia

**Objective:** To evaluate MRI diagnostic possibilities in patients with adenocarcinoma of adrenal gland and arterial hypertension.

**Material and Methods:** MRI performed in 26 patients with adrenal adenocarcinoma (15 male, 11 female) aged from 36 to 71 y.o, with hypertension history from 3 to 21 years, and control group of 17 healthy persons. Standard MRI included T1-, T2-weighted, fat saturation sequences, MRI with contrast enhancement (Gd-DTPA-BMA 0.2 mg/kg). In all cases MRI results were proved with histological findings after surgery.

**Results:** Our study includes 26 cases of adrenal adenocarcinoma. In 19 patients we found tumor of one adrenal gland, and in 6 cases - bilateral process. On MR scans tumors were large (from 7 to 19 cm), On T1-WI adenocarcinoma usually had signal intensity equal to or less than the liver, and all of them had heterogeneous structure. On T2-WI tumors were predominantly hypointense to the liver and heterogeneous due to of the structure of adenocarcinomas was seen better due to cystic and hemorrhage zones. High resolution MRI, especially with contrast enhancement, provided the possibility to distinguish tumor invasion to inferior cava vein (n = 3), aorta (n = 1), kidney (n = 5), liver (n = 4). We also examined these patients in 1 and 3 years after surgery and found recidives in contralateral gland in 3 cases.

**Conclusion:** MRI is a high effective method in patients with adenocarcinoma of adrenal gland and arterial hypertension. MRI with contrast enhancement gives the important additional information.
PP.39.277 MAGNETIC RESONANCE IMAGING IN PATIENTS WITH MYELOPOMA OF ADRENAL GLAND AND ARTERIAL HYPERTENSION

O. Belichenko1, A. Smolenskiy3, A. Vorontsov2, V. Vladimirova2, E. Averkeva2, A. Mikhailova2, 1Russian Cardiology Research Center, Moscow, Russia, 2Russian Endocrinology Research Center, Moscow, Russia, 3Russian State University of Physical Education, Sport, and Tourism, Moscow-Russia

Objectives: To evaluate MRI diagnostic possibilities in patients with myelopoma of adrenal gland and arterial hypertension (AH).

Material and Methods: MRI performed in 34 patients with adrenal myelopoma (16 male, 18 female) aged from 24 to 74 y.o. with hypertension history from 4 to 19 years, and control group of 23 healthy persons. Standard MRI included T1-, T2-weighted, fat saturation sequences, MRI with contrast enhancement (Gd-DTPA-BMA 0.2 mg/kg). In 10 cases MRI results were proved with histological findings after surgery or biopsy.

Results: Our study includes 34 cases of myelopoma of adrenal gland. 22 pts had AH 1-2A st., 9 pts had AH 2b-3 st., and 3 pts had malignant AH. In 29 patients we found tumor of one adrenal gland, and in 5 cases – bilateral tumors. On contrast enhanced MRI in all cases one or two hypointense tumor masses were seen in the adrenal area. The average diameter of left adrenal gland tumors was 5.1 cm and of right – 4.8 cm. Tumor masses had high signal intensity almost equal to retroperitoneal fat, and homogeneous structure. In patients with AH 2b-3 st. and especially with malignant AH we observed nodular hyperplasia (16 pts), bilateral adrenal masses (8 pts). Presence of hemorrhagic zones in the tumor was the indication to surgery. Contrast enhancement provided better view of borders of the tumor.

Conclusion: MRI is a high effective method in patients with myelopoma of adrenal glands and arterial hypertension and provides important information for planning treatment.

PP.39.278 CONCURRENT PRIMARY ALDOSTERONISM AND SUBCLINICAL CORTISOL HYPERSECRETION. A PERSPECTIVE STUDY

F. Fallo1, C. Bertello1, D. Tizzani1, N. Sonino1, A. Fassina1, M.C. Zennaro1, M. Covella1, E. Berra1, V. Crudo1, J. Burrello1, D. Leone1, F. Veglio1, P. Mulatero1, 1University of Padova, Padova-Italy, 2University of Torino, Torino-Italy, 3Paris Cardiovascular Research Center, Paris-France

Background: Cortisol hypersecretion from an aldosterone-producing adenoma has been reported anecdotally. In the absence of overt Cushing’s syndrome, the true prevalence of concurrent aldosterone and subclinical cortisol hypersecretion may be underestimated since hypercortisolism is not routinely investigated in primary aldosteronism.

Objective: To perspective estimate the occurrence of subclinical hypercortisolism in patients with primary aldosteronism.

Methods: Within a large population of hypertensive patients studied over the last 2 years, 76 had primary aldosteronism and were further investigated. No patient had clinical signs of hypercortisolism. Differential diagnosis between unilateral and bilateral aldosterone hypersecretion was made by CT/MRI and/or adrenal venous sampling (AVS) with aldosterone/cortisol ratio. Subclinical cortisol hypersecretion was defined by failure to suppress plasma cortisol to < 50 nmol/L after 1 mg-overnight dexamethasone (dex), initially used as screening test, and at least one of two abnormal tests, i.e. ACTH < 2 pmol/L, and urine cortisol > 694 nmol/d.

Results: Unilateral adrenal disease was found in 34 patients (micronodular hyperplasia, n = 1; adenoma, n = 32). Three out of these patients had pl cortisol > 50 nmol/L after dex. Only one (M, 71 y.o.) showed low-normal ACTH (1.7 pmol/L) and mildly elevated ur. cortisol (894 nmol/d) in addition to no suppression of pl. cortisol by dex (104 nmol/L). The patient had a right 4 cm adrenal mass at CT scan, and no AVS was performed. Laparoscopic adrenalec- tomy was followed by short-term steroid replacement to prevent adrenal insufficiency. All criteria for adenocortical adenoma were fulfilled at histology, with a marked prevalence of zona-fasciculata like cells in the tumor. In situ hybridization showed expression of CYPI B1 only in tumoral tissue and CYPI B2 expression only in the peri-tumoral area, suggesting the co-existence of a cortisol-producing adenoma and an aldosterone-producing hyperplasia in the same adrenal. Restoration to normal of ACTH, ur. cortisol and pl. cortisol response to dex, as well as serum K+ and aldosterone normalization, was seen at 6 months after surgery.

Conclusions: Concurrent aldosterone and subclinical cortisol hypersecretion is a rare event in patients with primary aldosteronism. In case of unilateral adrenal disease, there are important implications for the perioperative management.

PP.39.279 PSYCHOLOGICAL ASSESSMENT OF PRIMARY ALDOSTERONISM. A CONTROLLED STUDY

N. Sonino1, E. Tomba1, M.L. Genesia1, C. Bertello1, V. Crudo1, J. Burrello1, M. Covella1, E. Berra1, D. Leone1, P. Mulatero1, F. Veglio1, G.A. Fava1, F. Fallo1, 1University of Padova, Padova-Italy, 2University of Bologna, Bologna-Italy, 3University of Torino, Torino-Italy

Objective: To investigate psychological correlations in a population with primary aldosteronism (PA) using methods found to be sensitive and reliable in psycho- somatic research.

Methods: Twenty-three PA patients (12 M/11 F; mean age 50 ± 9 years) were compared with 23 patients with essential hypertension (EH) (15 M/8 F; mean age 47 ± 8 years) and 23 matched normotensive subjects. A modified version of the Structural Clinical Interview for DSM-IV, a shortened version of the structured interview for the Diagnostic Criteria for Psychosomatic Research (DCPR), and 2 self-rating questionnaires, the Psychosocial Index (PSI) and the Symptom Questionnaire (SQ), were administered.

Results: Twelve of 23 patients with PA (52.2%) suffered from an anxiety disorder compared to 4 of 23 with EH (17.4%) and to 1 control (4.3%) (P < 0.001). Generalized anxiety disorder was more frequent in PA than in EH patients and controls (P < 0.05). As to DCPR, irritable mood was more frequent in PA and EH compared to controls (P < 0.05), but did not differentiate PA from EH. Patients with PA had higher levels of PSI stress (P < 0.01) and psychological distress (P < 0.01), and lower level of well-being (P < 0.05) than controls. Compared to EH patients, PA patients had higher scores in PSI stress subscale (P < 0.05). SQ showed higher levels of anxiety (P < 0.01), depression (P < 0.01) and somatization (P < 0.01), and lower physical well-being (P < 0.05) in PA than controls.

Conclusion: A role of mineralocorticoid regulatory mechanisms in clinical situations concerned with anxiety and stress is suggested.

PP.39.280 BLOOD PRESSURE PROFILE IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM (PHPT) BEFORE AND AFTER SURGICAL TREATMENT

L. Petramala, M.C. Formicuccia, L. Zinnamosca, C. Marinelli, S. Sciomer, G. Cavallaro, G. De Toma, C. Letizia, University Sapienza, Roma-Italy

Introduction: PHPT is a disease characterized by excessive secretion of parathyroid hormone and persistent hypercalcemia. Besides the typical clinical features of PHPT, there is an increased prevalence of hypertension, atherosclerosis and endothelial dysfunction.

Objective: Aim of the study was to investigate in PHPT patients the behavior of arterial blood pressure and cardiovascular damage, before and after surgical treatment.

Materials and Methods: We enrolled 21 consecutive patients with PHPT (3M:18F; mean age 56 ± 6yrs) and 20 normal subjects (NS) (4M:16F; mean age 55 ± 6yrs), evaluating blood pressure profile, echocardiography, carotid intima-media thickness (IMT).

Results: 81% of patients with PHPT was affected by hypertension and ABPM showed the lack of normal circadian rhythm (“non-dipping pattern”), in almost 57% PHPT patients, compared with 10% of NS. PHPT patients also had a significant cardiac and vascular remodeling respect to NS, such as interventricular septum (10.7 ± 8.8mm/m2 vs 8.8 ± 1.2mm/m2; p < 0.001), systolic and diastolic end-stage diameter of left ventricle (46 ± 5.9mm/m2 vs 29.3 ± 1.9mm/m2; p < 0.001; and 30 ± 4mm/m2 vs 18.3 ± 1.9mm/m2; p < 0.001, respectively), mass of left ventricle (182 ± 20.4mm/m2 vs 125 ± 26mm/m2; p < 0.001), IMT (0.76 ± 0.15mm/m2 vs 0.57 ± 0.07mm/m2; p < 0.05). We showed in PHPT patients a positive correlation between serum PTH levels and SBP values (Fig. 1a), and a negative correlation between serum PTH levels and LVEDV-LVDD (Fig. 1b). The evaluation one year after parathyroidectomy showed a decrease of number of patients affected by hypertension (81% vs 62%; p = 0.012), and patients with the “non-dipping pattern” (57% vs 42%; p = 0.003), and decrease of number of antihypertensive drugs (n.17 vs n. 1.05; p = 0.001); moreover, 17% of patients did not take any antihypertensive drug and 48% reduces the number and dose of antihypertensive drugs.
**Conclusions:** Surgical treatment of PHPT normalizes calcium-phosphorus metabolism, and can reduce blood pressure profile, restore circadian rhythm of blood pressure and reduce cardiovascular remodelling.

**PP.39.281 SENSITIVITY, SPECIFICITY AND REPRODUCIBILITY OF THE ALDOSTERONE-TO-RENIN-RATIO AS A SCREENING TEST FOR PRIMARY ALDOSTERONISM**

P.M. Jansen, A.H.J. Danser, A.H. Van Den Meiracker, On behalf of the Dutch Arrat Investigators. Erasmus Medical Center, Rotterdam-The Netherlands

**Background:** The aldosterone-to-renin ratio (ARR) is a widely used screening test for primary aldosteronism (PA). A commonly adopted cut-off value according to the Endocrine Society is 1.5 91 pmol/L. However, its sensitivity, specificity, and reproducibility have not been studied extensively.

**Objective:** To characterize the main test characteristics of the ARR.

**Design and Methods:** In 99 patients with uncontrolled hypertension (despite the use of at least 2 antihypertensive drugs) plasma renin and aldosterone levels were assessed twice with an interval of 2 to 4 weeks. Betablockers and/or potassium sparing diuretics were discontinued at least 4 weeks before the first measurement. In all patients an intravenous salt loading test (SLT) was performed. Patients with a post-test plasma aldosterone concentration exceeding 235 pmol/L were considered to have PA. Subsequently, aldosterone and renin measurements were repeated in a subset of 64 patients after at least 4 weeks on standardized treatment consisting of a calcium-channel blocker and/or alphablocker. In the other 35 patients it was not possible to change the antihypertensive regimen due to very high blood pressure levels or side effects of standardized treatment. Sensitivity and specificity were calculated under random and standardized medication. Reproducibility was evaluated by Bland-Altman analysis of log-transformed ARR levels at the first (ARR1) and second (ARR2) measurement. The 95% limits of agreement were expressed as ARR1/ARR2 ratios.

**Results:** Fifteen patients had PA based on a positive SLT. The other 84 patients were considered essential hypertensives (EH). The median ARR was 36.5 (range 6.2-295.5) in PA patients versus 6.7 (0.2-65.7) in EH (p<0.001). Under random medication the ARR had 33% sensitivity and 100% specificity when a cut-off value of 91 was used. In the subgroup receiving standardized treatment the ARR rose from 10.3 (range 0.2-295) to 17.2 (0.9-438.6) (p<0.001). However, sensitivity remained low at a level of 37.5% with a specificity of 98.2%. Ninety-five percent of ARR1/ARR2 ratios were between 0.2 and 2.6 for PA patients, and between 0.3 and 4.0 for EH patients.

**Conclusion:** When applying the commonly adopted ARR cut-off value of 91, sensitivity for PA is low, even under ARR-neutral medication. Reproducibility is poor, stressing the need for repeated measurement of the ARR.

**PP.39.282 RELATIONSHIP BETWEEN TRIIODOTHYRONINE WITH BLOOD PRESSURE AND INSULIN RESISTANCE IN EUTHYROID TYPE 1 DIABETIC PATIENTS**

T. Bulum, I. Prkacin, L. Duvnjak. University Hospital Merkur, School of Medicine, University of Zagreb, Zagreb-Croatia

**Objective:** Oral triiodothyronine (T3) has been shown to induce hypertension and myocardial hypertrophy in laboratory rats. In pancreatic beta cells T3 increases expression of a number of genes involved in insulin production. It was shown that free serum triiodothyronine (FT3) concentrations correlated positively with systolic and diastolic blood pressure and insulin resistance in healthy euthyroid subjects. We investigated relationship between FT3 and systolic and diastolic blood pressure and insulin resistance in type 1 diabetic patients.

There was no significant difference in FT3 level between 89 patients with elevated blood pressure (mean 142±28 mmHg, FT3 = 5.45 pmol/L) and 215 patients without hypertension (mean 118±76 mmHg, FT3 = 5.44 pmol/L).

**Conclusion:** Although it was shown that FT3 causes hypertension and cardiac hypertrophy, increases blood volume and stimulate both systemic and tissue rennin-angiotensin systems, and that FT3 is associated with insulin production and fasting insulin concentrations, we have not identified significant relationship between serum FT3 level with blood pressure and insulin resistance in type 1 diabetic patients.

**PP.39.283 EFFECTS OF FEMALE SEX HORMONES AND CONTRACEPTIVE PILL ON THE 11BETA-HYDROXYSTEROID DEHYDROGENASE TYPE 2 ACTIVITY ESTIMATED BY URINARY METABOLITES RATIO**


**Objective:** A diminished activity of hydroxysteroid (11-beta) dehydrogenase 2 (11beta-HSD2), as revealed by urinary tetrahydrocortisol + allo-tetrahydrocortisol [(THF + aTHF) = THFs] (T4Hs/T3Hs) ratio above 1.5, is regarded as a feature in the pathogenesis of hypertension in some hypertensive patients. Little is known about conditions influencing urinary metabolites dosage. Recently, we demonstrated that female sex hormones and oral contraceptive (OC) modulates aldosterone and renin measurements in healthy subjects. Since it is known that OC increases plasma cortisol concentration, aim of the present study is to investigate possible influences of female sex hormones and OC on urinary THFs/THE ratio.

**Design and Methods:** We examined female sex hormones, cortisol, ACTH, THFs/THE ratio in 33 healthy normotensive women during free menstrual cycle and after OC therapy.

**Results:** After OC therapy cortisol concentration nearly doubled (from 12.5 to 21.6 mcg/dl, p<0.001), whereas mean THF/THE ratio was unchanged. However, after OC therapy two females displayed a ratio above 1.5. By contrast no significant changes were demonstrated from follicular to luteal phase of menstrual period.

**Conclusions:** In females oral contraceptive increase cortisol concentration and in certain hypertensive patients may affect urinary THFs/THE ratio.

**PP.39.284 PLASMA ALDOSTERONE LEVELS ON NORMAL, LOW AND HIGH SODIUM INTAKE IN PATIENTS WITH ESSENTIAL HYPERTENSION WITH NORMAL AND LOW PLASMA RENIN ACTIVITY**

J. Ciric, M. Zarkovic, B. Beleslin, M. Stojkovic. Clinic of Endocrinology, Diabetes and Metabolic Disease, Belgrade-Serbia

**Background:** Patients with low renin essential hypertension (EH) may have relative aldosterone excess as a risk factor for cardiovascular diseases.

**Aim:** The aim of the study was to evaluate daily plasma aldosterone profiles on normal, low and high sodium intake in patients with EH with normal and low plasma renin activity (PRA).

**Materials and Methods:** Study group included 41 patients with mild to moderate EH, 19 patients with low PRA (aged 31±8 yr) and 22 patients with normal PRA (aged 31±8 yr). Normal PRA was defined as normal for supine and postural reference range, with normal tendency to increase on low sodium intake. Blood samples for aldosterone were obtained at 1 h intervals for 24 h during routine daily activities in hospital.

**Results:** There was no significant difference in mean plasma aldosterone levels between groups on normal sodium intake: 340±170 pmol/l in low PRA group and 250±120 pmol/l in normal PRA group. In 6 patients with low PRA and 8 patients with normal PRA plasma aldosterone levels were determined on high sodium intake (10 g of added NaCl during 5 days). Mean plasma aldosterone in low PRA group was significantly higher (330±110 pmol/l) than in normal PRA group (180±120 pmol/l). On low sodium intake there was no difference in mean plasma aldosterone levels between groups.

**Conclusion:** Patients with EH and low PRA with normal aldosterone suppression on high sodium intake determined by one measurement, could be exposed by higher overall daily aldosterone secretion than patient with normal PRA.
The difference may have clinical importance on high sodium intake. It also implies that aldosterone/PRA ratio as a screening test for primary aldosteronism is more reliable on high and very high sodium intake.

**PP.39.285 EFFECT OF SURGICAL TREATMENT OF PHEOCHROMOCYTOMA ON BLOOD PRESSURE LEVEL AND VARIABILITY**


**Introduction:** Elevation of blood pressure (BP) is the most consistent manifestation of pheochromocytoma and presents either as sustained hypertension, with or without paroxysms, or as paroxysmal hypertension with intervening normotension. The aim of the study was to assess the influence of surgical pheochromocytoma treatment on blood pressure levels, diurnal rhythm and variability.

**Design and Methods:** In the ongoing project we examined retrospectively and prospectively 67 patients with pheochromocytoma (mean age 45 ± 14 years, 29 F, 38 M) with pheochromocytoma. Pheochromocytoma was confirmed in all cases histopathologically. 24-h ambulatory BP monitoring (SpaceLab 90207) was performed at baseline and during follow-up (after the operation). Nocturnal dipping was defined as nighttime blood pressure fall > 10%. Coefficient of BP variability (SD of mean BP / mean BP) was calculated. Mean follow up was 11 months.

**Results:** There were no significant changes in clinic systolic and diastolic BP levels in follow-up. However systolic and diastolic BP levels in ABPM decreased significantly during follow-up as compared with baseline (123 ± 14/77 ± 8 vs 131 ± 12/81 ± 10 mm Hg; p < 0.01/p < 0.05 and 109 ± 21/65 ± 13 vs 126 ± 16/74 ± 13 mm Hg; p < 0.001/p < 0.01 for daytime and nighttime BP levels respectively). A significant decrease in the number of antihypertensive drugs in the follow-up was observed (0.8 ± 1.1 versus 1.9 ± 1.1, p < 0.0001). Percentage of dippers increased during follow-up (from 19.7% to 46.5% for systolic BP). Both systolic and diastolic decline at night increased significantly at follow up (±4 ± 7/8 ± 9% vs. ±11 ± 15/15 ± 15%; p < 0.01/p < 0.05). Also a significant decrease in 24h heart rate was observed. There were no differences in blood pressure variability as compared at baseline and in the follow-up.

**Conclusion:** Surgical treatment of pheochromocytoma resulted in significant blood pressure decrease in ABPM. It was also associated with amelioration of BP diurnal rhythm. There was no change in blood pressure variability after the operation.

**PP.39.286 HUMORAL AND CELL-MEDIATED AUTOIMMUNITY MECHANISMS IN THE PATHOGENESIS OF PRIMARY ALDOSTERONISM**


**Aim:** To evaluate humoral and cell-mediated autoimmunity, both humoral and cell-mediated, in the pathogenesis of PA. A conclusive proof for an autoimmune basis of PA will require further in vivo studies with animals.

**Objective:** The continuum between the two major subtypes of primary aldosteronism (PA), e.g. aldosterone-producing adenoma (APA) and bilateral adrenal hyperplasia (BAH), suggests a common mechanism driving hyperaldosteronism. We therefore investigated the role of immunological mechanisms, both humoral and cell-mediated, in the pathogenesis of PA.

**Design and Method:** We characterized tissue infiltrating and peripherally circulating lymphocytes, molecular studies showed a predominance of Treg phenotype: their specific marker was 2,724 folds upregulated in APA specimens than in normal adrenal tissue (p < 0.01) and the proportion of Treg among circulating CD4+ lymphocytes was higher in APA patients than in healthy controls (4.42 ± 0.93 vs 2.52 ± 1.33, p = 0.0016). The mean titer of anti-AT1 specific antibodies, albeit lower than in pre-eclamptic women, was much higher in PA patients (1,2998) than in essential hypertensive patients and normotensives subjects (0.8852 and 0.4765, respectively; both p < 0.05); in PA patients, mean titer was two-fold higher in APA than in BAH (1.6141 vs 0.8852; p < 0.05).

**Conclusions:** Collectively these findings point to an involvement of autoimmunity, both humoral and cell-mediated, in the pathogenesis of PA. A conclusive proof for an autoimmune basis of PA will require further in vivo studies with animals.
Material and Methods: Study group included 67 patients with adrenal incidentalomas. There were 24 men and 43 women, aged 28 to 78 years, mean 58.5 ± 10.88. Endocrine evaluation included: 24-h urine excretion of catecholamines, plasma aldosterone to plasma renin activity ratio, dexamethasone suppression test with 1mg, oral glucose tolerance test.

Results: The average tumor size was 2.88 cm (SD = 1.38), minimal tumor size was 0.4 cm and maximum size was 7 cm. Body mass index was increased in 48 (71.64%) and 45 (64.17%) patients had arterial hypertension. Increased values of total cholesterol was noticed with 47 (70.15%) patients. Positive oral glucose tolerance test was found in 8 patients and 9 patients have had diagnosed diabetes mellitus. Low HDL was noticed with 31 (46.26%) patients. Seven patients was diagnosed with subclinical Sy. Cushing (10.44%), pheochromocytoma was diagnosed with 2 (3%) patients and primary aldosteronism wasn’t diagnosed at all.

Conclusion: Most of adrenal incidentalomas are nonfunctional. The most frequent of those tumors that produce hormones is subclinical Sy Cushing, than pheochromocytoma. Patients with incidentaloma have high prevalence of increased body mass index, arterial hypertension, increased values of total cholesterol, low HDL.

Methods: Twenty-nine patients with confirmed PA (15 with aldosterone-producing adenoma treated by unilateral laparoscopic adrenalectomy, 14 treated with spironolactone (mainly idiopathic aldosteronism)) were investigated by B-mode carotid ultrasound at the time of the diagnosis and then ~1 year after the specific treatment.

Results: The office blood pressure (BP) decreased from 167 ± 18/96 ± 9 to 136 ± 12/80 ± 7 mm Hg after adrenalectomy (P = 0.001), and from 165 ± 21/91 ± 13 to 151 ± 22/88 ± 8 mm Hg (n.s.) on spironolactone. The mean 24-h BP decreased from 198/133 ± 21/91 mm Hg to 126 ± 17/80 ± 10 mm Hg after adrenalectomy (P < 0.01), and from 155 ± 16/94 ± 12 to 139 ± 18/88 ± 8 mm Hg (n.s.) on spironolactone. IMT of CCA significantly decreased after surgery from 0.925 ± 0.147 to 0.864 ± 0.109 mm (P < 0.05), whereas we did not find any change of IMT in patients treated with spironolactone (0.936 ± 0.154 mm vs. 0.937 ± 0.196 mm (n.s.)).

Conclusions: Surgical but not conservative treatment of PA led to a significant decrease of common carotid IMT as a marker of subclinical organ damage. Therefore, to minimize the high cardiovascular risk of these patients, surgical treatment should be the preferred mode of treatment in all patients with unilateral forms of PA.

PP.39.289  INCREASED PREVALENCE OF ARTERIAL HYPERTENSION AMONG PATIENTS WITH NON-FUNCTIONING ADRENAL ADENOMAS

V. Vasilev, I. Matrosova, S. Zacharieva. Clinical Centre of Endocrinology and Gerontology, Sofia-Bulgaria

The increased use and accessibility to high-resolution imaging techniques in recent decades has led to the detection of an expanding number of incidentally found adrenal masses. Up to 20% of them experience some degree of hormonal hypersecretion of the cortex or the medulla. However, the existent assays fail to detect any hormonal disturbances in the vast majority of patients with adrenal incidentaloma. Accumulating evidence suggests that even these clinically inattentive adrenal adenomas may be associated with increased cardiovascular and metabolic adverse events.

Aim: The evaluation of the epidemiological, clinical and hormonal characteristics of all patients with clinically apparent adrenal tumours that were referred to our centre during the last 20 years.

Patients and Methods: We retrospectively included the results form clinical, biochemical and hormonal evaluation of 475 consecutive patients with adrenal adenoma who were admitted to our centre during the last 20 years.

Results: Mean age of all patients with adrenal adenomas was 54 ± 23 years. Hypertension was present in 333 of 475 patients (70%) compared to 41% in the general Bulgarian population. There was slight predominance in female subjects - 256 out of 352 (73%) versus 77 out of 123 (63%) in males. Prevalence within different age groups was as follows: 18-39 years - 34%; 40-59 years - 72%; over 60 years - 84%. Mean SBP was 140 ± 23 mmHg and DBP - 87 ± 13 mmHg.

Conclusions: In agreement with previous reports our results show markedly increased prevalence of arterial hypertension in clinically non-functioning adrenal tumours compared to the general Bulgarian population. This observation could not be related to aging as the increase is demonstrated throughout all age groups. A possible cause may be subtle hypersecretion of end hormones or precursor molecules, therefore the results require further investigation.

PP.39.290  ADRENALECTOMY IMPROVES COMMON CAROTID INTIMA-MEDIA THICKNESS IN PRIMARY ALDOSTERONISM

R. Holaj1, B. Štrach1, J. Rosa1, T. Zelinka1, O. Petrák1, D. Michalský2, K. Černý2

Background: Adrenalectomy has been shown to substantially contribute to the accumulation of different types of collagen fibres and growth factors in the arterial wall, which increases wall thickness. We previously showed that intima-media thickness (IMT) of the common carotid artery (CCA) was increased in primary aldosteronism (PA) independently of concomitant hypertension. This study was aimed at assessing the effects of specific treatment of PA on common carotid IMT.

Methods: Twenty-nine patients with confirmed PA (15 with aldosterone-producing adenoma treated by unilateral laparoscopic adrenalectomy, 14 treated with spironolactone (mainly idiopathic aldosteronism)) were investigated by B-mode carotid ultrasound at the time of the diagnosis and then ~1 year after the specific treatment.

Results: The office blood pressure (BP) decreased from 167 ± 18/96 ± 9 to 136 ± 12/80 ± 7 mm Hg after adrenalectomy (P = 0.001), and from 165 ± 21/91 ± 13 to 151 ± 22/88 ± 8 mm Hg (n.s.) on spironolactone. The mean 24-h BP decreased from 198/133 ± 21/91 mm Hg to 126 ± 17/80 ± 10 mm Hg after adrenalectomy (P < 0.01), and from 155 ± 16/94 ± 12 to 139 ± 18/88 ± 8 mm Hg (n.s.) on spironolactone. IMT of CCA significantly decreased after surgery from 0.925 ± 0.147 to 0.864 ± 0.109 mm (P < 0.05), whereas we did not find any change of IMT in patients treated with spironolactone (0.936 ± 0.154 mm vs. 0.937 ± 0.196 mm (n.s.)).

Conclusions: Surgical but not conservative treatment of PA led to a significant decrease of common carotid IMT as a marker of subclinical organ damage. Therefore, to minimize the high cardiovascular risk of these patients, surgical treatment should be the preferred mode of treatment in all patients with unilateral forms of PA.

PP.39.291  AN ABDOMINAL CT SCAN IN FIRST LINE IS AN EFFICIENT INVESTIGATION IN RESISTANT HYPERTENSIVES SUSPECTED TO HAVE AN ADRENAL CAUSE

D. Rosenbaum, F. Villeneuve, C.H. Gury, X. Gired. Pitie Salpetriere Hospital, Paris-France

Objective: To evaluate the efficiency for imaging the adrenal glands with an abdominal CT scan in first line in subjects with resistant hypertension suspected to have an adrenal cause.

Methods: On 134 hypertensive patients uncontrolled by at least a combination therapy, but suspected to have secondary hypertension due to adrenal cause, an abdominal CT scan was performed in first intention. In all subjects, an exploration of the renin-aldosterone axis in standardized conditions, a 24-hour urinary cortisol and a WHO recommended biological analysis were also performed.

Results: An abnormal morphology of adrenal was found by abdominal CT in 57.5% of patients. The abnormalities observed were: bilateral hyperplasia (30.6%), unilateral adenoma (15.7%), unilateral hyperplasia (6.7%), bilateral adenoma (4.5%). Abnormal hormonal tests for adrenal disease were found in 16.4% of patients, with a primary aldosteronism (A/R corrected > 25) in 10.4% of subjects or an increased urinary cortisol in 6%. At 6 months of follow-up, a controlled blood pressure was observed in 73.1% of subjects with spironolactone prescribed in 41.8% of subjects and adrenal surgery performed in 3.7% of patients. The analysis conducted, in retrospect, in the group of subjects with only the abnormality of adrenal hormones initially achieved, shows that treatment with spironolactone would have been prescribed only in 12.6% of subjects and an adrenal surgery would have been proposed only in 2.9% of patients.

Conclusion: In a population of patients with a resistant hypertension in which an adrenal cause is suspected, the realization of an abdominal CT scan in first line leads to the conclusion of an adrenal etiology in 45.5% of patients. In contrast, a specific treatment would have been undertaken only in 15.5% of patients screened only by hormonal examination. This study suggests that in subjects with un-controlled hypertension and suspected to have an adrenal cause, performing only an abdominal CT scan in first line is an especially efficient investigation.

PP.39.292  GENETICALLY NEGATIVE PARAGANGLIOMA OF THE BLADDER IN CHILDREN. REPORT ON 3 CASES


Introduction: Catecholamine-producing tumors - pheochromocytoma/paraganglioma (PHEO) can be found in different localisations. Bladder involvement is extremely rare and difficult to diagnose, especially in children.

Objectives: Aim of the study is to present 3 children with bladder localisation of hormonally active PHEO.
Material and Methods: 2 boys and 1 girl, aged from 9 to 14 y (median 12) with PHEO diagnosed clinically using following diagnostic panel: hormonal activity (urine epinephrin, norepinephrin and vanillylmandelic acid); mutation tests; ultrasound, computed tomography of the abdomen and pelvis and scintigraphy.

Results: Hormonal activity and imaging studies were positive and mutation tests (i.e. RET, VHL, SDHB, SDHD) were negative in all cases. In 2 hypertensive boys, typical signs of PHEO (swelling, headache, dizziness) during micturition were noted (micturitional attacks), but in a girl, only dysuria was observed without hypertension.

Results: Surgical treatment was performed successfully in all cases: partial cystectomy was done in 2 males, and total cystectomy in 1 female patient. Recovery was uneventful in all cases and all patients were followed routinely for 12 months. Observation was negative in all patients.

Summary: Micturitional attacks can be mostly observed in children with bladder paraganglioma. No typical genetic mutation causing PHEO was found.

PP.39.293 MODULATION OF THE ALDOSTERONE/ MINERALOCORTICOID RECEPTOR SYSTEM IN AGED WKY AND SHR: EFFECT OF LONG-TERM FOOD RESTRICTION
P. Gomes, V. Pinto, M.J. Pinho, S. Simão, E. Silva, M.P. Serrão, P. Soares-De-Silva. Faculty of Medicine, University of Porto, Porto-Portugal

Objective: Renal aging is associated with alterations in renal physiology which may be aggravated by diseases such as hypertension. In this study age-related alterations in the regulation of aldosterone/mineralocorticoid receptor (MR) functionality were investigated in WKY and SHR rats.

Design and Method: To this end, age-related changes were observed in oxidative stress levels, hyperaldosteronism and activation of the aldosterone/MR system in WKY and SHR rats. However, in WKY these effects are not associated with aging per se, but rather with age-related increases in body fat mass. Supported by grant PIC/JC/83204/2007

Conclusions: These findings suggest that aging is accompanied by increases in renal oxidative stress levels, hyperaldosteronism and activation of the aldosterone/MR system in WKY and SHR rats. However, in WKY these effects are not associated with aging per se, but rather with age-related increases in body fat mass. Supported by grant PIC/JC/83204/2007

PP.39.294 BLOOD PRESSURE, GONADOTROPINES AND ESTRADIOL VARIATIONS IN WOMEN WITH MILD AND SEVERE HOT FLUSHES
M. Stojanovic1, V. Stojanov2, M. Ivovic1, M. Tancic1, D. Lovic3, L.J. Marina1, M. Marinkovic1, M. Matic1, B. Subotic1, J. Cucic1, M. Zarkovic1, S. Vujovic1. 1Institute of Endocrinology, Clinical Center of Serbia, Belgrade-Serbia, 2Institute of Cardiology, Hypertension Center, Clinical Center of Serbia, Belgrade-Serbia, 3Intermedica, Nis-Serbia

Elevations in sympathetic nervous activity during hot flushes (HF) are found in the final year of perimenopause and during the first five menopausal years. In a publication from the Study of Women’s Health Across the Nation Heart Study, showed that, compared to their counterparts, women with HF had significantly reduced flow-mediated dilation and greater aortic calcification, indicating increased subclinical cardiovascular disease.

Objective: The aim of this ongoing study is to evaluate the variations of ambulatory blood pressure (ABPM), heart rate, FSH, LH and estradiol (E2) levels during mild and severe HF.

Design and Method: 56 menopausal women 50.2 + /- 5.5 years old, BMI 26.7 + /- 3.32 kg/m² with HF were studied. Blood samples for FSH, LH and E2 were taken at the time of HF. The women were instructed to record, announce and make extra blood pressure measurement with taking blood sample during all HF as well as to record their activities and vasomotor symptoms in a diary. Meditech ABPM 05 was used to obtain 24-h blood pressure (BP) and heart rate (HR). Statistical analysis: Sign Test and Wilcoxon matched pairs tests.

Results: FSH was significantly lower during severe HF compared to mild HF (54.42 vs. 60.32 IU/L; p = 0.02). LH was significantly higher during mild HF compared to severe HF (30.28 vs. 24.32 IU/L; p = 0.03). There was no significant difference in E2 values during mild and severe HF (30.12 vs. 26.46 pmol/L; p = 0.46). Systolic, diastolic BP and HR were significantly higher during severe HF compared to mild HF (systolic BP 146 vs 132; diastolic BP 102 vs 92 mmHg; HR 84 vs 76 /min P < 0.001).

Conclusions: FSH and LH were significantly lower during severe HF compared to mild HF. We also found fall in E2 values during severe HF which can partially explain the symptoms. Hot flashes are associated with significant increase in systolic, diastolic BP and HR. Appropriate estrogen/progestagen therapy initiating on time lower the risk of CVD and should be considered as a first line therapy in women with diagnosed hypertension in the final year of perimenopause and at the beginning of menopause if there is no contraindication.
POSTER SESSION SESSION 40
HEART FAILURE

PP.40.295  THE IMPORTANCE OF BLOOD PRESSURE FOR THE PROGNOSIS OF PATIENT HOSPITALISED WITH ACUTE HEART - ACUTE HEART DATABASE (AHEAD) REGISTRY

J. Spinar1, J. Paremca1, J. Vitovec1, P. Widimsky1, A. Linhart1, F. Malek1, L. Spinarová2, R. Miklá1, J. Jarovský1, L. Donec1, 1University Hospital, Brno-Czech Republic, 2University Hospital St. Ann, Brno-Czech Republic, 1University Hospital, Prague-Czech Republic, 2Internal Cardiology Department Motol, Prague-Czech Republic, 3Institute of Biostatistic and Analyse Masaryk University, Brno-Czech Republic

Abstract

Aims: The objectives of the Acute HEArt Database main (AHEAD main) was to determine the role of blood pressure at admission for the in hospital mortality in patients with acute heart failure (HF) in districts with centralised care of patients with acute coronary syndromes. The registry was performed in 7 centres with cath lab and with non stop 24 hour angiography services.

Results: From 4 153 included patients, 526 (12.66%) patients died during hospitalisation, 3 627 patients were discharged home. AHF patients were elderly, average age 71.5 ± 12.4 years. Males were younger (68.6 ± 12.4 years) compared with females (75.5 ± 11.5 years) p < 0.001. Females hospitalised with HF had higher systolic blood pressure (BPs) (140 mmHg vs 130 mmHg) and higher ejection fraction (EF) than males (42.7 vs 37.5%). The in hospital mortality for both sexes was similar 12.7%, in patients without cardiogenic shock 4.2%, in patients with cardiogenic shock 62.7%. The incidence and mortality according to BPs Incidence  Mortality  BPd Incidence  Mortality

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Low blood pressure was an important parameter for in hospital mortality in patients without cardiogenic shock in a multivariate model (p < 0.001).

Conclusion: Females hospitalised with HF are older and have higher BPs, but the same BPd and lower EF. The prognosis of both sexes is similar, systolic dysfunction of left ventricle and low BPd are strong predictors of mortality.

PP.40.296  PREVALENCE OF DIASTOLIC LEFT VENTRICULAR DYSFUNCTION IN EUROPEAN POPULATIONS BASED ON CROSS-VALIDATED DIAGNOSTIC THRESHOLDS

M. Kloch-Badeleck1, T. Kuznetsova2, W. Sakiewicz2, V. Tikhonoff2, A. Ryabkov2, A. Gonzalez1, L. Thijis1, Y. Jin4, S. Maluytina1, K. Stolarz-Skrzypek1, E. Casiglia1, J. Díez4, K. Narkiewicz3, K. Kawecka-Jaszcz1, J. Stasaßen2, On Behalf of The European Project On Genes In Hypertension (Epoh) Investigators, 1The First Department of Cardiology and Hypertension, Jagiellonian University, Krakow-Poland, 2Studies Coordinating Centre, Laboratory of Hypertension, Leuven-Belgium, 3Hypertension Unit, Department of Hypertension and Diabetology, Medical University of Gdańsk, Gdańsk-Poland, 4The Department of Clinical and Experimental Medicine, University of Padova, Padova-Italy, 5The Institute of Internal Medicine, Novosibirsk-Russia,

4Division of Cardiovascular Sciences, Centre For Applied Medical Research, Pamplona-Spain

Objective: Different diagnostic criteria limit comparisons between populations in the prevalence of diastolic LV dysfunction. We aimed to compare across populations age-specific echocardiographic criteria for diastolic left ventricular (LV) dysfunction as well as its correlates and prevalence.

Design and Methods: We measured the E and A peaks of transmural blood flow by pulsed wave Doppler and the Ea and Aa peaks of mitral annular velocities by tissue Doppler imaging (TDI) in 2 cohorts randomly recruited in Belgium (n = 782; 51.4% women; mean age, 51.1 years) and in Italy, Poland and Russia (n = 476; 44.5%; 44.5 years).

Results: In stepwise linear regression, the multivariable-adjusted correlates of the transmitral and TDI diastolic indexes were almost identical in the 2 cohorts and included indexed, age, body mass index, blood pressure and heart rate. Similarly, cut-off limits for the E/A ratio (2.95th percentile) and E/Ea ratio (97.5th percentile) in 388 and 185 healthy subjects selected respectively from both cohorts were consistent within 0.02 and 0.26 units (median across 5 age groups). The 2.5th percentile of the E/A ratio decreased by ~0.10 per age decade in healthy subjects. The healthy subsample provided age-specific and cut-off limits for normal E/A and E/Ea ratios. In the 2 cohorts combined, diastolic dysfunction groups 1 (impaired relaxation), 2 (possible elevated LV end-diastolic filling pressure) and 3 (elevated E/Ea and abnormally low A/EA) included 114 (9.1%), 135 (10.7%), and 40 (3.2%) subjects, respectively. We used left atrium volume index (> 28 mL/m2) and/or differences in duration between the mitral A and reverse pulmonary vein flow during atrial systole (Ad < ARd + 10) to confirm possible elevation of LV filling pressure in group 2.

Conclusion: The age-specific criteria for diastolic LV dysfunction were highly consistent across populations with an age-standardized prevalence of 22.4% vs. 25.1% (P = 0.09). This consistency suggests that currently proposed thresholds, while awaiting validation in prospective studies, might be used in clinical practice.

PP.40.297  THE EFFECT OF CARVEDILOL VERSUS METOPROLOL ON PERIPHERAL AND CENTRAL HEMODYNAMICS IN HEART FAILURE PATIENTS WITH GENETIC VARIANTS OF THE BETA2-RECEPTOR

B. Van Den Bogaard, O. De Peuter, J. Truijen, P. Kamphuisen, B.J. Van Den Born. Academic Medical Center; Amsterdam-The Netherlands

Objective: Carvedilol might be superior to metoprolol in lowering blood pressure in heart failure patients. We compared the effects of carvedilol and metoprolol on peripheral and central blood pressure in heart failure patients and assessed whether common functional beta2-adrenergic receptor haplotypes mediated treatment response.

Design and Methods: In this crossover study with a prospective open-label blinded outcome design, we randomized heart failure patients (left ventricular ejection fraction < 40%) with the Arg16/Gln27 (n = 6) or Gly16/Glu27 haplotype (n = 8) of the beta2-receptor to 6-weeks treatment with carvedilol and metoprolol. Peripheral blood pressures were measured using a validated oscillometric device. Central blood pressures were derived using applanation tonometry of the radial artery.

Results: Compared to metoprolol peripheral systolic and diastolic blood pressures were lower during carvedilol treatment, 133.2 ± 18 mmHg (p < 0.01) and 76 ± 8 versus 73.3 ± 7 mmHg (p = 0.08), the corresponding heart rates were 63 ± 7 and 63 ± 8 bpm (p = 0.89). Central systolic and diastolic blood pressure were 122.4 ± 15 versus 117.9 ± 18 mmHg (p = 0.02) and 76.3 ± 8 versus 73.3 ± 7 mmHg (p = 0.07) for metoprolol versus carvedilol. In Arg16/Gln27 carriers peripheral systolic and diastolic blood pressures were significantly higher with metoprolol than with carvedilol treatment, 134.4 ± 18/78.3 ± 9 versus 127.8 ± 19/73.3 ± 7 mmHg (p < 0.05) (p < 0.05). For Gly16/Glu27 carriers there was no significant difference between carvedilol and metoprolol, 128.6 ± 18/73.0 ± 8 versus 132.0 ± 14/73.0 ± 6 mmHg.
Conclusion: In heart failure patients carvedilol resulted in lower peripheral and central blood pressures compared to metoprolol at equipotent dosages. The higher blood pressure levels with metoprolol treatment were most pronounced in Arg16/Gln27 carriers.

PP.40.298 | AMLODIPINE, CALCIUM CHANNEL ANTAGONIST COULD PREVENT STRESS INDUCED CARDIAC DYSFUNCTION LIKE α AND β BLOCKER

Y. Takano, F. Ishikura, M. Egawa, K. Komaru, S. Toyokawa. Osaka University, Suita-Japan

Background: We have reported that α and β blocker protects, such as labetalol against emotional stress-induced cardiac dysfunction but protective effects of other antihypertensive drugs, such as calcium antagonist is unknown. Amlodipine is one of a calcium antagonist. The purpose of this study is to evaluate the effect of amlodipine to prevent stress induced cardiac dysfunction.

Methods: Rats premedicated with amlodipine (0.2mg/kg), labetalol (3mg/kg) or vehicle, were restrained for 30 minutes (immobilization stress: IMO) to reproduce emotional stress, and anesthetized to release stress. We measured the fractional area change (FAC) using SONOS5500 (Philips) with s12 probe (frequency: 5-12MHz, frame rate: 120Hz) at the end of IMO and every 10 min for 60 minutes.

Results: During IMO, FAC with labetalol was significantly lower than that with amlodipine or vehicle. At 20 minutes after IMO, FAC with amlodipine or labetalol was significantly higher than that with vehicle (84 ± 8% vs. 73 ± 5%, 60 ± 7%, p < 0.05). At 60 minutes after IMO, FAC with amlodipine increased as same as with vehicle, but labetalol was lower than the others.

Conclusion: Acute administration of amlodipine, could prevent a sudden drop of cardiac function after acute stress like IMO. Amlodipine might have a protective effect on stress induced cardiac dysfunction like α and β blocker.

PP.40.299 | THE EVALUATION OF CARDIOPULMONARY EXERCISE TEST IN PATIENTS WITH CHRONIC HEART FAILURE IN RELATION TO GENERATED BLOOD PRESSURE

K. Malaczyńska-Rajpold, I. Niskiewicz, M. Laskowski, E. Straburzynska-Migaj. Poznan University of Medical Sciences, Poznan-Poland

Objective: The characteristics of a group of patients suffering from CHF in CPET and evaluation of the relation of blood pressure and heart rate to aerobic efficiency in those patients.

Design and Methods: 85 patients (73 men and 12 women) without lung diseases, aged 19 to 66, suffering from chronic heart failure [mean ejection fraction (EF): 30 ± 10%] were tested with CPET according to the modified Bruce’s protocol. Following measurements of the test were taken into consideration: heart rate (HR) and systolic (SBP) and diastolic (DBP) blood pressure at rest and at maximal effort and peakVO2.

Results: We revealed that patients with CHF achieve following mean values of measured parameters: 
- HR: 52 ± 21 [1/min]; 
- ΔSBP: 22 ± 18 [mmHg]; 
- peakVO2: 17.7 ± 6.3 [ml/min/kg]; 
According to the classification of Weber peakVO2 and ΔSBP and ΔHR during exercise (p < 0.0001) as well as negative correlations between the classes of Weber and ΔHR and ΔSBP (p < 0.0001). Mean ΔHR and ASBP in each class of Weber were respectively:
- class A: 68 ± 22 [1/min] and 33 ± 16 [mmHg];
- class B: 50 ± 13 [1/min] and 22 ± 16 [mmHg];
- class C: 35 ± 18 [1/min] and 16 ± 18 [mmHg];
- class D: 35 ± 14 [1/min] and 2 ± 9 [mmHg].

Conclusions: 1) Patients with CHF mainly do not achieve values predicted for age and sex in CPET. 2) The ability to generate higher blood pressure and heart rate during exercise determines better aerobic efficiency in patients with CHF.

PP.40.300 | EFFECT OF HYPERTENSION ON CHRONIC HEART FAILURE PATIENTS PROGNOSIS

E. Mezhonov, S. Shalaye. Tyumen Regional Clinical Hospital, Tyumen-Russia

Objective: The aim was to study the course and prognosis in heart failure (HF) patients with hypertension.

Design and Methods: 84 patients (mean age 54 ± 8.1 years, 89.3% males) with impaired systolic function (LVEF < 40%) and symptomatic HF (NYHA class II–IV) were recruited. 66 (79%) had hypertension. During the study patients were treated optimally according to the national guidelines. 

Results: During the follow-up period (follow-up median 18 months), 33 patients (39%) had primary endpoint (33 hospitalizations due to HF, including 6 lethal cases). Hypertension was statistically more frequent in patients without offensive end point (p = 0.024). This difference can probably be explained by the fact that patients with raised blood pressure received much higher doses of antihypertensive medicines that influence on the pathogenesis of HF than those without hypertension. The average daily dose of ACE inhibitor enalapril in patients who recorded the offensive end points had 9.7 ± 5.67 mg, while in patients without it – 14 ± 10.1 mg (p = 0.038). Average daily dose of beta blocker bisoprolol in patients with onset of end points was 3.6 ± 1.82 mg, while in patients without it – 4.5 ± 1.89 mg (p = 0.012). We analyzed the end point onset frequency depending on the NT-proBNP level dynamic in relation to background therapy. Analysis of the NT-proBNP concentration dynamics in relation to the clinical condition of patients revealed that 33 patients had unplanned hospital stays for HF: 14 of these patients had NT-proBNP level more than 3000 pg/ml at baseline and follow-up visit, and in 13 patients NT-proBNP concentration increased during 3-month follow-up period. 4 patients with NT-proBNP concentration reduction or absence of its dynamics (dynamics was considered significant with a coefficient of variation of more than 15%) were rehospitalized due to HF decompensation (p < 0.001). Higher doses of ACE inhibitors (p = 0.04) and beta blockers (p = 0.03) were associated with more pronounced decrease in NT-proBNP and favorable prognosis for patients (p < 0.001).

Conclusion: The presence of hypertension in patients with HF allows to assign higher drug doses that affect on the pathogenesis, which in turn leads to better prognosis for patients.

PP.40.301 | PARAMETERS OF CENTRAL AORTIC PRESSURE AND ARTERIAL STIFFNESS IN HYPERTENSIVE PATIENTS WITH CHRONIC HEART FAILURE

V. Ivanenko Victoria Valeriavna1. Almazov Federal Center Heart, Blood and Endocrinology, Sankt-Petersburg-Russia

Objective: To assess the arterial wall stiffness and central aortic pressure at patients with chronic heart failure (HF) associated with hypertension (HTN).

Design and Methods: We examined 33 subjects (11 females and 21 males) from 51 to 64 years with hypertension. 18 patients were hypertensive patients with HF II-III functional class (NYHA) with impaired systolic function and without signs of congestion, 15 control hypertensive patients had no HF. Measurements of blood pressure (BP) and anthropometry were performed. Ejection fraction (EF) was measured Echocardiography. Central aortic pressure (CAP), pulse wave velocity (PWV), augmentation index (AI) and augmentation pressure (AP) were measured by Sphygmocor PAX device. All subjects were comparable on age, body mass index (BMI) and BP level.

Results: In control group higher values of peripheral BP and higher indicators of arterial wall stiffness were observed: PWV(8.3 ± 1.6 vs 8.0 ± 1.6 m/s, p < 0.05), AI(34.8 ± 7.8 vs 26.2 ± 13.1%, p < 0.01), AP(14.4 ± 4.3 vs 9.6 ± 6.7 mm Hg, p < 0.05), CAP(PP(133.2 ± 90.48 ± 8.7 vs 122.3 ± 11/40 ± 5.2 mm Hg, p < 0.01). EF was also significantly higher[56.6 ± 4.5 vs 35.9 ± 9.4%, p < 0.01). In hypertensive patients with HF PWV correlated with age (r = 0.47), SBP (r = 0.41), CAP (r = 0.39). In patients of control group PWV also correlated with age (r = 0.41), SBP and PP (r = 0.78, r = 0.32), p < 0.05 for all values. No correlations with EF was observed.
Directions: These hypertensive patients with HF do not demonstrate increased arterial stiffness indexes, and reduced EF is not associated with arterial rigidity. BP levels and age seem to be major determinants of arterial stiffness despite HF.

**PP.40.302** PEAK OXYGEN PULSE IN MILD CHRONIC HEART FAILURE PATIENTS - THE EFFECTS OF BETA-BLOCKERS

S. Dimopoulou1, A. Ntalianis2, A. Tasoulis2, C. Kapelios2, C. Manetos1, S. Koutroupi3, V. Agapitou1, G. Tzanis1, S. Vrentzouri1, J. Terrovitis1, S. Nanas1, C. Kapelios2, T. V. Agapitou1, S. Vrenzouri1, J. Terrovitis1

Hospital, University of Athens, Athens-Greece, 23Rd Cardiology Department, Laiko Hospital, University of Athens, Athens-Greece

Objective: Beta blockers modulate heart rate response to exercise in patients with chronic heart failure (CHF) improving cardiac autonomic nervous activity. However their effects on peak exercise oxygen pulse in mild CHF patients have not been fully investigated yet.

Design and Method: Twenty- six patients with mild CHF receiving b-blockers (mean age: 46 ± 9 yrs, 23 males, body mass index: 27 ± 3kg/m²), (Group A) and 39 CHF patients not receiving b-blockers matched for NYHA class, age, gender, body mass index (mean age: 47 ± 10 yrs, 35 males, body mass index: 27 ± 3kg/m²), (Group B) performed a ramp incremental symptom-limited cardiopulmonary exercise test on a treadmill. Measured parameters included heart rate at rest (HR), at peak exercise (peak HR), ventilatory efficiency during exercise (VE/VCO₂ slope), peak oxygen uptake (VO₂p) and peak oxygen pulse (O₂-pulse = VO₂p/peak HR).

Results: Patients in group A had a significantly lower resting HR (77 ± 12 vs 88 ± 16, bpm, p = 0.003) and a significantly higher O₂-pulse (12.8 ± 3.9 vs 10.9 ± 3.5, ml/beat, p = 0.05) compared to group B. There was also a trend towards lower peak HR (142 ± 18 vs 150 ± 19, bpm, p = 0.1), lower VE/VCO₂ slope (28 ± 4 vs 29 ± 5, p = ns) and higher VO₂p (22.1 ± 5.9 vs 20.2 ± 6.1, ml/ kg/min, p = 0.2) compared to group B.

Conclusions: Patients with mild CHF on b-blockers achieve greater peak exercise O₂-pulse compared to those CHF patients who do not receive b-blockers. The results of our study suggest a significant beneficial effect of b-blockers on O₂-pulse, an indirect index of myocardial stroke volume in mild CHF patients.

**PP.40.303** NEUROTICISM PERSONALITY TRAIT, ANXIETY STATE AND SEVERITY OF DISEASE, INDEPENDENTLY PREDICT QUALITY OF LIFE IN PATIENTS WITH CHRONIC HEART FAILURE

L. Samartzis1, S. Dimopoulou1, E. Kaldara2, C. Manetos1, A. Ntalianis1, V. Agapitou1, S. Vakrou2, S. Gyftopoulos1, J. Terrovitis2, S. Nanas1

Hospital, University of Athens, Athens-Greece, 23rd Cardiology Department, Laiko Hospital, University of Athens, Athens-Greece

Objective: To investigate the relationship between Neuroticism, Anxiety state, Quality of Life and severity of disease in a Greek population of patients with heart failure.

Design and Method: Thirty-six consecutive CHF outpatients (30 males, body mass index = 28 ± 5 kg/m², LVEF ≤ 45%), were asked to answer the Greek version of the Neuroticism subscale of the Five-Factor Personality Inventory (NEO-FFI) and the State Anxiety subscale of the State Trait Anxiety Inventory (STAI), as a part of a thorough psychological and psychiatric clinical evaluation. QoL was assessed with the Greek version of the disease-specific Kansas City Cardiomyopathy Questionnaire (KCCQ). All patients underwent a symptom limited cardiopulmonary exercise testing on a cycle-ergometer. The ventilatory equivalent for the carbon dioxide output slope (VE/VCO₂ slope) was used as an index of disease severity. Multiple linear regression analysis was conducted to determine the best linear combination of Neuroticism trait, State Anxiety score and severity of disease scores, for predicting KCCQ Overall Summary Score.

Results: The final multivariate linear regression model (adjusted R² = 0.54, F = 13.50, p < 0.001) shows that VE/VCO₂ slope (β = -0.89, SE = 0.32, beta = -0.36, p < 0.05) as well as Neuroticism (β = -1.06, SE = 0.40, beta = -0.34, p < 0.05) and State Anxiety (β = -0.49, SE = 0.18, beta = -0.36, p < 0.05) are independent predictors of KCCQ Overall Summary Score.

Conclusions: QoL can be predicted by the disease severity and also by Neuroticism and Anxiety state in CHF patients. These factors should be considered in the assessment of patient health status, as well as in the design of treatment interventions and rehabilitation.

**PP.40.304** ECHOCARDIOGRAPHIC PARAMETERS IN PATIENTS WITH ARTERIAL HYPERTENSION AND DIASTOLIC HEART FAILURE

M. Tsvetara, D. Tsvetara. Tbilisi Medical Academy, Tbilisi-Georgia

The Aim: of this research was to study the changes of left and right ventricular function and structure in untreated patients with Arterial Hypertension (AH) and Diastolic Heart Failure (DHF).

Methods: We studied 138 untreated patients (57 men and 81 woman) with AH and DHF (I group) and 631 untreated patients with AH (332 men and 299 woman), with left ventricular diastolic dysfunction but without HF (II group). All patients examined by standard Echocardiography. LV diastolic function was studied by PW and Colour M-mode mitral flow Dopplerography and Pulsed Doppler Tissue imaging (DTI). Right ventricular (RV) diastolic function was studied by PW tricuspid flow Dopplerography and DTI. Mean pulmonary arterial pressure was estimated by pulmonary arterial flow acceleration time, tricuspid and pulmonary regurgitation velocities.

Results: The LV mass index, systolic and diastolic diameters and volumes, RV and left atrial dimension was significantly greater in I group (p < 0.001). Transmirtal E and E/A, tricuspid E, LV TDI E/A and RV Isometric Relaxation Time on RV TDI was significantly greater in I group. Pw on colour M mode Doppler, tricuspid E and E/A was greater in II group. Mitral A wave Duration, acceleration time of pulmonary arterial flow (PulAT) was lower and pulmonary artery systolic, diastolic and mean pressure was significantly higher in I group. The frequency of restrictive and pseudo normal filling pattern in I group was 14.5% and 18% and in II group – 0.6% and 7.8% respectively. 62.2% of patient in I gr, and 39.6% in II gr. have right ventricular diastolic dysfunction according to tricuspid Dopplerography: RV TDI did not show any significant differences between groups. LV restrictive filling pattern was highly specific sign of diastolic HF (specificity – 0.99), but it was insensitive (sensitivity – 0.145). PulAT < 0.91 has sensitivity 0.47 and specificity – 0.92 in diagnosis of diastolic HF in patients with AH.

Conclusion: There are prominent changes of left and right ventricular structure and parameters of diastolic function in patients with diastolic HF. LV restrictive filling pattern was highly specific but non sensitive sign of diastolic HF. RV TDI did not change significantly in diastolic HF. PulAT < 0.91 has sensitivity 0.47 and specificity – 0.92 in diagnosis of diastolic HF in patients with AH.

**PP.40.305** THE CONTROL OF BLOOD PRESSURE BY ABPM CAN REDUCE CONGESTIVE HEART FAILURE HOSPITAL READMISSION?


The aim: of our study was to assess if the control of blood pressure (BP) by ambulatory monitoring can reduce congestive heart failure hospital readmission.

Methods: 48 hypertensive subjects admitted with congestive heart failure were included. The clinic BP at admission was > 140/90 mmHg or prior antihypertensive treatment. For each patient we recorded demographic data, BP values, echocardiographic data. All patients received pharmacological treatment. The BP was apparently well controlled at baseline. After 6 and 12 months all patients underwent ambulatory BP monitoring (ABPM). We defined ambulatory hypertension as a mean 24h BP > 125/80 mmHg. After 12 months, we divided the subjects in 2 groups: I = 19 patients with well controlled BP and II = 29 patients with BP over limits, depending on BP values see table. The readmission in the 12 months of follow-up was statistically significant (26,3% vs. 27,5%). For the BP values see table. The readmission in the 12 months of follow-up was statistically significant (26,3% vs. 27,5%). The differences concerning the non-compliance at low-salted diet were not statistically significant (26.3% vs. 27.5%). For the BP values see table. The readmission in the 12 months of follow-up was statistically significant (26,3% vs. 27,5%). The differences concerning the non-compliance at low-salted diet were not statistically significant (26.3% vs. 27.5%). The differences concerning the non-compliance at low-salted diet were not statistically significant (26.3% vs. 27.5%).

Results: The readmission in the 12 months of follow-up was statistically significant (26,3% vs. 27,5%). For the BP values see table. The readmission in the 12 months of follow-up was statistically significant (26,3% vs. 27,5%). The differences concerning the non-compliance at low-salted diet were not statistically significant (26.3% vs. 27.5%). The differences concerning the non-compliance at low-salted diet were not statistically significant (26.3% vs. 27.5%). The differences concerning the non-compliance at low-salted diet were not statistically significant (26.3% vs. 27.5%). The differences concerning the non-compliance at low-salted diet were not statistically significant (26.3% vs. 27.5%).

Conclusion: Approximately 2/3 of our patients had BP over limits despite well controlled office BP. A well controlled BP values, evaluated by ambulatory monitoring, can reduce the readmission for congestive heart failure. We rec-
omnend that hypertensive subjects with HF symptoms should be periodically evaluated by ABPM.

**PP.40.306**  
**EFFECTS OF BETA-BLOCKERS ON PEROXIDE OXIDATION IN ISCHEMIC MODEL OF CONGESTIVE HEART FAILURE IN RATS**

D. Shashurin1, A. Piryazev1, O. Aizova1, O. Medvedev1, 1Moscow State University, School of Medicine, Moscow-Russia; 2Scientific-Research Institute of Physical-Chemical Medicine, Moscow-Russia

**Objective:** Studies showed that in addition to well-known hemodynamic-neuroendocrine mechanisms of congestive heart failure (CHF) significant role in its pathogenesis belongs to peroxide oxidation. It is especially important in ischemic CHF where it acts as primary factor damaging myocardium and initiating heart remodeling. This is confirmed by high efficacy of compounds with antioxidative activity in ischemic CHF treatment.

**The aim:** Of current research was to evaluate intensity of peroxide oxidation in rats with modeled ischemic CHF receiving treatment by two beta-adrenergic blockers, proxodolol and carvedilol. Proxodolol is novel Russian drug only recently approved for CHF treatment, its antioxidative activity was not studied earlier. Carvedilol is widely used in CHF treatment and has prominent antioxidative activity, so in this research it was used as comparator drug.

**Design and Method:** The study was conducted in rats with CHF modeled by permanent ligation of coronary artery. After surgery animals were divided into groups either treated by carvedilol or proxodolol either fake treated (control group), with 10 animals in each group. Additionally sham-operated group was formed. Carvedilol and proxodolol were administered i/p in 2 mg/kg doses each 12 hours for 28 days; control and sham groups were treated by 0.9% NaCl.

Intensity of peroxide oxidation was evaluated by plasma concentrations of malondialdehyde ([MDA]ox) measured photometrically after treating samples with thiobarbituric acid. Blood samples were collected before surgery and after end of treatment. In addition to measurement of native MDA concentrations blood samples were treated by fixed Fe²⁺-dose and relative increase of [MDA]ox ([MDA]ox) was calculated. Finally for all parameters relative changes between baseline and end of treatment were evaluated (d[MDA], d[MDA]ox). Statistical analysis was performed with two-tailed t-test. Animals with low size of infarct zones or signs of post-surgical infections were excluded.

**Results:** In all groups d[MDA]ox > 1 was observed, but due to absence of statistically significant differences between groups it was considered result of surgical intervention but not of CHF or administration of beta-blockers. ([MDA]ox after end of treatment was higher in control and proxodolol groups than in sham and carvedirol groups (p < 0.05 in control vs. sham and carvedirol, trend in proxodolol vs. sham and carvedirol). This result confirmed that CHF leads to increase of peroxide oxidation, carvedilol decreases its intensity but proxodolol doesn’t.

**PP.40.307**  
**EFFECTS OF TESTOSTERONE ON CARIDAC FUNCTION IN PHYSICALLY ACTIVE RATS**

J. Klimas, P. Krenka, G. Doka, J. Kyselov, Faculty of Pharmacy, Comenius University, Bratislava-Slovak Republic

**Introduction:** The effects of long-term treatment with testosterone on cardiac function are controversial. Recently, some studies suggested a significant benefit of testosterone therapy on symptoms of heart failure in man. Others showed that testosterone might be involved in Signal Transducer and Activator of Transcription 3 (STAT3) pathway what might be cardioprotective. We tested the effects of testosterone, alone or in combination with voluntary physical activity, on cardiovascular function and STAT3 expression in rats.

**Methods:** Testosterone isobutyrat (100 mg/kg, s.c.) was administered weekly in sedentary or physically active Wistar rats. Physical activity was provided by voluntary free-wheel running during eight weeks. Intraperitoneal and diastolic blood pressures (SBP and DBP) were measured in a carotid and left ventricular pressure (LVP), rate of contraction (dP/dtmax) and relaxation (dP/dtmin) were determined using left ventricular catheterization under trichromo-ethanol anaesthesia.

**PP.40.309**  
**HEART FAILURE CONTROL AND POSTURAL BLOOD PRESSURE CHANGES IN HEART FAILURE PATIENTS**

B. Wizer1, M. Fedý-Łukasik1, W. Musiał1, J. Górski1, T. Rywik1, T. Grodzicki1, 1Jagiellonian University Medical College, Krakow-Poland, 2Medical, University Białystok, Białystok-Poland, 3Medical University Gdynia, Gdynia-Poland, 4Medical University Warszaw, Warszaw-Poland

**Objective:** The aim of the analysis was to evaluate of blood pressure (BP) control and postural changes in hypertensive (HT) patients with diagnosed heart failure (HF).

**Design and Method:** The multicenter prospective study has been conducted in several polish heart failure outpatient clinics, as a part of The National Project of Prevention and Treatment of Cardiovascular Disease in Poland, POLKARD (2007-09). The medical data of HF patients were obtained from standardized interview or medical records, laboratory tests; anthropometric and BP measurements were obtained by trained nurses in sitting position, at appropriate arm. Moreover, orthostatic BP changes were measured at 1st and 3rd minute
of standing. The analysis presents the baseline data of HF patients with history of HT. Statistical analysis performed using SAS 9.2.

Results: Of 403 HF patients included to the study, 215 with previously diagnosed HT and completed BP data were involved to the presented analysis. Mean (± SD) of age, office systolic/diastolic BPs, and left ventricular ejection fraction were respectively: 68 ± 9yrs (ranged: 46-94yrs); 31 ± 19/80 ± 12mmHg, and 34 ± 10%. Of the studied patients, 73% were men; 96% in NYHA class I to III; 92% had coronary artery disease and 65% of them had myocardial infarction history. Diabetes and chronic renal insufficiency have previously defined 33% and 25%, respectively. ACE-inhibitors (or ARB), β-blockers, diuretics, spironolacton, digitalis, and statins were taken by respectively: 33% (or 7%), 76%, 64%, and 60.03 ± 6.41 years, III FC - in 20 patients, mean age 62.64 ± 6.72 years, II FC - in 24 patients, mean age 61.53 ± 5.67 years, IV FC - in 20 patients, mean age 65.65 ± 6.73 years. The control group (healthy, etc.) amounted to 20 people, average age 61.53 ± 6.67 years. The groups were matched by the number, age of patients, the ratio of men and women. All patients underwent clinical and laboratory examination, echocardiography at rest, echocardiography, a study of heart rate variability. Patients with IHD as compared with the control group showed a significant decrease in LFn, all temporal parameters of HRV, except for index pNN50. Patients FC II compared with the control group had significantly (p < 0.05) decrease of all time, metrics LFn. Compared with the group of patients with FC I found significant (p < 0.05) decline in SDNN and SDNNI. In patients with FC III was significant (p < 0.05) decrease of all HRV parameters compared with the control group and the group I patients FC. Compared with the group of patients with FC II statistically significant (p < 0.05) decrease in SDNN and SDNNI. The patients in FC IV noted the most marked reduction of HRV time, LFn, HFn, which was significantly (p < 0.05) differed with those of patients in groups I - II FC and the control group. Statistically significant (p < 0.05) increase in LF / HF compared with the groups of patients I - II FC and the control group. The patient groups III and IV CHF was significantly (p < 0.05) differed in indices SDNN, SDANN, SDNNI, rMSSD. Analysis of intracardiac hemodynamics in patients with IHD and CHF of different functional classes suggests that the development and progression of heart failure leading role are the structural changes emerging in the process of left ventricular remodeling. Revealed a strong correlation time heart rate variability in CHF FC, the most pronounced - in indicator of the standard deviation of all analyzed RR intervals (SDNN) (r = - 0.82; p < 0.001).

PP.40.311 CHANGES OF PARAMETERS OF COAGULATION IN PATIENTS WITH HEART FAILURE TREATED WITH FILTRATION PLASMAPHERESIS

L. Simonyan1, Lu. Simonyan2, L. Khachatryan1. 1Yerevan State Medical University, Yerevan-Armenia, 2Center of Hematology, Yerevan-Armenia

Background: Heart failure is the most frequent complication of all organic illnesses. It is characterized by a shortness, weakness, headache, dizziness, oedema, increase of arterial pressure. The important pathogenetic factors are hemorheological disorders and circulation. Plasmapheresis is the removal, treatment, and return of (components of) blood plasma from blood circulation.

Aims: Research influence filtration plasmapheresis on the clinical feature and level of changes of fibrin and trombocytes agregation in the patients with HF.

Methods: Was investigated 30 patients HF who were treated by using medication and filtration plasmapheresis. 15 patients were treated only with medication. During plasmapheresis, blood is initially taken out of the body through a needle or previously implanted catheter.

Results: HF is characterized by the changes of level of fibrinogen and trombocytes agregation. It patients level of fibrinogen was increased until 5.7 ± 0.7 (standard is 3.0 ± 0.07) and trombocytes agregation 26.5 ± 1.4 (standard is 19.0 ± 0.3). In 46% patients with HF develop shortness, 76% oedema, 55% increase of arterial pressure. Has been seen normalization level of fibrinogen and trombocytes agregation and clinical feature after treatment with use filtration plasmapheresis. The level of fibrinogen at patients of HF gets to 3.2 ± 0.3 and trombocytes agregation 19.8 ± 0.2. Patients who were treated only with medication were observed changes of level of fibrinogen and trombocytes agregation, but they did not get to the normal (4.5 ± 0.6 and 21.1 ± 0.2).

Conclusion: Treatment of HF with use filtration plasmapheresis leads to normalizes level of fibrinogen and trombocytes agregation and clinical feature. Plasmapheresis can be used for treatment patients with HF.
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HAEMODYNAMICS

**PP.41.312**

**INTENSIFIED ANTIHYPERTENSIVE TREATMENT FOR 6 MONTHS DOES NOT IMPROVE EJECTION FRACTION OR VENTRICULO-VASCULAR COUPLING IN PATIENTS WITH TYPE-II-DIABETES AND HYPERTENSION**

T.K. Sonder, J. Lambrechtsen, J. Hangaard, K. Egstrup. University Hospital of Odense, Svendborg-Denmark

**Objective:** To examine whether intensive treatment of hypertension in patients with type-II diabetes mellitus improves ejection fraction and ventriculo-vascular coupling.

**Methods:** We included 64 patients from a diabetes out-patient clinic. Patients were characterized as having controlled (CH), uncontrolled (UH) or resistant hypertension (RH) on basis of ambulatory blood pressure measurements. We performed cardiac ultrasound and pulse wave analysis according to guidelines and data were analyzed blinded online in Echopac and customized software. Ventriculo-vascular coupling was estimated using the formula EA/ELV and ejection fraction was estimated using Simpson biplane method.

**Results:** Only 6.9% had normal left ventricular geometry. 37.9% had concentric hypertrophy, 13.8% had eccentric hypertrophy and 41.4% had other remodeling. EA and ELV decreased significantly in both patients with UH and RH and EA/ELV increased. EF decreased in patients with UH and RH. Diastolic function was unchanged in all groups.

**Discussion and Conclusion:** We investigated whether the changes in EA/ELV and EF were results of different use of medication and we found, that treatment with diuretics and ARBs increases EA (P = 0.06 and P = 0.02) and decrease ELV (P < 0.001 and P = 0.002) and as such increase EA/ELV (P = 0.02 and P = 0.23). We also found a reduced EF in patients treated with diuretics and ARBs (P = 0.001 and P = 0.17). Of the 28 patients treated with ARBs, 21 were also treated with diuretics. Significantly more patients were treated with diuretics after six months than at baseline (62.5% as opposed to 84.4%, P = 0.004).

The increased use of diuretics in the antihypertensive treatment could explain the decrease in EA (afterload is reduced) and the decrease in EA/ELV and EF (preload is reduced too much and too fast for the non-compliant (hypertrophic) ventricle to cope). However the decrease in ELV reflecting contractility of the left ventricle is not load dependent and as such a reduction in preload should not cause a decrease in ELV. The dilation of the left ventricle is more likely to cause the decrease in ELV. We have no good explanation for the dilation of the left ventricle but maybe the damage to the cardiovascular system in this group of patients is so substantial that progression to end stage heart failure is inevitable. In contrast to our expectations we found that EF and ventriculo-vascular coupling worsened despite intensive antihypertensive treatment.

<table>
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**PP.41.313**

**DIFFERENCES IN POSTPRANDIAL HEMODYNAMIC RESPONSE ON A HIGH PROTEIN VERSUS A HIGH CARBOHYDRATE DIET**

J. Dopheide1 J.M. Geleijnse2 S.J.L. Bakker1 E.J. Brink1 M.A. Van Baak3 On Behalf of Top Institute Food and Nutrition, Wageningen. 1Maastricht University, Maastricht-the Netherlands, 2Wageningen University, Wageningen-the Netherlands, 3University Medical Center Groningen, Groningen-the Netherlands. *Two Quality of Life, Zeist-The Netherlands

**Objective:** Several intervention trials have shown that diet composition affects blood pressure (BP). In this study we focused on postprandial hemodynamic changes on a high carbohydrate versus a high protein diet.

**Design and Method:** In this randomized double-blind parallel group study, 53 adult untreated overweight subjects with mildly elevated BP (BMI 25-35 kg/m2, BP > 130/85 and < 160/100 mm Hg) were included. After a 2-week run-in period on a weight-maintaining standardized diet (15 en% protein (P), 30 en% fat (F) and 55 en% carbohydrate (C)), subjects were randomized to a high P or a high C diet for 4 weeks. On the high C diet 60 g of C of the run-in diet was replaced by 3x20 g of maltodextrin supplements, on the high P diet 60 g of C was replaced by 3x20 g of a protein supplement (mixture of 20% pea, 20% soy, 30% egg and 30% milk protein isolate). Supplements were matched for Na, P, K, Ca and Mg content and taken with each meal. Postprandial hemodynamic responses to the diets were determined on day 1 and day 28 of supplement use over 4 hours after meal ingestion. Differences in the postprandial responses between groups were analyzed by ANCOVA with baseline fasting values as covariate.

**Results:** On day 1, postprandial mean arterial pressure (MAP) and total peripheral resistance (TPR) were lower in the C than in the P group (-2.6 mm Hg (95% CI -5.1, -0.2), p = 0.04 and -0.8 mm Hg/(mL/min) (95% CI -1.8, -0.2), p = 0.12, whereas cardiac output (CO) response did not differ between diets (-0.4 mL/min (95% CI -0.6, 0.4), p = 0.61). In contrast, after 4 weeks CO response was higher in the C than in the P group (+ 0.6 mL/min (95% CI 1.0, + 0.2), p = 0.007), TPR remained lower in the C than in the P group (-1.2 mm Hg/(mL/min) (95% CI -2.1, -0.2), p = 0.017), while no significant differences were found in MAP response (+ 0.6 mm Hg (95% CI 3.2, + 1.9), p = 0.61).
Conclusions: The results of the study show that the acute postprandial cardiac output response to a maltodextrin-supplemented mixed meal increases during a 4-week maltodextrin-supplemented diet, whereas the acute response to a protein-supplemented mixed meal does not change during a 4-week protein-supplemented diet. Thus, the difference in acute postprandial blood pressure fall after a maltodextrin-supplemented compared to a protein-supplemented mixed meal disappears with continued supplementation.

Introduction: Pulse wave velocity (PWV) has become a well-accepted surrogate measure of arterial stiffness and has been shown to be a significant predictor of cardiovascular risk in diseased and older healthy populations. We suggest a novel and accurate method for measure of PWV.

Method: PWV is calculated from pulse transit time (PTT) using 2 separate pulse recordings over a known distance. 8F sheaths were introduced in the right femoral arteries and routine coronary angiography were performed with 5F diagnostic catheters. Ascending aorta pressures were measured with right diagnostic catheter tip in the ascending aorta and synchronous femoral arterial pressures were measured with sheath in the femoral artery. Distance between the two pressure sites calculated (Total right diagnostic catheter length – Length of the catheter outside the patient = Sheath length). PWV was calculated as the distance between the two measuring sites divided by the PTT.

Results: We evaluated the PWV measured by the catheter method in 24 subjects of both sexes (40 to 76 years of age; 107 to 197 mm Hg aortic systolic and 53 to 95 mm Hg aortic diastolic pressure). Pearson Correlation Analysis between aortic PWV and clinical parameters (age, sex, weight, height, smoking, coronary artery disease, hypertension, diabetes mellitus, hyperlipidemia, ascending aorta and femoral arterial blood pressures and pulse pressures, heart rate) showed that PWV correlated positively and independently with age (p = 0.004), coronary artery disease (p = 0.04), ascending aorta systolic pressure (p = 0.006), femoral artery systolic pressure (p = 0.008), ascending aorta pulse pressure (p = 0.003) and femoral artery pulse pressure (p = 0.04).

Conclusions: We suggest a novel and accurate but invasive method for measure of PWV as ascending aorta-femoral artery. Similar results were obtained in carotid-femoral pulse wave velocity measurements.

Objective: Left ventricle (LV) myocardial wall stress (WS), a component of cardiac afterload and contractility index, is directly proportional to the radius of the LV cavity and inversely proportional to parietal thickness. WS is necessary for contractility, yet it increases O2 demand. The aim of this study is to establish the importance of LV peak WS (PWS) and LV systolic WS (SWS) in hypertensive patients (pts) with a Myocardial Infarction (MI).

Design and Method: 796 consecutive Pts with a MI (age 68.77, 63.2% males, 45.3% with STEMI). Variables: analytical study at admission, transthoracic echocardiogram, maximum troponin I, coronaryography, risk scores; LV PWS and SWS calculated with known formulas. Pts followed for 2 years to detect endpoints: mortality, reinfarction, hospitalization for heart failure (HHF). Intra-hospital (IH) and 2 year prognostic value of LV PWS and SWS calculated with known formulas. Pts followed for 2 years for detection of endpoints: mortality, reinfarction, hospitalization for heart failure (HHF). Intra-hospital (IH) and 2 year prognostic value of LV PWS and SWS investigated both in hypertensive and non-hypertensive pts.

Results: Hypertensive pts had higher LV PWS (194.8 ± 182.2*10^13 dynes/cm², p = 0.056) and LV SWS (3348.2 ± 3129.1 dynes/cm², p < 0.001). These latter measurements correlated negatively with the GRACE score for IH mortality (r = -0.238, p < 0.001 for LV PWS; and r = -0.204, p < 0.001 for LV SWS) but only LV PWS helped predict IH mortality risk [LV PWS > 190*10^13 dynes/cm² associated with decreased IH mortality risk (1.1% vs. 7.7%, OR 0.130, p = 0.002)]. None of these parameters helped predict cardiovascular risk at 2 years in hypertensive pts. In non-hypertensive pts, only LV PWS correlated (weakly) with the GRACE score (r = -0.191, p = 0.045) but none helped predict IH and 2 year mortality risk (LV PWS and LV SWS were non-significantly higher in pts who died in the first days after admission).

Objective: Isolated diastolic hypertension is the most common form of hypertension in young adults. Recently it has been proposed to belong to a larger group of patients with narrow pulse pressure (lower than 45 mmHg), including about a third of systo-diastolic hypertension, called predominantly diastolic hypertension (PDIH). Increased peripheral vascular resistance (PVR) is considered the main hypertensive mechanism in these patients. However young patients are usually described as hyperdynamic or hyperkinetic with a high CI and a low PVR. We therefore studied the hemodynamic characteristics of PDIH patients that have not been described previously.

Design and Method: Ambulatory blood pressure monitoring (ABPM) and impedance cardiography were used to evaluate systemic circulation.
noninvasively in 177 non-medicated patients referred to our hypertension unit. Heart rate (HR), stroke volume (SV), cardiac index (CI) and PVR were obtained after 10 min of supine rest and then in the upright position. We selected 102 patients under the age of 50, and considered those with a pulse pressure of < 45 mmHg on daytime ABPM (n = 46) as PDH patients. These patients were divided as those with CI greater than 3.6 L/min/m², considered the hyperdynamic group (H) as per previous reports, and those with < 3.6 as the normodynamic group (N).

Results: 19 and 27 patients were included in the H and N groups, respectively. There were no significant differences in age, sex, BMI, height, HR, 24 hour, diurnal, and nocturnal ABP values were similar (diurnal: H = 134.5 ± 5.9/2.1 ± 5 vs N = 136.1 ± 6/94.7 ± 7 mmHg; p = 0.54). The H group had lower PVR than N (1083 ± 218 vs 1458 ± 267 dyn. cm⁻²; p < 0.01)). Increased SV determined the greater CI observed in the H group (103 ± 20 vs 81 ± 18 ml respectively [p < 0.01]). These results remained the same when corrected for body surface area. In the upright position, SV decreased H = 50 ± 17 vs. N = 34.6 ± 16 ml (p < 0.01) abolishing supine SV difference (53 ± 11 vs 47 ± 11 ml; [p = 0.97]). Also PVR rose H = 838 ± 265 vs N = 730 ± 418 dyn. seg.cm⁻² (p = 0.97).

Conclusions: PDH patients are a heterogeneous group regarding their systemic hemodynamic pattern. This study describes a novel hyperdynamic subgroup with increased SV and elevated PVR that shares some, but not all features of hypokinetic patients. In the group with supine to upright position, demonstrates that compensatory mechanisms for SV are preserved.

**Abstracts e527**

**PP.RI.310**

**TRANSTHORACIC DOPPLER ECOCARDIOGRAPHY AND RIGHT HEART CATHETERIZATION IN THE ASSESSMENT OF SYSTOLIC PULMONARY ARTERY PRESSURE IN PATIENTS WITH IDIOPATHIC PULMONARY ARTERIAL HYPERTENSION**


**Russian Research Cardiology Complex, Moscow-Russia**

The aim: To compare the levels of systolic pulmonary artery pressure (SPAP) by echocardiography vs Right heart catheterization (RHC) of patient with idiopathic pulmonary hypertension (IPH).

Materials and Methods: In the study we included 30 patients (25 females and 5 males) with IPH aged 21-52 (mean age 37 ± 9.9 years). The estimation of tricuspid regurgitation gradient was based on measurement of peak tricuspid regurgitation velocity. Right atrial pressure was estimated in accordance with respiratory variation of inferior vena cava diameter. SPAP = tricuspid regurgitation pressure gradient + estimated right atrial pressure.

Results: In pts with IPH (functional class II-IV, WHO) we estimated tricuspid regurgitation gradient. The mean value was 77 ± 18mmHg. Taking into account right atrial pressure levels mean SPAP was 86 ± 19,4mmHg by Transthoracic Doppler Echocardiography. According to Right heart catheterization data mean SPAP was 87 ± 24.3mmHg. We found a positive correlation between SPAP assessed by Transthoracic Doppler Echocardiography and RHC (0.9096).

Conclusion: Transthoracic Doppler Echocardiography provided correct measurements of SPAP as compared with RHC and might be used as screening method in patients with IPH.

**PP.RI.319**

**THE CORRELATION BETWEEN ARTERIAL STIFFNESS AND THE CHANGES OF BLOOD PRESSURE AND PULSE WAVE VELOCITY BY ACUTE BLOOD PRESSURE REDUCTION: A STUDY USING BRACHIAL-ANKLE PULSE WAVE VELOCITY AND SUBLUNGBLADAR ADMINISTRATION OF NITROGLYCERIN**

J.K. Park¹, J.H. Shin², S.H. Kim³, Y.H. Lim¹, J.H. Shin¹, J.U. Lee¹, K.S. Kim¹, S.K. Kim², J.H. Kim¹, H.K. Lim¹, ¹Hanyang University Medical Center, Seoul-South Korea, ²Hanyang University Guri Hospital, Guri-South Korea

Objective: Arterial stiffness inversely means arterial distensibility. It can be noninvasively measured by pulse wave velocity (PWV). If artery is stiffer, the change of blood pressure (BP) by sublingual administration of nitroglycerin (NTG) would be higher. The aim of the study is to know the correlation between arterial stiffness and the change of BP and PWV by acute blood pressure reduction using brachial-ankle pulse wave velocity (baPWV) and sublingual administration of nitroglycerin.

Design and Method: Seventy consecutive patients (42 male) with risk factor of coronary artery disease, admitted to Hanyang University Medical Center between July 2010 and September 2010, were included. We measured the changes of BP and baPWV before and after the administration of sublingual nitroglycerin (NTG) and analyzed the correlation between initial baPWV and the change of hemodynamic data.

Results: After administration of sublingual NTG, BP, heart rate and PWV were significantly changed (ASBP, ΔMBP, ΔDBP, ΔHR, and ΔbaPWV, 8.49 +/− 7.12, 9.18 +/− 6.63, 7.75 +/− 5.65mmHg, 4.79 +/− 5.27beats/min and 256.94 +/− 156.58cm/sec, respectively, p < 0.001). But, PP was not decreased (ΔPP = 0.74 +/− 5.99mmHg; p = 0.305). The initial baPWV was negatively correlated with ASBP, ΔMBP and ΔbaPWV when adjusted for age (adjusted r = 0.240, -0.314 and -0.626, p < 0.05; p < 0.01 and p < 0.001, respectively), but not with ΔDBP, ΔPP and ΔHR (adjusted r = -0.149, -0.163 and -0.173, p = 0.221, 0.180 and 0.156, respectively).

Conclusions: In patient with stiffer artery, in other word, in patient with lower arterial distensibility, the change of BP (SBP and MBP) and PWV is higher by acute BP reduction.
cardio-vascular diseases in a case group were compared with those of 48 hypertensives without BP falls in a control group, who were matched for mean SBP-24, age and gender.

**Results and conclusions:** We detected 63 short-time BP falls (in average 0.9% per day) in 48 (18.5%) AH patients, which formed a case group. Mean minimal SBP was 84.0±(80-88) and DBP – 49.0±(44-55) mmHg. HR corresponding to minimal SBP was 58.0(54-65) min⁻¹. Minimal SBP and DBP values positively correlated with SBP-24 and DBP-24 (both r = ±0.37), but were not related to age, gender, AH duration, class of antihypertensive agent and BP variability. We revealed two time intervals of most frequent BP sponding to minimal SBP was 58.0(54-65) min⁻¹. Minimal SBP and DBP – 84.0(80-88) and DBP – 49.0(44-55) mmHg, HR correlated with systolic blood pressure with a delay of about 20 min. We revealed that systolic and diastolic blood pressure with a delay of about 30 min. Conclusion: The rhythm of BP was associated with a rhythm of heart rate and body temperature.

**RESULTS:**

**METHODS:**

We included into the study 315 patients with CAD and PIC before CABG operation. All patients before the operation underwent EchoCG with mitral annulus tissue Doppler imaging and thoracic and abdominal multisliced computed tomography (MSCT) with heart chambers and coronary arteries contrast.

**RESULTS:**

In 214 (67.9%) patients according to MSCT data NAFLD was diagnosed. Of them, in 78 (24.8%) according to biochemical liver damage markers steatohepatitis was diagnosed, while in 136 (43.1%) – steatosis. In 50 (64.1%) patients with steatohepatitis DM type 2 was found, while in 28 (35.9%) – metabolic syndrome (MS). In patients with steatohepatitis DM type 2 was found in 58 (27.9%) patients, while MS – in 78 (37.4%) patients. In patients with comorbid steatohepatitis no DM or MS were found. Left chambers remodelling, central hemodynamics and LV myocardial function in the patients with NAFLD didn’t significantly differ between the groups. In the patients with NAFLD compared to patients with PIC without liver damage showed significantly more impaired contractile function, left chambers remodelling, higher LVMI (148.6±12.4 and 146±12.1, ð<0.0001) and larger RV transverse diameter (20.4±8.4, ð<0.0001) and longitudinal contractility according to mean systolic mitral annulus velocity (6.4±2.2 and 6.8±2.5, ð<0.0001) and larger RV transverse diameter (38.2±4.4 and 39.8±0.3, ð<0.0001).}

**CENTRAL HEMODYNAMICS, MYOCARDIAL FUNCTION AND LEFT HEART CHAMBERS REMODELING IN THE PATIENTS WITH POSTINFARCTION CARDIOSCLEROSIS AND NON-ALCOHOLIC FATTY LIVER DISEASE

M. Dolžhenko1, A. Bazylevich1, S. Potashev1, 1Shupyk’s National Medical University of Postgraduate Education, Kiev-Ukraine, 2Danylo Galytskogo National Medical University, Lviv-Ukraine, 3Shupyk’s National Medical Academy of Postgraduate Education, Kiev-Ukraine

**Objective:** to study potential influence of NAFLD upon central hemodynamics, myocardial function and left heart chambers remodeling in the patients with postinfarction cardiosclerosis and non-alcoholic fatty liver disease.

**Methods:** We included into the study 315 patients with CAD and PIC before CABG operation. All patients before the operation underwent EchoCG with mitral annulus tissue Doppler imaging and thoracic and abdominal multisliced computed tomography (MSCT) with heart chambers and coronary arteries contrast.

**Results:** In 214 (67.9%) patients according to MSCT data NAFLD was diagnosed. Of them, in 78 (24.8%) according to biochemical liver damage markers steatohepatitis was diagnosed, while in 136 (43.1%) – steatosis. In 50 (64.1%) patients with steatohepatitis DM type 2 was found, while in 28 (35.9%) – metabolic syndrome (MS). In patients with steatohepatitis DM type 2 was found in 58 (27.9%) patients, while MS – in 78 (37.4%) patients. In patients with comorbid steatohepatitis no DM or MS were found. Left chambers remodelling, central hemodynamics and LV myocardial function in the patients with NAFLD didn’t significantly differ between the groups. In the patients with NAFLD compared to patients with PIC without liver damage showed significantly more impaired contractile function, left chambers remodelling, higher LVMI (148.6±12.4 and 146±12.1, ð<0.0001) and larger RV transverse diameter (20.4±8.4, ð<0.0001) and longitudinal contractility according to mean systolic mitral annulus velocity (6.4±2.2 and 6.8±2.5, ð<0.0001) and larger RV transverse diameter (38.2±4.4 and 39.8±0.3, ð<0.0001).
Abstracts

**PP.41.326**

**THE EFFECT OF COLD PRESSOR TEST UPON ARTERIAL STIFFNESS IN HYPERTENSIVE PATIENTS WITH OR WITHOUT OTHER CARDIOVASCULAR RISK FACTORS**

K. Keramida1, E. Karpanou2, G. Vyssoulis3. 1Cardiology Clinic, Thriasio Hospital, Athens-Greece, 216 Cardiology Clinic, Onassis Cardiac Surgery Center, Athens-Greece, 3Hypertension Unit, 16 Cardiology Clinic Athens University, Hippokration Hospital, Athens-Greece

The purpose of this study was to determine whether and how cold pressor test (CPT) can acutely affect the reactivity of arteries in patients with arterial hypertension (AH) with or without other cardiovascular risk factors, such as metabolic syndrome (MS) and diabetes mellitus type 2 (DM2). The study sample comprised 102 hypertensive patients, who were divided in 3 groups: Group 1: 32 patients with AH, Group 2: 38 patients with AH and DM2, Group 3: 32 patients with AH and MS. All patients underwent assessment of arterial stiffness by using carotid-femoral pulse wave velocity (PWVc-f) before and during CPT. In the total sample, one-way ANOVA showed that CPT numerically increased PWVc-f (%dPWVc-f 3.47 ± 20.05, p > 0.05) and systolic blood pressure (%dBP 0.02 ± 10.92, p > 0.05), while it decreased diastolic blood pressure (%dDBP -0.13 ± 10.97, p > 0.05) and heart rate (%dHR -3.32 ± 10.41, p > 0.05), but none of these changes was statistically significant. When the three groups were examined separately, PWVc-f increased in all three groups (group 1: 4.33 ± 20.15, group 2: 3.38 ± 20.68, group 3: 2.74 ± 19.79, p > 0.05), SBP increased in group 1 (2.41 ± 10.35, p > 0.05), while it decreased in the other two groups (group 2: -0.59 ± 11.86, group 3: -1.62 ± 10.19, p > 0.05), DBP increased in group 1 (0.34 ± 8.80, p > 0.05) and in group 3 (0.26 ± 11.22, p > 0.05), while it decreased in group 2 (-0.86 ± 12.54, p > 0.05) and HR decreased in all groups, but again none of these changes was statistically significant. This study shows that cardiovascular reactivity of hypertensive patients to CPT seems not to be modified by the coexistence of MS or DM2 with AH.

**PP.41.326**

**CENTRAL AORTIC PRESSURE ESTIMATED BY RADIAL APPLANATION TONOMETRY IN HYPERTENSIVE PULMONARY OEDema**

O. Istratouie, R. Mustafa. Cardiology Center Craiova, Craiova-Romania

**Background:** radial applanation tonometry can do an accurate, noninvasive estimation of central aortic pressure profile and variables like central pulse pressure, aortic augmentation index are closely related to the presence of left ventricular hypertrophy, diastolic dysfunction, heart failure and mortality in hypertensive patients. The aim of the study was to determine central aortic pressure profile and its prognostic value in hypertensive pulmonary oedema.

**Methods:** 30 patients in group A, aged 40-80 years, diagnosed with hypertensive pulmonary oedema were included in our study. A standard transthoracic echocardiogram was performed for left ventricular EF, myocardial mass, diastolic function and we performed radial applanation tonometry; we measured the same parameters in 30 normal (group B) subjects of similar age.

**Results:** mean age in group A is 54.5 years, 17 (56.6%) males and 13 (43.3%) females 3 pts (10%) had diabetes mellitus, 6pts (20%) had abnormal fasting glycemia, 12pts (40%) had BMI > 30kg/m², 8pts (26.66%) had GFR < 60 ml/min m²

**Conclusion:** 1. a higher aortic augmentation index, aortic augmentation pressure and a shorter ejection duration are found in hypertensive pts with pulmonary oedema: 2. a shorter ejection duration correlates with the presence of diastolic dysfunction in pts with hypertensive pulmonary oedema 3. aortic augmentation index and left ventricle myocardial mass correlate in pts with hypertensive pulmonary oedema 4. central aortic pressure profile may become a marker of prognosis for hypertensive pulmonary oedema as it indicates the presence of left ventricular remodelling.
HYPERTENSIVE WOMEN ARE CHARACTERIZED BY POOR QUALITY OF LIFE COMPARED TO HYPERTENSIVE MEN

V. Katsi, G. Soureitis, J. Orestis, J. Vlasseros, C. Benekos, M. Divani, D. Barlagianmis, N. Alexopoulos, C. Vlachopoulos. Hippokration Hospital, Athens-Greece

Background: Females and the elderly, demonstrate low scores of health-related quality of life (H-RQoL) as far as coronary artery disease is concerned. We assessed the hypothesis that age and gender have an influence on H-RQoL in the context of essential hypertension (EH).

Methods: We studied 154 subjects with untreated uncomplicated stage I-II of essential hypertension (EH). Assessment of SF-36 scores among male and female hypertensives

Results: Females scored significantly lower in the physical functioning dimension when compared to men (Table). This decline in the female group is negatively correlated to age (r = -0.328, p = 0.002).

Conclusions: Older women may represent a more vulnerable group of hypertensives, as far as their physical functional capacity is concerned. Quality of life has hitherto been underestimated but should be more intensively considered in parallel to hypertension control.

Comparison of SF-36 scores among male and female hypertensives

<table>
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<th>SF-36 SCALES</th>
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<th>FEMALE (n = 76)</th>
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<td>TOTAL SF-36 SCORE</td>
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</table>

SECONDARY HYPERTENSION ASSOCIATED WITH RENAL ARTERY STENOSIS: STUDY POST-ANGIoplasty

M.I. Povedo-Garcia, M.A. Esteban-Moreno, P.J. Gonzalez-Martinez, M.D. Del Pino Y. Pino. Torrecadenas Hospital, Almeria-Spain

Purpose: The atherosclerotic renal artery stenosis is a recognized cause of renal failure and secondary hypertension. In the last decade, significant advances in terms of image test, medical treatment and renal revascularization techniques have substantially changed the landscape renovascular disease scene. We analyze the clinical characteristics and treatment in a cohort of patients diagnosed with renovascular hypertension defined as a systemic hypertension resulting from a renal artery affection, often due to occlusive lesions in the main renal arteries, which underwent arteriography + / - percutaneous transluminal angioplasty.

Materials and Methods: Retrospective study in patients admitted with suspected renovascular hypertension from January 2000 to October 2010, whom were subjected to diagnostic arteriography. We analyzed the extent of stenosis and the indication of percutaneous transluminal angioplasty with stent implanting. After that, we studied the control of blood pressure in our patients and the necessity for reduction/elimination of antihypertensive drugs.

Results: Angiography was performed in the renal artery in 52 patients, 47% (25 patients) had no significant stenosis (< 70%) and 53% (27 patients) had significant stenosis (> 70%). We analyzed the location of stenosis: • In patients with < 70% stenosis: 16 patients had left renal artery stenosis (64%), 3 patients with right renal artery (12%) and 6 patients bilateral stenosis (24%) • In patients with > 70% stenosis: 18 patients had left renal artery stenosis (67%) and 9 patients with bilateral stenosis (33%). Stent implantation was performed in 88% (23 patients) of cases of significant stenosis > 70%. Necessity for antihypertensive drug treatment after surgery, with a statistically significant average reduction of 1.3 drugs (p = 0.005). 12 out of 23 patients whom underwent renal artery revascularization surgery (uni or bilateral), 53% continued to required hypertension treatment after revascularization.

Conclusions: The percutaneous transluminal angioplasty with stent implantation showed no significant improvement in reduction of antihypertensive treatment. Failure in clinical response to revascularization, should be search not only in technical causes, but in patient selection, accurate diagnosis and renal parenchymal damage.

IS MICROALBUMINURIA RELATED TO CAROTID ABNORMALITIES IN ELDERLY SUBJECTS?


Purpose: To assess the relationship between carotid artery wall morphology and microalbuminuria and to identify potentially implicated factors.

Methods: 47 patients > 65 years old (35 women, 73 ± 1 years and 12 men, 76 ± 2 years) underwent a 24 h ambulatory blood pressure (BP) monitoring. Carotid doppler ultrasound scan and a complete clinical evaluation were performed. Pulse wave velocity (PWV) was obtained from carotid and femoral arteries’ digitized BP values. Carotid damage was evidenced by the presence of intima-media complex thickening (IMT) and/or parietal plaques. Morning surge (MS); mean systolic BP of the 2 h after awakening minus mean systolic BP of the 1 h-night interval showing the lowest sleep systolic BP (Kario). Blood levels of triglycerides (TG), glucose, cholesterol (total and HDL and LDL fractions) were determined.

Statistics: zero order bivariate associations and partial correlations, after removing the effect of one or more variables, were performed in order to identify potentially relevant or confounding factors (alternative Pearson/ product-moment correlation).

Results: (I). The degree of carotid damage was directly associated with microalbuminuria (R = 0.36, p < 0.03; R² = 0.13, 13% of reciprocal variation explained) and age (R = 0.42, p < 0.003). Age explained 18% of variation in carotid damage (R² = 0.18). (II). Carotid damage and microalbuminuria accounted for 20% of each other variation (R² = 0.20) after removal of potentially confounding factors (simultaneously controlling for the effects of smoking, body weight, LDL total cholesterol, diastolic diameter and arterial pressure variability, R = 0.45, p < 0.01). (III). Carotid damage-microalbuminuria correlation (CMr) was abolished after controlling for TG (R = 0.35, N.S.), glycemia (R = 0.30, N.S.) or PWV (R = 0.32, N.S.). (IV). Holding hypertension constant had no effect on CMr (R = 0.36, p < 0.03) showing that hypertension was not implicated in CMr. (V) CMr was strengthened (R = 0.38, p < 0.02) after controlling for smoking effects. (VI). Neither MS (R = 0.23, N.S.) or PWV (R = 0.18, N.S.) were related to carotid damage.

Conclusions: A weak but consistent correlation was found between carotid damage and microalbuminuria. Presented evidence supports the idea that pulse wave velocity, triglyceridemia and glycemia might be involved in the relationship between carotid wall damage and microalbuminuria.
**HOMEOGRAPHY, SUBCLINICAL INFLAMMATION AND CIRCADIAN RHYTHM OF BLOOD PRESSURE IN THE ESSENTIAL HYPERTENSIVE PATIENTS**

V. Dmitriev, E. Oschepkova, N. Ageeva, A. Rogozov, V. Titov. Russian Cardiology Research and Production Complex, Moscow-Russia

**Objective:** The aim of our study was to investigate the association of hemorheological parameters with subclinical inflammation marker (C-reactive protein) and circadian rhythm of blood pressure in the essential hypertensive patients.

**Design and Method:** 54 EH pts (41 M, 13 F) grade 1 or 2, without diabetes mellitus, average 46.8 ± 1.5 years, without antihypertensive therapy for 2 weeks before the study. All pts had short duration of EH. Patients with acute inflammatory diseases, not earlier than 2 months were included in the study. Plasma (t₁pl) and blood viscosity at high (η(1)) (128±1) and low(η(2)) (0.95±1) shear rates were measured by a rotational viscometer (Low Shear 30 “Contraves”, Switzerland). High-sensitivity C-reactive protein (CRP) was defined by a turbidimetry method. 24 hour blood pressure monitoring (24-h BPM) was carried out by Meditech ABPM-04 (Hungary). The statistical analysis was carried out by nonparametric method of Spearman with STATISTICA 6. The data is presented as M ± m.

**Results:** In the whole group of EH patients 24-h SBP was 139.7 ± 1.5 mm Hg, DBP 85.9 ± 1.5 mm Hg. CRP level was 8.7 ± 2.3 mg/L. Increased CRP level (> 3 mg/L) was found in 31 pts (57%). Ht level was 50.4 ± 0.5%, η₁ was 5.17 ± 0.07 mPa.s, η₂ was 27.2 ± 0.8 mPa.s, η₁ 1.52 ± 0.01 mPa.s, erythrocyte aggregation stability (η(2)/η(1)) was 5.22 ± 0.09, η₁ at standard Ht was 3.20 ± 0.02 mPa.s, η₂ at standard Ht was 8.3 ± 0.2 mPa.s. We found high levels of η₂ in 39 (72%) EH pts, increased levels of η₁ in 41 (76%) and increased levels of η₂ in the 26 (48%) EH pts. The significant association of CRP and plasma viscosity level (r = 0.42, p < 0.01) and blood viscosity at high shear rate at standard Ht (r = 0.28; p < 0.05) were found in the whole group of EH pts, thesignificant association of CRP and plasma viscosity (r = 0.41; p < 0.05) in the EH men were observed. In women similar associations were not demonstrated.

**Conclusion:** our results confirm hypothesis about significant association between subclinical inflammation, hemorheological parameters and abnormal day/night ratio SBP in essential hypertension.

**SYSTEMATIC REVIEW: NEUTROPHILS AND CLINICAL OUTCOMES IN PATIENTS WITH ACUTE CORONARY SYNDROMES AND/OR CARDIAC REVASCULARIZATION**


**Background:** some studies have suggested that high levels of total white blood cell (WBC) count and C-reactive protein (CRP) may be considered as independent prognostic factors in patients with acute coronary syndromes (ACS) and/or after cardiac revascularization by percutaneous coronary intervention or coronary artery bypass grafting surgery. Evidence on the role of neutrophils in cardiovascular disease is less compelling. Therefore, we conducted a systematic review of the literature with the aim of identifying all the available evidence to clarify the role of neutrophils (absolute or relative count, neutrophil/lymphocyte ratio) as a prognostic risk factor in patients with ACS and/or cardiac revascularization.

**Methods and results:** all published studies evaluating the role of neutrophils as a risk factor for clinical outcomes were assessed using the MEDLINE and EMBASE databases. Study selection, data extraction and validity assessment was performed independently by two reviewers. Twenty-one studies (17 of which with positive results) for a total of more than 34000 patients were included. Ten of 13 studies in ACS patients found that neutrophils measured on-admission are related to mortality rate and/or to major adverse clinical events. A predictive value of neutrophils after cardiac revascularization procedures was demonstrated in 7 out of 8 studies. Most of the studies showed that neutrophils were independent predictors of cardiovascular outcomes when analyzed concomitantly with other markers of inflammation (WBC, CRP).

**Conclusions:** the findings of our systematic review highlight the potential application of this inexpensive and readily available inflammatory marker for risk stratification in patients with ACS and/or cardiac revascularization.

**PREVALENCE OF LEFT VENTRICULAR HYPERTROPHY IN GENERAL POPULATION BY SEVENTEEN DIFFERENT ELECTROCARDIOGRAPHIC CRITERIA. THE HERMEX STUDY**

F. Felix-Redondo1, D. Fernandez-Berger1, A. Calderon1, L. Conssensgra, V. Barrios1, P. Alvarez-Palacios1, A. Hidalgo1, V. Tejero2, Y. Morcello1, C.S. Villanueva Norten, Villanueva De La Serena- Spain, Fundesalud, Villanueva De La Serena- Spain, C.S. Rosa De Luxemburgs, Madrid- Spain, Hosp. Santa Maria Del Rosell, Cartagena-Spain, Hosp. Ramon Y Cajal, Madrid- Spain

**Objective:** To determine the prevalence in the general population of left ventricular hypertrophy (LVH) according to 17 different electrocardiographic criteria and assess whether the combined use of these could enhance detection capabilities.

**Method:** Cross-sectional study on a representative sample of the general population of a health area of Badajoz (Spain). A survey was conducted by collecting a history of cardiovascular risk factors and treatment. Blood pressure was measured and an electrocardiogram was obtained and read electronically on line according to 17 recognized criteria of electrocardiographic LVH. We calculated the overall prevalence and prevalence ratio (PR) among hypertensive and normotensive for each criterion and all of them together.

**Results:** 2564 EKG were obtained for analysis. Mean age 50.9 (SD 14.7) years, 45.7% men. The prevalence according to different criteria from highest to lowest were Dalfö index (19.4%), R V6/V5 (14.3%), Perugia (10.9%), Romhilt ≥ 2 points (7.5%), Lewis (6, 2%), Criterion ESH 2007 (4.0%), Cornell DVP (3.6%), Gubner DVP (3%), R AVL DVP (2.9%), Cornell (2.6%), R AVL (2.6%), Hannover 2.3%, Gubner (1.4%), QRS sum DVP (1.4%), QRS sum (0.8%) and Sokolow-Lyon voltage and DVP (0.7%). The criteria that showed higher PR were Gubner (10.3%), Cornell 6 and R AVL DVP 5.3, and lowest R V6/V5 1.3, Sokolow 1.3 and Romhilt 1.7. The composite of all of them had a prevalence of 36.2% and a PR of 1.8.

**Conclusions:** There is a great variability in the prevalence of LVH according to the criteria used. The Sokolow index is the worst case detects and less discriminate between hypertensive and normotensive population. The combination of different criteria increases the detection capability.

**MAGNESIUM THERAPY IN BORDERLINE HYPERTENSION**

K. Kisters1, F. Tokmak2, M.Q. Nguyen2, B. Gremmler2, C. Funke1, M. Hausberg1. St. Anna Hospital, Herne-Germany, Ruhr University, Bochum-Germany, Stadtl. Klinikum, Karslsruhe-Germany

A magnesium deficiency can play a pathogenetic role in the development of primary hypertension. Therefore we measured plasma and intracellular Mg ++ levels in erythrocytes of 18 untreated borderline hypertensive patients, and in 35 untreated normotensive healthy subjects as controls. In hypertensive patients intracellular Mg ++ content was significantly lower (1.61 ± 0.09 mmol/L, mean ± SD), than in controls (1.84 ± 0.14 mmol/L, P < 0.05). After 12-15 weeks of an oral Mg ++ supplementation with 240-500 mg Mg ++ /day, the erythrocyte Mg ++ content had increased significantly in the borderline hypertensive group (1.78 ± 0.11 mmol/L) (P < 0.05). There was no significant difference between the normotensive and borderline hypertensive group in plasma Mg ++ concentrations (0.87) ± /-0.13 versus 0.83 ± /-0.17 mmol/L). Systolic and diastolic blood pressure values of the borderline hypertensive group also normalized after oral Mg ++ administration (before therapy: 147.6 ± 8.5/82.2 ± 4.4 mmHg; after therapy: 137.2 ± 7.8/83.8 ± 3.4 mmHg; P < 0.05) We conclude that Mg ++ deficient borderline hypertensives can benefit from an oral magnesium supplementation with regard to high blood pressure an quality of life.

**FACTORS ASSOCIATED WITH CONTROL OF HYPERTENSION IN OUR AREA**

M. Á. Barón Ramos, A. Ruz Zafra, M.I. Maiz Jiménez, A. Perez Rivera, I. Gallardo Romero, A. Ruiz Cantero. Hospital De La Serranía De Ronda, Ronda-Spain

Purpose of the study: It is known the degree of control of hypertension varies among studies, but in any case, there is a high percentage of hypertensive patients that do not have their hypertension controlled, despite receiving adequate treatment. We attempted to analyze the profile of our patients with uncontrolled hypertension to establish which factors determine this situation.

Material and Methods: We studied 345 patients with hypertension who were admitted to our Department of Internal Medicine. We studied the usual epidemiological data (age, sex, etc), as well as their cardiovascular risk factors, previous cardiovascular events and the treatment received. They were divided
into two groups (controlled hypertension or uncontrolled hypertension) and we established the differences between the two groups. We used the Chi² for qualitative variables and T Student for quantitative ones.

Results: We analyzed a total of 345 patients, of whom 167 (48.40%) were female and 178 (51.6%) were male. The distribution of cardiovascular risk factors was: Diabetes 143 (41.4%), dyslipidemia 153 (44.3%), congestive heart failure 61 (17.7%), previous stroke 59 (17.1%), ischemic heart disease 73 (21.2%), tobacco use 39 (11.3%), peripheral arterial disease 16 (4.5%) and chronic renal failure 48 (13.9%). In 29 cases (8.4%) patients received non specific pharmacological treatment for hypertension. In 90 cases (26.1%) patients were on monotherapy, 103 (29.9%) received two drugs, 73 cases (21.2%) received three, 39 (11.3%) received 4 drugs, 9 cases (2.6%) received 5 and only 2 patients (0.6%) received therapy with 6 drugs. The drugs most commonly used were diuretics 201 (58.3%), followed by ACE inhibitors 137 (39.7%), beta-blockers 128 (37.1%), ARBs 122 (35.4%), calcium channel blockers 50 (14.5%), alpha-blockers 44 (12.8%) and recent direct blockers of renine 4 (1.2%). The mean number of drugs used was 2.11 ± 1.25. The patients were classified into two groups: 199 in the “controlled” group (57.68%) and 146 in the “uncontrolled” group (41.44%). By analyzing the different demographic characteristics, risk factors, and treatments we found statistically significant differences in those patients who had chronic heart failure.

Conclusions: It seems that the degree of control of hypertension is not dependent on factors such as age, sex, number or kind of drugs used. The only risk factor that seems to be related to the hypertension control is the presence of chronic heart failure. We have not studied the compliance and adherence, which could be one of the main reasons for not controlling their hypertension. It is noteworthy that despite what current guidelines recommends, 34.6% of patients were with 1 or no drug for hypertension.

Objective: Erectile dysfunction (ED) is a common medical problem. It is strongly related to both physical and psychological health status. ED is mainly characterized in patients (P) with CAD and ED, the impact of a previous history of HT. Characterize ED in P with HT.

Design and Method: 69 men (age 58.0 ± 10.9 years) with CAD documented by angiography, were prospectively evaluated for ED through the 5-item version of the International Index of Erectile Function (IIEF-5). P without ED were excluded. P with ED (n = 53) were separated in 2 groups (G): G1 - P with ED and HT vs G2 – P with ED without HT. Clinical, analytical, echocardiographic and angiographic parameters were compared.

Results: Of 69 men, 76.8% (n = 53) had ED, being more frequent in P with HT (77.4% vs60%; p = 0.021). P in G1 were older (62.7 ± 7.9 vs52.2 ± 1.7; p = 0.013) more often had DM (46.3% vs40%; p = 0.002), prevalent CAD (46.3% vs83%, p = 17.81%; p = 0.0001) associated with microalbuminuria (40%vs83.3%; p = 0.040), beta-blockers (52.5% vs88.3%; p = 0.007) and had lower glomerular filtration rate (79.6 ± 27.2 vs96.0 ± 14.8; p = 0.021). No differences were found between the two G in severity and duration of ED; incidence of dyslipidemia, smoking, heart failure, stroke or chronic renal disease; hemoglobin and NT-proBNP values. P in G1 tend to have higher number of segments with CAD (2.44 ± 1.40± vs1.67 ± 0.99; p = 0.074), with no differences in systolic function evaluated by echocardiography. In P with HT and ED this appeared in a progressive way in 73% of cases; 81.1% never approached the physician about this rate (79.6 ± 7.9 vs52.2 ± 1.7; p = 0.0001), longer deceleration time of left ventricular inflow wave (E 241 ± 42 vs Y 214 ± 35 msec; p < 0.0001) and greater ventricular relative wall thickness (RT: E 48.4 ± 10.1 vs Y 44.8 ± 9.1; p < 0.005) in elderly compared with young-middle patients. On the other hand, metabolic parameters showed more deteriorated in young-middle compared with elderly patients, such as body mass index, serum gamma-glutamyltransferase level and uric acid level. The prevalence of metabolic syndrome was 17.5% in elderly and 38.6% in young-middle patients. No significant differences were found in heart rate and cardiac systolic function between the groups. In elderly patients (22 men, 35 women), BNP was higher but not significantly in women than in men. RT was significantly greater in women than in men, whereas the prevalence of metabolic syndrome and uric acid level were higher in men than in women. Diastolic function was similar in both genders.

Conclusions: It seems that elderly hypertensive patients have decreased diastolic function with high prevalence of metabolic syndrome in men and with ventricular concentric remodeling in women.

Objective: Aging has widely been recognized as a major health problem and the optimal management of lowering blood pressure in elderly patients is controversial. We examined correlation of different demographic characteristics between elderly and young-middle patients with untreated non-failing hypertension.

Method: One hundred and ninety-one patients (mean 59.1 ± 11.0 years, 165.09±8.6 mmHg) were divided into 2 groups by age, as elderly: E (65 < , 72.0 ± 5.4 years, n = 57) and young-middle: Y (65, 53.6 ± 7.8 years, n = 134).

Results: Elderly patients had significantly higher diastolic blood pressure, pulse pressure and B-type natriuretic peptide (BNP) compared with young-middle patients (E: 43.9 ± 41.0 vs. Y: 29.7 ± 33.7 pg/ml; p < 0.05). Echocardiographic finding showed significantly lower E/A ratio (E: 0.74 ± 0.19 vs. Y: 0.92 ± 0.28, p = 0.0001), longer deceleration time of left ventricular inflow wave (E: 241 ± 42 vs Y: 214 ± 35 msec, p < 0.0001) and greater ventricular relative wall thickness (RT: E: 48.4 ± 10.1 vs Y: 44.8 ± 9.1; p < 0.005) in elderly compared with young-middle patients. On the other hand, metabolic parameters showed more deteriorated in young-middle compared with elderly patients, such as body mass index, serum gamma-glutamyltransferase level and uric acid level. The prevalence of metabolic syndrome was 17.5% in elderly and 38.6% in young-middle patients. No significant differences were found in heart rate and cardiac systolic function between the groups. In elderly patients (22 men, 35 women), BNP was higher but not significantly in women than in men. RT was significantly greater in women than in men, whereas the prevalence of metabolic syndrome and uric acid level were higher in men than in women. Diastolic function was similar in both genders.

Conclusions: Result suggests that elderly hypertensive patients have decreased diastolic function with high prevalence of metabolic syndrome in men and with ventricular concentric remodeling in women.

Objective: Microalbuminuria is a biomarker of hypertension-related target organ damage (TOD), and is an independent predictor for cardiovascular (CV) morbidity and mortality. M has been assessed in several clinical trials; however, its prevalence in unselected hypertensive patients (P) remains poorly investigated. In an observational cross-sectional study we assessed the prevalence of M in a cohort of P and evaluated the clinical conditions associated with M. The study was performed by 13 general practitioners in the area of ASL Napoli 3 Sud. For each P were collected medical history, anthropomorphic measures, physical examination data, and laboratory parameters. M was determined using urine spot collection. From January 2009 to march 2010 were evaluated 1024 P [60 ± 11 years, male 51%, systolic blood pressure (SBP): 130 ± 9 mmHg, diastolic blood pressure (DBP): 79 ± 6 mmHg]. M was present in 290 P (28.4%). P with and without M resulted to be different respect to the age (61 ± 12 vs 60 ± 10 years, p < 0.05), SBP (132 ± 10 vs 129 ± 9 mmHg, p < 0.0001), body mass index (29.5 ± 27 ± 4 kg/m², p < 0.0001), fasting plasma glucose levels (120 ± 36 vs 98 ± 19, p < 0.0001), and serum creatinine (1 ± 0.5 vs 0.9 ± 0.2, p < 0.01), prevalence of diabetes (42% vs 12%, p < 0.0001), prevalence of hypercholesterolemia (30% vs 12%, p < 0.0001), prevalence of metabolic syndrome (42% vs 11%, p < 0.0001) number of prescribed antihypertensive drugs (3.7 ± 1.9 vs 2.5 ± 1.3, p < 0.0001) and achievement of target values of BP (61% vs 90%, p < 0.0001). Logistic regression analysis was used in order to identify the predictors M. Logistic regression models were adjusted for age, duration of hypertension, SBP, serum creatinine, HDL-cholesterol, diabetes, hypercholesterolemia, hypertriglyceridemia, metabolic syndrome, drug therapy (beta-blockers, ACE-inhibitors, AT1 antagonists), number of antihypertensive drugs, and achievement of BP target. M was independently associated with duration of hypertension (OR: 1.031, 95% CI: 1.008-1.055, p = 0.008), the number of prescribed antihypertensive drugs (OR: 1.292, 95% CI: 1.441-1.459, p = 0.001) and the lack of achievement of target values of BP (OR: 1.9, 95% CI: 1.158-3.215, p = 0.012). The results of this study indicate that the assessment of M in P allows the identifcation of pattern of new determinants of CV risk such as the duration of hypertensive disease, and the response to antihypertensive therapy.
Objective: Increase of persons of older age groups and long-livers (older 90 years) in the population structure is typical feature of the demographic situation of last decades in European countries. Arterial hypertension is characterized by a high prevalence in patients of older age groups. The aim of the study is assess of main clinical features of patients older 90 years with arterial hypertension.

Methods: 118 long-livers were examined in our clinic with the help of clinical history, physical examination and by appropriate instrumental and biochemical tests.

Results: Arterial hypertension was revealed in 83% of patients. 17% of examined persons were without arterial hypertension. Distribution of patients according to degree of hypertension was as follows: I degree was in 3% of patients, II degree – 79.5%, III degree – 17.5%. Blood pressure was less than 180/110 mm Hg in 99% of patients according to a profile of blood pressure within 3 days, that is, there were only periodic blood pressure rises to high values. Most of the examined patients had a moderate increase in blood pressure. The level of systolic blood pressure was 110 mm Hg in 11.5% patients with II degree of hypertension, which confirms the labile nature of hypertension in long-livers. All long-livers have many concomitant diseases. All patients with arterial hypertension have ischemic heart disease. Signs of chronic heart failure were in 100% of hypertensive patients. Significant frequency chronic ischemia of brain (chronic cerebrovascular insufficiency) was found in the examined long-livers, the prevalence of it exceeds 85%. Chronic ischemia of brain was found in 80% of long-livers without arterial hypertension. It was found in 83.3% of patients with arterial hypertension II degree and in 94.1% of patients with arterial hypertension III degree. Reliable information about the duration of hypertension was not possible to obtain. However the majority of patients indicated for a long length of hypertension calculated for decades.

Conclusions: High prevalence of hypertension was found in long-livers. Moderate and labile hypertension was found in majority of observed persons.

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Objective: To identify, how the insomnia is correlated with hypertension by comparison of normal population with hypertensive patients.

Materials and Methods: The study was performed on 59 subjects with essential arterial hypertension (28 females, 31 males). In all patients a 24-h blood pressure monitoring (ABPM) protocol was performed using a SpaceLab 90207 monitor (SpaceLab Healthcare; Issaquah, WA). Blood pressure was measured every 20 min during the daytime (from 06.00 to 22.00) and every 30 min at night-time (22.00-06.00). The following parameters were calculated: 24-h mean (MAP), systolic (SBP) and diastolic (DBP) blood pressure, day-systolic (DSBP) and diastolic (DDBP) blood pressure as well as night-systolic (NSBP) and diastolic (NDDBP) blood pressure. The non-dipper hypertension was defined if declines in blood pressure at night were below 10% of the daytime values. Of 59 patients we identified 32 dippers (16 females, 16 males; mean age 37.19 ± 14.9 yrs) and 27 non-dippers (12 females, 15 males; mean age 36.33 ± 14.6 yrs). We measured serum adiponectin, glucose, uric acid, cholesterol (total, LDL and HDL) and triglycerides. The anthropometric measurements included height, weight, waist circumference and body mass index (BMI).

Results: In the group with obesity (BMI > 30 kg/m²) serum adiponectin (3.0 ± 1.7µg/ml; p < 0.025) and HDL (40.0 ± 14.02 mg/dl; p < 0.05) were significantly lower, whilst serum uric acid level (6.0 ± 2.8 mg/dl; p < 0.005) and triglycerides (181.7 ± 84.6 mg/dl; p < 0.005) were significantly higher as compared to the group with BMI < 30 kg/m². Dippers and non-dippers had similar values of waist circumference, adiponectin, uric acid, total, LDL, HDL, cholesterol, triglycerides and glucose. In all patients with essential hypertension, adiponectin positively correlated with HDL (r = 0.482; p < 0.05) but inversely with BMI (r = -0.411; p < 0.05), waist circumference (r = -0.350; p < 0.05) triglycerides (r = -0.284; p < 0.05) and uric acid (r = -0.380; p < 0.05). Both in all patients with hypertension as well as in subgroups of dippers and non-dippers we did not find correlations between adiponectin and the ABPM parameters.

Conclusions: 1. In patients with essential hypertension lower adiponectin level was weight-dependent and associated with metabolic disorders. 2. No significant associations between adiponectin level and the ABPM parameters were found.
PREVENTION OF RADIAL ARTERY GRAFT VASOSPASM DURING CABG IN PATIENTS WITH ARTERIAL HYPERTENSION COMBINED WITH ISCHEMIC HEART DISEASE: CLINICAL ASPECTS

M. Dyakova, Y. Vechersky, V. Zatolinok, K. Eremenko. Institute of Cardiology, Tomsk-Russia

Objective: To study the properties of the radial artery used as a graft in autotransplantation for CABG, and ascertain the incidence of vasospasm. The study included 106 patients with AH and CHD, with 103 cases of arterial hypertension and 3 cases of arterial hypertension with coronary artery disease.

Material and Methods: The study included 106 patients with AH and CHD, with mixed vascular catherization of the aorta, with the age 58 ± 8.0 years, who underwent CABG graft with the use of two or more autologous grafts. Depending on the methods before and after CABG surgery all patients divided into 3 groups: in group I (n = 30) calcium antagonists were not appointed, in group II (n = 51) amlodipine was used (mean daily dose of 5 mg/day), in group III (n = 25) felodipine was administered (mean daily dose of 5 mg/day). The following clinical parameters were evaluated: ischemia, infarction (MI), death, hypotension, tachycardia. The average follow-up was 6 months.

Results: In group I the highest number of complications was noted: 3 cases (10%) - intra-operative MI in a zone bypass using radial artery conduit, of which 1 (3.3%) case was fatal; in 6 pts (20%) - early postoperative period complication - transient episodes of myocardial ischemia with severe disorders of hemodynamics and 12 patients (40%) have required the correction of the supraventricular tachyarrhythmia. On the background of the appointment calcium antagonists in the II and III group complications were observed less frequently. In group II: 2 cases (3.9%) perioperative infarction without hemodynamic disorders has developed; in 3 (5.9%) - myocardial ischemia with severe hemodynamic disturbances in the early postoperative period was observed; in 2 cases (3.9%) - supraventricular tachycardia and in 16 (31.3%) - hypotension. Complications resolved without lethal consequences with the correction of treatment. On the background of the appointment felodipine (IIbR) - incidences of ischemia and infarction were not observed; in 3 cases (12%) - supraventricular tachycardia developed and in 7 (28%) - hypotension, also stopped treatment and a decrease in dose. An autopsy (n = 1), as well as angiography (n = 5) in all patients after MI has not revealed occlusion or stenosis of radial grafts. Thus, the development of both intra-and postoperative complications were attributed to the phenomena of transient spasm, and reduction of blood flow in radial grafts.

Conclusions: In patients with arterial hypertension combined with ischemic heart disease radial artery, when used as a graft for CABG has a pronounced tendency to vasospasm, which negatively affects treatment outcomes. Appointment of calcium antagonists, allows for effective prevention of radial artery vasospasm. Used in a clinical trial felodipine showed higher efficacy in the prevention of ischemia, myocardial edema, and tachycardia than amlodipine.

USEFALNESS OF A SIMPLE ANTICIPATORY PRESCRIPTION TOOL TO FIGHT AGAINST THERAPEUTIC INERTIA IN ARTERIAL HYPERTENSION


Objectives: Hypertensive inertia (TI) contributes to the high prevalence of uncontrolled hypertension. Its determinants are numerous. So far, actions to correct treatment and a decrease in dose. An autopsy (n = 1) and supporting that a reduction on salt intake would prevent cardiovascular disease. 24-hour urinary sodium excretion has become the “gold standard” method for obtaining data on sodium intakes in population surveys. However, in the clinical setting, a 24-hour urine collection is not frequently done due to its troublesome process for the patient. The aim of this study was to find a relation between the overnight spot sodium value and the 24-hour urinary Na excretion, in order to find a simple way to identify individuals at risk of high salt intake.

Methods: We recruited 45 advanced medical students attending our pathophysiology course, at the School of Medicine, Montevideo-Uruguay. The ethics committee of the University Hospital approved the study. Each student was asked a simple set of questions about personal and familiar medical background and pharmacological treatment. The students were instructed on the method of urine collection, advised on the importance of collecting a
 complete sample, and provided with plastic bottles and a funnel. The day the study began, they were asked to void his or her bladder and to collect all urine voided from that moment until the same time the following day. The second day, they separated 10 ml of urine (spot) from the first void in the morning and continued collecting the sample until the appointed time. The total volume of urine collected was measured, and the complete sample mixed thoroughly before aliquots were taken for laboratory analysis. Sodium, potassium, creatinine and osmolality were determined on each sample.

Results: We recruited 45 students, 33 completed the study (73.3%); 20 (0.6) women and 13 (0.4) men. The mean age was 22.7 ± 2.2 years and the body mass index 22 ± 2.5. The averaged blood pressure was 124.9 ± 15.3 mmHg systolic and 73.2 ± 9.9 mmHg diastolic. The mean 24-hr urinary volume was 1366 ± 379 ml. Sodium concentration was 138 ± 52 vs. 119 ± 44 mmol/24hr (p=0.26). When comparing spot vs 24 hr collection data, a spot sodium value higher than 75 mmol/L was significantly associated with a high daily sodium consumption (>100mmol/d) (p < 0.005).

Conclusion: This simple rule, is a promising tool for selecting patients at risk of high sodium consumption, in order to measure 24 hr urinary sodium excretion on them.

Objective: The aim of the study was to assess blood pressure variability (BPV) and heart rate variability (HRV) in treated hypertensive patients depending on time of quinapril administration.

Design and Methods: Following one week run-in placebo period (visit V2) 60 patients aged 18 to 68 years (mean 40.0 ± 15.7) with mild to moderate essential hypertension received quinapril in dose 10 mg once a day in the morning (8.00 a.m.). After two weeks (visit V3), patients with poor blood pressure (BP) control (BP > 140/90 mmHg) received 20 mg of quinapril in the morning. After next four weeks (visit V4) drug administration was changed for night time (8.00 p.m.). Treatment was continued for next four weeks (visit V5). During visit 2, 4 and 5 24-h ABPM and 24-h ECG monitoring were performed. BPV was defined as standard deviations (SD) of mean values of systolic BP, diastolic BP and mean BP in 24-h ABPM (SBPV24h, DBPV24h and MBPV24h respectively). In 24-h ECG selected parameters of time and frequency domain measures were analysed.

Results: The results of mean office BP, MBPS and HRV parameters at each visit are shown in the table.
Conclusions: 1) BP control in menopausal women is poorer than in non-menopausal, even though menopausal women are more consistently treated and receive more combined treatment. 2) No significant difference as to the type of drug used in both groups was observed. 3) Surprisingly, the combined treatment was not widely used, even though the BP level was high.

Hypertensive Women

\[ \text{Menopausal women (n = 184)} \quad \text{Non-Menopausal women (n = 115)} \]

- **Age**: 60.8 ± 9.9 vs. 36.4 ± 8.9
- **Treatment**: 146 (79.3%) vs. 32 (28%)*
- **Number of drugs**: 5.12 ± 0.83 vs. 0.33 ± 0.57
- **Monotherapy**: 100 (54.3%) vs. 26 (22.6%)*
- **Monotherapy SBP/DBP**: 154.7 ± 22.89/9 ± 14.6 vs. 148.8 ± 22.7/87.9 ± 12.9
- **Combined therapy**: 46 (25%) vs. 6 (5.2%)
- **Combined therapy SBP/DBP**: 151 ± 22.4/86.2 ± 11.7 vs. 130.8 ± 17.9/84.2 ± 12.3
- **BP Control**: 63 (34.2%) vs. 70 (61.4%)*
- **BP Control SBP/DBP**: 127.33 ± 9.7/75.6 ± 7.8 vs. 122.6 ± 10.2/75.7 ± 8.2

**Results**: No relationship was observed between TBW/m² and the extra to intracellular fluid ratio or to blood pressure and creatinine clearance. TBW/m² was directly related with urinary sodium excretion (r = 0.287, p = 0.017), active renin (r = 0.331, p = 0.005), and urinary epinephrine (r = 0.346, p = 0.018). The last relationship was lost in a multivariate regression analysis. Extra-to-intracellular fluid ratio was not related with parameters of either the RAAS or SNS.

Conclusions: No relationship of extra-to-intracellular body fluid partition with components of the RAAS and SNS was demonstrated by use of BIA.

**PP.42.349** THE RESPONSIVENESS OF THE BRACHIAL-ANKLE PULSE WAVE VELOCITY RELATIVE TO ACUTE BLOOD PRESSURE REDUCTION AND ITS CLINICAL DETERMINANTS

J.K. Park¹, J.H. Shin¹, S.H. Kim², Y.H. Lim¹, J.H. Shin¹, J.U. Lee³, K.S. Kim⁴, S.K. Kim⁴, J.H. Kim⁴, H.K. Lim³,¹ Hanyang University Medical Center, Seoul-South Korea,² Hanyang University Guri Hospital, Guri-South Korea

**Objective**: Pulse wave velocity (PWV) is useful method to measure arterial stiffness. But, PWV is quite affected by blood pressure (BP). Therefore, it is difficult to know the effect of BP reduction itself after antihypertensive treatment. We studied the responsiveness of brachial-ankle PWV (baPWV) relative to acute BP reduction (ΔbaPWV/ΔBP) and its clinical determinants.

**Design and Method**: Seventy consecutive patients with risk factor of coronary artery disease, admitted to Hanyang University Medical Center between July 2010 and September 2010, were included. We measured the changes of BP and baPWV before and after the administration of sublingual nitroglycerin (NTG) and analyzed the ΔbaPWV/ΔBP with clinical parameter.

**Results**: After administration of sublingual NTG, BP and PW were significantly decreased (ΔSBP, ΔMBP, ΔDBP and ΔbaPWV, 10.5 ± 6.7, 12.0 ± 5.1, 9.5 ± 5.0 mmHg and 286.8 ± 150.9 cm/sec, respectively, p < 0.01). The ΔbaPWV was significantly correlated with ΔSBP and ΔMBP (r = 0.356, p < 0.01 and r = 0.438, p < 0.01), but not with ΔDBP (r = 0.272, p = 0.051). On the multiple regression analysis, the ΔMBP was most significant variable for predicting the ΔbaPWV. The ΔbaPWV/ΔMBP was 23.78 ± 13.01, which was correlated with age and serum creatinine (r = 0.369, p < 0.01 and r = 0.519, p < 0.01). The ΔbaPWV/ΔMBP were higher in man and hypertensive group than woman and normotensive group (29.00 ± 12.10 versus 19.23 ± 12.68, p < 0.01 and 29.98 ± 10.93 versus 21.30 ± 12.38, p < 0.05).

**Conclusions**: The ΔbaPWV/ΔMBP was considerable and its clinical determinants were age, sex, hypertension and serum creatinine. Therefore, careful consideration is required when interpreting the effects of antihypertensive treatment on arterial stiffness using baPWV.

**PP.42.350** EVALUATION OF BODY FLUID DISTRIBUTION AND HORMONAL SYSTEMS IN HYPERTENSION

C. Catena, G.L. Colussi, C. Petri, F. Pezzutto, L.A. Sechi. Hypertension Unit, Department of Internal Medicine, University of Udine, Udine-Italy

**Objective**: Abnormalities of body water content and body fluid distribution can affect blood pressure levels and might reflect changes in the activity of the RAAS and SNS. Therefore, careful consideration is required when interpreting the effects of antihypertensive treatment on arterial stiffness using baPWV.

**Design and Methods**: In 72 untreated essential hypertensive patients (51 ± 14 yrs, 37M/35F) we measured anthropometric indices, creatinine clearance, 24-h urinary sodium excretion, active renin and aldosterone, and 24-h urinary aldosterone, epinephrine and norepinephrine excretion. Body fluid compartments were identified by the bioelectrical impedance analysis (BIA), a non-invasive and reproducible method that permits measurement of water distribution and has been validated in renal patients. Total body water was normalized for the body surface area (TBW/m²) and extra-to-intracellular ratio in fluid distribution was calculated.

**Results**: No relationship was observed between TBW/m² and the extra to intracellular fluid ratio or to blood pressure and creatinine clearance. TBW/m² was directly related with urinary sodium excretion (r = 0.287, p = 0.017), active renin (r = 0.331, p = 0.005), and urinary epinephrine (r = 0.346, p = 0.018). The last relationship was lost in a multivariate regression analysis. Extra-to-intracellular fluid ratio was not related with parameters of either the RAAS or SNS.

**Conclusions**: No relationship of extra-to-intracellular body fluid partition with components of the RAAS and SNS was demonstrated by use of BIA.
were taken to allow the determination of LVH regression, cardiovascular risk and other parameters then evaluated at the baseline, 1 and 2 years after.

**Results:** LVH was found on the uncontrolled hypertensive group and on the controlled hypertensive group. When left ventricular mass index reduction was analyzed instead of LVH status, it was found to be significantly associated with reduced risk and a better blood pressure such as other cardiovascular risk factors.

**Conclusion:** Clinic blood pressure is an ineffective way of assessing BP control. Thus in apparently controlled hypertensive subjects, based on office blood pressure, cardiac structural changes do remain despite antihypertensive therapy. We need to access other cardiovascular risk factors to optimize the overall risk reduction, including left ventricular hypertrophy. LVH regression, as revealed by echocardiography after 1 and 2 years of therapy, is associated with reduced global cardiovascular risk in patients with hypertension.

**PP.42.353 EVALUATION OF PATIENTS ADMITTED TO A DEPARTMENT OF SUB-ACUTE CARE WITH A DIAGNOSIS OF INJURY AFTER AN ACCIDENTAL FALL: PREVALENCE OF TRUE SYNCOPE**


**Objective:** The Sub-Acute Care Department represents a new approach to the management of patients who, after an acute severe illness, need further clinical observation in order to complete the process of recovery, to apply international guidelines and drug titration, to manage comorbidities, to define prognosis and follow-up. During the first year of this clinical activity we realized that about 10% of admissions were represented by a diagnosis of mild to severe injury caused by a fall, often defined as accidental without a clear etiology.

**Design and Method:** We analyzed 100 consecutive patients with diagnosis of accidental fall associated with bone fractures (46%) or mild (27%), moderate (24%) and severe (3%) contusion. At clinical admission patients received “an initial evaluation of the patient, a complete clinical examination, including orthostatic blood pressure measurements and a standard electrocardiogram (ECG); in addition a MMSE (Mini Mental State Examination) was performed. In selected cases, Holter monitoring (n = 12), echocardiographic and color Doppler examination (n = 16), carotid sinus massage (n = 4) were performed.

**Results:** Patients were transferred from orthopaedic/surgical wards (80%) or from medical departments (20%). In all cases the decision of transferring the patients was supported by the presence of injury. Mean age was 78 ± 12 years (range 25-96); 90% of the patients had 2 associated diseases, 60% had > 4 associated diseases. Mean MMSE value resulted 22 ± 7 (n.s. = 30). The combination of a careful medical history and physical examination allowed to identify a clear accidental fall without loss of consciousness in 27 patients: in these cases age was lower, MMSE value was higher and/or a witness was available. In 37 patients there were no conclusive data, while in 36 the history was highly suggestive of syncope. In this group, the following etiologies were identified: iatrogenic orthostatic hypotension (10 pts), orthostatic hypotension (9 pts), rapid paroxysmal atrial fibrillation (2 pts), ventricular tachycardia (1 pt), advanced atherosclerotic block (3 pts), severe aortic stenosis (1 pt), neutrally mediated syncope (2 pts), severe pulmonary hypertension (1 pt), severe anemia (2 pts), severe hypothyroidism (1 pt), sudden death (1 pt). In those 37 patients without a clear definition of the falls we found alcoholic abuse in 3 cases, iatrogenic orthostatic hypotension in 2, orthostatic hypotension associated to known Parkinson disease in 4, new onset/diagnosis of Parkinson disease in 3. Considering both groups (73 pts) a history of relapsing fall was present in the 13%.

**Conclusions:** The diagnosis of syncope in old patients with history of falls can be easily underestimated; its recognition can be more difficult when an initial cognitive impairment is present. Therefore in these patients it is necessary to search symptoms and signs of true loss of consciousness by means of a specific initial examination, including hearing the caregiver history; this approach may guide further clinical monitoring and specific tests to define a correct diagnosis.

**PP.42.354 DIAGNOSTIC APPROACH AND TREATMENT OF HYPERTENSION AMONG HEALTH CARE WORKERS POPULATION**


**Introduction:** Few epidemiological knowledges are available among health care workers population presenting hypertension.

**Purpose:** This study was design to assess diagnostic process and treatment of hypertension among health care worker population in order to improve way of treatment.

**Methodology:** This is a prospective study including 821 health care workers from Abidjan’s public hospitals. There were 208 medical doctors, 464 nurses and 149 assistant nurses. There were 59% women, 41% men. The mean age was of 42.9 years old.

**Results:** The prevalence of hypertension was of 17.5%. 48.1% among teaching medical doctors group, 14.6% in the other medical doctors group, 14.8 in the nurses group and 18.8% in the assistant nurse group. 86.9% of the cases of hypertension were diagnosed after the recruitment of these people. 74.3% were already having association of symptoms when hypertension was diagnosed. The disease was found by a physician in 77.8% of cases and by a nurse in 22% of cases. In many cases (67.8%), the follow-up was done by a cardiologist. 15.7% by general practitioners. However, 10.7% of people had no medical follow-up.

Monotherapy treatment was most commonly used (49.7%) while combination of 2 drugs was used in 36.4% of cases. We observed a bad medication adherence in 71.1% of patients. Among them, 40.5% had a very bad medication adherence while 30.6% had less bad medication adherence than the first group. Among the very bad medication adherence group, 29% had stopped taking their medication. 07 people had never taken any medication. The non treatment adherence was most commonly observed in the assistant nurses group (52.9%) followed by nurses group (42.6%). People taking combination of 2 or 3 drugs had better treatment adherence than those taking monotherapy.

**D. Piskorz, A. Tommasi. Sanatorio Britanico Sa, Rosario-Argentina**

**Objective:** In hypertensive (HT) patients (p) treatment prevents target organ damage. Patients taking combination of 2 or 3 drugs had better treatment adherence than those taking monotherapy.

**Material and Methods:** 108 consecutive HT p without LVH measured by the method of Devereux at baseline and follow-up. Continuous variables are reported as means with standard deviations, and quantitative variables in absolute numbers and percentages. Variance test was applied for statistical analysis, and statistical significance was p < 0.05.

**Results:** Follow-up 2140 ± 1395 days. 12% (12 p) developed concentric remodeling (CR), and 25% (27 p) LVH. 65% (17 p) of patients with LVH were women as well as 41.7% (5 p) of those with CR and 43.5% (30 p) of those with normal ventricle (NV) (p < 0.05). 6 p (22.8%) with LVH had diabetes as well as 3 p (25%) with CR and 3 pts (4.4%) with NV (p < 0.025). The left ventricular mass index at follow-up was 131.5 ± 21.6 g/m² in p with LVH, 92.7 ± 19.4 g/m² in p with CR, and 93.4 ± 16.4 g/m² in p with NV, the eccentricity index was 0.41 ± 0.04, 0.5 ± 0.07, and 0.37 ± 0.04, respectively (p < 0.025).

Blood pressure monitoring was 137.5 ± 14.5/77.6 ± 9 mmHg in p with LVH; 138.8 ± 24.7/80 ± 12.2 mmHg in p with CR, and in p with NV 133.5 ± 13.2/77.4 ± 10.1 mmHg (p = NS); however, remained with high blood pressure 16 p (59.3%) with LVH, 6 p (50%) with CR, and 23 p (28.4%) with NV (p < 0.005). Few epidemiological knowledges are available among health care workers population presenting hypertension.

**Conclusion:** 1 women and diabetics p frequently developed LVH, 2) poor control of blood pressure mostly explains the development of LVH in HT p under treatment.

**PP.42.356 IMPACT OF BLOOD PRESSURE IN DAMAGE SUBCLINICAL TARGET ORGAN IN HYPERTENSIVE PATIENTS**


**Objective:** To determine in HT p without left ventricular hypertrophy (LVH) the changes in ventricular geometry in the follow up and their causes.

**Material and Methods:** 108 consecutive HT p without LVH measured by the method of Devereux at baseline and follow-up. Continuous variables are reported as means with standard deviations, and quantitative variables in absolute numbers and percentages. Variance test was applied for statistical analysis, and statistical significance was p < 0.05.

**Results:** Follow-up 2140 ± 1395 days. 12% (12 p) developed concentric remodeling (CR), and 25% (27 p) LVH. 65% (17 p) of patients with LVH were women as well as 41.7% (5 p) of those with CR and 43.5% (30 p) of those with normal ventricle (NV) (p < 0.05). 6 p (22.8%) with LVH had diabetes as well as 3 p (25%) with CR and 3 pts (4.4%) with NV (p < 0.025). The left ventricular mass index at follow-up was 131.5 ± 21.6 g/m² in p with LVH, 92.7 ± 19.4 g/m² in p with CR, and 93.4 ± 16.4 g/m² in p with NV, the eccentricity index was 0.41 ± 0.04, 0.5 ± 0.07, and 0.37 ± 0.04, respectively (p < 0.025).

Blood pressure monitoring was 137.5 ± 14.5/77.6 ± 9 mmHg in p with LVH; 138.8 ± 24.7/80 ± 12.2 mmHg in p with CR, and in p with NV 133.5 ± 13.2/77.4 ± 10.1 mmHg (p = NS); however, remained with high blood pressure 16 p (59.3%) with LVH, 6 p (50%) with CR, and 23 p (28.4%) with NV (p < 0.005). Few epidemiological knowledges are available among health care workers population presenting hypertension.
was divided into 02 groups: (UTHP, n = 51) was defined as: BP ≥ 140/90 mmHg and (CPTH, n = 49) those with: BP < 140/90 mmHg. The OD was evaluated by: carotid doppler, carotid intima-media thickness (IMT), echocardiogram: left ventricular mass index (LVM), plasma creatinine, glomerular filtration rate (GFR), radial applanation tonometry using (HDI / PW CR-2000 and ShygmoCor) evaluated: the index of elasticity of large and small arteries (C1) and (C2), respectively, aortic systolic pressure (AoSp), aortic pulse pressure (AoPP) and augmentation index (Alx). Statistical analysis was performed by t student, finding significant differences when p < 0.05.

Results: When comparing the different variables under study under UTHP vs CTHP found: SBP (mmHg) (160.4 ± 19.81 vs 124.93 ± 9.34, p = 0.001), DBP (mmHg) (87.05 ± 12.55 vs 71.93 ± 9.21, p = 0.001), IMM (mm) (0.93 ± 0.20 vs. 0.89 ± 0.15, p = 0.20), LVM (g/m²) (101.68 ± 28.14 vs 113.80 ± 46.52, p = 0.11), Creatinine (mg/dl) (0.89 ± 0.24 vs 0.90 ± 0.19, p = 0.74), GFR (cc / min) (87.30 ± 27.99 vs 103.68 ± 42.31, p = 0.02), C1 (ml / mmHg x 10) (9.93 ± 3.86 vs 16.48 ± 4.41, p = 0.001), C2 (ml / mmHg x 100) (3.29 ± 1.77 vs 6.20 ± 2.76, p = 0.001), AoSp (mmHg) (148.01 ± 23.23 vs 114.40 ± 12.61, p = 0.001), AoPP (mmHg) (50.72 ± 19.39 vs 40.20 ± 12.41, p = 0.001), Alx (%) (30.50 ± 9.18 vs 20.04 ± 12.66, p = 0.001).

Conclusion: We only found differences when comparing the variables: SBP, DBP, C1, C2, AoSp, AoPP, and Alx, which were significantly higher in UTHP, compared with those without LVH (7.82% vs 13.24%, p < 0.001). The negative area (NA) value was significantly higher in AH group, too (CCA dx NA: AH group = 50 mmHg m/s, C group = 50.9 mmHg m/s, p < 0.04).

Results: The CS parameters as beta stiffness (beta) and pulse wave velocity (PWV) were significantly elevated in AH group (CCA dx beta AH group = 6.9, p < 0.01; PWV AH group = 7.2 m/s, PWV C group = 6.1 p < 0.001; Ep AH group = 144kPa, C group = 101,5kPa, p < 0.001). The negative area (NA) value was significantly higher in AH group, too (CCA dx NA: AH group = 50 mmHg m/s, C group = 50.9 mmHg m/s, p < 0.04).

Conclusions:

- The aim of the study is to analyse the parameters of carotid stiffness (CS) and wave intensity (WI). The relationships between CS and WI may provide the information concerning the interaction of the heart and the vascular system.
- Methods: We investigated 60 pts with arterial hypertension (AH), mean age 59 years. The pts had preserved LVEF and no dilated left atrium. The control group (C) consisted of 22 subjects without cardiovascular disease, mean age 50 years. Ultrasound and echo-tracking was used for the measurement CS and WI. The measurements were performed on common carotid artery (CCA).
- Conclusion: The parameters beta, Ep, PWV and NA were significantly elevated in AH group. The correlations between NA and CS parameters reflect the influence of arterial stiffness on ventriculoarterial interaction.

PP.42.357 LEFT VENTRICULAR HYPERTROPHY: INFLUENCE OF ECHOCARDIOGRAPHIC METHOD USED ON THE PROGNOSIS

S. Cinza Sanjurgo1, J.E. López Paz2, A. Hermida Ameijeiras2, G. Calvo González2, M.L. Romero Miguez2, V. Martínez Durán1, A. Pascual Montes1, J.M. Paz Fernández2, G. Calvo Gómez2. Malpica Health Center, Malpica-Spain; University Hospitals Complex of Santiago, Santiago De Compostela-Spain

Introduction and Objectives: Left ventricular hypertrophy (LVH) is an independent risk factor for cardiovascular risk (CV). The aim of this study is to analyze the CV prognosis of a cohort of patients based on the method used to identify LVH measured by echocardiography and the circadian variability of blood pressure (BP) assessed by ABPM.

Material and Methods: A random sample of 432 hypertensive patients without prior CV disease. All patients underwent clinical evaluation and biologic, ABPM-24h and echocardiography (calculation of left ventricular mass index-LVM, normalized for body surface (BS) and height (H)). Monitoring of cardiovascular risk factors (dyslipidemia, mellitus diabetes, tobacco), previous CV disease (ischemic heart disease, hypertensive encephalopathy, myocardial infarction), echocardiography, carotid doppler, carotid intima-media thickness (IMT), echocardiogram: left ventricular mass index (LVM), plasma creatinine, glomerular filtration rate (GFR), radial applanation tonometry using (HDI / PW CR-2000 and ShygmoCor) evaluated: the index of elasticity of large and small arteries (C1) and (C2), respectively, aortic systolic pressure (AoSp), aortic pulse pressure (AoPP) and augmentation index (Alx).

Results: 405 patients completed follow-up (218 women, 55.5 years). We iden-
tified 195 patients (48.15%) with LVH-BS and 248 patients (61.23%) with index-LVMI, normalized for body surface (BS) and height (H)). Monitoring of cardiovascular risk factors (dyslipidemia, mellitus diabetes, tobacco), previous CV disease (ischemic heart disease, hypertensive encephalopathy, myocardial infarction), echocardiography, carotid doppler, carotid intima-media thickness (IMT), echocardiogram: left ventricular mass index (LVM), plasma creatinine, glomerular filtration rate (GFR), radial applanation tonometry using (HDI / PW CR-2000 and ShygmoCor) evaluated: the index of elasticity of large and small arteries (C1) and (C2), respectively, aortic systolic pressure (AoSp), aortic pulse pressure (AoPP) and augmentation index (Alx).

Conclusions: Although the normalization method used for height is more sensitive and identifies a greater prevalence of LVH, in addition to not being influenced by the BMI of patients, we can say that both normalization methods are equally useful in assessing the prognosis of hypertensive patients.
Microalbuminuria was present in 57.3% of the patients with high systolic charge, in 57% of the patients with high diastolic charge, in 40.6% of the dipper and in 59.6% of the non dipper.

Conclusions: There is a high prevalence of organic lesions in this patients. In our study we observed a prevalence of 49.7% of microalbuminuria, 68% of left ventricular hypertrophy and a 36.3% of IMT thickening.

Results: In a second visit we analyzed blood pressure, weight, abdominal perimeter, used the familiar precedents as DM, hypertension and cardiovascular diseases. The highest NAFLD prevalence (38%) was found in patients aged between 50 to 80 years. Interestingly, only in 3.6% of NAFLD patients (1.0% in all population) the diagnosis has been established before DIREG-LOI930 program initiation, despite regular observations of participants in primary care centers.

Conclusions: We have shown that NAFLD has very high prevalence (27%) in Russian population. Direct screening explored that NAFLD prevalence is 27-folds higher comparing with anamnestic data enclosing extremely high rate of underdiagnostics. The attention should be given by primary care physicians for focus diagnosis of this potentially curable disorder.

Methods: A non-interventional, cross-sectional and descriptive study. It includes the 100 first patients that had the inclusion criteria of all the patients seen in the Internal Medicine doctor’s office of two Valencian hospitals during the first semester of 2010. Criteria inclusion: Patients ≥ 40 years old, with one or more risk factor associated with pathological ABI, as type 1 and 2 diabetes mellitus (DM), arterial hypertension, lipid disorders (cholesterol ≥ 200 mg/dl, HDL ≤ 40 mg/dl, LDL ≥ 100 mg/dl, triglycerides ≥ 180 mg/dl, smoking, sedentariness, overweight and obesity, and who voluntarily accepted to take part in the study, having signed a previous letter of consent.

We evaluated in the first visit: age, sex, socioeconomic level, DM, hypertension, lipid disorders, overweight, physical exercise and smoking. We also valued the familiar precedents as DM, hypertension and cardiovascular diseases. In a second visit we analyzed blood pressure, weight, abdominal perimeter, ABI, body mass index, cardiac and breathing frequency. ABI > 0.9 = normal, ABI < 0.5 = PAD and ABI ≥ 1.3 = Mönckeberg calcifications.

Results: Mean age 62.3 years +/− 11.2 years (range 40-84), 40% were males. Personal precedents: lipid disorders 54%, overweight 54%, hypertension 51%, sendentariness 35%, DM 18%, smoking 22%. Familiar precedents: hypertension 48% and cardiovascular disease 39%, DM 31%. Systolic blood pressure was 131.7 mmHg (SD 17.9), diastolic blood pressure 83.1 mmHg (SD 11.2), BMI of 28.3 Kg/m² (SD 4.62), abdominal perimeter 94.2 cm (SD 10.9). ABI mean 1.03 (SD 0.18).

Number of patients: ABI > 1.3 = 7, ABI 0.9 – 1.3 = 79 y ABI < 0.9 = 14.

Conclusions: PAD is a chronic disease with moderate prevalence in our study. Pathological ABI is associated with a relevant percentage of risk factors, which can be modified, such as sedentariness, smoking and overweight. Therefore it is very important for patients to be conscious about changing their lifestyle, increasing physical exercise, following a healthy diet and giving up smoking. Due to the high percentage of pathological ABI in asymptomatic patients, the systemic execution of this test (cheap and easy to make) in usually internal medicine patients, is very convincing due to the therapeutic change that the test can provide.
Methods: The study included 300 (mean age 54 ± 0.4) and 230 women (mean age 55 ± 0.5) with CHD and stable angina 2-3 functional class form central clinics of 3 districts of Ingush Republic. The survey included the questionnaire on demographic parameters, risk factors and medications; blood pressure measuring. Left ventricular hypertrophy (LVG) was evaluated on the basis of resting ECG.

Results: The prevalence of HP in CHD patients was 88%. In men it revealed in 81.3% (n = 244) and in women in 86.9% (n = 200). Mean duration of HP was 5.4 ± 0.3 in men and 6.1 ± 0.3 in women. ECG signs of LVG was revealed in 11% of men (165) and 17% of women. Antihypertensive medications received 77% of men and 84% of women. From them high compliance to the therapy had 27% of men and 21% of women, periodically take medications 62% and 56%, accordingly. The most frequent class of drugs were ACE inhibitors (81%), calcium antagonists (73%) and beta-blockers (42%). Most patients received two antihypertensive medications (46%), three medications received 22% of patients and 4 medications – 19%. The goal blood pressure levels were achieved in 48% of men and 61.5% of women.

Conclusion: HP is highly prevalent in CHD patients of Ingush Republic. Every second patient with HP and CHD had LVG. Constant treatment (mainly 2 drugs) receive only two patients. 54% of patient had goal blood pressure levels.

PP.42.364 DEFINITION OF HYPERTENSION IN AFRICA
P. Ghataorbe1, N. Heeney1, M. Rehan1, R. Sahibzada2, N. Heeney3, M. Ahmad1, I. Jawad1, K. Nijjer1. 1Kent and Canterbury Hospital, Gillingham-United Kingdom, 2Mia-Ra, London-United Kingdom, 1Medway Maritime Hospital, London-United Kingdom
JNC VI definition of high blood pressure Blood pressure levels have been classified thorough the JNC VI guidelines into the following levels. According to this a patient has high blood pressure “if the average of 2 or more diastolic BP measurements on at least 2 subsequent visits is 90 mm Hg and/or the average of multiple systolic BP readings on 2 or more subsequent visits is consistently 140 mm Hg.” The following table gives the JNC VI classification of high blood pressure. Category Systolic, mm Hg Diastolic, mm Hg Hypertension Stage 1 (mild) 140–149 or 90–99 Subgroup: borderline 140–149 or 90–94 Stage 2 (moderate) 160–179 or 100–109 Stage 3 (severe) 180 or 110 Isolated systolic hypertension 140 and < 90 Subgroup: borderline 140–149 and < 90. A new definition of hypertension has been proposed by the ASH writing group which is “Hypertension is a progressive cardiovascular syndrome arising from complex and interrelated etiologies. Early markers of the syndrome are often present before blood-pressure elevation is sustained; therefore, hypertension cannot be classified solely by discreet blood-pressure thresholds. Progression is strongly associated with function and structural cardiac and vascular abnormalities that damage the heart, kidneys, brain, vasculature and other organs and lead to premature morbidity and death.” Due to varying definitions of hypertension the rates of prevalence of hypertension in countries in Africa has been variable even in the comparison of studies done in individual countries. Hypertension is defined by Baliga as “that level of blood pressure associated with an increased number of cardiovascular complications“. Purcell et al have referred MRFT to show that the increasing blood pressure in a population results in increasing cardiovascular risk. Interestingly since in children apart from extreme hypertension, hypertension has not been linked with cardiovascular risk. This is definitively debatable. Other authors such as Rose feel that since blood pressure in a population has a continuous distribution so a strict definition of the dividing line is hard to make. He feels a better approach is to look at efficacy of medications in reducing cardiovascular risk and use it to define the dividing line. Kaplan has rephrased Rose in saying the definition of hypertension should be “level at which benefits (minus risks and costs) of action exceed the risks and costs (minus the benefits of inaction).” According to the JNC VII this dividing line is a “systolic blood pressure of greater or equal to 140 mmHg systolic or 90 mmHg diastolic based on an average of two or more readings taken at two or more visits after the initial screening visit. There should be an appropriate sized cuff for the patient’s arm circumference and accurate recording of Korotkoff sounds (IV and V) If the question is approached from the opposite angle and if we try to define normal blood pressure then according to the JNC VII guidelines normal blood pressure is blood pressure less than 120/80 mmHg. All blood pressure greater than this is defined as being part of a category such as pre-hypertension, stage I or stage II hypertension which increases cardiovascular risk.

Conclusions: Cardiovascular risk is significantly different between WCH and normotension, regardless of the normotensive population type and follow-up length. However, follow-up drug therapy and microalbuminuria was more frequent in WCH other than in SH. Therefore, HP was more prevalent in WCH than SH, and its possible impact on outcome should be evaluated in future studies. WCH shows significantly higher risk than normotension, although the best method for its detection and treatment remains to be established but the method to detect may lay in the diurnal ambulatory blood pressure values.

PP.42.365 ASSOCIATION OF EARLY SYSTOLIC BLOOD PRESSURE RESPONSE TO EXERCISE WITH FUTURE CARDIOVASCULAR EVENTS IN UNCOMPROMISED MILD TO MODERATE HYERTENSION
M. S. Cho, C. H. Lee, J. Y. Lee, C. Park. Asan Medical Center, University of Ulsan College of Medicine, Seoul- South Korea
Objective: The relationship between blood pressure (BP) response during exercise and future cardiovascular events remains unclear. We tried to find out the impact of early systolic blood pressure (SBP) rising during exercise test to the future cardiovascular event in the patients with sustained hypertension (HT).

Design and Methods: Between 2002 and 2005, a total of 300 patients who were newly diagnosed mild to moderate HT without complications were enrolled from Asan - ambulatory blood pressure monitoring (ABPM) registry. All patients successfully performed treadmill test with achieving target heart rate according to Naughton-Balke protocol. The patients were divided into quartiles according to SBP at 8 minutes (7.4 METS). The primary end point was composite of death, IHD and stroke.

Result: The 5-year survival rate was not significantly different among quartiles (60% vs. 75% vs. 59.7% vs. 98.4% in quartile 1 to 4 respectively, Log rank p = 0.435). For 5 years, event free survival rate was significantly lower in quartile 3 and 4 than the quartile 1 (98.3% vs. 90.2%, Log rank p = 0.026, 98.4% vs. 88.2%, Log rank p = 0.023). After multivariable adjustment for covariates, the risk for the composite of death, IHD and stroke was not significantly different between quartile 4 and quartile 1 (Hazard ratio, 8.11; 95% confidence interval, 0.72-91.46; p = 0.09).

Conclusion: We found that the risks of death, IHD, stroke was not significantly different among quartiles after further adjusting for covariates. The exercise BP response alone may not be a good predictor of future cardiovascular events in the patients with mild to moderate HT.

PP.42.365 PROGNOSTIC VALUE OF WHITE-COAT DIAGNOSED BY AMBULATORY MONITORING IN INITIALLY UNTREATED SUBJECTS
C. Dos Santos Moreira, P. Alcântara, C. Alcântara, V. Ramalhinho, C. Bastos, J. Braz Nogueira. Department of Medicine 1 - Faculty of Medicine - University of Lisbon, Lisbon-Portugal

The prognostic impact of white-coat hypertension (WCH) is not yet completely clear. In this study, we investigated cardiovascular outcome in normotensives, white-coat hypertension (WCH) and sustained hypertension (SH) in the short and long-term follow-up (during six years). The purpose of the study was to assess the prognostic significance of WCH in patients in a reference center of hypertension, and to compare the evolution of the WCH during six years based in the results for BP measured in the office and during 24-h ambulatory monitoring. Twenty-four-hour ambulatory blood pressure monitoring offers a more valid assessment of an individual’s true blood pressure level by taking frequent readings during routine daily activities.

Material and Methods: We have studied 125 patients with WCH and 102 normotensives. In the WCH group we splitted them in two groups depending on the quantification of the blood pressure at the time of the WCH: office blood pressure and daytime ambulatory BP during the six years. Office BP was considered normal when systolic BP was < 140 mmHg and diastolic BP < 90 mmHg; the cut off values for daytime ambulatory BP were 135 and 85 mmHg, respectively. White-coat hypertension was defined as isolated ambulatory hypertension and sustained blood pressure was defined as ambulatory and office hypertension. The clinical variables analyzed included blood pressures, age, sex, body mass index, serum cholesterol, fibrinogen, smoking, sleep period and years of follow-up. Microalbuminuria was determined in all patients with an interval of six month. We considered that the patient had microalbuminuria positive if the concentration was more than 30 mg/24hours. We used a one-way model to compare the groups and a Logrank test for studying the albumin.

Results: During the six years, 64 patients changed from WCH to SH, and when analyzing the basal values of the two populations presented significative differences according to the values of Ambulatory Diurnal Systolic and Diastolic pressures (125.4 ± 8.1; 132.4 ± 7.3; p < 0.001 and 70.3 ± 6.1; 78.3 ± 5.6; p < 0.001). When comparing the three populations, and considering microalbuminuria event to be present, we found significative differences between the three analyzed populations according to the logrank model (p < 0.001) and (p < 0.001) when comparing the WCH to the SH.

Conclusions: Cardiovascular risk is significantly different between WCH and normotension, regardless of the normotensive population type and follow-up length. However, follow-up drug therapy and microalbuminuria was more frequent in WCH other than in SH. Therefore, HP was more prevalent in WCH than SH, and its possible impact on outcome should be evaluated in future studies. WCH shows significantly higher risk than normotension, although the best method for its detection and treatment remains to be established but the method to detect may lay in the diurnal ambulatory blood pressure values.
INCREASING OF HIGHLY SENSITIVE C-REACTIVE PROTEIN AND FIBRINOGEN LEVELS IN WOMEN WITH PREECLAMPSIA

M. Craina1, P. Stanciu1, E. Bernad1, C. Serban2, R. Nitu1.1 University of Medicine and Pharmacy Victor Babes/Department of Obstetrics and Gynecology Bega, Timisoara-Romania, 2 University of Medicine and Pharmacy Victor Babes/Pathophysiology Department, Timisoara-Romania

Objective: In pregnancies with preeclampsia exists a generalized inflammatory response that is much more intense than in normal pregnancy. The aim of this study was to measure maternal plasma concentrations of hsCRP and fibrinogen in preeclamptic women compared to healthy pregnant women.

Design and Method: In this prospective study we included 68 preeclamptic women and 60 healthy pregnant women in the last trimester of pregnancy aged 25± 8 years, who were referred to our outpatient cardiological clinic during the first two months of pregnancy. We initially excluded those that underwent in-vitro fertilization (n = 10) and those with antecedent to the pregnancy both hypertension (n = 27), and diabetes mellitus (n = 8). At first visit, hygienic-dietetic consultancy was given in all of the participants (weight = 67 ± 16 Kg, and height = 163 ± 10 cm) and office systolic and diastolic BP measurement (112 ± 8/68 ± 6 mmHg) was performed. From the analysis we excluded those (n = 12), those with hypertensive baseline office BP levels (unrecognized hypertension, n = 21), and those who developed gestational diabetes (n = 28). Between 26th and 28th week of pregnancy, office and ambulatory BP measurement was performed in 460 (215 primipara) pregnant women (n = 59, were lost at follow-up) divided into different gestational clinical BP phenotypes: sustained hypertension (GSH), masked hypertension (GMH), white-coat hypertension (GWCH) and normotension (GNT).

Results: At 26th-28th week of pregnancy, the prevalence of GSH, GMH, GWCH and GNT was 6% (n = 23), 4% (n = 18), 12% (n = 55) and 79% (n = 364) respectively. In the total population preeclampsia was developed in 2.2% (n = 10, [GSH, n = 5, GMH n = 4, and WCH, n = 1]), whereas preterm delivery was performed in 12% (n = 55) including 8 of 10 preeclamptic women. In a logistic multivariate regression model including age, weight and height at first visit, the multinomial variable of gestational clinical BP phenotypes (reference was the GNT phenotype) preterm delivery was determined by weight: 1.07 (1.02-1.14) p = 0.025, GSH: 5.12 (3.4-9.6), p < 0.001, and GMH: 3.1 (2.1-6.9), p = 0.008, whereas GWCH failed to determine outcome.

Conclusion: Ambulatory BP monitoring in the early third trimester of pregnancy translated into diverse clinical phenotypes and among them the out-of-clinic hypertensive including masked hypertension demonstrated an adverse effect on preterm delivery. In the same setting, masked hypertension was strongly related to the development of preeclampsia later in pregnancy.

PREVALENCE AND PREDICTIVE VALUE OF MASKED HYPERTENSION IN PREGNANCY

O. Papazachou1, C. Thomopoulos1, M. Daskalaki1, N. Rodolakis1, D. Papadopoulos1, A. Komnou1, M. Papavassiliou1, T. Makris1.1 Cardiology Dept, Helena Venizelou Hospital, Athens-Greece, 2 Cardiology Dept, Laiko Hospital, Athens-Greece, 3 Cardiology Dept, Stimonaglio Hospital, Athens-Greece

Objective: We aimed to determine the prevalence of masked hypertension in the early third trimester (26th – 28th week) of pregnancy and its relation to preterm (< 37 week) delivery and incident preeclampsia.

Methods: We studied 615 consecutive white women without co-morbidities, aged 25 ± 8 years, who were referred to our outpatient cardiological clinic during the first two months of pregnancy. We initially excluded those that underwent in-vitro fertilization (n = 10) and those with antecedent to the pregnancy both hypertension (n = 27), and diabetes mellitus (n = 8). At first visit, hygienic-dietetic consultancy was given in all of the participants (weight = 67 ± 16 Kg, and height = 163 ± 10 cm) and office systolic and diastolic BP measurement (112 ± 8/68 ± 6 mmHg) was performed. From the analysis we excluded those (n = 12), those with hypertensive baseline office BP levels (unrecognized hypertension, n = 21), and those who developed gestational diabetes (n = 28). Between 26th and 28th week of pregnancy, office and ambulatory BP measurement was performed in 460 (215 primipara) pregnant women (n = 59, were lost at follow-up) divided into different gestational clinical BP phenotypes: sustained hypertension (GSH), masked hypertension (GMH), white-coat hypertension (GWCH) and normotension (GNT).

Results: At 26th-28th week of pregnancy, the prevalence of GSH, GMH, GWCH and GNT was 6% (n = 23), 4% (n = 18), 12% (n = 55) and 79% (n = 364) respectively. In the total population preeclampsia was developed in 2.2% (n = 10, [GSH, n = 5, GMH n = 4, and WCH, n = 1]), whereas preterm delivery was performed in 12% (n = 55) including 8 of 10 preeclamptic women. In a logistic multivariate regression model including age, weight and height at first visit, the multinomial variable of gestational clinical BP phenotypes (reference was the GNT phenotype) preterm delivery was determined by weight: 1.07 (1.02-1.14) p = 0.025, GSH: 5.12 (3.4-9.6), p < 0.001, and GMH: 3.1 (2.1-6.9), p = 0.008, whereas GWCH failed to determine outcome.

Conclusion: Ambulatory BP monitoring in the early third trimester of pregnancy translated into diverse clinical phenotypes and among them the out-of-clinic hypertensive including masked hypertension demonstrated an adverse effect on preterm delivery. In the same setting, masked hypertension was strongly related to the development of preeclampsia later in pregnancy.

FREQUENCY AND RISK FACTORS ASSOCIATED WITH HELLP SYNDROME

P. Stanciu1, M. Craina1, E. Bernad1, C. Serban2, R. Nitu1.1 University of Medicine and Pharmacy Victor Babes/Bega Clinic of Obstetrics and Gynecology, Timisoara-Romania, 2 University of Medicine and Pharmacy Victor Babes/Pathophysiology Department, Timisoara-Romania

Objective: HELLP syndrome, an obstetric complication that is frequently mis-diagnosed at initial presentation is characterized by haemolysis, elevated liver enzymes and low platelet count and is consider a variant of preeclampsia. The purpose of our study was to analyze the frequency of HELLP syndrome in our clinic and risk factors observed in women diagnosed with HELLP syndrome.

Design and Method: This retrospective study included 22 women diagnosed with HELLP syndrome that attended the University Clinic of Obstetrics and Gynecology “Bega” from Timisoara-Romania in a two years period. We divided the women in two groups considering Tennessee Classification System diagnostic criteria for HELLP syndrome: haemolysis with increased LDH (> 600 U/L), AST (> 70 U/L), and platelets < 100-109/L; 14 women with complete HELLP syndrome and 8 women with partial accomplished HELLP criteria. The severity of the syndrome was quantified by the values reached by liver enzymes, markers of hemolysis, platelet number, and blood pressure.

Results: 14 women out of 22 (63%) diagnosed with complete HELLP syndrome underwent an urgent cesarean delivery and 8 of 22 (37%) diagnosed with incomplete HELLP syndrome benefits from conservative management with supportive measures to allow fetal maturity. However in 5 of these cases (62%) a cesarean delivery was required due to aggravated symptoms and in 3 cases (38%) a vaginal delivery was triggered after 37 weeks of gestation. The risk factors observed were maternal age over 35 years in 6 cases (27.2%), gestational age (27-36 weeks) in 19 cases (86.3%), increased systolic and diastolic blood pressure values in 15 cases (68.1%), decreased platelet count in 17 cases (77.2%), and increased alanine aminotransferase (ALT) and aspartate aminotransferase (AST) values in 14 cases (63.6%), increased lactate dehydrogenase (LDH) values in 16 cases (72.7%), decreased fetal weight and decreased Apgar scores in 19 cases (86.3%).

Conclusions: Our study showed that a lot of risk factors like are associated with HELLP syndrome. A prompt recognition and treatment is emphasized in these women, because the prognosis can be adversely affected by delayed or less than optimal diagnosis and treatment.
Abstracts

Levels (1437,0 vs 2000,0 µg/ml). Associated maternal complications (n = 74) were significantly associated with class 1 HELLP syndrome (67,6%, OR:3,66), postpartum onset (14,3% vs 28,3%; OR:2,38), headache (29,5% vs 51,3%; OR:2,51), visual symptoms (8,1% vs 18,9%; OR:2,63), transfusion (15,3% vs 50,0%; OR:5,53), fetal distress (1,02% vs 27,02%; OR:53,93), and lower levels of hemoglobin and platelets and higher levels of bilirubin, transaminases, LDH, uric acid and D-dimers. Maternal mortality: 0,6%.

Conclusions: as described above, different factors were identified with a worse maternal and fetal outcome, so their presence must lead to a close monitoring of the disease. The possibility that the development of maternal complications may be increased when the onset of the disease is after delivery suggests the necessity of having a high grade of suspicion in every case also during the first days postpartum.

Results: There were 172 women with HELLP syndrome during the study period. No fetal viability (n = 25) was significantly associated with a higher frequency of preeclampsia in previous gestations (6,8% vs 24%; OR:4,33), abruptio placenta (5,4% vs 32%; OR:8,18), and requirement for blood transfusion (26,5% vs 52%; OR:3,0), a lower gestational age (34,0 vs 26,5 weeks), and fetal weight (1997,5 vs 600,0 gr), and increased systolic (170,0 vs 190,0 mmHg) and diastolic blood pressure (105,0 vs 110,0) and D-dimer levels (1437,0 vs 2000,0 µg/ml). Associated maternal complications (n = 74) were significantly associated with class 1 HELLP syndrome (67,6%, OR:3,66), postpartum onset (14,3% vs 28,3%; OR:2,38), headache (29,5% vs 51,3%; OR:2,51), visual symptoms (8,1% vs 18,9%; OR:2,63), transfusion (15,3% vs 50,0%; OR:5,53), fetal distress (1,02% vs 27,02%; OR:53,93), and lower levels of hemoglobin and platelets and higher levels of bilirubin, transaminases, LDH, uric acid and D-dimers. Maternal mortality: 0,6%.

Conclusions: as described above, different factors were identified with a worse maternal and fetal outcome, so their presence must lead to a close monitoring of the disease. The possibility that the development of maternal complications may be increased when the onset of the disease is after delivery suggests the necessity of having a high grade of suspicion in every case also during the first days postpartum.
Background: Resistant hypertension (RH) is defined as the failure to reach blood pressure (BP) goal in patients (pts) treated with an appropriate three-drug regimen including a diuretic.

Objective: To compare clinical characteristics and laboratory parameters of controlled and resistant essential hypertensive pts after a standardized 4-week 3 drug-regimen including a diuretic.

Methods: In the selection phase of a randomized trial, we included patients referred for RH after a negative standardized screening for secondary hypertension. Then, all patients received a standardized 3-drug regimen (irbesartan 300 mg/d, hydrochlorothiazide 12.5 mg/d, amlodipine 5 mg/d). After 4-week treatment, pts underwent clinical and biological assessment and a 24h-BP monitoring with the SpaceLab® 90207 monitor. Pts were classified as “controlled” if mean day-time ambulatory BP (dABP) was < 135 and 85mmHg or “resistant hypertensive” pts if dABP was > 135 and/or 85mmHg.

Results: Among 202 pts included in the study, 27 were classified as controlled by and 175 as resistant to the standardized 4-week treatment. Resistant hypertensive pts were more often men (75% vs 48%; p = 0.01) and had higher plasma uric acid (342 ± 75 vs 305 ± 75 mmol/l; p = 0.01), lower HDL-cholesterol (1.2 ± 0.3 vs 1.4 ± 0.4 mmol/l; p = 0.02) and lower plasma renin concentra-
tion (geometric mean 21 [95% CI: 18-24] vs 54 [35-85] pg/ml; p < 0.0001) on week 4. Age, ethnicity, body mass index, diabetes, current smoking, estimated glomerular filtration rate, urine sodium and aldosterone excretion did not sign-
ificantly differ between the two groups.

Conclusions: After 4 week triple drug-regimen including a low dose diuretic, pts with RH achieve a lower plasma renin concentration than those who responded adequately to the treatment. As recommended by international guidelines, this confirms the need to increase the sodium depletion in RH to achieve BP control.

PP.43.371 CHIEF: CHINESE HYPERTENSION INTERVENTION EFFICACY STUDY

W. Wang1, L. Y. Ma1, M.B. Liu1, Q. Deng1, Y.Q. Zhang2, L.S. Liu2. 1National Center for Cardiovascular Disease,Fu Wai Hospital,Cams, Beijing-China, 2FuWai Hospital, Beijing-China

Aim: To evaluate the effects of amlodipine-based antihypertensive combination treatment on the blood pressure control goals and cardiovascular events.

Subject and Methods: From Oct. 2007 to Oct. 2008, a total of 13542 patients have been randomized into study from 180 centres in China.Patients are eligi-
gle for inclusion in the study if they are essential hypertension, 50-79 years of age with at least one cardiovascular risk factor and sign the consent forms. This project is a multi-centre randomized, controlled, blind-endpoint assess-
ment clinical trial. Patients are randomly assigned to low-dose amlodipine (2.5mg/d) + diuretics (1/2 table; group A) or amlodipine(2.5mg/d) + telmis-
artan (40mg/d; group T). The primary endpoints are composite of non-fatal stroke/myocardial infarction and cardiovascular death. All patients will be followed-up for 4 years(2007-2012).

Interium of Results: The characteristics of patients in both Group A and group T were similar: mean age 61.5 ± 7.7 Yrs, history of cerebrovascular diseases 19%, coronary diseases 12%, diabetes 18%, dyslipidemia 42%, mean blood pressure 157/93 mmHg. After 8-week treatment, mean blood pressure in both groups were reduced to 133/80mmHg, with an average reduction of 24/13mmHg. Blood pressure control rates reached 72.1% and 72.6% in group A and T, respectively. Mean blood pressure control rate reached 77.6%, 85.9% and 87.0% in Group A, and 77.7%,85.6% and 87.1% in Group T after 6, 12, 24 months treatment, respectively.

Conclusion: Randomization of patients was successfully implemented in this trial. Amlodipine-based antihypertensive combination regimen achieved a higher blood pressure control rate in patients with essential hypertension in China.(No. 2006BA010A03, National 11.5 Key Project of Scientific and Technical Supporting Programs) US ClinicalTrials.gov identifier: NCT01011660 C/O: Wang Wen; Email: wangfw@yahoo.cn Fuwai Hospital, Beijing 100037
OBJECTIVES: Clinical studies have documented morning-evening, administration-time differences in blood pressure (BP) lowering efficacy, duration of action, safety profile and/or effects on the circadian BP pattern of several different classes of hypertension medications. Only one previous study has evaluated the safety profile and/or effects on the circadian BP pattern of several different hypertension medications. We studied 204 subjects with essential hypertension (95 men and 109 women), aged 40.7 ± 11.1 years, initially randomly assigned to receive valsartan (160 mg/day) as a monotherapy either on awakening or at bedtime for 12 weeks. Due to uncontrolled ambulatory BP, HCTZ (12.5 mg/day) was added to valsartan as a single-pill formulation, maintaining the original circadian time of treatment, for another 12 weeks. BP was measured by ambulatory monitoring at 20-min intervals from 07:00 to 23:00h and at 30-min intervals at night for 48h before and after adding HCTZ. Physical activity was simultaneously monitored every minute by wrist actigraphy.

RESULTS: Adding HCTZ resulted in a statistically significant reduction of the 24h BP mean, slightly greater after bedtime dosing (decrease of 6.1/4.0 mmHg in systolic/diastolic BP after HCTZ on awakening; 9.2/5.6 mmHg after bedtime dosing; P = 0.034/0.096 between groups). The efficacy of HCTZ on the awake BP mean was similar for the 2 treatment-groups (P > 0.254). Results, however, reveal a greater efficacy with bedtime dosing in regulating sleep-time BP mean (decrease of 4.4/3.2 mmHg in systolic/diastolic BP after HCTZ on awakening; 6.1/4.0 mmHg after bedtime dosing; P < 0.001 between groups). Accordingly, there was a significant (P < 0.001) increase in sleep-time relative BP decline towards a more dipping BP pattern only when HCTZ was added at bedtime.

CONCLUSIONS: In patients not properly controlled with valsartan monotherapy, the addition of 12.5 mg/day HCTZ efficiently reduces BP to a larger extent after bedtime dosing. Bedtime administration of HCTZ is also significantly more efficient than morning dosing in reducing sleep-time BP, the most relevant prognostic marker of cardiovascular morbidity and mortality.

RESULTS: The median time of follow-up was 5.6 yrs (range 0.5 to 8.6 yrs). In hypertensive subjects treated with all medications upon awakening, CVD risk was progressively higher with incremental number of agents used for treatment (1.75, 2.26, 3.02, and 4.18 in patients treated with 1, 2, 3 or 4 medications, respectively; P < 0.001 compared to normotensive subjects). CVD risk was markedly lower in subjects treated with ≥ 1 medications at bedtime (0.35, 1.45, 0.94, and 2.28 with 1, 2, 3 or 4 total ingested medications respectively). CVD risk was even lower, and always statistically comparable to that of normotension, when subjects were treated with al medications at bedtime (0.35, 0.39, 0.87, and 0.79 with 1, 2, 3 or 4 medications).

CONCLUSIONS: Pharmacological therapy of hypertension should take into account when to treat with respect to the rest-activity cycle of each individual subject. Bedtime chronotherapy has been shown to be more effective in decreasing sleep-time BP and thus significantly reduce CVD risk. These novel results challenge the common belief of a residual CVD risk among hypertensive subjects that cannot be properly reduced by pharmacotherapy with available hypertension medications.
Olomouc, Olomouc-Czech Republic, 2 Prostějov Hospital, Prostějov-Czech Republic, 3 St. Anne’s University Hospital, Brno-Czech Republic, 4 Military Hospital, Olomouc-Czech Republic, 6 University Hospital Ostrava, Ostrava-Czech Republic, 7 Faculty of Medicine and The Faculty of Science of the Masaryk University, Brno-Czech Republic, 8 Faculty of Informatics and Statistics, University of Economics in Prague, Prague-Czech Republic, 9 Hradec Hospital, Hradec N. Mor.-Czech Republic

Background: There is currently limited data on which drug should be used to improve blood pressure control in patients with resistant hypertension. This study was designed to assess the effect of the addition of 25 mg of spironolactone on blood pressure (BP) in patients with resistant arterial hypertension.

Methods: Patients with office systolic BP > 140 mm Hg or diastolic BP > 90 mm Hg despite treatment with at least 3 antihypertensive drugs, including a diuretic, were enrolled in this double-blind, placebo-controlled, multicentre trial. 117 patients were randomly assigned to receive spironolactone (n = 59) or a placebo (n = 58) as an add-on to their antihypertensive medication, by the method of simple randomization.

Results: Analyses were done with 111 patients (55 in the spironolactone and 56 in the placebo group). At 8 weeks, the primary end point – a difference in mean fall of BP on day-time ambulatory blood pressure monitoring (ABPM) between the groups was -5.4 mm Hg (95% CI -10.0, -0.8) for systolic (p = 0.024) and -1.0 mm Hg (95% CI -4.0, 2.0) for diastolic BP (p = 0.358). The ABPM night-time systolic, 24-hour ABPM systolic and office systolic BPs were significantly decreased by spironolactone (difference of -8.6, -9.8 and -6.5 mm Hg; p = 0.011, 0.004 and 0.011), while the fall of the respective diastolic BP values was not significant (-3.0, -1.0 and -2.5 mm Hg; p = 0.079, 0.405 and 0.079). The adverse events in both groups were comparable.

Conclusions: Spironolactone is an effective drug for lowering systolic blood pressure in patients with resistant arterial hypertension.

DECREASING SLEEP-TIME BLOOD PRESSURE DETERMINED BY AMBULATORY MONITORING REDUCES CARDIOVASCULAR RISK IN RESISTANT HYPERTENSION


Objectives: Independent prospective studies have found that the sleep-time blood pressure (BP) mean is a better predictor of cardiovascular (CVD) risk than the awake or 24h BP means. However, a limitation of all of the previous studies is that they use actigraphy factors for PWV.

Methods: The median time of follow-up was 5.4 yrs (range 0.5 to 8.5 yrs). Subjects randomized to ingest ≥ 1 medications at bedtime experienced significantly better BP control during sleep as expressed by the enhanced reduction of the asleep BP mean and increased sleep-time relative BP decline towards a more dipping BP pattern. The decrease in sleep-time BP mean during follow-up was significantly associated with event-free survival (relative risk for each 5 mmHg decrease in sleep-time mean 0.89 [0.84-0.94], p < 0.001). Moreover, the decrease in mean asleep BP during follow-up was the only parameter significantly associated with survival when other ABPM characteristics (including daytime BP mean, morning surge, or standard deviation) were simultaneously included in the Cox regression models.

Results: The mean time of follow-up was 5.4 yrs (range 0.5 to 8.5 yrs). Subjects randomized to ingest ≥ 1 medications at bedtime experienced significantly better BP control during sleep as expressed by the enhanced reduction of the asleep BP mean and increased sleep-time relative BP decline towards a more dipping BP pattern. The decrease in sleep-time BP mean during follow-up was significantly associated with event-free survival (relative risk for each 5 mmHg decrease in sleep-time mean 0.89 [0.84-0.94], p < 0.001). Moreover, the decrease in mean asleep BP during follow-up was the only parameter significantly associated with survival when other ABPM characteristics (including daytime BP mean, morning surge, or standard deviation) were simultaneously included in the Cox regression models.

Conclusions: In resistant hypertension, the progressive reduction in the asleep BP mean from baseline was the most significant predictor of survival. Treatment at bedtime is the most cost-effective and simplest strategy of successfully achieving the therapeutic goals of adequate asleep BP reduction and preserving or re-establishing the normal 24h BP dipping pattern.

NO DIFFERENCE IN PULSE WAVE VELOCITY BETWEEN PRIMARY HYPERALDOSTERONISM AND ESSENTIAL HYPERTENSION

I. Kantola, V. Väliaho, J. Varis. Turku University Hospital, Turku-Finland

Objective: Primary hyperaldosteronism (PHA) is probably the most common etiologic factor for secondary hypertension. Hypertension connected to PHA usually achieves more damage on arterial wall and target organs than essential hypertension (EH).

Design and Method: We compared the pulse wave velocity (PWV) of 20 patients with PHA to 20 gender, age, diabetes, smoking, blood pressure and cholesterol medication matched patients with essential hypertension. In the PHA group, aldosterone producing adenoma had been removed in 11 subjects, 9 subjects had either bilateral hyperplasia or a non-operated adenoma. A Doppler ultrasonography device (Micro Medical PulseTrace PWV, Micro Medical Ltd; Rochester, Kent, UK) was used for the measurement of both carotid-femoral (C-F) and carotid-radial (C-R) PWV.

Results: C-F PWV was 8.6 (1.4) m/s in patients with PHA and 9.2 (1.8) (p = 0.202) in patients with EH. C-R PWV was 10.3 (1.2) m/s and 10.2 (1.3) (p = 0.646), respectively. Neither group presented significant differences in PWV's between the sexes. Smokers had a significantly higher Doppler C-F PWV in the control group (10.5 (2.1) vs. 8.7 (1.5), p = 0.046) and also in united study and control subjects (10.0 (1.7) vs. 8.5 (1.4), p = 0.006). A similar difference was observed in the study group, but only with borderline significance (9.5 (1.2) vs. 8.2 (1.3), p = 0.063). Surgical vs conservative treatment of PHA or gender showed no difference in PWV. The explanatory factors defining Doppler C-F PWV were DBP (R-square of 0.412, p = 0.003) and SBP during the examination (p = 0.03), overall SBP (p = 0.07) and evening DBP (p = 0.05) in home monitoring. For Doppler C-R PWV, the significant variables were 24h sleep SBP standard deviation (R-square 0.318, p = 0.009) and 24h SBP dipping between wake and sleep periods (R-square 0.2278, p = 0.010).

Conclusion: Our findings disagree with two earlier studies; since in our study PWV did not significantly differ between patients with either primary aldosteronism or essential hypertension. Smokers had a higher PWV than non-smokers. PWV in treated or not-treated aldosteronism did not differ from each other. Systolic and diastolic blood pressures were the most important explanatory factors for PWV.

IMPACT OF INDAPAMIDE SR, AMLODIPINE, AND CANDESARTAN ON BLOOD PRESSURE VARIABILITY: THE X-CELLENT TRIAL

Y. Zhang1, D. Agnoletti2, M.E. Safar2, J. Blacher2. 1Shanghai Institute of Hypertension, Shanghai-China, 2Diagnosis and Therapeutic Center; Hôtel-Dieu Hospital; Ap-Hp; Paris Descartes University, Paris-France

Objective: Recently, blood pressure (BP) variability has emerged as a critical cardiovascular risk factor, which should be controlled by antihypertensive drugs. The aim of the study was to investigate the effect of different antihypertensive agents on BP variability.

Design and Method: We analyzed ambulatory blood pressure monitoring data in 579 patients before and after 3-month antihypertensive treatment, in a multicenter, multinational, randomized, double-blind, and placebo-controlled study with four parallel treatment arms, the X-CELLENT trial (NCT011X SR versus Candesartan and amlopidine in the reduction of systolic blood pressure in hypertensive patients).

Results and Conclusions: Our results indicate that amlopidine and indapamide SR were the only antihypertensive agents to decrease BP variability significantly. Amlodipine significantly decreased variability in most BP components (systolic BP, diastolic BP, pulse pressure, and mean BP) in three time frames (24-hour, daytime, and nighttime). Indapamide SR significantly decreased variability in systolic BP in two time frames (24-hour and daytime). Candesartan did not reduce BP variability.
Table 1. Comparisons of systolic BP variability after 3-month antihypertensive treatment

<table>
<thead>
<tr>
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<th>Placebo</th>
<th>Indapamide SR</th>
<th>Amlodipine</th>
<th>Candesartan</th>
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<tr>
<td>(n = 120)</td>
<td>(n = 133)</td>
<td>(n = 124)</td>
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24-h 12.4 ± 2.7 11.7 ± 2.5* 11.5 ± 2.6* 12.2 ± 2.7 0.022
Daytime 13.2 ± 3.7 12.3 ± 3.0* 12.0 ± 3.1* 12.6 ± 3.2 0.034
Nighttime 11.4 ± 3.2 10.7 ± 3.3 10.2 ± 3.2* 11.4 ± 3.3 0.015

Values are mean ± SD.
* indicates P < 0.05 by subgroup test when compared with placebo (only conducted when P for trend reached statistical significance).

### PP.43.381 BLOOD PRESSURE REDUCTION IN CARDIO-RENAL HYPERTENSIVE PATIENTS: RESULTS FROM THE 3A REGISTRY

1 University Hospital Erlangen, Nephrology and Hypertension, Erlangen-Germany, 2 Humboldt-Universität Zu Berlin, 3 Universitätsklinikum Charité, Berlin-Germany, 4 Clinical and Regulatory Affairs, Novartis Pharma GmbH, Nurnberg-Germany, 5 Cardiology, Klinikum Ludwigshafen, and Institut für Herzinfarktforschung Ludwigshafen, Ludwigshafen-Germany

#### Background:
Cardiovascular disease (CV) combined with chronic renal failure has a high cardiovascular morbidity and mortality and thus effective blood pressure control is critical to prevent complications.

#### Methods:
In the non-interventional 3A Registry study conducted in Germany, patients were eligible for documentation in whom the physician had decided to modify the antihypertensive therapy. This included treatment with the direct renin inhibitor aliskiren (DRI) or an ACE inhibitor (ACE-I)/angiotensin receptor blocker (ARB) or an agent not blocking the renin-angiotensin-system (non-RAS), alone or on top of an existing drug regimen. Patients were prospectively followed for one year.

#### Results:
Of the 14576 patients recruited by 923 physicians in Germany in 2008 and 2009, 591 (10.9%) hypertensive patients had cardio-renal disease defined by diagnosed CV disease and estimated glomerular filtration rate < 60 ml/min/1.73 m². In the cardio-renal disease patients treated with different antihypertensive regimen the fall in blood pressure after one year were obtained: Patients with an aliskiren containing regimen showed a similar (10.8 ± 13.7 ± 14.4%; p = 0.11, p = 0.30) or, if any, greater blood pressure reductions than patients with ACE-I/ARB containing regimen (9.1 ± 13.6 ± 14%) or non-RAS (9.8 ± 125.1 ± 14%), without significant adverse effect on renal function or potassium concentrations. The same was found for decreases in ambulatory blood pressure recording.

#### Conclusions:
According to our real life analysis direct renin inhibition with aliskiren is effective in lowering blood pressure in patients with cardio-renal syndrome without provoking adverse renal effects.

### PP.43.382 AMLODIPINE/VALSARTAN SINGLE PILL COMBINATION REAL LIFE SAFETY AND EFFECTIVENESS IN THE TREATMENT OF HYPERTENSION

I. Chazova1, N. Dongre2, A. Vignochik1, 1 Russian Cardiology Scientific-Industrial Complex, Moscow-Russia, 2 Novartis Pharma Ag, Basel-Switzerland, 3 Novartis Pharma Llc, Moscow-Russia

#### Objectives:
The aim of our study was to evaluate safety and effectiveness of the single pill combination of amlopidine and valsartan in patients with arterial hypertension (HTN).

#### Methods:
This was a multicenter, open-label, observational, non-interventional, post marketing surveillance study conducted in Russia, Philippines, Saudi Arabia, Middle East Countries, Thailand and India. 9090 patients with HTN were enrolled. 754 were excluded from per protocol analysis (296 were lost to follow-up, 72 discontinued due to adverse events, 3 patients died, 348 had missing data, 35 due to other reasons). 8336 patients completed the study: mean age 54.7 years, 43.1% men, 41.3% Asian, 50.1% Caucasian, 83.4% with prior HTN treatment (discontinued), baseline blood pressure (BP) of 165.099.3.

#### Results:
The significant reduction in BP (-36.3-18.9 mmHg, p < 0.0001) was achieved during 12 weeks of treatment with amlopidine/valsartan single pill combination resulting in a final BP of 128.780.4 mmHg. We observed a dose-dependent effect with the least BP reduction for 5/80 mg dose (-32.4-17.8 mmHg, p < 0.0001), average BP reduction for 5/160 mg (-34.9/18.3 mmHg) and the greatest for 10/160 mg doses (+4.1/-20.6 mmHg, p < 0.0001). Treatment response increased with increasing severities of baseline BP with the greatest BP drops observed in grade III patients with systolic BP over 200 mmHg. The BP drops by baseline BP severity are presented. [figure1] Mean BP levels in all subgroups of patients after 12 weeks of amlopidine/valsartan single pill combination treatment were lower than 140/90 mmHg. BP control (< 140/90 mmHg) was achieved in 77.7% patients at the end of the study period.

#### Conclusion:
Our data shows, that an optimal BP reduction was achieved for all HTN grades as well as isolated systolic HTN providing evidence that most of hypertensive patients may benefit from treatment with amlopidine/valsartan single pill combination.
OBJECTIVE: Only 30% patients (pts) with hypertension and diabetes achieve the recommended blood pressure (BP) target of <130/80 mm Hg, even with combination therapy which is often required. This study closely mimics trends in real-life clinical practice, and evaluates the probability of achieving BP targets with an aliskiren (ALI)-based stepped-care regimen in pts with mild-to-moderate hypertension. Results of pre-specified sub-analyses in pts with diabetes are reported.

Methods: This was a 24-week, open-label, non-comparator study in pts with mean sitting systolic BP (msSBP) 140 to <180 mm Hg and/or mean sitting diastolic BP (msDBP) 90 to <110 mm Hg. Incremental therapy with an aliskiren (ALI)-based stepped-care regimen in pts with mild-to-moderate hypertension and diabetes mellitus. Results of pre-specified sub-analyses in pts with diabetes are reported.

Results: Of 256 pts treated, 88 (34.4%) had diabetes at baseline. In this subgroup all pts were Caucasian, 51.5% were obese (body mass index ≥30 kg/m²), with mean age: 59.8 years, mean duration of hypertension: 7 years, and mean BP at baseline: 156.9/87.5 mm Hg. At study end, the estimated cumulative probability of reaching BP target was 72.6% (Table). Mean BP reduction from baseline was -29.8/12.0 mm Hg and the estimated probability of reaching SBP or DBP response was 95.9% and 94.5%, respectively.

Conclusion: An ALI-based stepped-care treatment regimen with add-on HCTZ or AML is effective in achieving BP target of <130/80 mm Hg in 72.6% pts with mild-to-moderate hypertension and diabetes mellitus.

Table 1: Estimated cumulative probability of patients with diabetes achieving BP control, per treatment step.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Number of patients who entered the treatment step (N)</th>
<th>Number of patients censored (n') (%)</th>
<th>Estimated cumulative BP control rates (%)</th>
<th>95% confidence interval of percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALI</td>
<td>88</td>
<td>7 (8.0)</td>
<td>3.57</td>
<td>(0.40, 7.55)</td>
</tr>
<tr>
<td>ALI + HCTZ</td>
<td>78</td>
<td>5 (5.7)</td>
<td>32.80</td>
<td>(22.43, 43.16)</td>
</tr>
<tr>
<td>ALI + HCTZ+ AML</td>
<td>50</td>
<td>3 (3.4)</td>
<td>72.58</td>
<td>(62.22, 82.93)</td>
</tr>
</tbody>
</table>

Abstracts e549
PP.43.387  **ADDITION OF HYDROCHLOROTHIAZIDE (H) INCREASES ANTIHYPERTENSIVE EFFICACY IN PATIENTS WITH MODERATE-TO-SEVERE HYPERTENSION WHOSE BLOOD PRESSURE (BP) IS INADEQUATELY CONTROLLED BY DUAL COMBINATION THERAPY (DCT) WITH OLMESARTAN MEDOXOMIL (O) PLUS AMLODIPINE(A)**

J. Scholze¹, D. Magometschnigg².  

**Purpose:** To assess the antihypertensive effects of adding H 12.5 or 25mg in moderate-to-severe hypertensive pts whose BP was inadequately controlled by DCT with O/A 40/10mg.  

**Methods:** All pts received 8 weeks of single-blind treatment with O/A 40/10mg. Pts with seated SBP ≥ 140 mg and DBP ≥ 90 mmHg (N = 808) were then randomised to 8 weeks of double-blind, parallel-group treatment period and either continued DCT with O/A 40/10mg, or had H 12.5 or 25mg added. The primary efficacy parameter was the change in DBP from the end of single-blind to the end of double-blind treatment (Weeks 8–16); changes in SBP, ambulatory BP and seated BP goal rates were also measured.  

**Results:** By Week 16, the addition of H 12.5 and 25 mg had increased further the BP-lowering efficacy of O/A 40/10 mg. Reductions in seated DBP and SBP were largest with O/A/H 25 mg, and significantly greater than those seen in pts randomised to continue with O/A 40/10 mg (2.8 and 3.6 mmHg, respectively, p < 0.0001 for each). Ambulatory BP was significantly reduced by the addition of each dose of H (Table), with the greatest reduction seen with O/A/H 40/10/25 mg. The highest rate of seated BP goal attainment (41.3%), seen with O/A/H 40/10/25 mg, was significantly better than that seen in pts who continued with O/A 40/10 mg (24.2%, p < 0.0001).  

**Conclusions:** In pts who did not achieve adequate BP control on OML 5mg, adding OLM allowed the achievement of a 24 h BP control in about 40% of cases. Treatment up titration in still uncontrolled patients further increased control rates across the groups by 6–10%.  

PP.43.389  **DOSE-DEPENDENT EFFICACY OF PERINDOPRIL ARGinine IN PATIENTS WITH ARTERIAL HYPERTENSION IN THE PREMIA NATIONAL PROGRAM**

I. Chazova, V. Mychkia, M. Kirilova, U. Prokhorova.  

**Objective:** The antihypertensive effect of a new form of perindopril was assessed in an open randomized trial in patients with stage 1 and stage 2 hypertension.  

**Materials and Methods:** The randomized study included 2200 patients from 73 towns. Average age was 56.2 ± 2 years, and 42.6% were men and 57.4% women. In the study patients, the incidence of metabolic syndrome was 44.3%, family history of cardiovascular diseases was 18.3%, and diabetes mellitus was 13.2%. Most (83.2%) patients were previously treated, but had uncontrolled blood pressure (BP > 140/90 mm Hg or ≥ 130/80 mm Hg in diabetes). According to the study design, perindopril 5 mg was initiated in previously untreated patients. In patients with uncontrolled BP, perindopril 5 mg could replace previous ACE inhibitors or angiotensin receptor blockers, if these had been administered at an average dose. After two weeks, perindopril dosage could be up titrated, as required. Other baseline antihypertensive treatments remain unchanged.  

**Results:** In a subset of 538 patients (24.4% of the study population), perindopril 5 mg was initiated and uptitrated to perindopril 10 mg. Mean systolic (SBP) and diastolic (DBP) blood pressures were reduced significantly (see table below). Treatment with perindopril 5 mg resulted in a SBP/DBP reduction of 14.5/6.4 mm Hg versus baseline. After dose uptitration to perindopril 10 mg, mean reduction in SBP/DBP reached 29.4/13.3 mm Hg. Perindopril treatment was well tolerated.  

**Conclusion:** Perindopril dose uptitration resulted in a twofold better reduction in mean blood pressure and should be considered an effective and well-tolerated treatment option for a wide range of hypertensive patients who are newly diagnosed, untreated, or uncontrolled on previous treatment.

**Table:** Blood pressure in patients (n = 538) with uptitration from perindopril 5 mg to perindopril 10 mg

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Baseline</th>
<th>Baseline – Perindopril 5 mg</th>
<th>Baseline – Perindopril 10 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBP, mm Hg</td>
<td>159.83 ± 11.75</td>
<td>94.94 ± 7.05</td>
<td>85.39 ± 6.85</td>
</tr>
<tr>
<td>DBP, mm Hg</td>
<td>94.94 ± 7.05</td>
<td>85.39 ± 6.85</td>
<td>76.45 ± 5.94</td>
</tr>
<tr>
<td>ΔSBP, mm Hg</td>
<td>0.0001 vs baseline</td>
<td>P&lt;0.01 vs week 2</td>
<td></td>
</tr>
<tr>
<td>ΔDBP, mm Hg</td>
<td>0.0001 vs baseline</td>
<td>P&lt;0.01 vs week 2</td>
<td></td>
</tr>
</tbody>
</table>
Differential Effects of Antihypertensive Treatment on Oxidative Stress and Inflammation

M. Serg, P. Kampus, J. Kals, M. Zagura, J. Eha, K. Zilmer, T. Kullisaar
Department of Cardiology, University of Tartu, Tartu-Estonia
Department of Biochemistry, Endothelial Centre: University of Tartu, Tartu-Estonia
Department of Biochemistry, Endothelial Centre: University of Tartu, Tartu-Estonia
Clinical Pharmacology Unit, University of Cambridge, Cambridge-United Kingdom.

Objective: Arterial hypertension is associated with increased oxidative stress and vascular inflammation. These factors may contribute to target organ damage and increased cardiovascular risk in hypertensive patients. Therefore, we studied the effect of four classes of antihypertensive drugs on oxidative stress and inflammatory markers in patients with essential hypertension.

Design and Method: In this double-blinded placebo controlled rotational study we randomized 41 treatment-naive mild to moderate hypertensive patients to receive doxazosin 4 mg, candesartan 16 mg, bisoprolol 5 mg, isosorbide mononitrate 50 mg, and placebo daily for 6 weeks. Brachial blood pressure, plasma high sensitivity C-reactive protein (hsCRP), interleukin-6 (IL-6), asymmetric dimethylarginine (ADMA), oxidized LDL (oxLDL), interleukin-8 (IL-8), and plasma high sensitivity C-reactive protein (hsCRP) were measured during placebo and after each treatment period. Oldham corrections were used to compare changes in blood pressure and biomarkers for all drugs.

Results: Candesartan decreased systolic blood pressure and pulse pressure more effectively than isosorbide mononitrate and bisoprolol (p < 0.01). Only isosorbide mononitrate reduced hsCRP significantly (p < 0.01). Furthermore there was a trend (p = 0.06) to IL-6 reduction with isosorbide mononitrate. However, oxLDL was reduced significantly more with doxazosin than isosorbide mononitrate. These effects of the study were significantly greater in patients with high initial SBP (p < 0.001). Achievement to target SBP < 140 mmHg at visit 3 was found to be similar in both age groups [227/304 (74.7%) vs 460/230 (71.7%) and better in patients with lower initial BP [236/296 (79.7%) vs 771/128 (60.2%); p < 0.001]. A total of 76 adverse events in 60 patients were reported during the course of the study (50 at visit 2 and 26 at visit 3); but only 4 adverse events were reported to have a causality relationship with valsartan/amlopidin combination. There was no influence of either initial SBP or age on the frequency of adverse events.

Conclusions: In conclusion, valsartan/amlopidine single pill combination therapy reduced blood pressure with similar tolerability independent of age and initial systolic blood pressure levels; but a better achievement to target was observed with lower initial SBP in hypertensive patients in our population.

The Influence of Age and Initial Blood Pressure Levels on Blood Pressure Control and Tolerability in Hypertensive Patients Under Single Pill Fixed-Dose Combination of Angiotensin Receptor Blocker and Calcium Channel Blocker

B. Boyaci, P. Kızılirmak, M. Berktaş
1. Department of Cardiology, Gazi University Faculty of Medicine, Ankara-Turkey
2. Medical Manager, Novartis Pharma, Istanbul-Turkey

Objective: To evaluate the influence of age and initial systolic blood pressure levels on blood pressure control and tolerability in hypertensive patients under single pill fixed-dose combination therapy of angiotensin receptor blocker (ARB; valsartan) and a calcium channel blocker (CCB; amlopidine).

Design and Method: A total of 751 patients (62.3% female; mean age: 58.2 ± 11.1 years) under ARB-CCB single pill combination therapy were included in this non-interventional, multi center study at 170 centers in Turkey. The follow-up visits were at intervals based on the physicians’ initiative. Blood pressure (mmHg; visit 1-3) and adverse event incidence (%; visit 2-3) were included in this non-interventional, multi center study at 170 centers in Turkey. The follow-up visits were at intervals based on the physicians’ initiative. Blood pressure (mmHg; visit 1-3) and adverse event incidence (%; visit 2-3) were compared in terms of age (≥ 65 or < 65 years) and initial SBP (≥ 180 or < 180 mmHg) levels.

Results: At the time of this interim analysis, 612 (81.5%) and 425 (56.6%) patients have attended to the follow-up visits conducted in 34.0 ± 10.7 years; 65.5% female) were determined to have systolic blood pressure (SBP) ≥ 180 mmHg at the initial visit while remaining patients had SBP < 180 mmHg (mean age 58.0 ± 10.7 years; 65.5% females).

Mean SBP in age subgroups (≥ 65 or < 65 years) reduced from 168.9 ± 24.0 at initial visit to 131.6 ± 15.9 at visit 3; and from 165.4 ± 22.1 to 130.3 ± 13.3 mmHg, respectively. The reduction in SBP did not differ with age. On the other hand, SBP decreased from 190.9 ± 14.2 to 135.9 ± 18.5 mmHg in patients with initial SBP ≥ 180 mmHg, and from 154.0 ± 14.8 to 128.4 ± 11.4 mmHg in those with initial SBP < 180 mmHg. The reduction in SBP were significantly greater in patients with high initial SBP (p < 0.001). Achievement to target SBP < 140 mmHg at visit 3 was found to be similar in both age groups [227/304 (74.7%) vs 460/230 (71.7%) and better in patients with lower initial BP [236/296 (79.7%) vs 771/128 (60.2%); p < 0.001]. A total of 76 adverse events in 60 patients were reported during the course of the study (50 at visit 2 and 26 at visit 3); but only 4 adverse events were reported to have a causality relationship with valsartan/amlopidin combination. There was no influence of either initial SBP or age on the frequency of adverse events.

Conclusions: In conclusion, valsartan/amlopidine single pill combination therapy reduced blood pressure with similar tolerability independent of age and initial systolic blood pressure levels; but a better achievement to target was observed with lower initial SBP in hypertensive patients in our population.

Aliskiren/Amlopidine Combination Therapy Lowers Blood Pressure More Effectively Than Amlodipine Alone in Patients with Type 2 Diabetes Mellitus or Metabolic Syndrome

R.C. Braun-Dullaeus, D. Zappe, C. Cherif Papat, J. Zhang, Otto-Von-Guericke University, Magdeburg-Germany
Novartis Pharmaceuticals Corporation, East Hanover-USA
Novartis Pharma Ag, Basel-Switzerland

Objective: Patients with stage 2 hypertension are at high risk of cardiovascular events, and this risk is further increased in patients with concomitant diabetes or metabolic syndrome. This was a post hoc analysis of the subgroup of patients with type 2 diabetes mellitus or metabolic syndrome (NCEP ATP III criteria) from an 8-week, double-blind study comparing the efficacy of aliskiren/amlopidine (ALI/AML) combination therapy with amlopidine (AML) monotherapy in patients with stage 2 hypertension.

Methods: In all, 485 patients (mean sitting SBP [msSBP] 160–200 mmHg) were randomized to ALI/AML 150/5 mg or AML 5 mg for 1 week, followed by double the doses for a further 7 weeks. Treatment analyses were performed post hoc by ANCOVA (BP changes) and logistic regression (BP control).

Results: In the overall study population, ALI/AML combination therapy provided significantly greater BP reductions and BP control rates (<140/90 mmHg) than AML alone at week 8 endpoint (Table). In patients with diabetes/metabolic syndrome, ALI/AML produced significantly greater reductions in msSBP and mean sitting DBP (msDBP) than AML after 8 weeks’ treatment (Table), with additional least-squares mean reductions of 3.9 mmHg (95% CI 0.6, 7.7; p < 0.05) and 2.9 mmHg (95% CI 0.6, 5.2; p < 0.05), respectively. There was also a trend towards more patients reaching BP goal with ALI/AML than with AML. Both treatments were generally well tolerated.

Conclusions: ALI/AML provided significant additional BP reductions over AML in patients with stage 2 hypertension and diabetes/metabolic syndrome, as well as in the overall patient population. Aliskiren/amlopidine combination therapy is an effective treatment for hypertension in patients with diabetes or metabolic syndrome.
POSTER SESSION

POSTER SESSION 44

THERAPEUTIC ASPECTS

PP.44.393  IRBESARTAN/AMLODIPINE FIXED COMBINATION IN PATIENTS UNCONTROLLED ON AMLODIPINE 5 MG (I-COMBINE STUDY)

G. Bobrie, On Behalf of The I-Combine Investigators.

Hypertension Unit - Hego - Aphp, Paris-France

Objective: To compare the antihypertensive efficacy of the fixed combination Irbesartan/Amodipine 150mg/5mg (I150/A5) to Amodipine 5mg (A5) in lowering Systolic Home Blood Pressure Measurement (SHBPM) after 5 weeks (W5).

Methods: It was a multicenter, prospective, randomized, open-label, with blinded endpoint evaluation (PROBE) phase III study. Uncontrolled patients (SHBPM ≥ 135 mmHg) after at least 1 week of A5 were randomised (1:1) in 2 parallel groups: one received I150/A5 from W0 to W5 followed by forced titration I/A 150/10 from W5 to W10; the other received A5 from W0 to W5 followed by forced titration A10 from W5 to W10. The primary objective was the SHBPM change between the 2 groups at W5. A secondary objective was SHBPM change between the 2 groups at W10. Compliance was monitored by pill count.

Results: 403 patients from 12 countries were enrolled. ITT analysis was performed on 287 patients. Mean age was 57.3 ± 11.2 years, female 51.9%, obesity 41.8% and diabetes 15.3%. History of CV disease: 6.6%. At W0, mean SHBPM was 148.8 ± 10.0 / 85.0 ± 9.2 mmHg similar in the 2 groups. At W5, mean SHBPM were 135.9 ± 11.6 mmHg in group I150/A5 and 142.9 ± 12.2 mmHg in group A5. The adjusted mean difference between groups was -6.2 ± 1.0 mmHg (p < 0.001). Percentage of controlled patients (HBPM: < 135 and < 85 mmHg) at W5 was 44.7% in group I150/A5 vs. 21.6% in group A5 (p < 0.001). At W10, after Amodipine forced titration, mean SHBPM were 130.6 ± 11.4 mmHg in group I150/A10 and 135.4 ± 10.3 mmHg in group A10. The adjusted mean difference between groups was -6.2 ± 1.0 mmHg (p < 0.001). Percentage of controlled patients (HBPM: < 135 and < 85 mmHg) at W10 was 67.4% in group I150/A10 vs. 44.3% in group A10 (p < 0.001). Compliance at W5 was 95.8% in group I150/A5 and 95.1% in group A5. At W5, 37 (12.8%) patients (pts) experienced adverse events (AE): 20 pts in I150/A5 and 17 in A5. Most frequent AE was headache (2 pts and 5 pts in each group respectively) and oedemas (1 pt and 5 pts respectively). At W10, 46 (16.4%) patients experienced AE: 22 in I150/A5 and 24 in A5. Most frequent AE was dizziness (1 pt and 2 pts and 4 pts and oedemas (7 pts and 9 pts respectively). Per protocol analysis (130 patients in group I/A and 132 in group A) shows similar results.

Conclusion: This study shows that combination of I150/A5 achieve clinically higher BP reduction and BP control than monotherapy with A5. Forced titration of amodipine to 10 mg in both groups induced a further BP decrease but with more AE.

PP.44.394  ADVANCED FORM OF PERINDOPRIL ARGinine IN THE TREATMENT OF HYPERTENSIVE MENOPAUSAL AND NON-MENOPAUSAL WOMEN IN THE NATIONAL PROGRAM PREMIA

M. Kirillova1, V. Mychka1, J. Prokhorova1, S. Olimpieva1, V. Kilikovsky2, I. Chazova2. 1Russian Research and Production Cardiology Complex, Moscow-Russia; 2Russian State Medical University, Moscow-Russia

Objective: To estimate antihypertensive efficacy and cardiometabolic effects of the new form of perindopril arginine in menopausal and non-menopausal women with hypertension, 1-2 stages with high risk.

Design and Methods: The study included 1273 women with hypertension, stages 1-2: average age was 57.9 ± 0.22 years, 248 were non-menopausal and 1025 were menopausal, average weight was 79.36 ± 0.37 kg, body mass index was 29.77 ± 1.13kg/m², waist circumference was 93.28 ± 0.36cm, 5.3% consumed tobacco, 18.5% had family history of cardio-vascular diseases. 27.5% women had increased blood pressure (BP) stage 1,72.5% with stage 2. Women were prescribed 5 mg of perindopril arginine. In women previously treated by another ACE the last was changed to perindopril arginine 5 or 10 mg. If the effect was not enough the therapy included indapamid retard 1.5 mg. All women underwent clinical examination, including the anthropometrical measurement, 24-hour blood pressure monitoring, fasting glucose and glucose during oral glucose tolerance test. Total cholesterol (TC), low density lipoproteins (LDL), high density lipoproteins (HDL), triglycerides (TG) were determined.

Results: After 16 weeks target levels of systolic BP were achieved in 91% of non-menopausal women and 77% of menopausal women. As a result the systolic BP (SBP) significantly decreased from 155.79 ± 0.85 mmHg to 124.17 ± 0.49 mmHg in non-menopausal women and from 161.15 ± 0.36 mmHg to 127.87 ± 0.36 mmHg in menopausal women (p < 0.005), diastolic BP didn’t change significantly: from 94.14 ± 0.51 mmHg to 78.14 ± 0.37 mmHg and from 94.91 ± 0.24 mmHg to 79.49 ± 0.20 mmHg respectively. TC level decreased significantly from 5.52 ± 0.07 mmol/L to 5.07 ± 0.05 mmol/L (p < 0.005) in non- menopausal women and from 5.91 ± 0.03 mmol/L to 5.30 ± 0.03 mmol/L (p < 0.005) in menopausal women. Other indicators did not change significantly in non-menopausal and menopausal women: body mass index decreased from 29.63 ± 0.34 kg/m² to 28.99 ± 0.34 kg/m² and from 29.81 ± 0.14 kg/m² to 29.33 ± 0.14 kg/m² respectively, waist circumference from 92.03 ± 0.92cm to 89.99 ± 0.89cm and from 93.59 ± 0.39cm to 92.08 ± 0.39cm, LDL from 3.22 ± 0.13 mmol/L to 3.05 ± 0.04 mmol/L and from 3.57 ± 0.06 mmol/L to 3.11 ± 0.05 mmol/L, level of HDL increased from 1.36 ± 0.06 mmol/L to 1.36 ± 0.08 mmol/L and from 1.33 ± 0.03 mmol/L to 1.35 ± 0.03 mmol/L, TG from 1.62 ± 0.09 mmol/L to 1.64 ± 0.10 mmol/L and from 1.80 ± 0.04 mmol/L to 1.66 ± 0.05 mmol/L respectively. Levels of glucose did not change significantly.

Conclusions: The results of perindopril arginine therapy in women with hypertension showed significant antihypertensive effect. In menopausal women blood pressure was originally higher and both SBP and total cholesterol significantly decreased more in menopausal women than in non-menopausal.

PP.44.395  EFFECTS OF ALISKIREN-BASED THERAPY ON AMBULATORY BLOOD PRESSURE PROFILE AND CENTRAL AORTIC PRESSURE IN UNTREATED PATIENTS WITH MILD-TO-MODERATE ESSENTIAL HYPERTENSION


Yokohama City University, Yokohamaicity-Japan

Objective: Hypertension is highly prevalent and one of major risk factors of cardiovascular and renal diseases. Accumulated evidence has indicated that activation of the renin-angiotensin system is involved in the pathogenesis of hypertension and the related target organ damage. Among the components of the renin-angiotensin system, renin plays an important role in the regulation of activity of the renin-angiotensin system by catalyzing the rate-limiting step of the system. Aim of this study was to examine the beneficial effects of aliskiren-based therapy on ambulatory blood pressure (BP) profile and in untreated mild-to-moderate essential hypertension.

Design and Method: This study enrolled Japanese patients (N = 12, 6 males and 6 females, mean age 55.8 ± 6.6 years) with untreated mild-to-moderate essential hypertension (140 < 180 mmHg and 90 < 110 mmHg). Diabetic patients were excluded from the study. The aim was to control clinic BP to a level less than 140/90mmHg. All eligible patients were initially given 150mg of aliskiren once daily and the dose of aliskiren was titrated up to 300mg daily 4 weeks after the treatment as needed. In addition, optional addition of concomitant medication (either a thiazide diuretic at low dose or a CCB) was used to achieve the target BP control 8 weeks after the treatment as needed. At baseline and 12 weeks after the treatment, 24-h ambulatory BP monitoring was performed. Measurements of central BP, brachial-ankle pulse wave velocity (baPWV), and biochemical parameters were also performed before and after aliskiren-based therapy.
Results: Aliskiren-based therapy was well tolerated in all patients without significant adverse events. After 12-weeks of aliskiren-based therapy, office BP, ambulatory BP, and central BP were significantly decreased as compared with baseline (24-hr systolic BP, 147 ± 13 vs 135 ± 12 mmHg; 24-hr diastolic BP 89 ± 10 vs 81 ± 10 mmHg; daytime systolic BP, 155 ± 15 vs 143 ± 14 mmHg; daytime diastolic BP, 93 ± 11 vs 85 ± 10 mmHg; night time systolic BP, 128 ± 11 vs 122 ± 12 mmHg; night time diastolic BP, 80 ± 9 vs 77 ± 8 mmHg; central BP, 166.6 ± 15.3 vs 151.4 ± 12.8 mmHg; P < 0.05). Compared with baseline, aliskiren-based therapy also significantly decreased baPWV and plasma renin activity (PRA) (baPWV: 1656 ± 202 vs 1490 ± 226 cm/sec; PRA: 0.6 ± 0.3 vs 0.2 0.2 ng/ml/hr; P < 0.05).

Conclusion: These results suggest that aliskiren-based therapy, as a first-line regimen, improves ambulatory BP profile as well as clinic BP and may have vascular protective effects in patients with untreated mild-to-moderate essential hypertension.

PP44.396 THE ANTIHYPERTENSIVE AND RENOPROTECTIVE EFFICACY OF ALISKIREN: RESULTS OF EVERY OTHER DAY ADMINISTRATION

G. Spanos, R. Kalaitzidis, K. Pappas, D. Karasavvidou, E. Evangelou, K. Stamosoupolos. Department of Nephrology, University Hospital of Ioannina, Ioannina-Greece

Objective: Renin inhibitor aliskiren shows antihypertensive and renoprotective activity similar or better than other renin-angiotensin-aldosterone system (RAAS) blockers. Furthermore, it has been suggested that the drug has a long half-life (exceeding 40 hours), provides smoothly sustained 24-h blood pressure control and maintaining a blood pressure lowering effect following a missed dose. In this pilot study we investigated the antihypertensive and renoprotective effect of every other day administration of the drug, either as monotherapy or in combination with other antihypertensive agents.

Design: Six hypertensives with microalbuminuria (5 patients) or proteinuria (1 patient) were studied. Initially all patients received aliskiren 150mg once-daily (od) and then titrated to 300 mg od if required, followed by nebivolol 5 mg or chlorthalidone 25 mg. Those patients who completed a 6-month treatment period were switched to every other day administration of aliskiren 300 mg for an additional period of 6 months without changing the administration frequency of the other agents.

Methods: Office BP measurements were monitored every 4 weeks while 24h and 48h ambulatory BP measurements (ABPM), as well as laboratory measurements were performed at baseline, month 6 and month 12, respectively.

Results: All patients completed the total treatment period. There was non-statistical significant difference in office BP between month 6 and month 12 (median 130/85 mmHg and 130/84 mmHg, respectively). There was also non-statistical significant difference in the overall 24 and 48h systolic/diastolic ABPM (median 126/82 mmHg and 134/83 mmHg, respectively). However, at the end of the 12-month period the measurements of the first 24 hours (the day that aliskiren was taken), there was better systolic BP control than the second half of the 48h-ABPM (median 127/82 mmHg and 137/83 mmHg, respectively, p = 0.043). The administration of aliskiren resulted in a median reduction of microalbuminuria of 20 mg/g serum creatinine (p = 0.043). This reduction was evident also on the every other day protocol (median 25 mg/g serum creatinine, p = 0.042).

Conclusions: Despite the long half-life of the drug, aliskiren provides less adequate blood pressure control on an every other day administration protocol. However, in terms of reducing microalbuminuria, administration of aliskiren every other day appears to be effective.

PP44.397 EFFECTS OF ALISKIREN VERSUS TELMISARTAN ON CENTRAL AORTIC SYSTOLIC PRESSURE DURING ACTIVE TREATMENT AND FOLLOWING TREATMENT WITHDRAWAL

R. Düsing1, B. Williams2, F. Baschiera3, I-Y. Baek1, P. Brunel1.
1Universitätsklinikum Bonn, Medizinische Klinik Und Poliklinik I, Bonn-Germany, 2Department of Cardiovascular Sciences, University of Leicester, Leicester-United Kingdom, 3Novartis Pharma Ag, Basel-Switzerland

Objective: Antihypertensive drugs may have different effects on brachial BP (BrBP) and central aortic systolic pressure (CASP); assessing CASP may provide information on drug effects and cardiovascular risk beyond that provided by BrBP. This study compared the BP-lowering effects of aliskiren and telmisartan after 12 weeks’ treatment and following 1 week of withdrawal in 822 patients with hypertension. A subset of patients underwent non-invasive measurement of CASP to determine the effects of active treatment and its withdrawal on control of CASP.

Design and Method: Patients with hypertension (mean sitting SBP 140-< 180 mmHg; 24-h mean ambulatory SBP (MABSBP) ≥ 135 mmHg) were randomized to aliskiren 150 mg or telmisartan 40 mg for 2 weeks, then double the doses for a further 10 weeks, followed by 1-week’s treatment withdrawal. Office CASP was derived from pulse wave analysis calibrated to BrBP using the BPro™ device, and was measured at baseline, end of active treatment (EOA) and end of withdrawal; 324 patients had CASP measurements.

Results: At baseline, CASP was similar in both groups (Table). Aliskiren and telmisartan reduced CASP to a similar extent from baseline to EOA. There were profound differences between treatments in control of CASP after 1 week’s treatment withdrawal: aliskiren-treated patients had a further reduction in CASP of 0.9 mmHg from EOA, compared with an increase of 6.5 mmHg in the telmisartan group (between-treatment difference, 7.4 mmHg; p < 0.001). Table). MASBP showed similar trends, but the between-treatment differences were less marked than for CASP.

Conclusions: Aliskiren and telmisartan provided similar reductions in both MASBP and CASP after 8 weeks of treatment. However, aliskiren was more effective than telmisartan at sustaining BP reductions following treatment withdrawal; this was particularly pronounced for CASP, suggesting that direct renin inhibition provides prolonged effective control of CASP in patients with hypertension.
ARE HYPERTENSIVE PATIENTS WITH A MYOCARDIAL INFARCTION APPROPRIATELY TREATED?

S. Barra, L. Paiva, P. Providência, F. Caetano, A. Leitão

Coimbra Hospital Centre, Vila Nova De Gaia-Portugal

Objectives: Arterial Hypertension (HT) is unequivocally a risk factor for coronary artery disease (CAD) and cardiovascular death. The aim of this study is to investigate whether hypertensive patients with a Myocardial Infarction (MI) are treated as aggressively as non hypertensive patients concerning the application of invasive stratification and treatment strategies.

Design and Method: 796 patients admitted for a Myocardial Infarction (age 68.8 ± 13.4y, 63.2% males, 71.4% with previously known HT, 44.6% with STEMI). Data: analytical study at admission, risk scores, coronariography and eventual percutaneous coronary interventions (PCI) results. Patients divided into two groups (hypertensive vs. non hypertensive) and compared in relation to the prevalence of invasive strategies. The impact of invasive revascularization strategies in hypertensive patients' intra-hospital (IH) and year 2 prognosis was investigated.

Results: Hypertensive patients were older (70.6 vs. 63.2, p < 0.001), had higher GRACE scores (164.7 vs. 153.4, p = 0.003) and higher risk for acute heart failure (HF) at admission (29.4% vs. 17.5%, p = 0.001). They were not less frequently submitted to coronary angiography (74.9% vs. 80.0%, p = n.s.). Despite having more extensive CAD, as expected (2.39 vs. 1.89 affected coronary segments, p = 0.052), their rate of overall revascularization was significantly lower (53.6% vs. 62.7%, p = 0.041), mostly resulting from a lower rate of PCI (50.2% vs. 59.6%, p = 0.036) [similar rate of coronary artery bypass graft]. In spite of more extensive CAD, the number of implanted stents was not superior (0.76 vs. 0.81, p = n.s.). The application of invasive revascularization strategies reduced intra-hospital and 2 year mortality risk in hypertensive patients (4.1% vs. 16.1%, p < 0.001; and 13.0% vs. 33.3%, p < 0.001), their 2 year rate of reinfarction (10.7% vs. 23.4%, p = 0.001) and hospitalization for decompensated HF (11.8% vs. 24.4%, p = 0.002) compared to non hypertensive patients. However, as the application of invasive revascularization strategies reduces intra-hospital and 2 year mortality risk of hypertensive patients with a MI, plus their rate of reinfarction and hospitalization for decompensated HF during a 2 year follow-up, this study reinforces the need for aggressive stratification and treatment strategies in patients with HT.

Conclusions: Despite their more extensive CAD and higher risk scores, patients with HT are not submitted to invasive revascularization as often as non hypertensive patients. However, as the application of invasive revascularization strategies reduces intra-hospital and 2 year mortality risk of hypertensive patients with a MI, their rate of reinfarction and hospitalization for decompensated HF during a 2 year follow-up, this study reinforces the need for aggressive stratification and treatment strategies in patients with HT.

EPROSARTAN-BASED HYPERTENSION THERAPY, SYSTOLIC ARTERIAL BLOOD PRESSURE AND COGNITIVE FUNCTION: ANALYSIS OF MIDDLE EAST DATA FROM THE OSCAR STUDY


1 Rashid Hospital of Dubai, Dubai-United Arab Emirates, 2Medical Director Eup, Abbott Gulf – Levant, Beirut-Lebanon, 3Division of Cardiology, American University of Beirut, Beirut-Lebanon, 4Marketing Manager Cardiology Products, Abbott Gulf - Levant, Beirut-Lebanon, 5Abbott Products Operations Ag, Allschwil-Switzerland, 6Evidence Based Communication (Ebc), Rueil-Malmaison-France, 7Fovéa Group, Rueil-Malmaison-France, 8Faculty of Medicine, University Hospital of Toulouse, Toulouse-France

Background: Studies have indicated a relationship between hypertension and cognitive function. Possible effects of antihypertensive therapy on cognitive function are thus a matter of interest.

Design and Methods: The Observational Study on Cognitive function And SBP Reduction (OSCAR) was an open-label, multinational trial designed to evaluate the impact of eprosartan-based antihypertensive therapy on cognitive function in patients with essential hypertension. Eprosartan 600 mg/day for 6 months with provision for additional medication as needed was initiated in hypertensive subjects aged 50 years or more. We report here findings from 853 patients in an intention-to-treat cohort from 7 countries of the Middle East.

Results: Arterial blood pressure was reduced significantly (p < 0.001) during the study: at the end of six months of eprosartan-based therapy, the mean (± SD) reduction from baseline was 32.1 ± 14.3/18.3 ± 13.1 mmHg (p < 0.001). Mean pulse pressure was reduced by 18.3 ± 13.1 mmHg (p < 0.001 vs. baseline). Blood pressure was normalized (systolic < 140 mmHg and diastolic < 90 mmHg) in 68.2% of patients. The overall mean Mini-Mental State Examination (MMSE) score after 6 months of eprosartan-based therapy was 1-point higher than at baseline (p < 0.001). MMSE score on completion of 6 months follow-up was either unchanged or increased from baseline in 793 (93%) individuals and decreased in 60 (7%). Factors associated with or stability of or improvement in cognitive function included MMSE score at baseline, DBP at baseline and treatment-associated change in DBP. Seven treatment-emergent adverse drug reactions (ADRs) were recorded in the Middle East safety population (n = 1137), of which 4 were considered to be possibly (n = 2), probably (n = 1) or highly probably (n = 1) related to study medication. Two ADRs led to treatment termination and one to study discontinuation. None of the recorded ADRs was classified as severe or serious. Nervous system disorders (3 events in 3 patients) were the most frequently recorded form of ADR. No deaths occurred in this subgroup.

Conclusions: Results from the Middle East subgroup of OSCAR support the hypothesis that antihypertensive therapy based on eprosartan may be associated with preservation or improvement of cognitive function.
R.J. Petrella1, E. Shlyakhto2, A.O. Conrady2, J.P. Berrou3, A. Sedefjian4, A.

In patients taking 300 mg of Aliskiren on awakening, the ambulatory BP was lower than awakening administration. This must be taken into account especially in those patients with an altered circadian pattern of BP.

Conclusions: Administration of Aliskiren shows its antihypertensive efficacy in no dipper subjects and controls BP throughout 24 hours with only one daily dose. However, like other medications which inhibit the renin-angiotensin system, the administration of Aliskiren on a bedtime basis is more effective (it lowers nocturnal ambulatory BP). This increases diurnal/nocturnal ratio of BP) than awakening administration. This must be taken into account especially in those patients with an altered circadian pattern of BP.

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PP.44.403 ALISKIREN CHRONOTHERAPEUTIC REGIMEN IN NO-DIPPER HYPERTENSIVE SUBJECTS


Background and aims: The alteration of the circadian variability of blood pressure (BP) is associated with an increase of the cardiovascular risk in hypertensive patients. This is the reason why it is important to investigate the antihypertensive efficacy not only in terms of “how much the BP is decreased” but also of “how the circadian pattern of BP is modified”. It is more important to block the renin-angiotensin system at night, basing on the possibility of modifying the diurnal/nocturnal ratio of BP (i.e. SBP/DBP) (Observational Study on Cognitive function And SBP Reduction) 2948 patients met this definition of resistant hypertension (RH): SBP/DBP ≥ 140/90 mmHg (> 130/80 mmHg for diabetes mellitus (DM)) despite ≥ 3 antihypertensive sub-groups.

Results: RH patients’ mean age was 66.9 ± 9.5 years (74.8% > 60 years); 1474 were women. Mean BMI was 28.8 ±14.5/93.3 ± 9.8 mmHg; pulse pressure (PP) was 71.5 ± 14.2 mmHg; 2108 RH patients (71.5%) had systo-diastolic hypertensive (SDH); 827 (28.1%) had isolated systolic hypertension (ISH). Mean Mini Mental State Examination (MMSE) was 26.5 ± 3.6 (range 12.0-30.0).

Significant (p < 0.001) differences vs non-RH patients included greater age, BMI, SBP and PP, and lower MMSE. After eprosartan-based therapy for 6 months (EBT, 600 mg/day) BP in RH was 138.8 ± 12.2/81.9 ± 7.4 mmHg (ASBP ≥ 15.7; ÐDBP ≥ 11.4 ± 9.8); PP was 57.0 ± 10.8 mmHg (APP -14.5 ± 13.8) (all p < 0.001 vs. baseline and non-RH group). 2576 patients (87.4%) responded to EBT (i.e. SBP < 140 mmHg and/or ÐSBP ≥ 15 mmHg, or DBP < 90 mmHg and/or ÐDBP ≥ 10 mmHg); 1426 RH patients (48.4%) achieved normalized BP (i.e. SBP < 140 mmHg; DBP < 90 mmHg). ÐPP in RH ISH was -18.0 ± 13.3 mmHg (p = 0.002 vs SDH). End-of-EBT mean MMSE was 27.5 ± 3.0 (p < 0.001 vs. baseline; n.s. vs non-RH). MMSE increased from 26.1 ± 3.7 to 27.1 ± 3.2 in RH-DM and from 26.3 ± 3.4 to 27.4 ± 3.1 in RH-ISH (n.s. vs comparator RH-non DM and other hypertensive subsets).

Conclusions: Blood pressure responses after EBT coincided with stabilization/improvement of MMSE in RH patients. EBT effects on PP may be relevant to the evolution of MMSE in RH-ISH patients.

PP.44.404 MAGNESIUM SUPPLEMENTATION ON BLOOD PRESSURE, INTRACELLULAR IONS LEVEL AND INSULIN RESISTANCE IN HYPERTENSIVE PATIENTS USING DIURETICS

V. Malty1, M. Rodrigues1, D. Valença1, M. Torres1, S. Argolo1, J. Nogueira Neto1, A. Sanjuaní1, 1Rio De Janeiro State University, Discipline of Clinical and Experimental Pathophysiology - Clinex, Rio De Janeiro-Brazil, 2Sergio Franco Laboratory, Rio De Janeiro-Brazil, 3Rio De Janeiro State University, Lipids Examination, Rio De Janeiro-Brazil

Background: Alterations in intracellular homeostasis of magnesium, can contribute to the development of hypertension and insulin resistance. Long term use of diuretics can induce a depletion of intracellular magnesium. Objective: to evaluate the effect of oral supplementation of magnesium on blood pressure, intra-erythrocyte concentration of magnesium and sodium, and insulin resistance of primary hypertensive patients treated with thiazide diuretic.

Methods: Randomized, double blind clinical trial. Thirty nine primary hypertensive patients stage 1 were distributed in 2 groups. One group received thiazide diuretic (25 mg) and magnesium (240 mg of element magnesium) (Mg group) and the other group received thiazide diuretic (25 mg) and placebo during 16 weeks (Placebo group). The intra-erythrocyte concentration of magnesium was made by atomic absorption.

Results: after 16 weeks using diuretic plus magnesium or diuretic plus placebo we observed significant reduction in blood pressure evaluated by auscultatory method and by ambulatory blood pressure monitoring during 24 hours in the two groups; although there was no significant difference between the two groups. The intra-erythrocyte concentration of magnesium did not change significantly in the Mg group (-3.8 ± 2.0 mmEq/L/cell), however in the placebo group the reduction was significant (-16.3 ± 4.1 mmEq/L/cell: p = 0.001). The amount of the intra-erythrocyte sodium was significantly reduced in both groups, without statistical significance between the two groups. At the final visit the sensibility to insulin evaluated by HOMA was not changed significantly in both groups.

Conclusions: This trial demonstrated that the thiazide diuretic reduced significantly and equally the blood pressure in the two groups of treatment. In spite of the significant reduction in the level of intracellular magnesium in the placebo group any hypotensive effect of this treatment was registered.

PP.44.405 PECULIARITIES OF BETA BLOCKERS EFFECT ON HEART RATE VARIABILITY IN HYPERTENSIVE PATIENTS WITH DIFFERENT SYMPATHO-VAGAL BALANCE

T. Ovdienko. Nce The M.D. Strachesko Institute of Cardiology Ams. Kiev-Ukraine

Objectives: Increase of sympathetic-vagal balance (ratio LF/HF) can be an independent predictor of cardiovascular complications. The aim of this study was to investigate the effect of beta blocker therapy (carvedilol, betaxolol) on heart rate variability (HRV) in patients (pts) with different low to high frequency ratio (LF/HF) with essential hypertension (EH).

Methods: Ambulatory BP monitoring and 24-hour Holter ECG monitoring has been recorded in 76 untreated pts and 4 weeks after beta blocker therapy (carvedilol (25-50mg/day), betaxolol (10-20mg/day)) using Meditech CardioTens System. The analysis of HRV included time parameters: SDNN, SDANN, pNN50%, rMSSD, SDSD and HRV triangular index, spectral parameters: TP, LF and HF, LFn, HFn, ratio LF/HF and their circadian fluctuations.
Results: Forty pts had – low LF/HF ratio (< 2.5) - 1 group (gr), thirty-six pts had high LF/HF ratio (> 2.5) – 2gr. They did not differ in age (1gr 46 ± 1.8 vs 2gr 47.8 ± 1.3 yrs, p = 0.28). We found significant time parameters of HRV (pNN50%, pNN50, rMSSD, SDSD), spectral parameters (HF, HFn, LFn, LFp) in 1gr and 2gr pts. 1gr patients showed higher level of time parameters (pNN50%, pNN50, rMSSD, SDSD) and spectral parameters (HF, HFn) for daytime and nighttime before treatment in comparison with 2gr pts (p < 0.05). After 4 weeks of beta blocker therapy we found significant 24h increase of rMSSD from 34.9 ± 2.2mc to 50.8 ± 3.4mc, p < 0.05 in 1gr and from 25.3 ± 1.4mc to 34.2 ± 2.2mc, p < 0.05 in 2gr; other time parameters of HRV(pNN50%, pNN50, SDSD, SDNN-i) changed in the same way. Under beta blocker treatment we noticed 24h increase of high frequency power and decrease of low frequency power without significant changes in low to high frequency ratio in 1gr (from 1.97 ± 0.08 to 1.89 ± 0.25, p > 0.05) and sig- nificant decrease of low to high frequency ratio in 2gr (from 4.35 ± 0.23 to 3.27 ± 0.31, p < 0.0001).

Conclusion: These findings demonstrated that beta blocker therapy (carvediol, betaxolol) doesn’t influence significantly on sympatho-vagal balance in patients with not low to high frequency ratio (LF/HF) and leads to normalizing effect on sympatho-vagal balance in patients with low to high frequency ratio.

PP.44.406 INAPPROPRIATE ANTIPLATELET THERAPY IN HYPERTENSION
V. Gil-Guillen, V. Pallares-Carratala, M.J. Matinez, Z. Perseguer, D. Orozco, M. Mayor, F. Valls-Roca. 1Universidad Miguel Hernandez, San Juan-Spain, 2Unión De Mutuos, Burriana-Spain, 3Cs Benigamim, Benigamim-Spain
Objective: The objective of the study is to assess the prevalence and factors related to the inappropriate use of antiplatelet therapy in hypertension.

Methods: The study design was cross-sectional, multicenter, carried out in 525 consecutive hypertensive subjects under antiplatelet therapy collected in Pharmacy offices. Antiplatelet therapy was considered as the use of aspirin or clopidogrel and hypertension was considered in subjects under antihypertensive treatment. Criteria to consider appropriate or not antiplatelet therapy were those recommended by the Interdisciplinary Spanish Society for Cardiovascular Prevention, based on the European recommendations.

Results: Among the 525 patients evaluated, 11.6% (95% CI 8.6-21.8) was in inappropriate antiplatelet therapy. Among them, only 40% (95%CI 26.4-53.6) had SBP controlled. Factors associated to this inappropriate use was dyslipidemia (OR 4.47, 95%CI 2.11-9.46; p = 0.000) and diabetes (OR 2.43, 95%CI 1.20-4.92; p = 0.014), explaining 21.3% of the variability.

Conclusion: The prevalence of inappropriate antiplatelet therapy is relatively high in patient with diabetes and dyslipidemia. The coexistence of uncontrolled hypertension can increase the risk of hemorrhagic complications in these patients.

PP.44.407 ARTERIAL BLOOD PRESSURE CONTROL AND AGE: THE EXPERIENCE OF A SINGLE CENTRE
S. Flori, S. Leoni, B. Stagni, I. Serio, L. Bolondi. Division of Internal Medicine, Bologna-Italy

Aim of study: Aim of the present study was to investigate the blood pressure control in male patients referred to our Hypertension Centre; secondary aim was to analyse the correlation between blood pressure control, age of patients and number of anti-hypertensive drugs used to treat hypertension.

Materials and Methods: The clinical charts of 253 hypertensive patients were retrospectively reviewed; all patients were referred to our centre during a period of 16 years. They were divided from 21 to 88 years old: all of them were treated with antihypertensive drugs (number of antihypertensive drugs taken from each patient: range 1-6). Patients were divided in groups according to age (< 40, 40-49, 50-59, 60-69, 70-79, ≥ 80 years). The objective of antihypertensive treatment was considered arterial blood pressure ≤ 140/90 mmHg.

Results: Our data showed that arterial hypertension was respectively controlled (≤ 140/90 mmHg) in 39% of patients < 40 years, 37% of patients 40-49 years, 56% of patients 50-59 years, 51% of patients 60-69 years, 42% of patients 70-79 and 33% of patients ≥ 80 years. Not significant difference were observed between the use of more or less of 3 drugs in patients with or without optimal control of hypertension, except for patients over 80 years old. In this group, 50% of controlled patients was treated with ≤ 3 drugs and 50% with > 3 drugs; 75% of uncontrolled patients was treated with ≤ 3 drugs and 25% with > 3 drugs.

Conclusions: Patients aged from 50 to 59 had the best pressure control (56%) and over 59 this percentage decreases progressively with age. Despite the indication to take care about the number of drugs in older people, in our patients over 80 we need more of 3 drugs to obtain a satisfying pressure control.

PP.44.408 LERCANIDIPINE EFFECTS IN HYPERTENSIVE NEPHROPATHY PATIENTS
L. Bezrodna, L. Mishchenskali, V. Bezrodnyy, O. Kupchinska, M. Mospan. M.D. Strazhesko Institute of Cardiology, Kiev-Ukraine,

Background: Hypertension is often followed with renal impairment and insulin resistance (IR). Calcium antagonists effects on IR and renal function in hypertensive nephropathy patients remains in debate.

Objective: To investigate the influence of lercanidipine on IR and renal function in hypertensive nephropathy patients.

Design and Methods: We examined 33 untreated non-diabetic essential hypertensive patients with hypertension nephropathy before and after 3 months treatment with lercanidipine 20 mg/daily. Blood pressure (BP) was measured by ambulatory BP monitoring. 24h urinary collection was used for evaluation of glomerular filtration rate (GFR) and microalbuminuria measurement. An oral glucose tolerance test (OGTT) with plasma insulin detection was performed. IR was calculated with HOMA index. The patients were divided into 2 groups: gr 1 pts – with GFR 60-89 ml/min (n = 18), gr 2 pts – with GFR 30-59 ml/min (n = 15).

Results: Basically gr 2 pts had significantly higher plasma insulin (lasting, at 60 and 120 min of OGTT, p < 0.001 in all cases) and glucose level at all stages of OGTT (p < 0.05 in all cases). HOMA index in gr 1 and gr 2 was 2.0 ± 0.2 vs 3.4 ± 0.2 (p < 0.001) respectively. Under treatment 24h systolic and dia- stolic BP remarkably decreased in both groups (p < 0.001 in all cases), GFR increased and HOMA index decreased in gr 2 (p < 0.001) and p < 0.05 respectively) while there were no significant changes of them in gr 1 pts. In univariate analysis GFR was inversely related to HOMA index (r = -0.406, p < 0.001). A multiple linear regression analysis revealed the independent relationship between GFR rising and HOMA index decreasing (β = 0.260, p < 0.05) under lercanidipine treatment.

Conclusion: Our results revealed that lercanidipine decreased insulin resistance and improved renal function in hypertensive nephropathy patients with GFR 50-59 ml/min and did not change these parameters in patients with GFR 60-89 ml/min. Relationship between renal function improvement and HOMA index decreasing under lercanidipine treatment suggests an important role of insulin resistance in the development of hypertensive nephropathy.

PP.44.409 POPULATION PHARMACOKINETIC-PHARMACODYNAMIC ANALYSIS OF THE ANTIHYPERTENSIVE EFFECT OF EPROSARTAN
P.C. Van Rijn-Bikker, O. Ackaert, R. Van Hest, N. Snelder, B. Ploeger. 1Academic Medical Center, Amsterdam-the Netherlands, 2Lap&P Consultants, Leiden-The Netherlands, 3Central Hospital Pharmacy, The Hague-The Netherlands, 4Academic Medical Center Maastricht, Maastricht-The Netherlands

Objective: Heterogeneity in pharmacokinetics (PK) and pharmacodynamics (PD) determines the inter-patient variability in antihypertensive drug response. This study aimed to develop a PK-PD model to determine the relationship between the exposure and the drug response and to describe the time course of the diastolic blood pressure (DBP) following oral administration of the angioten- sin receptor blocker eprosartan. Using this model, the inter-patient variability is estimated for the different PK and PD parameters and the influence of ethnicity on the inter-patient variability is investigated.

Design and Method: Eprosartan plasma concentrations (349 observations) and DBP were determined in 87 mildly hypertensive patients aged 47.8 ± 7.6 years with different ethnic backgrounds (33 Dutch Caucasians, 41 Creole Surinamese, 13 Hindustani Surinamese). All patients participated in the ROTATE study (Am. J. Hyp. 2009; 22: 1295-1302). Baseline DBP was recorded and drug efficacy was assessed after 3- and 6-week single-drug treat- ment with eprosartan dosed 600 or 800 mg/day. Data were analysed using nonlinear mixed effect modelling (NONMEM).
PP.44.411 PHYSICIAN'S EXPECTATIONS ABOUT NEW DRUGS FOR THE CONTROL OF HYPERTENSION: THE HYPERTENSION 2020 PROJECT

A. Coca1, E. Lopez De Sa2, P. Aranda3, P. Conthe4, Jl. Llisterri5, J. Ampudia6, 1Hospital Clinico Universitario, Valencia-Spain, 2Hospital La Paz, Madrid-Spain, 3Hospital Carlos Haya, Malaga-Spain, 4Hospital Gregorio Marañon, Madrid-Spain, 5Centro Ingeniero Benlloch, Valencia-Spain, 6Hospital Clinico Universitario, Valencia-Spain

Introduction: Hypertension has a big economic impact on European health care systems due to the high cost of care and pharmaceuticals and the accompanying morbidity and mortality. Spending on antihypertensive drugs is expected to decrease in coming years due to loss of patents, but the introduction of new, more-expensive antihypertensive drugs may have a negative effect on the contain-ment of pharmaceutical costs and help to increase the total cost of managing hypertension. The objective of this study was to determine the expectations of physicians about the development of new antihypertensive agents, based on data from the Hypertension 2020 survey.

Methods: The Hypertension 2020 Project analyzed the opinions of Spanish physicians about expectations on cardiovascular risk in the near future, with special reference to hypertension, through an analysis of data from a survey on perceptions on future treatments for hypertension. We carried out a quantitative study using self-completed online questionnaires administered to 109 physicians of endothelium-dependent vasodilatation (EDVD). Endothelial dysfunction (ED) appeared “night- pickers” group on SBP (16.13% before therapy) and during 12-weekly combined antihypertensive therapy were dis-

Results: Time profiles of eprosartan concentrations were adequately described with a 2-compartment PK model with 0 order absorption. The population parameter of clearance was estimated at 111 ml/min; the estimated inter- patient variability of clearance was 35%. Fourier analysis showed that 2 cosine functions with different amplitude (AMP24h and AMP12h) adequately describe the circadian 24-hour DBP-pattern, with a nocturnal dip and a morn- ing surge (DBP.baseline DBP + AMP12h *cos(2*π*time/24) + AMP24h *cos(2*π*time/12)). The delay between the increase in eprosartan plasma concentra- tion and the antihypertensive drug effect was modelled using a hypothetical effect compartment. A log-linear relationship was used to describe the relation- ship between the concentration in the effect compartment (Ceff) and the reduct- ion in DBP (DDBP = slope * log (Ceff)). Estimated population parameters of baseline DBP. AMP24h and AMP12h were 92 mm Hg, 10.7 mm Hg and -4.6 mm Hg, inter-patient variability was 6% (baseline DBP) and 29% (AMP24h). Inter-patient variability in drug response (i.e. slope) was 51% and decreased to 39%, when ethnicity was included in the model as covariate. It was observed that the Creole Surinamese population exhibited a smaller drug response than Dutch Caucasians and Hindustani Surinamese (slope values were: -0.3 mmHg (n = 41) vs -2.4 mmHg (n = 46) p < 0.05).

Conclusions: The developed PK-PD model allows the quantification and expla- nation that they should be designed for use in association with current agents, as a useful deter- minant of responsiveness to eprosartan. PK-PD models may be used to optimize and individualize dosage regimens. Future research will focus on systolic BP and identification of other patient characteristics that influence response to eprosartan.

PP.44.410 ANTIHYPERTENSIVE AND VASOPROTECTIVE EFFICACY OF COMBINED THERAPY WITH LERCANIDIPINE AND PERINDOPRIL IN HYPERTENSIVE PATIENTS

L. Hafsova, G. Khamidullaeva, B. Karimova, F. Zakirova. Republican Center of Cardiology, Tashkent-Uzbekistan

Objective of the study: to study clinical, antihypertensive and vasoprotective efficacy of combine use of lercanidipine and perindopril in patients with stage II essential hypertension.

Design and Methods: The study included 31 male patients with stage II essen- tial hypertension (ESC/ESH 2007), an average age of 46.62 ± 8.74 years. Mean duration of arterial hypertension was 5.83 ± 3.99 years. Daily blood pres- sure profile (DBPP) was assessed by TONOPORT V computer system (“GE Medical Systems”, Germany). Vascular ultrasound was performed to measure the brachial artery diameter during reactive hyperemia test and analysis of endothelium-dependent vasodilatation (EDVD). Endothelial dysfunction (ED) was diagnosed if EDVD was less than 10% (ΔD < 10%). Common carotid intima-media thickness (IMT) was measured by high-resolution ultrasound. Microalbuminuria was defined as an albumin urinary excretion (AUE) between 20-200 mg/l and determined by IEA. Combined antihypertensive therapy was conducted with lercanidipine (Lercamen, – Berlin Chami, Menarini Group) and perindopril (Perindiam, “Servier”) in a mean daily dosage of 10.84 ± 4.67 mg and 6.61 ± 2.7 mg, respectively, during 12 weeks. Results were expressed as mean ± SD.

Results: High antihypertensive efficacy of these drugs combination was observed by means of ambulatory blood pressure measurement. At this average daily systolic blood pressure significantly decreased from 143.40 ± 10.8 mm Hg to 128.95 ± 10.24 mmHg (p = 0.000), average daily diastolic blood pressure decreased from 91.01 ± 9.17 to 81.82 ± 11.00 mm Hg (p = 0.000). However, during 12-weekly combined antihypertensive therapy were dis- appeared “night- pickers” group on SBP (16.15% before therapy) and DBP (12.9% before therapy). Vascular protection of therapy was shown in normalization of endothelium-dependent vasodilatation, reduction common carotid IMT and level of AUE: AD 11.2 ± 4.43% vs. 6.16 ± 3.61% (p = 0.000); IMT 0.76 ± 0.22mm vs. 0.88 ± 0.22mm (p = 0.040); level of AUE 15.52 ± 11.87 mg/l vs. 22.52 ± 15.37 mg/l (p = 0.049). Tolerability of the therapy was good.

Conclusion: Combined therapy with lercanidipine and perindopril in patients with essential hypertension is characterized by high antihypertensive and vasoprotective efficacy. Vascular protection of therapy was shown in normalization of endothelium-dependent vasodilatation, reduction IMT and level of AUE.

PP.44.412 RENAL SYMPATHETIC NERVE DENERVATION FOR THE TREATMENT OF RESISTANT HYPERTENSION: FIRST RESULTS IN ROTTERDAM, THE NETHERLANDS

N. Van Der Linde, T. Leertouwer, P. Pattynama, A. Van Den Meiracker. Erasmus Mc, Rotterdam-The Netherlands

Objective: To describe the first results of renal sympathetic nerve denervation for treatment of resistant hypertension in Rotterdam, The Netherlands.

Design and Methods: From Sept until Dec 2010 8 patients (mean age 48 ± 8 yrs, 3 males) with resistant hypertension were treated with a new endovascular catheter-guided technique, in which the renal nerves are denervated through radiofrequency ablation. Blood pressure (BP) and heart rate (HR), glomerular filtration rate (GFR), plasma noradrenalin and renin were measured before 1 week and 1 month after the procedure.

Results: Baseline BP was 164 ± 17/103 ± 15 mmHg, HR 83 ± 24 bpm and GFR 72.9 ± 14.5 mL/min. Average number of antihypertensives was 5.3 (range 4-7). Renal sympathetic nerve denervation was uncomplicated in all patients. Four out of 8 patients showed a marked decrease in BP (Figure). Plasma noradrenalin concentration decreased from 402 ± 97 to 308 ± 103 pg/ml (p < NS) after 1 week and to 350 ± 137 pg/ml (p = NS) after 1 month. Plasma renin concentra- tion at baseline (median 13 uU/ml) did not change significantly (16 uU/ml after 1 week and 18 uU/ml after 1 month). Changes in SBP were not related to baseline BP or changes in plasma noradrenalin or plasma renin concentra- tion. HR, GFR and number of antihypertensives after 1 week and 1 month did not change.

Conclusion: In patients with therapy resistant hypertension renal sympathetic nerve denervation was associated with a response rate of 50%. The response was unrelated to changes in plasma noradrenalin or plasma renin concentration.
Changes of Markers for Sudden Cardiac Death in Patients with Arterial Hypertension and Coronary Artery Disease During Ivabradine Therapy

N. Koziolova, M. Surovtseva, M. Eltsova, A. Chernyavina. Perm State Medical Academy, Perm-Russia

Objective: to estimate changes of markers for sudden cardiac death in patients with arterial hypertension (AH) and coronary artery disease (CAD) during multi-drug therapy including ivabradine.

Materials and Methods: 3 groups of patients (30 people each) with AH and stable angina were examined. Average age was 56.0 ± 5.0 years. Average functional class of angina was 2.25 ± 0.36. The patients were divided into the groups depending on antischismic therapy. Within multi-drug therapy the patients of the first group were treated with perindopril and ivabradine, the patients of the second group were treated with perindopril, bisoprolol and ivabradine, the patients of the third group were treated with perindopril and bisoprolol. Therapy lasted for 6 months. Before and after therapy markers for sudden cardiac death, such as left ventricle myocardium mass index (LVMMI), HRVti increased significantly more in the second group than in the first and the third groups (13.9 < 0.001) and 13.1 < 0.001, (Δmg < 0.001)). Daily average HR decreased significantly in all the groups, the most in the second group. SDNN in the third group increased significantly less than in the first and the second groups (Δmg < 0.001). WMVR in the third group increased significantly less than in the first and in the second groups (13.1 ± 0.1% vs 20.1 ± 0.2% (Δ < 0.001) and 13.1 ± 0.1% vs 20.0 ± 0.2% (Δ < 0.001)). HRVti increased significantly more in the second group than in the first and the third groups (Δmg < 0.001). The total number of ventricular extrasystoles per 24 hours in the second group decreased significantly more than in the first and the third groups (33.50 ± 0.36% vs 33.00 ± 0.64% (Δ < 0.001) and 33.50 ± 0.36% vs 7.50 ± 0.17% (Δ < 0.001)). In the second group the average number of bigeminal and polytopic ventricular extrasystoles per patient decreased significantly more than in the first and the third groups (Δ < 0.001). After therapy no significant changes in daily QTc and QTcd were evaluated.

Results: during therapy LVMMI decreased significantly more in the second group than in the first and the third groups (13.9 ± 0.2% vs 9.0 ± 0.2% (Δ1-2 < 0.001) and 13.9 ± 0.2% vs 9.1 ± 0.1% (Δmg < 0.001)). Daily average HR decreased significantly in all the groups, the most in the second group. SDNN in the third group increased significantly less than in the first and the second groups (Δmg < 0.001).WMVR in the third group increased significantly less than in the first and in the second groups (13.1 ± 0.1% vs 20.1 ± 0.2% (Δ < 0.001) and 13.1 ± 0.1% vs 20.0 ± 0.2% (Δ < 0.001)). HRVti increased significantly more in the second group than in the first and the third groups (Δmg < 0.001). The total number of ventricular extrasystoles per 24 hours in the second group decreased significantly more than in the first and the third groups (33.50 ± 0.36% vs 33.00 ± 0.64% (Δ < 0.001) and 33.50 ± 0.36% vs 7.50 ± 0.17% (Δ < 0.001)). In the second group the average number of bigeminal and polytopic ventricular extrasystoles per patient decreased significantly more than in the first and the third groups (Δ < 0.001). After therapy no significant changes in daily QTc and QTcd were found in all the groups.

Conclusions: ivabradine within multi-therapy for patients with AH and stable angina influences favourably the markers for sudden cardiac death, without changing daily QTc and QTcd.

Impact of Computer System Using Text Messages for Patient Feedback on Blood Pressure Control in Patients with Arterial Hypertension

O. Posnenkova, A. Kiselev, V. Gridnev, V. Schwarz, P. Dovgalevsky. Saratov Research Institute of Cardiology, Saratov-Russia

Purpose: To determine the effect of a computer system using text messages (SMS) for patient feedback on the control of blood pressure (BP) in patients with arterial hypertension (AH).

Methods: 199 patients (≥ 18 years old) with established AH were enrolled in the study. 97 of them (mean age 49 ± 11.3 years) were offered to answer automatically generated SMS requests about their BP level during 1 year. The other 102 patients (mean age 51 ± 11.1 years) received usual care. Their BP records concerning the same period were extracted from ambulatory patients' records retrospectively. Three control check-points were assigned for the group of SMS monitoring - one, six and 12 months of follow-up. The number of patients dropped out of SMS monitoring, and principal causes of withdrawal were determined on every checkpoint. A part of patients with goal BP was estimated over each period. Goal BP was defined according to ESH-ESC Hypertension Guidelines (2007). In a year of follow up, the rate of the goal BP achievement was compared in SMS monitoring group vs. the group of usual care.

Results: 62 from 97 patients included in the group of SMS monitoring (64%) successfully answered one year of follow-up. During the first 6 months 15 patients (16%) had left the study. The principal cause in 9 patients (60%, p < 0.05) was "difficulties using text messaging". During the period from one to six months of observation 19 more patients had withdrawn from SMS monitoring. The main cause in 15 participants (79%, p < 0.05) was "loss of interest". Patients reported they felt well and were satisfied with treatment. During the period from six to 12 months only 1 patient had withdrawn (the cause = "lost of interest"). In the group of SMS monitoring goal BP was achieved in 54% of patients (CI 75% - 93%) after the first month of study, in 77% (CI 67% - 88%) after six months and in 71% (CI 60% - 83%) after 12 months. In the group of usual care goal BP was achieved in only 12% of patients (CI 5% - 18%). Odds ratio was 13 (CI 6.0 - 29.6).

Conclusion: Use of computer system with patient feedback via text messages enhances achievement of goal BP in AH patients as compared with usual care, and facilitates its maintenance in primary care over a long time period.

The Effect of Different Nitrates Forms on 24-Hour Blood Pressure in Patients with Angina Pectoris and Hypertension

N. Pozdnjakova, V. Gorbunov, E. Kokurina. National Research Center for Preventive Medicine, Moscow-Russia

Objective: To evaluate the effect of different nitrates forms on the blood pressure (BP) profile in patients with stable angina pectoris and hypertension, receiving combination hemodynamic therapy.

Design and Methods: 30 males, mean age 58.8 ± 7.5 years, with moderate to severe angina and hypertension stage I-II were treated with diltiazem for a month. Then the patients were randomized into 2 equal groups: buccal nitroglycerin (NG) or isosorbide-5-mononitrate (IM) prolonged form were added to diltiazem for a month. The treadmill-test and 24-hour ambulatory blood pressure monitoring were performed at baseline and at the end of each treatment period. Antianginal effect was evaluated by analyzing the time until ST-depression onset. Mean diurnal, nocturnal and 24-hour BP, nocturnal BP fall, morning BP surge, BP variability and smoothness index were calculated to evaluate the anti-hypertensive treatment effect.

Results: The time until ST-depression onset increased significantly after dilation monotherapy and combination treatment (p < 0.05 vs baseline and diltiazem). Diltiazem in effective antiischemic dose reduced mean BP values (p < 0.005) but did not change nocturnal BP fall, morning BP surge and BP variability. Smoothness index on diltiazem was 0.64 ± 0.15 and 0.61 ± 0.10 for systolic and diastolic BP respectively. Both nitrates caused additional diurnal and 24- hour BP decline (p < 0.05 vs diltiazem). Nocturnal BP decreased only in IM-group (p < 0.05 vs diltiazem), thus nocturnal BP in IM-group was significantly lower if compared with NG-group (p < 0.05). The nocturnal BP fall and morning BP surge were lower in NG-group if compared with IM-group. Both nitrates did not change BP variability. Smoothness index was 0.91 ± 0.19 and 0.83 ± 0.15 for systolic and diastolic BP in NG-group and 1.00 ± 0.17 and 1.00 ± 0.20 in IM-group respectively (p > 0.05 NG vs IM).

Conclusions: Two nitrates caused significant additional antihypertensive action in patients with stable angina pectoris and hypertension, treated with diltiazem. We can conclude that their effects on 24-hour blood pressure profile are very different despite co-linearity between nocturnal BP fall and morning BP surge. Only IM addition effectively reduced night-time BP. Combination treatment with diltiazem and IM may be successfully used in patients with predominantly nocturnal hypertension.

The Impact of a Community Trial on Pharmacological Treatment in Individuals with Metabolic Syndrome 2000-2007: Findings from the Isfahan Healthy Heart Program

M. Gharipour. Isfahan Cardiovascular Research Institute, Isfahan-Iran

Background: Pharmacological therapy is a crucial step in the management of individuals with metabolic syndrome, when lifestyle modifications alone cannot achieve the therapeutic goals. The present study aims to evaluate the efficacy of comprehensive interventions on drug compliance in individuals with metabolic syndrome.

Methods: A cross-sectional population-based survey examined a random sample of adults living in two intervention counties (Isfahan and Najaf-Abad) and a control area (Arak) in central Iran in 2000 and was repeated in 2007 after conducting a community trial. For each phase of study, an independent random sample was selected by a random multi-stage cluster sampling method. In addition to physical examination and blood sampling, data regarding the demographic characteristics, medical status and history of medication use were obtained. Drug compliance related to metabolic syndrome components was assessed.
**RESULTS:** The most common pharmacologic agents consumed by individuals with metabolic syndrome were beta blockers (26.1% and 30.4% in 2000 and 2007, respectively), followed by lipid lowering agents (5.4% and 14% in 2000 and 2007), with significant differences before and after intervention.

**CONCLUSIONS:** Our results revealed a significant increase in medication used to control blood pressure and lipid profile among individuals with metabolic syndrome.

**PP44.417**

**EFFECTIVENESS OF HIGH DOSE OF PERINDOPRIL/INDAPAMIDE FIXED COMBINATION ON AMBULATORY BLOOD PRESSURE IN PATIENTS WITH PER/IND-INDUCED HYPERTENSION**

D. Raev, T. Yanev. Medical Institute-Ministry of Interior, Sofia-Bulgaria

**Objective:** There are recent data from an evaluation of three randomised clinical trials, that high dose of fixed combination perindopril indapamide (Per/Ind) provided an incremental reduction in office blood pressure (OBP). However, there are no data of effect of high dose Per/Ind on ambulatory BP (ABP). The aim of this study was to evaluate the effect of the routine administration of high dose of Per/Ind fixed combination in addition to current antihypertensive therapy in reducing ABP in uncontrolled medicated hypertensive patients.

**Design and Method:** This was a prospective, non-interventional, observational study. 43 hypertensives (mean age 59.4 ± 8.2 years) with uncontrolled OBP were studied. 84% of them had a SBP > 150 mmHg. 63% of patients used ACE inhibitors (ACEI), 47% – thiazide diuretics (TD), 46% – beta-blockers (BB), 21% – calcium antagonists (CA) and 5% – angiotensin receptor blockers (ARB). 2 tablets of fixed-dose combination Per 5 mg/Ind 1.25 mg (Per/Ind2.5) were added to the existing therapy once-daily and where ACEI, ARB or TD were used they were replaced by this fixed combination. At inclusion 4% of patients were treated with 2 tbl, Per/Ind2.5 only, 75% with 2 tbl, Per/Ind2.5 and BB or CA, and 21% with 2 tbl, Per/Ind2.5, BB and CA. 24-hrs ABP monitoring was performed before and on week 12 after started of Per/Ind with BP measurement per 15 minutes. Daytime and nighttime was determined according patient’s diary and the data were synchronized to arising time. Morning BP was determined as the average BP during the first 3 hrs after rising. The effect of addition of high dose Per/Ind on BP smoothness was estimated by calculation of smoothness index (SI).

**Results:** 12 weeks treatment with 2 tablets Per/Ind2.5, added to existing medication resulted in significant reduction of 24-hr BP (136 ± 9/88 ± 7 mmHg vs 126 ± 8/78 ± 6 mmHg, p < 0.001), daytime BP (142 ± 9/90 ± 9 mmHg vs 131 ± 9/84 ± 6 mmHg, p < 0.001), nighttime BP (122 ± 77/79 ± 7 mmHg vs 109 ± 8/66 ± 7 mmHg, p < 0.001), and in morning BP (147 ± 10/96 ± 9 mmHg vs 135 ± 9/87 ± 7 mmHg, p < 0.001). Office BP decreased from 162 ± 10/95 ± 9 mmHg to 140 ± 10/89 ± 9 mmHg also (p < 0.001). These BP reductions translated into high response and normalization rates (62%, resp. 51%). SI of SBP/DBP increased after addition of the fixed combination – 1.24 ± 0.51/1.2 ± 0.5 vs. 1.57 ± 0.61/1.4 ± 0.5 (p < 0.05/p < 0.01).

**Conclusions:** The addition of 2 tablets of Per/Ind2.5 fixed combination to the existing antihypertensive therapy in uncontrolled according to OBP patients resulted in rapid and smooth reduction in ABP. In such hypertensive population in which most patients were prone to be treatment resistant the addition of high dose Per/Ind may be of a matter of choice to control BP in real clinical practice.

**PP44.418**

**INFLUENCE COMBINATION LERCANIDIPINE WITH DILTIAZEM ON BLOOD PRESSURE AND CENTRAL BLOOD PRESSURE IN PATIENTS WITH MILD TO MODERATE ARTERIAL HYPERTENSION**


**The aim:** was to evaluate the antihypertensive effects combination lercanidipine with diltiazem in patients with mild to moderate arterial hypertension.

**Patients and Methods:** 17 patients were included. Systolic (SBP) and diastolic (DBP) blood pressure, heart rate (HR), patient’s compliance, adverse effects, efficacy of therapy baseline and 1 month of treatment were evaluated. Ambulatory blood pressure monitoring and central blood pressure were done in all patients before and on 1st month of therapy. Combination lercanidipine 20 mg with diltiazem 240 mg daily dose. Mean age of patients was 55.4 ± 0.93 yr., BMI = 30.12 ± 0.42 m2, initial SBP = 161.33 ± 0.45 mmHg, DBP = 93.72 ± 0.63 mm Hg., HR = 76.68 ± 0.67 b.m.

**Results:** That was established that in mild and moderate hypertensive patients combination lercanidipine 20 mg with diltiazem 240 mg decreased the office SBP from – 161.33 ± 0.45 to 149.66 ± 0.32 mmHg, (p < 0.05) and DBP from – 93.72 ± 0.63 to 85.83 ± 0.55 mm Hg., (p < 0.05), HR did not change – 76.68 ± 0.67 and 75.97 ± 0.73 b.m. (p > 0.05). The average daily SBP decreased from – 142.57 ± 0.64 to 131.56 ± 0.59 mmHg, (p < 0.05) and DBP from – 89.73 ± 0.60 to 81.56 ± 0.54 mmHg, (p < 0.05), HR did not change – 72.36 ± 0.78 and 73.63 ± 0.68 b.m. (p > 0.05). Central blood pressure decreased from – 137.69 ± 0.74 to 130.62 ± 0.61 mmHg, (p < 0.05) We did not note any negative changes in biochemical and clinical laboratory data. Only 4 adverse events were noted (edema to lercanidipine; headache, stuffiness in ear, flushing to diltiazem.) and in only 1 patient with edema we had to stop lercanidipine and in other patient we had to stop diltiazem because he had headache and flushing.

**Conclusion:** the combination lercanidipine 20 mg with diltiazem 240 mg effectively lowered BP and was safe and well tolerated.

**PP44.419**

**DIFFERENTIAL EFFECTS BETWEEN ALISKIREN AND BENZAPEPRIL WHEN USED IN COMBINATION WITH ANGIOTENSIN II RECEPTOR BLOCKER ON ALBUMINURIA AND CARDIAC HYPERTROPHY IN CHRONIC KIDNEY DISEASE PATIENTS WITH HYPERTENSION**

M. Ohsawa, K. Tamura, K. Azushima, S. Haku, T. Kanaoka, A. Maeda, T. Dejima, H. Wakui, K. Azuma, Y. Toya, S. Umemura. Department of Medical Science and Cardiorenal Medicine, Yokohama City University Graduate School, Yokohama Japan

**Objective:** Despite the first-line use of angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin II receptor blockers (ARBs), there is still a substantial need to efficiently inhibit the progression of chronic kidney disease (CKD) with proteinuria. Direct renin inhibitor aliskiren may provide more effective blockade of renin-angiotensin system in the kidney and may exert more renoprotective effects in CKD patients with hypertensive. The aim of this study was to examine the beneficial effects of addition of aliskiren or benazepril to the ARB treatment on ambulatory blood pressure (BP) and cardiological function in CKD patients with hypertension and albuminuria.

**Methods:** This study enrolled Japanese hypertensive CKD patients who had already receiving the standard dose of ARB but with residual albuminuria (urinary albumin/creatinine ratio > 30mg/g creatinine). Twelve patients were randomly assigned to the aliskiren (150-300mg/day) group or the benazepril (5-10mg/day) group. The dose of either drug was titrated up to the maximum to obtain BP control to a level less than 130/80mmHg in the office. If the addition of aliskiren or benazepril could not still achieve the target BP control, amlopidine and α-methyldopa were added as optional concomitant antihypertensive drugs to reach the target BP in each group.

**Results:** There were no significant differences in clinical characteristics including ambulatory BP profile and renal function between the groups at baseline. The average doses of aliskiren and benazepril were 175.0 ± 23.0 mg/day and 7.5 ± 1.1 mg/day after 24-weeks of treatment, respectively. Optional concomitant antihypertensive drugs were also used in one patient of the aliskiren group (n = 1, amlopidine + methyldopa) and four patients of the benazepril group (n = 4, amlopidine) during the treatment period. Ambulatory BP was comparably lowered in both the aliskiren group and benazepril group after 24-weeks of treatment. On the other hand, the addition of 24-week aliskiren treatment resulted in significant improvements in the urinary albumin/creatinine ratio and the urinary L-FABP/creatinine ratio compared with the baseline value, while the addition of 24-week benazepril treatment did not exert such beneficial effects (urinary albumin/creatinine ratio, aliskiren -51.5 ± 9.9% vs benazepril 25.0 ± 10.7%, P < 0.001; urinary L-FABP/creatinine ratio, aliskiren -67.6 ± 6.1% vs benazepril 88.0 ± 103.0%, P < 0.05). No significant difference was observed in the changes in eGFR between the two groups during the treatment. Furthermore, add-on treatment with aliskiren, but not benazepril, did cause a significant improvement in the left ventricular mass index (LVMI), a parameter of cardiovascular remodeling assessed by echocardiography (aliskiren -17.4 ± 4.3% vs benazepril 7.2 ± 11.8%, P < 0.05).

**Conclusion:** Aliskiren may have superior cardiological protective effects to benazepril in CKD patients with hypertension and albuminuria who are already treated with ARB.
PP.44.420  FIXED COMBINATION OF VALSATAN AND AMLODIPINE: DECREASE OF CARDIOVASCULAR RISKS IN PATIENTS WITH HYPERTENSION ACCOMPANIED BY METABOLIC SYNDROME

N. Maksimchuk, E. Tarlovskaya, S. Malchicova, I. Sapozhnikova. Kirov State Medical Academy, Kirov-Russia

Purpose: To study possibility of fixed combination of valsartan and amlodipine on regression of left ventricular hypertrophy, reduction in microalbuminuria and endothelium-dependent vasodilatation in patients with hypertension accompanied by metabolic syndrome.

Materials and Methods: 20 patients with hypertension accompanied by metabolic syndrome with a history of a previous ineffective anti-hypertensive therapy were studied. Of them, 15 patients were females and 5 were males. Combined anti-hypertensive therapy was administered during 12-24 weeks. It included valsartan and amlodipine depending on the level of arterial hypertension (in dosage of 5 (amlodipine)/160 mg (valsartan) and in the dose of 10/160 mg). All patients were performed the measurement of endothelial function, level of blood pressure, urinary albumin excretion and level of left ventricular hypertrophy.

Results: Reliable reduction of arterial hypertension to the target level was revealed in the patients who received the therapy. There was a significant reduction in microalbuminuria on -65.1 ± 24.9 mg/l in comparison with the original. The growth of endothelium-dependent vasodilatation was 3.6 ± 7.2% in comparison with the original, reliable regression of left ventricular hypertrophy was revealed in the group before and after the treatment: on -9.1 ± 12.4 g/m².

Conclusion: The fixed combination of valsartan and amlodipine allows to achieve reliable reduction of arterial blood pressure, significant reduction of microalbuminuria, significantly improved of endothelium-dependent vasodilatation, reliable regression of left ventricular hypertrophy in patients with hypertension accompanied by metabolic syndrome. These findings show that the fixed combination of hypotensive drugs has a multifaced impact on cardiovascular risk.

PP.44.421  AMLODIPINE AND VALSATAN SINGLE PILL COMBINATION EFFICACY AND SAFETY IN TREATMENT OF ARTERIAL HYPERTENSION IN REAL LIFE PRACTICE IN RUSSIA

I. Chazova, Y. Karpov, A. Vgoretchik, A. Zuzumila. Russian Cardiology Scientific-Industrial Complex, Moscow-Russia, 2Novartis Pharma Llc, Moscow-Russia

Objectives: The aim of our analysis was to evaluate the efficacy of amloidipine/valsartan single pill combination in a large subgroup of Russian Caucasian patients.

Methods: This was a multi-centre, multinational, open-label observational non-interventional post marketing surveillance study. 2874 patients with hypertension were enrolled in Russia, 50 patients did not complete the study as per protocol and 2824 patients data was analyzed: mean age 55.7 yrs, 46.8% men, 24.9% smokers, 38.7% had coronary heart disease, 19.8% had heart failure, 18.8% diabetic, 89.7% received hypertension treatment before they were prescribed amloidipine/valsartan combination and enrolled in our study (69.2% ACE inhibitors, 49.0% diuretics, 43.2% beta-blockers, 33.2% calcium antagonists).

Results: The baseline SBP/DBP (167.5 ± 16.2/100.1 ± 9.2 mmHg) was reduced by 38.9/16.2 mmHg (p < 0.0001) during 12 weeks of treatment. 80.0% of patients reached BP goal <140/90 mmHg. Only 577 (20.4%) patients received beta-blockers and 372 (13.2%) diuretics concomitantly. We analyzed data for patients on stable doses of amloidipine/valsartan and observed dose-dependent BP drops (see figure) and according to baseline BP elevation level. The BP reduction was smallest in patients with grade I hypertension (SBP 140-159 mmHg, n = 635) -25.3/-15.9 mmHg (P < 0.0001), average in patients with grade II hypertension (SBP 160-179 mmHg, n = 1449) -36.8/-19.2 mmHg (P < 0.0001), and greatest in grade III patients (SBP 180 mmHg, n = 719) -55.9/23.9 (P < 0.0001). BP reduction observed in patients with baseline SBP = 190 mmHg (n = 296) was -65.7/-26.2 mm Hg (P < 0.0001) and in patients with baseline SBP = 200 mmHg (n = 145) -74.2/-28.5 mmHg (P < 0.0001). In patients with ISH (n = 122), SBP was reduced by 51.6 mmHg while DBP was only reduced by 5.8 mmHg (P < 0.0001).

Conclusion: Our results show powerful BP drops and excellent BP control rate achieved with amloidipine/valsartan single pill combination in a real life setting in Russian Caucasian patients.

PP.44.422  LONG-TERM EFFICACY AND SAFETY OF COMBINATION OLMESARTAN MEDOXOMIL/AMLODIPINE BESYLATE + HYDROCHLOROTHIAZIDE STRATIFIED BY AGE: A TRINITY STUDY SUBGROUP ANALYSIS

S. Chrysanthi, D. Kereziakis, S. Opari, J. Izot, T. Littlejohn, M. Melinos, J. Lee, V. Fernandez, R. Heyrman. 1Okahoma Cardiovascular and Hypertension Center and University of Oklahoma College of Medicine, Oklahoma City-USA, 2The Christ Hospital Heart and Vascular Center and The Carl and Edyth Lindner Center, Cincinnati-USA, 3University of Alabama at Birmingham, Birmingham-USA, 4State University of New York At Buffalo, Buffalo-USA, 5Piedmont Medical Research Associates, Winston-Salem-USA, 6Daichi Sankyo, Inc, Parsippany-USA

Objective: In a prespecified subgroup analysis of the TRINITY study, the long-term efficacy and safety of olmesartan (OM)/amlodipine (AML) + hydrochlorothiazide (HCTZ) were evaluated in study participants (pts) < 65 yrs (80.4%) and ≥ 65 yrs (19.6%).

Design and Method: After completing the 12-week double-blind TRINITY study, pts were administered OM 40/AML 5 + HCTZ 12.5 mg in a 40-week open-label extension. Pts not achieving BP goal (< 140/90 or < 130/80 mmHg for pts with diabetes, chronic renal disease, or chronic cardiovascular disease) after 2 weeks were randomly titrated to OM 40/AML 5 + HCTZ 25 mg or OM 40/AML 10 + HCTZ 12.5 mg. At week 16, pts not achieving BP goal were further titrated to OM 40/AML 10 + HCTZ 25 mg. Back-titration to a lower dose of triple therapy was allowed at the investigator’s discretion. Study objectives were to determine BP goal attainment (OM/AML 5 mg HCTZ twice daily) in each open-label visit (weeks 12-52), percentage (%) of pts reaching BP goal, and safety assessments.

Results: At week 12 (open-label start), mean BP (on treatment) was 134±28±3 mmHg (< 65 yrs) and 137±58±0 mmHg (≥ 65 yrs). Efficacy and safety results are presented in the Table. At week 52/early termination, mean SeDBP ranged from 78.5 to 83.8 mmHg (< 65 yrs) and from 74.0 to 77.5 mmHg (≥ 65 yrs); mean SeSBP ranged from 124.7 to 136.6 mmHg (< 65 yrs) and from 126.2 to 137.8 mmHg (≥ 65 yrs). The% of pts reaching BP goal ranged from 45.0% to 79.8% (< 65 yrs) and from 42.3% to 79.9% (≥ 65 yrs). Most AEs were mild or moderate in severity. In pts < 65 yrs and ≥ 65 yrs, the incidence of AEs was 36.0% to 58.7% and 37.2% to 60.9% and the incidence of drug-related AEs was 9.9% to 19.4% and 13.3% to 21.1%, respectively.

Conclusions: Long-term treatment with OM/AML + HCTZ was both well-tolerated (with no distinctive AE by age group) and effective in lowering BP achieving BP goals irrespective of age (< 65 yrs and ≥ 65 yrs).

PP.44.423  EFFECTIVENESS OF COMBINATION OF THE DIRECT RENIN INHIBITOR ALISKIREN AND HYDROCHLOROTHIAZIDE IN HYPERTENSIVE PATIENTS

L. Samerkanova, M. Loukyanov, S. Boizov. Russian Cardiology Research Complex, Moscow, Russia, Moscow-Russia
Objective: To evaluate the effectiveness of aliskiren and of different doses of hydrochlorothiazide (HCT) in combination with aliskiren in patients with hypertension I-II degree.

Materials and Methods: In the study were included 30 patients, age 58.7 ± 9.7 years. After 2 weeks of therapy by aliskiren 300 mg/day patients were randomized to group 1 (aliskiren 300 mg/day and HCT 12.5 mg/day) and group 2 (aliskiren 300mg/day and HCT 25mg/day). Ambulatory blood pressure monitoring (ABPM), evaluation of microalbuminuria, of potassium and sodium blood level and urine level were done before, after 2 and 8 weeks of therapy.

Results: Systolic blood pressure (SBP) and diastolic blood pressure (DBP) significantly decreased after 2 weeks of aliskiren therapy from 164 ± 10.0 mmHg and 91.5 ± 11 mmHg to 142.6 ± 9.7 mmHg (p < 0.001) and 85.9 ± 10.3 mmHg (p < 0.001), respectively. Target blood pressure (BP) level was achieved in 10 cases (33.3%). After 8 weeks of following combined therapy SBP and DBP levels decreased significantly in group 1 from 141.6 ± 8.2 mmHg to 131 ± 8.0 mmHg and from 89 ± 13 mmHg to 78 ± 6 mmHg in group 2 from 142.9 ± 9.2 mmHg to 128.9 ± 9 mmHg and from 90.5 ± 12.3 mmHg to 74 ± 8.3 mmHg. There were no significant differences of BP level between groups. Target BP level was achieved in 75% and 85.7% of cases, respectively. Monotherapy by aliskiren 300 mg/day provided a significant reduction of microalbuminuria from 10.41 ± 30.2 mg/l to 2.8 ± 0.81 mg/l, potassium urine level from 47.3 ± 28.3 mmol/l to 30.5 ± 2.1 mmol/l and sodium urine level from 152 ± 43.6 mmol/l to 140 ± 30.2 mmol/l. There were no significant differences of potassium and sodium blood level before and after 8 weeks of combined therapy in groups 1 and 2.

Conclusion: Aliskiren therapy 300 mg/day during 2 weeks decreased significantly BP level in hypertensive patients. Combination of aliskiren and HCT in doses 12.5 mg/day and 25 mg/day provides further significant decrease of BP level and achievement of target BP values in 75% and 85.7% of cases, respectively.

BLOOD PRESSURE REDUCTION WITH FIXED-COMBINATION PERINDOPRIL ARGININE/AMLODIPINE IN THE IMPRESS NATIONAL PROGRAM

R. Accetto, P. Dolenc: University Medical Centre, Dpt. for Hypertension, Ljubljana-Slovenia

Objectives: Combination antihypertensive therapy with an ACE (angiotensin-converting enzyme) inhibitor and a calcium channel blocker (CCB) is a rational approach to achieve blood pressure (BP) goals. We evaluated BP reduction with fixed-combination perindopril arginine/amlopidine in patients with hypertension in real clinical practice settings.

Design and Methods: 318 patients were included in this open observational study, mean age 62.8 years ± 11.4 (48.7% were men and 51.3% women). There were 22% patients who had never been treated for hypertension. BP of those previously treated for hypertension with monotherapy or combinations was not controlled. BP and heart rate (HR) were measured at the beginning of the study (W0), and after therapy (W4) and eight weeks (W8) of treatment. At study entry, previous ACE inhibitors and CCBs, prescribed either in fixed or fixed combination therapies, were replaced by the fixed combination of perindopril arginine/amlopidine (Prestance®) 5/5 mg, 5/10, 10/5, 10/10 mg, and titrated as required. Other background antihypertensive therapy remained unchanged.

Results: Mean BP and HR were reduced as shown in the table below. BP normalization (< 140/90 mm Hg and < 130/80 in diabetes) was achieved after 4 weeks and 8 weeks of treatment in 28.2% and 78.9% of patients, respectively. Among patients with a baseline BP level above 180/110 mm Hg, we observed reduction of 47.3±20.5 mm Hg.

Conclusion: BP in patients treated with fixed-combination perindopril arginine/amlopidine was controlled in 78.9% of patients after 8 weeks of treatment. The magnitude of BP reduction with fixed-combination perindopril arginine/amlopidine was greater in patients with higher BP at baseline.

Table: BP reduction with the fixed-dose combination of perindopril arginine/amlopidine.

<table>
<thead>
<tr>
<th></th>
<th>W0</th>
<th>W4</th>
<th>P (W0-W4)</th>
<th>WB</th>
<th>P (W4-WB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBP (mmHg ≤ SD)</td>
<td>168.2 ± 17.2</td>
<td>145.3 ± 12.7</td>
<td>&lt; 0.001</td>
<td>137.3 ± 10.3</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>DBP (mm Hg ≤ SD)</td>
<td>97.1 ± 11.5</td>
<td>86.3 ± 8.7</td>
<td>&lt; 0.001</td>
<td>82.4 ± 7.6</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>HR (min-1 ≤ SD)</td>
<td>77.7 ± 11.3</td>
<td>74.3 ± 9.0</td>
<td>&lt; 0.001</td>
<td>72.8 ± 8.5</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

Abbreviations: DBP, diastolic blood pressure; HR, heart rate; SBP, systolic blood pressure; SD, standard deviation; W, week.

OBJECTIVE TRIAL OF ANGIOTENSIN RECEPTOR BLOCKER (ARB)–DIURETIC VERSUS ARB–CALCIUM CHANNEL BLOCKER COMBINATION THERAPY FOR HYPERTENSION UNCONTROLLED BY ARB MONOTHERAPY: THE KANAGAWA COMBINATION ANTIHYPERTENSIVE THERAPY (K-CAT) STUDY

J. Oshikawa1, Y. Toya1, J. Okabayashi1, S. Kobayashi1, T. Mikawa2, M. Miyakawa3, K. Shimizu4, G. Yawata4, K. Kimura4, S. Umemura5, ‘Yokohama City University Graduate School of Medicine, Yokohama, Japan, 1’Kobayashi Clinic, Yamato-Japan, 2’Shonankamakura General Hospital, Kamakura-Japan, 3’Mikawa Clinic, Kawasaki-Japan, 4’Miyakawa Clinic, Yokohama-Japan, Shimizu Clinic, Sajimagahara-Japan, Yokohama City University Center Hospital, Yokohama-Japan, and 5’S. Marianne University School of Medicine, Kawasaki-Japan

Objective: Combination therapy with multiple antihypertensive drugs is recommended for patients whose hypertension is uncontrolled by monotherapy. Diuretics increase the activity of the renin–angiotensin–aldosterone system (RAS), and angiotensin receptor blockers (ARBs) reduce blood pressure (BP) potentially in the state of increased RAS activity. Therefore, ARB-diuretic combination therapy would be expected to reduce BP synergistically as well as reduce the side effects of each drug. We compared the efficacy and safety of two combination therapies: losartan (LST)–amilodipine (AML) and fixed-dose LST–hydrochlorothiazide (HCTZ).

Design and Method: The K-CAT study was a prospective randomized open-label trial comparing two combination therapies. The study enrolled patients with hypertension treated with ARB monotherapy for >1 month. They were randomized to receive either LST 50 mg–AML 5 mg or fixed-dose LST 50 mg–HCTZ 12.5 mg once daily. Office BP was measured every 3 months. The primary endpoint was changes in systolic BP 3 months after starting combination therapy. Secondary endpoints were achievement of target BP and changes in diastolic BP at 3 months and achievement of target BP and BP changes at 6, 9, and 12 months. Also, effects on metabolism were examined during the 1-year follow-up period.

Results: A total of 174 patients were enrolled (77 in the LST–AML group and 97 in the LST–HCTZ group), and their data were used for intention-to-treat (ITT) analysis. After allocation, 62 patients in the LST–AML group and 58 in the LST–HCTZ group completed the study; their data were used for per-protocol (PPS) analysis. PPS analysis showed that systolic BP had decreased from 153.1 to 131.4 mmHg in the LST–AML group and from 150.8 to 131.3 mmHg in the LST–HCTZ group after 3 months; there were no significant differences between the groups. Changes in diastolic BP, achievement of target BP, and lipid metabolism were also similar in the two groups. Although serum uric acid concentration was significantly higher in the LST–HCTZ group than in the LST–AML group at 12 months, LST–HCTZ had no effect on serum uric acid concentration in the high–uric acid group. ITT analysis showed similar tendencies (W4 and W8) in all parameters. At study entry, other background antihypertensive therapy remained unchanged.

Conclusion: Fixed-dose LST–HCTZ has similar BP-lowering effects to those of LST–AML.

CLINICAL AND VASOPROTECTIVE EFFICIENCY OF COMBINED THERAPY WITH LERCANIDIPINE WITH PERINDOPRIL AND EPROSARTAN IN HYPERTENSIVE PATIENTS

L. Khaliyozova, F. Zakirova, B. Karimova, G. Khamidullayeva. Republican Center of Cardiology, Tashkent-Uzbekistan

Objective: Comparative study clinical and vasoprotective efficiency of 12-week combined therapy with lercanidipine with perindopril and eprosartan in hypertensive patients.

Design and Methods: There have been included 78 hypertensive men with the I-III grade hypertension. Middle age was 46.5 ± 10.3yrs. and average duration of hypertension 5.9 ± 4.0 yrs. Blood pressure was measured by sphygmomanometer by Korotkov method. Flow-mediated endothelium dependent vasodilatation (EDVD) was measured during reactive hyperaemia due to 5 minute brachial occlusion. Patients were divided into 2 groups according to therapy: lercanidipine and perindopril (L + P) and lercanidipine and eprosartan (L + E). Group included 39 patients. Daily dose of lercanidipine was 10–20mg, the perindopril – 5–10 mg and eprosartan 600–1200mg.

Results: It has been shown high antihypertensive efficacy of lercanidipine combination with perindopril and eprosartan along with the absence of any side effects. SBP reduction was -16.3% in the L + P group: from 156.4 ± 12.5 mmHg to 130.3 ± 7.01 mmHg (p = 0.000) and -16.01% in the L + E
group: from 153.2 ± 9.7 mmHg to 128.5 ± 7.09 mmHg (p = 0.000). DBP has decreased -16.9% in the L + P group: from 99.49 ± 7.8 mmHg to 82.82 ± 4.7 mmHg (p = 0.000) and -15.4% in the second one: from 100 ± 9.7 mmHg to 84.2 ± 6.7 mmHg (p = 0.000). 84.6% of patients who took combined therapy L + P have archived goal BP (< 140/90mmHg) in comparative to those who were in L + E – 74.4%. Moreover, it has been noted, significantly improvement of EDVD during both of therapy mode. AD has changed from 8.23 ± 3.7% to 12.03 ± 4.1% in the L + P group (p = 0.000) in contrast with second group: from 6.7 ± 2.8% to 10.6 ± 1.8% (p = 0.000).

Conclusion: Combined therapy with lercanidipine and perindopril and eprosartan in patients with essential hypertension is characterized by high anti-hypertensive and vasoprotective efficacy. Vascular protection of therapy was shown in normalization of EDVD.

**PP.44.427**  
**EFFECT OF COMBINED THERAPY WITH LERCANIDIPINE AND RAMIPRIL ON LEFT VENTRICULAR HYPERTROPHY IN ELDERLY PATIENTS WITH ISOLATED SYSTOLIC HYPERTENSION**

E. Ter-Stepanyants1, A. Ordyan1, L. Alekseyan2, A. Naghdalyan2,1. Yerevan State Medical University, Yerevan-Armenia, 2Muratsan Clinical Hospital, Yerevan-Armenia

Objective: This study aimed to evaluate the efficacy and tolerability of combined therapy with lercanidipine and ramipril in elderly patients with isolated systolic hypertension (ISH) and left ventricular hypertrophy (LVH).

Design and Methods: 46 elderly patients (21 males and 25 females) with ISH were studied during 24 weeks. Mean age of patients was 74.2 ± 4.2 years. Baseline systolic blood pressure (SBP) – 168.1 ± 16.8mmHg, diastolic blood pressure (DBP) – 63.2 ± 10.8mmHg, left ventricular mass index (LVMI) – 135.2 ± 3.6 g/m² (for men > 120 g/m², for women > 100g/m²). Mean duration of hypertension was 7.2 ± 5.2 years. All patients received Lercanidipine 10-20mg and Ramipril 5mg once daily for 24 weeks. Left ventricular mass, E/A ratio, left ventricular (LV) diastolic diameter, posterior wall and septal thickness were determined by EchoCG and Doppler examination at baseline and after 3 and 6 months of the treatment. Control examination of SBP and DBP were made every 2 weeks. Tolerability evaluations were based on adverse events, clinically relevant reports of abnormalities, laboratory tests, and patients requested to subjectively estimate their state, as excellent, good, satisfactory and unsatisfactory. The relationship between parameters was established by Spearman correlation analysis, p < 0.05 was considered statistically significant.

Results: A distinct decrease in the level of SBP was noted already to the 2nd week from the beginning of the treatment. After 24 weeks SBP decreased from 168.1 ± 16.8 to 136.2 ± 11.8 (p < 0.001). In the observed patients pulse pressure against the background of treatment with lercanidipine with ramipril was reduced in 24 weeks by 40% of the initial level. EchoCG and Doppler examination revealed reducing of LVMI from 135.2 ± 3.6 g/m² to 116.6 ± 3.2 g/m² (p < 0.005), LV posterior wall and septal thickness reduced from 11.4 ± 2.3 to 10.6 ± 1.4 mm (p < 0.001) and 12.65 ± 1.2 ± 11.4 ± 1.6 mm (p < 0.001), E/A ratio increased from 0.79 ± 0.18 to 0.92 ± 0.12 (p < 0.002). Treatment was well tolerated; no clinically relevant or laboratory tests changes were induced by the treatment. None of the patients estimated his state as unsatisfactory.

Conclusion: This study shows that combined therapy with lercanidipine and ramipril beneficially affects on left ventricular hypertrophy and blood pressure in elderly patients with isolated systolic hypertension, has a good tolerability and favorable effect on pulse pressure.

**PP.44.428**  
**COMPARISON OF MONOTHERAPY VS COMBINATION THERAPY ON BLOOD PRESSURE CONTROL**

E. Arslan1, S. Erdine1, M. Senocak1, A.M. Erdem1, A. Kaya1. 1Istanbul University Cerrahpasa Medical Faculty, Istanbul-Turkey, 2Istanbul-Turkey, 3Turkish Republic Ministry of Health Sefa Kayakoy Village Clinic, Kucukcekmece, Istanbul-Turkey, 4Selcuk University Medical Faculty, Konya-Turkey

Objective: To compare the difference between monotherapy and combination therapy on blood pressure (BP) control in TRES 1 study.

Design and Method: Patients with newly diagnosed or established hypertension were enrolled in an observational study by 213 primary care physicians from 49 sites countrywide. Patients were followed monthly during the first three months, and every three months until Month 12. Patient data were automatically stored on a central database via an internet-based management system. t test, chi-square test, McNemar test, and two-way analysis of variance were performed in the analysis of the data and p < 0.05 was accepted significant. Data were expressed as mean ± SD or as percentages.

Results: Data of 770 patients (260 men and 510 women) collected regarding the antihypertensive drug regimen. Systolic BP (SBP) was not changed significantly in monotherapy (P = 0.076) but there was a change in diastolic BP (DBP) close to significance limit (P = 0.074). In combination therapy the change in SBP is close to significance limit (p = 0.051) but not significant in DBP (P = 0.484). Two-way analysis of variance revealed no significant change in SBP (P = 0.158) and close to significance limit in DBP (p = 0.09), without any significance between therapies (SBP p = 0.312, DBP p = 0.411). Re-analysis of patients with initial BP levels 140/90 mmHg by two-way analysis of variance, before and after treatment SBP and DBP values revealed significant improvement in blood pressure control (p < 0.001 vs p < 0.001) but there is no superiority between monotherapy and combination therapy in SBP (p = 0.364) and DBP (p = 0.883).

Conclusion: Although there was no statistical difference between mono-therapy and combination therapy in BP control, re-analysis of patients whose initial blood pressure levels were 140/90 mmHg showed a significantly successful SBP and DBP control, that indicated the importance of 1 mmHg change in high BP cut-off value regarding BP control rates.

**PP.44.429**  
**LEFT VENTRICULAR DIASTOLIC DYSFUNCTION, PULSE PRESSURE AND CENTRAL PRESSURE IN HYPERTENSIVE PATIENTS SUBMITTED TO COMBINED OR MONOTHERAPY TREATMENT**


Introduction: recent clinical trials allow us to know that using monotherapy is not successful in most patients, principally those with some comorbidities. However we don’t know the effects of both monotherapy or combined therapy, on left ventricular diastolic dysfunction (LVDD) and pulse pressure (PP) in those with moderate hypertensive patients (HTAP). The objective of this study was to evaluate the effects of both monotherapy or combined therapy on HTAP. Then we studied 48 men HTAP (58 ± 6 years old) who were divided in two groups: Group I 28 HTAP who received 80 mg of telmisartan and 20 HTAP received 80 mg of telmisartan plus 5 mg of amlopidine added if brachial office pressure goal (< 140/90 Hgmm) wasn’t got with monotherapy. All of them were submitted to a standard echocardiography study to evaluate thickness of left ventricle (LV) walls to know LV mass, E/A mitral flow index, non invasive systolic and diastolic central pressures (CSCP,DSCP) and pulse pressure (CPP, PP, BPP) measurements. We follow these HTAP during 6 months after which results were compared.

Results: baseline data respect to systolic / diastolic brachial pressure were 162 ± 6 / 96 ± 5 for group I and 168 ± 4/ 95 ± 6 for group II. At the end of the study: LVmass were 135 ± 6 g/m² for group I and 120 ± 4 for group II (p = 0.002), while E/A index was in 11 to 10 HTAP in group I (35%) while 18 HTAP were significantly less in group II (90%, p < 0.0001).Systolic/diastolic central pressures were in group I: 125 ± 3/84 ± 2 versus 110 ± 3/80 ± 2 in group II (p < 0.05 for both of them). BPP was 58 ± 5 in group I versus 46 ± 3 in group II (p < 0.001), while CPP was 42 ± 5 in group I and 30 ± 4 in group II (p < 0.001).

Conclusions: Combination therapy with telmisartan plus amlopidine, is not only effective to reduce peripheral and central blood pressure but also to reduce LVDD and pulse pressure, two very well known factors which increase HTAP cardiovascular risk. We should have take into account these results at the moment of choice the treatment in our hypertensive patients.

**PP.44.430**  
**COMPARATIVE EFFECTIVENESS OF RENIN ANGIOTENSIN SYSTEM BLOCKADES PLUS CCB OR DIURETIC FOR ESSENTIAL HYPERTENSION: A SYSTEMATIC REVIEW**

R. Ma, X. Zhang, L. Yang, F. Bai, J. Yu. The Second Hospital of Lanzhou University, Lanzhou-China

Purpose: The relative effectiveness of two combination therapy- Renin Angiotensin System (RAS) blockades/Calcium Channel Blockers (CCBs) versus RAS blockades/diuretics for lowering blood pressure is unknown. This systematic review is to compare the benefits and harms of RAS blockades plus CCBs versus RAS blockades plus diuretics for treating essential hypertension in adults.
Methods: We retrieved MEDLINE, the Cochrane Central Register of Controlled Trials, EMBASE and SCI using computers to identify relevant randomized controlled trials in English that directly compared the effect of RAS blockades plus CCBs with that of RAS blockades plus diuretics in adult patients with essential hypertension, reported an outcome of mean difference or interest of BP reduction, lasted at least 4 weeks, and included at least 20 patients. A standardized protocol with predefined criteria was used to extract data on study design, interventions, population characteristics, and outcomes; We evaluated the quality and applicability of included studies and assessed strength of the evidence for key outcomes.

Results: Five clinical studies were eventually included. We found no significant difference between RAS blockades/CCBs with RAS blockades/diuretics in reduction of blood pressure. However, RAS blockades/CCBs associated with significant stronger DBP response rate. No differential effects were observed for the incidence of adverse events.

Conclusion: Available evidence shows that RAS blockades/CCBs and RAS blockades/diuretics have similar effects on blood pressure control. High strength of evidence is needed. Data regarding in patient subgroups is missing.

E. Bazaeva, E. Mordvinova, A. Rogoza, M. Loukyanov, S. Boytsov. Russian Cardiology Research Complex, Moscow-Russia

Objective: To evaluate the efficacy and safety of losartan and combination of losartan and amlodipine in treatment of hypertension (HT).

Materials and Methods: The study included 100 patients with HT, I-II degree (33 men and 67 women, age 62 ± 8.9 years). Losartan therapy 50-100 mg/day was performed during 10 weeks. In cases of non-achieved target blood pressure (BP) level combination of losartan 100 mg/day and amlodipine 5-10 mg/day was used during further 16 weeks. Office BP measurement and ambulatory blood pressure monitoring (ABPM) were performed. Arterial stiffness (pulse wave velocity, PWV) was assessed by volume sphygmography.

Results: Systolic BP (SBP) and diastolic BP (DBP) decreased respectively from 161.9 ± 9.8 mmHg to 141.7 ± 7.1 mmHg (p < 0.001) and from 101.8 ± 8.6 mmHg to 94.8 ± 3.8 mmHg (p < 0.001) after 10 weeks of therapy by losartan. Target BP level was achieved in 52 patients (52%), subgroup 1. This effect on BP level was stable in all patients of subgroup 1 up to the end of 26 weeks of the therapy by losartan. For 48 patients with non-achieved BP level (subgroup 2) we used combination of losartan and amlodipine during 16 weeks that leads to significant decrease of SBP from 148.3 ± 5.2 mmHg to 131.2 ± 3.5 mmHg (p < 0.001) and DBP from 93.4 ± 6.2 mmHg to 78.4 ± 5.7 mmHg (p < 0.001) respectively. Target BP level was achieved after the combine therapy in 39 patients (81.25%) of subgroup 2. PWV decreased from 16.8 ± 2.3 m/s to 15.7 ± 1.7 m/s (p < 0.001) after 10 weeks of losartan therapy. PWV in subgroup 1 decreased significantly after 16 weeks of therapy from 15.2 ± 1.8 m/s to 14.8 ± 2.1 m/s (p < 0.001), in subgroup 2 - from 15.4 ± 1.7 m/s to 13.9 ± 1.3 m/s (p < 0.001), respectively. There were no side effects of the therapy: hypotension, allergy, increased creatinine and potassium blood level.

Conclusion: Antihypertensive losartan therapy during 10 weeks leads to achievement of target BP level in 52% of cases, as well as to reduction of PWV. This effect on BP level was stable in all these patients up to the end of further 16 weeks of losartan therapy. Combined therapy by losartan and amlodipine in hypertensives with non-achieved target BP level leads to achievement of target BP in 82% of cases and to significant additional decrease of PWV.

Design and Methods: The study investigated whether the SPC of aliskiren (Al) 300 mg and amlodipine (Am) 10 ml (Al300/Am10) is able to improve significantly the BP in hypertensive patients not adequately controlled by the SPC of Ol40/Am10. In a subgroup analysis the efficacy in different age groups (non elderly, i.e. < 65 years; n = 119 and elderly, i.e. ≥ 65 years; n = 68) was also assessed. After wash-out 342 patients with mean sitting systolic/diastolic BP at through (msSBP/msDBP) ≥ 160/100 mmHg and < 180/110 mmHg entered a 4-week treatment phase with Ol/Am (4 days Ol 10/Am 5 mg free combination, 4 days Ol 20/Am 10 mg free combination, 20 days Ol 40/Am 10 mg SPC). 186 patients with still uncontrolled BP at week 4 (msDBP ≥ 90 mmHg) entered a second 4-week treatment phase with Al300/Am10. If BP was not controlled after that time (msDBP ≥ 90 mmHg or msSBP ≥ 140 mmHg), HCT 12.5 mg was added in an optional study extension (n = 65).

Results: Office Blood pressure (BP) Overall popul (n=187*) Non elderly popul <65 years (n=119*) Elderly popul ≥ 65 years (n=68*)

<table>
<thead>
<tr>
<th></th>
<th>msDBP start of treatment phase (mmHg)</th>
<th>ms DBP after 4 weeks of treatment (mmHg)</th>
<th>Mean reduction after 4 weeks of treatment (mmHg)</th>
<th>ms SBP start of treatment phase (mmHg)</th>
<th>msSBP after 4 weeks of treatment (mmHg)</th>
<th>Mean reduction after 4 weeks of treatment (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ol/Am (n=74*)</td>
<td>147.4 ± 9.8</td>
<td>146.8 ± 10.2</td>
<td>4.8 (p&lt;0.0001*)</td>
<td>147.5 ± 9.6</td>
<td>142.3 ± 9.6</td>
<td>5.1 (p&lt;0.0001*)</td>
</tr>
<tr>
<td>Ol/Am (n=76*)</td>
<td>146.8 ± 9.9</td>
<td>145.9 ± 10.2</td>
<td>4.7 (p&lt;0.0001*)</td>
<td>147.3 ± 8.9</td>
<td>142.9 ± 8.9</td>
<td>5.4 (p&lt;0.0001*)</td>
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<tr>
<td>Ol/Am (n=97*)</td>
<td>148.3 ± 9.4</td>
<td>147.5 ± 10.2</td>
<td>4.8 (p&lt;0.0001*)</td>
<td>147.4 ± 9.4</td>
<td>142.8 ± 9.4</td>
<td>5.4 (p&lt;0.0001*)</td>
</tr>
<tr>
<td>Ol/Am (n=53*)</td>
<td>148.5 ± 9.4</td>
<td>147.8 ± 10.2</td>
<td>4.7 (p&lt;0.0001*)</td>
<td>147.6 ± 8.7</td>
<td>142.9 ± 8.7</td>
<td>5.4 (p&lt;0.0001*)</td>
</tr>
</tbody>
</table>

*A1300/Am10 IIT population, A1300/Am10/HCT12.5 safety population, paired t-test wk 8 vs. wk 4, **paired t-test wk 12 vs. wk 8.

Double and triple combination with Al300/Am10 +/- HCT12.5 was generally well tolerated.

Conclusion: Hypertensive patients not controlled by SPC Ol40/Am10 achieve significant additional BP reduction from treatment with Al300/Am10. Blood pressure reduction in different age-groups retrospectively showed no relevant difference. Further clinically relevant BP reductions (p < 0.0001) was achieved by switching to the SPC Al300/Am10/HCT12.5.

PP.44.432 EFFICACY OF THE SINGLE-PILL COMBINATION OF ALISKIREN 300/AMLODIPINE 10MG (+/- HCT 12.5) IN HYPERTENSIVE PATIENTS NOT CONTROLLED BY THE COMBINATION OF OLMESARTAN 40/AMLODIPINE 10MG INCLUDING A SUBANALYSIS OF THE NON ELDERLY VS. ELDERLY

C. Axthelm1, C. Sieder1, E. Kaiser2. 1Klinikum Pirna Gmbh, Department of Internal Medicine II, Pirna-Germany, 2Novartis Pharma Gmbh, Nuremberg-Germany

Objective: Most hypertensive patients require combination therapy for adequate treatment according to INC7 and ESH/ESC. Several different antihypertensive single pill combinations (SPC) are already on the market including the lately introduced combination of olmesartan 40 mg and amlodipine 10 mg (Sevikal® 40/10, Ol/Am/40/10). Also, hypertension and uncontrolled blood pressure are more common in elderly than in non-elderly patients.

PP.44.433 EFFICACY OF THE SINGLE-PILL COMBINATION OF ALISKIREN 300/AMLODIPINE 10MG IN HYPERTENSIVE PATIENTS NOT CONTROLLED BY THE COMBINATION OF OLMESARTAN 40/AMLODIPINE 10MG - A SUBANALYSIS IN OVERWEIGHT, OBSESE AND METABOLIC RISK PATIENTS

A. Axthelm1, C. Sieder2, E. Kaiser2. 1Klinikum Pirna Gmbh, Department of Internal Medicine II, Pirna-Germany, 2Novartis Pharma Gmbh, Nuremberg-Germany

Objectives: Obesity, metabolic risk factors and hypertension are co-morbid risk factors for the development of cardiovascular disease. Risk factors like obesity and diabetes have been shown to reduce the likelihood of achieving BP control rates (Banegas et al. Hypertension 2004;43:1338–44). Thus overweight and obese patient with hypertension require improved options for antihypertensive
therapy. The AWESOME study investigated whether the single pill combina-
tion aliskiren (AI) 300 mg and amloidipine (Am) 10 mg (AI300/Am10) is able
to significantly improve BP reduction in hypertensive patients not adequately
controlled by the SPC olmesartan 40 mg/amloidipine 10 (Sevikar® 40/10, Ol40/
Am10). This subanalysis addresses the efficacy in relation to BMI and metabolic
disorders.

Design and Methods: After wash-out 342 patients with mean sitting sys-
tolic/diastolic blood pressure at trough (msSBP/msDBP) = 160/100 mmHg
were distributed into 3 groups. Group 1 (n = 132) received amlodipine 5mg/daily.
Patients in group 2 (n = 132) received Ramipril 5 mg daily. Patients in group 3
(n = 78) received amlodipine 5 mg daily plus Ramipril 5 mg daily. The activity of
the autonomic nervous system was assessed using spectral and statistical analysis of
heart rate variability (HRV).

Results: After a 4-week-effect of antihypertensive therapy with amloidipine
was achieved in 25 patients: control of blood pressure, SBP < 140, DBP < 90
in 20 patients, normalization of systolic blood pressure < 130 and DBP < 90
in 5 patients. During this period, was not recorded any changes in the spectral
and temporal parameters of HRV. After 4-weeks of combination therapy
with perindopril and amloidipine (Prestans 5 / 5 server) noted a normalization
of systolic and diastolic blood pressure in 22 patients. After the addition of
perindopril were apparent changes in the parameters of heart rate variability;
increasing values of parasympathetic system SDNN,SDNNi,pNN50<(p < 0.01)
,HFn(p < 0.05) ratio LF/HF decreased(p < 0.05).

Conclusion: Combination therapy with perindopril-amloidipine (Prestans 5 / 5)
compared with monotherapy (amloidipine) in patients with arterial hyper-
tension and chronic obstructive pulmonary disease favorably affects the
autonomic nervous system by suppressing the sympathetic hyperactivity. In
addition combination therapy leads to a significant reduction in blood pressure
with a decrease in symptoms of respiratory failure.

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**PP.44.435 COMPARATIVE EVALUATION OF THE IMPACT OF DIFFERENT COMBINATION IN ANTHTYHERTENSIVE THERAPY IN HYPERTENSIVE PATIENTS**

K. Nikoghosyan, S. Gurgerovyan, S. Vatianin. Institute of Cardiology, Yerevan-Armenia

Purpose: The aim of present study was investigation of influence of combin-
ation of ACE-inhibitors (Ramipril) with Ca-antagonist (Lercanidipine) and
ACE-inhibitors (Ramipril) with diuretic (Hypothiazide) on heart functions and
dynamics of myoccardial remodeling in patients with arterial hypertension
(AH).

Methods: Fifty-six patients (average age 61.4 ± 2.0 y.) with mild to moderate
AH and without signs of heart failure were observed. Doppler-echocardiography
and echocardiography were performed to all of them at baseline and after 12
months of treatment. Inter-ventricular septum thickness (IVST), left ventricle
(LV) posterior wall thickness (PWT) in diastole, LV ejection fraction (EF), velocity
of shortness of myocardial circular fibers (Vcf), velocity of shortness of LV ante-
rior-posterior size in systole (ΔS), LV mass index (LVM), early diastolic mitral
flow velocity / atrial induced velocity ratio (E/A ratio), isovolumetric relaxation
peripheral resistance (IVRT) and blood flow deceleration time (DT) were defined.
Patients were randomized into 2 groups of 28 patients in each. Patients in I group received
Ramipril in 10 mg and Lercanidipine in 10 mg daily dose; patients in II group
- Ramipril in 10 mg and Hypothiazide in 12.5 mg daily dose.

Results revealed at the end of treatment: All patients achieved goal blood pressure level - 140/90 mm Hg. Regression of LV hypertrophy was observed in
21 (75.0%) patients in I and 10 (35.7%) patients in II groups: LVMI decreased
by 21.4% in I and 10.7% in II groups (p < 0.05), PWT - by 10.1% in I and 6.9% in II
groups (p < 0.05) respectively. Increase of EF by 17.9% in I and 8.9% in II
groups (p < 0.05) ratio LF/HF decreased(p < 0.05) and
ΔS by 18.7% in I and 12.4% in II groups (p < 0.05)
respectively was observed. Initially infringed diastolic function was improved:
E/A increased by 24.1% in I and 12.8% in II (p < 0.05), IVRT decreased by
21.7% in I and 13.1% in II (p < 0.05), DT - by 15.6% in I and 9.3% in II groups
(p < 0.05).

Conclusions: Thus, antihypertensive long-term treatment with ACE-inhibitors
Ramipril isn’t accompanied with cardiodepressive effect and makes positive
input on LV myocardial remodeling and predicts regression of LV hypertrophy.
Hypotensive long-term therapy with combinations Ramipril + Lercanidipine
and Ramipril + Hypothiazide has the same antihypertensive effect, promotes
regression of LV hypertrophy and LV remodeling. But the combination of
Ramipril + Lercanidipine is more preferable.

**PP.44.436 INFLUENCE OF THE LEFT VENTRICAL HYPERTROPHY AND ELEVATED ARTERIAL STIFFNESS ON CORONARY EVENTS IN PATIENTS WITH ARTERIAL HYPERTENSION AND EFFICACY OF LONG-TERM TREATMENT**

S. Gurgerovyan, S. Vatianin, K. Nikoghosyan. Institute of Cardiology, Yerevan-Armenia

Purpose: The aim of present study was investigation of influence of combi-
nation therapy with perindopril and amloidipine on arterial hypertrophy and
elevated arterial stiffness in hypertensive patients with chronic obstructive
pulmonary disease.

Design and Methods: The study included 31 patients with arterial hyperten-
sion and chronic obstructive pulmonary disease with preserved left ventricu-
lar systolic function (LVEF > 40%), systolic blood pressure (SBP)> 165, ± 8.5
diastolic blood pressure (DBP)>105.5 ± 5.5. All patients within 4 weeks
were receiving mono-therapy with amloidipine 5mg/per day. After 4-weeks
of treatment perindopril was added 5mg/per day. The activity of the autono-
mic nervous system was assessed using spectral and statistical analysis of
RR-interval intervalograms. RR recorded for 5 minutes at rest and in supine
position. The spectral parameters of heart rate variability were determined
(low-frequency component (LF), high frequency (HF) component, time
parameters SDNN, SDANN, RMSSD, pNN50). All parameters were mea-
sured in the beginning and after 4 weeks treatment with amloidipine and the
addition of perindopril.

Results: After a 4-week-effect of antihypertensive therapy with amloidipine
was achieved in 25 patients: control of blood pressure, SBP < 140, DBP < 90
in 20 patients, normalization of systolic blood pressure < 130 and DBP < 90
in 5 patients. During this period, was not recorded any changes in the spectral
temporal parameters of HRV. After 4-weeks of combination therapy
with perindopril and amloidipine (Prestans 5 / 5 server) noted a normalization
of systolic and diastolic blood pressure in 22 patients. After the addition of
perindopril were apparent changes in the parameters of heart rate variability;
increasing values of parasympathetic system SDNN,SDNNi,pNN50<(p < 0.01)
,HFn(p < 0.05) ratio LF/HF decreased(p < 0.05).

Conclusion: Combination therapy with perindopril-amloidipine (Prestans 5 / 5)
compared with monotherapy (amloidipine) in patients with arterial hyper-
tension and chronic obstructive pulmonary disease favorably affects the
autonomic nervous system by suppressing the sympathetic hyperactivity. In
addition combination therapy leads to a significant reduction in blood pressure
with a decrease in symptoms of respiratory failure.
Objective: Left ventricular (LV) hypertrophy and elevated arterial stiffness (AS) often accompany with myocardial ischemia (MI). The aims of present study is to estimate the influence of the LV hypertrophy and elevated AS on the myocardial ischemia (MI) in arterial hypertensive (AH) patients (pts) and to evaluate the efficacy of long-antihypertensive treatment.

Design and Method: In 42 AH pts (mean age 52.4 ± 2.5 years) with office blood pressure (BP) > 160 mmHg/100 mm Hg were performed 2D echocardiography, Doppler echocardiography and 24-h ECG Holter monitoring. MI was estimated by changes in wall motion score (WMS) index at rest and at peak of the dobutamine stress-echocardiography (SE). WMS index was quantified by well-known method and AS - on the basis of carotid-femoral pulse wave velocity (PWV) by means of a computerized method (Complior SP). The pts received ramipril (10 mg/d) and in addition to it, if necessary also hydrochlorothiazide (12.5-25 mg/d). The research was performed at baseline and after 18 months of treatment.

Results: The LV mass index (LVMi) and PWV was considerably higher in AH pts (181.05 ± 5.39 mg²/g, 12.53 ± 1.9 m/sec, accordingly, p < 0.05 for each). Twelve (28.5%) pts had an episode of MI in 24-h ECG Holter monitoring. In 9 (21.4%) pts at rest and 29 (69.0%) – at peak of SE were determined the negative T wave in V5 and V6, ventricular arrhythmia. In multivariate analysis 47.6 pts were observed some changes: Twelve (28.5%) pts had an episode of MI in 24-h ECG Holter monitoring.

Conclusions: AH associated with LV hypertrophy and increase of AS. AH pts often had the silent ischemia which was recovered by Holter monitoring and SE. LVMi and PWV were considered as important factors for coronary events development. The long-term treatment promotes the improvement these disturbances.

PP.44.437 EFFICACY OF ROSUVASTATIN ON GLUCOSE, LIPID METABOLISM AND BLOOD PRESSURE VALUES IN HYPERTENSIVE ELDERLY PATIENTS

L. Susan1, C. Serban2, A. Pacurar1, I. Mozov2, R. Susan3, A. Narita1, S. Gotia4, E. Velizhanina, T. Zhupanova, A. Rudakov.1 University of Medicine and Pharmacy Victor Babes/Ist Medical Clinic, Timisoara-Romania, 2University of Medicine and Pharmacy Victor Babes/Pathophysiology Department, Timisoara- Romania, 3University of Medicine and Pharmacy Victor Babes/Department of Family Medicine, Timisoara-Romania, 4University of Medicine and Pharmacy Victor Babes/Physiology Department, Timisoara-Romania

Objective: The metabolic syndrome includes interrelated risk factors that indicate individuals at increased risk for type 2 diabetes mellitus (DM) and coronary artery disease. The purpose of this study was to assess the efficacy of Rosuvastatin on glucose, lipid metabolism and blood pressure values in elderly subjects with metabolic syndrome.

Design and Method: Forty-eight hypertensive patients with metabolic syndrome (mean age 71 ± 8 years) were studied. MS was defined by the National Cholesterol Education Program Adult Treatment Panel III guidelines. The patients included in the study received in a 6 months period a single dose of 20 mg per day of Rosuvastatin. Blood pressure values, lipid profile, glucose levels and body mass index (BMI) were assessed in all participants before Rosuvastatin administration and after the 6 months period.

Results: By all 48 patients enrolled in the study, 21 were with reduced tolerance to glucose and 18 with diabetes mellitus type 2. The values of investigated parameters before and after Rosuvastatin treatment were: total cholesterol: 243 mg/dl ± 26 vs 203 mg/dl ± 19 (p < 0.01); LDL cholesterol: 33 ± 9 mg/dl vs mg 43 ± 5 mg/dl (p < 0.001); HDL cholesterol: 137 ± 26 mg/dl vs mg 110 ± 14 mg/dl (p < 0.001); triglycerides: 182 ± 24 mg/dl vs 150 ± 24 mg/dl (p < 0.001); glucose: 138 ± 15 mg/dl vs 114 ± 13 mg/dl (p < 0.05); BMI: 36 ± 12 kg/m² vs 31 ± 9 kg/m² (p < 0.05); Systolic Blood Pressure (SBP): 158 ± 23 vs 134 ± 12 mmHg (p < 0.05); Diastolic Blood Pressure (DBP): 95 ± 13 vs 83 ± 10 mmHg (p < 0.05).

Conclusions: In this study, Rosuvastatin decreased blood pressure values and improved lipid profile after a 6 months period administration. The results of our study can improve the management of cardiometabolic risk in elderly hypertensive patients with metabolic syndrome.

PP.44.438 THE POSSIBILITY OF RECEIVING ALISKIREN IN OBSESE PATIENTS WITH ARTERIAL HYPERTENSION

E. Velizhanina, T. Zhupanova, A. Rudakov. Tuuemen Cardiology Center, Tuuumen-Russia

Most patients with arterial hypertension (AH) have metabolic disorders, overweight and obesity.

Objective: To study the application of direct renin inhibitor aliskiren in obese patients with AH.

Methods: 12 patients with AH stage II (10 males, 2 females: mean age 45.9 ± 2.84 years), medium and high risk of vascular complications and degree 1 of obesity were examined. Patients underwent clinical examination and ambulatory 24-hour blood pressure monitoring using BPLab (MnPDP,3, Russia) device at the beginning and after 4 weeks of aliskiren therapy (300 mg per day). The results were statistically analyzed using statistical SPSS 10.0 for Windows software.

Results: For most patients (83.3%) aliskiren monotherapy was quite effective. The target level of blood pressure (less than 140/90 mmHg) was achieved after 4 weeks of the therapy. Statistically significant reduction of the diastolic and systolic blood pressure level was detected. The target level of blood pressure was not achieved in 2 patients as they received combination therapy (aliskiren 300 mg and amlodipine 5 mg per day). Significant reduction in systolic and diastolic office blood pressure was revealed in the group with a good clinical effect. Weight loss (from 99.09 ± 4.46 kg to 98.03 ± 4.16 kg, p < 0.05), reduction in waist circumference (from 106.9 ± 3.99 cm to 105.09 ± 3.62 cm, p < 0.05) and in hip circumference (from 109.45 ± 1.73 cm to108.18 ± 1.6 cm, p < 0.05) were observed. Statistically significant reduction of the systolic and diastolic blood pressure and heart rate fall in the daytime period were detected during the ambulatory 24-hour blood pressure monitoring. There was noted high tolerability to aliskiren and absence of adverse effects.

Conclusion: Use of aliskiren provides the significant hypotensive effect and helps to reduce cardiovascular risk in obese patients with AH.

PP.44.439 EFFICIENCY OF EPLERENONE AS FIRST CHOICE ADDITION DRUG TO THE TREATMENT OF RESISTANT HYPERTENSION

D. Agapakis1, M. Baltatzis2, Ch. Savopoulos2, E. Massa2, Ath. Myrou2, E. Satsoglou1, A. Hatziotisios1. 1Department of Internal Medicine, General Hospital of Roumensea, Roumensea-Greece, 2First Preadeptative Department of Internal Medicine, Aristotle University of Thessaloniki, Hospital A, Thessaloniki-Greece

Objective: Patients with resistant hypertension (RH) are at a greater risk for cardiovascular events while it is an increasingly common condition. On the other hand, individuals with RH have higher aldosterone levels and greater intravascular volume expansion in comparison with patients without RH. Our objective was to estimate the effect of eplerenone as first choice addition drug to previous antihypertensive therapy in patients with RH.

Design and Methods: 57 patients (59.3 ± 8.2 years; 42.1% males) with uncontrolled blood pressure despite concomitant use of three antihypertensive agents (in effective doses, including a diuretic) were enrolled. Cardiovascular comorbidity was present in 52.6% of the patients while none of them had chronic kidney disease. Mean blood pressure was 163/93 mmHg. All patients were put additional on 50 mg eplerenone once daily. Blood pressure was measured every 4-weeks for a 12-week-period while patients were examined for possible adverse effects.

Results: At 4, 8 and 12 weeks after the addition of eplerenone, the blood pressure gradually decreased by a mean of 16.1/3.7 mmHg, 18.9/4.0 mmHg, and finally 20.1/4.3 mmHg from the initial value (p < 0.01). Serum potassium was increased from a mean of 3.7 mmol/L to 4.5 mmol/L (p < 0.05) but remained within the normal values. No other adverse effects or drop-outs were observed.

Conclusions: According to our study, the addition of eplerenone, as a first choice drug in patients with RH was shown safe and effective, thus, presenting a appropriate therapeutic approach in the management of these patients.
THE EFFECT OF ANTIHYPERTENSIVE DRUGS ON SYSTOLIC BLOOD PRESSURE OF HYPERTENSIVE PATIENTS OVER THE COURSE OF THEIR TREATMENT

A. Pinopoulou1, J. Trizol1, M. Pikilidou1, B.H. Stricker2, P. Zebekakis1, O. Giata1, A. Lasaridis1. 11St Department of Medicine, Ahepa University Hospital, Thessaloniki-Greece, 2Department of Epidemiology, Erasmus Medical Center, Rotterdam-The Netherlands

Objective: The aim of the present study was to investigate longitudinally the effect of antihypertensive drugs on systolic blood pressure (SBP) in a hypertensive population.

Design and Method: This retrospective population study consisted of 431 hypertensive adult patients (122 males) of an outpatient hypertension clinic of a tertiary hospital that were followed up for three to seventeen years (median = 7years). Age, body mass index (BMI), SBP, diastolic blood pressure and drug usage were recorded for each patient at each visit. Other laboratory tests, including glucose, creatinine and uric acid, were also measured and included as covariates in the model. Patients with diabetes were excluded from the study. Repeated measures analysis using a multilevel model was applied in order to investigate the continuous effect of drug usage on SBP within and between patients. A mixed effects model was used, in order to account for the differences in duration of follow-up among patients, and multiple imputation was applied to estimate missing biochemistry values.

Results: The rate of change in SBP (in mmHg/year) was the primary outcome measure in this study and was evaluated after adjustment for age, BMI, laboratory tests and dose of each drug used. Complete case analysis revealed that six drugs were significant independent predictors of SBP. These included zofenopril ($\beta$ = -51.74, 95% CI -95.40 to -8.09), captopril ($\beta$ = -4.59, 95% CI -7.67 to -1.51), propranolol ($\beta$ = -4.01, 95% CI -7.67 to -0.35), indapamide ($\beta$ = 1.08, 95% CI 0.22 to 1.94), nifedipine ($\beta$ = 1.20, 95% CI 0.14 to 2.26) and carvedilol ($\beta$ = 13.94, 95% CI 1.39 to 26.48). Multiple imputation analysis revealed that fourteen drugs resulted in a significant change in SBP, among which a dihydropyridine calcium channel blocker (CCB) (lercanidipine), an angiotensin receptor blocker (irbesartan), a diuretic (hydrochlorothiazide) and a non-dihydropyridine CCB (verapamil) had a more potent effect in reducing SBP.

Conclusions: From a pool of 49 substances, several categories of antihypertensive drugs were found to induce a significant reduction in SBP in a hypertensive population.
LATE-BREAKER POSTER SESSION

LATE-BREAKER POSTER SESSION 3

PPLB3.441 DEPRIVATION AND BLOOD PRESSURE IN PEOPLE ATTENDING PRIVATE MEDICAL SCREENING: A RETROSPECTIVE ANALYSIS

L. Guo, A. Ogunleye1, G. Sandercock2, D. Brodie1. 1Faculties of Society & Health, Bucks New University, Uxbridge-United Kingdom, 2Department of Biological Sciences, University of Essex, Colchester-United Kingdom

Objective: Socioeconomic deprivation and blood pressure are important factors in the progression of mortality in cardiovascular disease. Here we examined the influence of socioeconomic deprivation (SED) on blood pressure in people attending private health screening.

Design and Method: A retrospective study of 65,536 participants across the UK was conducted using a dataset provided by a private healthcare company. Blood pressure was defined as being “raised” if it was higher than 140/90 mm Hg. The English Indices of Deprivation 2007 scale was used to allocate deprivation scores, and the cohort was divided by quintile (group 1 being the least deprived and group 5 the most deprived). Data analysis was by logistic and linear regression with adjustment for age, gender, and smoking.

Results: Participants in the least deprived area had a more unfavourable blood pressure profile compared with those in the most deprived area. Participants from the most deprived area are less likely to have higher systolic blood pressure when adjusted for age, sex and smoking, and odds ratio was 0.83 (95% CI 0.74–0.94, P = 0.002). No statistical significance was found in diastolic blood pressure.

Conclusions: These findings are contrary to those observed in the developed countries. However, these results are taken from a population which may be different from the general populace because participants were employed and able to afford private health screening. One of the benefits of this study is that the data were collected from different areas across the UK.

PPLB3.442 USE OF ALISKIREN IN THE CLINICAL PRACTICE: DATA FROM A LARGE ITALIAN COHORT OF HYPERTENSIVE PATIENTS INCLUDED IN THE NATIONAL AIFA WEB-BASED DRUG MONITORING SYSTEM

M. Volpe1, G. Tocci, F. Bianchini1, M. de Rosa3, E. Fedozzi3, A. Covezzoli3, A. P. Maggioni1. 1University of Rome – Sapienza, Sant’Andrea Hospital, Rome-Italy, 2ANMCO Research Center, Florence-Italy, 3Care Systems Department, CINECA, Consortium of Italian Universities, Casalecchio di Reno-Italy

Introduction: In Italy, prescriptions of the direct renin inhibitor aliskiren (aliskiren) to high risk hypertensive patients must be electronically filled by specialized physicians only when a therapeutic plan, including at least two anti-hypertensive drugs (independently of the class or the dosage), fails to normalize BP levels.

Aim: To retrospectively analyze the effects of the addition of aliskiren 150–300 mg daily to antihypertensive therapy in a setting of clinical practice in a non-controlled population of high CV risk hypertensive patients.

Methods: Clinical data were derived from patients included in the national web-based drug monitoring system. Follow-up visits were required for measuring BP levels, and collecting data on drug safety and tolerability. At 1-month or 6-month follow-up visits aliskiren could be up-titrated from 150 mg to 300 mg daily in uncontrolled hypertensive patients, if needed.

Results: Between March 2009 and February 2010, aliskiren was prescribed to 11,511 treated, uncontrolled hypertensive patients (47.6% female, aged 68.0 ± 11.1 years, BMI 28.4 ± 4.9 kg/m²). At 1-month follow-up visit (n = 8,197, 70.6%), systolic and diastolic BP was reduced from 158.9 ± 16.8 to 142.1 ± 15.2 mmHg (P < 0.0001) and from 90.8 ± 9.6 to 83.1 ± 8.5 mmHg (P < 0.0001), respectively. At 6-month follow-up visit (n = 4,907; 42.3%), BP was reduced from 158.7 ± 17.0 to 141.9 ± 15.0 mmHg at 1 month and to 137.9 ± 13.9 mmHg at 6 month for the systolic and from 90.5 ± 9.7 mmHg to 83.4 ± 8.4 mmHg at 1 month and to 81.3 ± 8.0 mmHg at 6 month for the diastolic BP levels. Only a few drug-related side effects was reported (n = 33).

Conclusions: Although data derived from registries need to be interpreted with caution, the Italian web-based drug monitoring system provided information on “real-life” use of aliskiren in hypertension. Systolic and diastolic BP levels were markedly and consistently reduced after addition of aliskiren to antihypertensive therapy (including ACE Inhibitors or ARBs). This effect was associated with very low rates of reported side-effects.

PPLB3.443 RELATIONSHIP BETWEEN RENAL FUNCTION, LEFT VENTRICULAR DIASTOLIC FUNCTION AND Plasma NT-proBNP in Essential Hypertensive Patients

Y. Yang, Y. Wang, P.J. Gao. Shanghai Institute of Hypertension, Ruijin Hospital, Shanghai-China

Background: Recent studies showed that NT-proBNP was not only a marker of chronic heart failure but a marker of renal failure. Little was known if NT-proBNP could detect the early stage of left ventricular dysfunction or renal dysfunction.

Objectives: The purpose of this study was to evaluate NT-proBNP as a marker of LV diastolic dysfunction and early renal dysfunction in essential hypertensive patients.

Methods: In 204 patients (mean age 55 ± 14, men 59%) with essential hypertension, we measured LV diastolic function by conventional and tissue Doppler echocardiography to detect the ratio of early diastolic mitral annulus Ea wave velocities to tissue Doppler mitral annulus early diastolic Ea wave velocities (E/Ea). We defined left ventricular diastolic dysfunction as normal or mildly reduced left ventricular systolic function: LVEF 50% and E/Ea 15. LV hypertrophy by M-mode criteria was considered when LVMi was .134 g/m² (male) or .110 g/m² (female). We defined left atrial enlargement as left atrial volume index (LAVI) > 26 ml/m². The evaluation of renal function was estimated by glomerular filtration rate (GFR) with the creatinine determination of the technetium-99m. We defined GFR < 60 ml/min as renal dysfunction; 24 h urine protein > 150 mg as proteinuria. NT-proBNP was determined using the electrochemiluminescence immunoassay “ECLIA” on Elecsys and cobas e immunoassay analyzers.

Results: In univariate analysis, NT-proBNP was correlated with age, 24 h mean heart rate and 24 h mean systolic blood pressure (the correlation coefficients were 0.54, 0.38, 0.36, 0.79 and -0.446 respectively, P < 0.001). NT-proBNP was significantly correlated with age, 24 h mean heart rate, LVMi, GFR and E/Ea in multivariate analysis. NT-proBNP increased (lg NT-proBNP: 2.22 ± 0.46 vs 1.47 ± 0.48, P < 0.001) in patients with LV diastolic dysfunction (n = 47), and the similar results were found in LV hypertrophy patients (n = 53, lg NT-proBNP: 2.04 ± 0.62 vs 1.50 ± 0.49, P < 0.001) and in patients with left atrial enlargement (n = 46, lg NT-proBNP: 1.94 ± 0.62 vs 1.55 ± 0.53, P < 0.001). NT-proBNP was further increased in renal dysfunction patients (n = 34, lg NT-proBNP: 2.17 ± 0.65 vs 1.51 ± 0.49, P < 0.001), and the similar results were found in patients with proteinuria (n = 28, lg NT-proBNP: 1.89 ± 0.78 vs 1.61 ± 0.52, P = 0.016). Patients with E/Ea < 15 were detected by NT-proBNP at a cut-off of 85 pg/ml with a sensitivity of 77% and specificity of 55%. With the NT-proBNP cut-off value of 108 pg/ml, the ROC area (0.936, sensitivity: 95%, specificity: 86%) was highest for the detection of LV diastolic dysfunction with concomitant renal dysfunction.

Conclusions: NT-proBNP is a promising marker for the detection of LV diastolic dysfunction and renal dysfunction in essential hypertensive patients. We must consider renal function when using NT-proBNP as a cardiac biomarker.
the study was to establish relationships of hyperglycemia and lipid profile in significantly promotes risk of the 2 type diabetes mellitus (DM) development, leads to evaluate body composition and heart function was measured by echocardiography. (P)RR mRNA expression was detected by qPCR and circulating metabolites using commercially available kits.

**RESULTS:** The (P)RR expression significantly increased in all white adipose tissues from mice receiving the HF/HC diet. Furthermore, animals on the HF/HC diet receiving the (P)RR blocker gained 30% less weight than animals on the same diet receiving saline, which is explained mainly by a decrease in abdominal fat. This partly results from the 19% decrease in Kcal consumption but also to a greater maintenance in lean body mass bursed in this group. Furthermore, circulating triglycerides, free fatty acids and glucose were normalized and insulin was reduced. In addition, this was accompanied by an improved heart function.

**Conclusion:** To our knowledge, this is the first report of the protective effect of (P)RR blockade in the development of obesity and obesity-related disease. Therefore, this may be a novel therapeutic target for this widespread disease.

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**ROLE OF (PRO)RENIN RECEPTOR BLOCKADE IN PREVENTING OBESITY AND OBESITY-RELATED DISEASE**

B. Ahmed1, S. Bisotto1, C. Michel1, T. Nguyen1, P. W. Schiller1, J. L. Lavoue1, 1Research Center of the Hospital Center of the Université de Montréal (CRCHUM), Montreal-Canada, 2IRSC, Montreal-Canada

**Introduction and Aim:** The binding of renin and prorenin to the (pro)renin receptor (P)RR increases the activity of the RAS and stimulates angiotensin II-independent signaling. Given the known implications of the adipose tissue RAS in development of obesity, we aimed to determine whether the (P)RR is regulated by obesity and if so, what is the effect of (P)RR blockade.

**Methods:** Mice were placed on a normal or high-fat/high-carbohydrate (HF/HC) diet then sacrificed to collect the different adipose tissue depots. Groups which received the (P)RR blocker or placebo in addition to either diet were added. Mice and food were weighed on a weekly basis. EchoMRI was used to evaluate body composition and heart function was measured by echocardiography. (P)RR mRNA expression was detected by qPCR and circulating metabolites using commercially available kits.

**Results:** The (P)RR expression significantly increased in all white adipose tissues from mice receiving the HF/HC diet. Furthermore, animals on the HF/HC diet receiving the (P)RR blocker gained 30% less weight than animals on the same diet receiving saline, which is explained mainly by a decrease in abdominal fat. This partly results from the 19% decrease in Kcal consumption but also to a greater maintenance in lean body mass bursed in this group. Furthermore, circulating triglycerides, free fatty acids and glucose were normalized and insulin was reduced. In addition, this was accompanied by an improved heart function.

**Conclusion:** To our knowledge, this is the first report of the protective effect of (P)RR blockade in the development of obesity and obesity-related disease. Therefore, this may be a novel therapeutic target for this widespread disease.
EVIDENCE THAT CAT1 OVER EXPRESSION CAN PREVENT OXIDATIVE STRESS INDUCED HYPERTENSION

G. Konstantinidis1, G. Head, R. Evans2, T. Nguyen-Huu, D. Kaye1, N. Rajapakse1, J. The Heart and Diabetes Institute, Melbourne-Australia, 1Monash University, Melbourne-Australia

Catonic amino acid transporter 1 (CAT1) is the predominant L-arginine transporter expressed in endothelial cells. Impaired L-arginine transport contributes to low nitric oxide (NO) bioavailability observed in hypertension. This creates a vicious cycle which progressively reduces NO content and increases oxidative stress, leading to further increases in blood pressure. We aimed to determine whether mice expressing in endothelial cells. Impaired L-arginine transport contributes to low oxidative stress induced hypertension. Baseline conscious mean arterial pressure (MAP) was measured with the use of radiotelemetry in control (n = 8) and CAT + mice (n = 6). Responses of MAP to an averse (restraint) and non averse (feeding) stress were also recorded in these animals. Both strains of mice then received the superoxide dismutase inhibitor, diethyldithiocarbamic acid (DETC) (30 mg/kg/day). Its saline vehicle via a minipump for a period of 7 days. Baseline measurements of MAP as well as responses of MAP to restraint and feeding stress were repeated 7 days after minipump implantation. Baseline MAP was greater in control mice (98 ± 2 mmHg) compared with CAT + mice (92 ± 2 mmHg) (P < 0.001). The increase in MAP in response to restraint (39 ± 1%) and feeding (31 ± 1%) stress in control mice was greater when compared with the respective increases in MAP to restraint (34 ± 1%) and feeding (18 ± 1%) stressors in CAT + mice (P < 0.001). In control mice (n = 8), MAP increased following DETC administration (P ≤ 0.001). This increase in MAP was most prominent at night when mice were active (7.2 ± mmHg; P ≤ 0.001). In control mice, increases in MAP in response to restraint-stress and feeding were augmented during DETC administration (P < 0.001). DETC had little effect on basal MAP in CAT + mice (P = 0.31; n = 4). In these mice, the increase in MAP in response to restraint stress was not altered by DETC (P = 0.34), but the increase in MAP in response to feeding stress was greater during DETC administration than under control conditions (P < 0.001). In both strains of mice, saline vehicle for DETC had little effect on baseline MAP (P = 0.53). The increase in MAP in response to restraint and feeding stress stimuli was lesser during saline administration than under control conditions in both strains of mice (n = 4; P ≤ 0.001). These data suggest that inhibition of superoxide dismutate can increase MAP and enhance increases in MAP to aversive stress. CAT1 over expression can prevent these increases in MAP most likely via increasing NO bioavailability. We conclude that improved L-arginine transport is beneficial in preventing oxidative stress induced increases in blood pressure.

BIOCHEMICAL AND CLINICAL CHARACTERISTICS OF HYPOURICEMICS PATIENTS WITH RESPECT TO THOSE WITH NORMAL OR HIGH URIC ACID LEVELS

A. Y. Sanchez1, S. Suria1, M. Kaijo1, N. Esparriza1, C. Garcia-Canton1, P. Bagata1, I. Aynan1, V. Garcia-Nieto1, M. D. Checa1, Hospital Universitario Insular de Gran Canaria, Las Palmas-Palmas, 1Hospital Nuestra Señora de Candelaria, Santa Cruz de Tenerife-Spain

Background: The positive association between high serum uric acid (sUA), metabolic syndrome, hypertension (HTA), diabetes mellitus (DM) and cardiovascular diseases has been recognised by several epidemiological studies (1–8). However, whether low sUA also conferred the contrary association, has not been studied.

Methods: Cross-sectional study of 173 patients (57.39 ± 17.38 years) divided in three groups: hypouricemics (sUA ≤ 2 mg/dl, n = 78), hyperuricemics (sUA > 7 in men and > 6.5 in women, n = 28) and normouricemics (n = 67). All the patients have GFR (MDRD4) > 60 ml/min.

Results: There were significant differences between all the groups in creatinine levels (hypouricemics: 0.74 ± 0.15, normouricemics: 0.95 ± 0.14, hyperuricemics: 1.08 ± 0.15 mg/dl, p = 0.0000). The increase in MAP in response to restraint (39 ± 1%) and feeding (31 ± 1%) stress in control mice was greater when compared with the respective increases in MAP to restraint (34 ± 1%) and feeding (18 ± 1%) stressors in CAT + mice (P < 0.001). In control mice (n = 8), MAP increased following DETC administration (P ≤ 0.001). This increase in MAP was most prominent at night when mice were active (7.2 ± mmHg; P ≤ 0.001). In control mice, increases in MAP in response to restraint-stress and feeding were augmented during DETC administration (P < 0.001). DETC had little effect on basal MAP in CAT + mice (P = 0.31; n = 4). In these mice, the increase in MAP in response to restraint stress was not altered by DETC (P = 0.34), but the increase in MAP in response to feeding stress was greater during DETC administration than under control conditions (P < 0.001). In both strains of mice, saline vehicle for DETC had little effect on baseline MAP (P = 0.53). The increase in MAP in response to restraint and feeding stress stimuli was lesser during saline administration than under control conditions in both strains of mice (n = 4; P ≤ 0.001). These data suggest that inhibition of superoxide dismutate can increase MAP and enhance increases in MAP to aversive stress. CAT1 over expression can prevent these increases in MAP most likely via increasing NO bioavailability. We conclude that improved L-arginine transport is beneficial in preventing oxidative stress induced increases in blood pressure.

NOMOGRAM OF CIRCULATING SOLUBLE FMS-LIKE TYROSINE KINASE-1 AND PLACENTAL GROWTH FACTOR IN NORMOTENSIVE THAI PREGNANT WOMEN

T. Wataganara, B. Pratumvinit, J. Leetheerakul, S. Pongprasobchai, P. Lahfahroengron, J. Pooliam. Faculty of Medicine Siriraj Hospital, Bangkok-Thailand

Objective: Some circulating trophoblast-specific proteins, such as soluble fms-like tyrosine kinase-1 (sFlt-1) and placental growth factor (PlGF), may be clinically useful in management of preeclampsia. Serum nomogram of these markers from European population was previously reported using an automated Elecsys® system. Ethnic variability is anticipated in biomarker analyses. In this study, we prospectively explored physiologic alterations of these analytes in Thai women.

Study design: One hundred and forty two serum samples from healthy, normotensive, singleton Thai pregnant women were prospectively collected from 6 gestational age intervals; 10–14, 15–19, 20–24, 25–29, 30–34, and 35–40 weeks. Analysis for the levels of sFlt-1 and PlGF was made from fresh specimens, using an automated Elecsys® system.

Results: Statistical analyses were achieved from 140 participants who remained unaffected with preeclampsia or fetal growth restriction until the time of delivery. Quartiles for these markers were calculated for each gestational age interval. Serum sFlt-1 levels continuously increased through the pregnancy. Serum PlGF levels reached its peak levels at menstrual period of 25–29 weeks, and then declined. Serum sFlt-1/PlGF ratios were consistently lower than that of the European population throughout the pregnancy.

Conclusion: Fluctuation pattern of sFlt-1 and PlGF in Thai women concurs with the finding in European women, but the absolute levels do not. Ethnic diversities, leading to lower sFlt-1/PlGF ratio, may translate to a lower incidence of preeclampsia in Thailand. The regional-specific nomogram for serum sFlt-1 and PlGF may facilitate the clinical applications, both predictive and diagnostic, for placental pathology.

MATURATION OF THE POSTJUNCTIONAL RESPONSES TO ANGIOTENSIN II IN THE RABBIT AORTA


Objective: In the aorta of newborn sheep, angiotensin II-mediated contraction (postjunctional response) is absent or diminished compared to adult animals. In contrast, the aorta of near-term mice has an intact angiotensin II response. However there are no comparative studies on postjunctional angiotensin II-mediated responses in newborn and young rabbits. Therefore the aim of the present study was to evaluate aorta angiotensin II-mediated responses at postjunctional level of newborn and young rabbits.

Design and Method: Aortas of anesthetized (xylazine 3 mg/kg and ketamine 22 mg/kg) male New Zealand newborn (day 1) and young (3 to 5 months old) rabbits were dissected, removed and cut in rings to study angiotensin II postjunctional effects. Aorta rings were mounted in isolated-organ baths and connected to isometric transducers. Non-cumulative dose–response curves for angiotensin II were determined. Statistical analysis was performed by Student’s t-test and by F-test (for Hill slope). P < 0.05 was assumed to denote a significant difference.

Results: Angiotensin II (1–300 nM) caused a dose-dependent contraction of the aorta in both groups. Maximal contraction was lower in neonate than in young rabbits (neonate: E max 0.23 ± 0.07 N/g, n = 5; young: E max 0.67 ± 0.12 N/g, n = 6). It was not observed significant differences in angiotensin II contraction potency (neonate: EC50 1.01 ± 8.2 ± 7.70 ± 9.0 N/m, n = 5; young: EC50 1.48 ± 10.8 ± 3.67 ± 9.0 N/m, n = 6) and in Hill slope (neonate: Hill slope 1.07 ± 0.19; young: Hill slope 0.94 ± 0.08) among groups.

Conclusion: Postjunctional angiotensin II-mediated responses in aorta are fully expressed in neonates when compared to young adult rabbits. The fact that the slope was similar among groups suggests that it is the same receptor to mediate these responses in both groups, possibly AT1. The lower efficacy of angiotensin II at birth suggests that either the maturation of the excitation-contraction coupling or the receptor density is still incomplete. These results differ from what was observed in sheep, but is in agreement with the results obtained in near-term mice3, showing that aorta postjunctional angiotensin II-mediated responses at birth are species dependent.