

POSTERS' SESSION

POSTERS' SESSION PS01 CORONARY HEART DISEASE

PP.01.01 EFFECTS OF ANGIOTENSIN-CONVERTING ENZYME INHIBITORS AND AT1 RECEPTORS INHIBITORS ON FIBRINOLYSIS IN CORONARY ARTERY PATIENTS, WITH ARTERIAL HYPERTENSION

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Objective: Hypertension is related, with the atherosclerosis, as well as with disturbances in the system of hemostasis /fibrinolysis and continues to be associated with an elevated risk of cardiovascular disorders, mainly thrombotic. The purpose was to make a research concerning the effect of the antihypertensives, such as the Converting Enzyme Inhibitor of Angiotensin 1 and the Angiotensin receptor blockers type 1 of ANG-II in the secretion of the Tissue Plasminogen Activator (t-PA) and the Plasminogen Activator Inhibitor 1 (PAI-1), as well as in the activity of the Matrix Metalloproteinases (MMPs) and the Tissue Inhibitors of Metalloproteinases (TIMPs) in coronary artery patients who were treated with the hypertensives Perindopril, Losartan and Irbesartan.

Design and method: A group of 8 healthy volunteers and 90 patients participated who were diagnosed for essential hypertension, with known CAD. 69 patients reacted positively. It was ascertained that during the primary and the secondary hypertension the levels of the mechanism of pro-matrix metalloproteinase 2 (pro-MMP-2), the activity of the pro-MMP-2 and the pro-MMP-9 as well as the levels of PAI-1 in plasma are elevated, whereas the levels of the tissue inhibitor of metalloproteinase 1 (TIMP-1), the issue inhibitor of metalloproteinases-2 (TIMP-2) and the tPA are not affected.

Results: The Irb and Los drugs reduce the pro-MMP-2 and pro-MMP-9 activity and the pro-MMP-2 and PAI-1 levels, while they increase the TIMP-1, TIMP-2 and tPA levels in patients' plasma examined from the 7th to the 90th day of treatment in comparison to the levels in patients' plasma before the beginning of the treatment. The Per drug reduces the pro-MMP-2 levels and the pro-MMP-2 and pro-MMP-9 activity in the patients' plasma from the 7th to the 90th day of treatment, whereas the TIMP-1, TIMP-2 and tPA levels are not affected.

Conclusions: a) The MMP-2 and MMP-9 activity is increased during the rupture of the atherosclerotic plaque and the left ventricular hypertrophy because of the elevated afterload and that b) the hypertension is associated with disturbances in the system of hemostasis /fibrinolysis, increasing the PAI-1 levels and decreasing the tPA levels, causing thus prothrombotic complications.

PP.01.02 THE DAILY DYNAMIC PROFILE OF BLOOD PRESSURE AMONG PATIENTS WITH HYPERTENSION AND ACUTE CORONARY SYNDROME ASSOCIATED WITH ANXIETY AND DEPRESSIVE DISORDERS

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Objective: To study the daily dynamic profile of blood pressure among patients with hypertension and acute coronary syndrome (ACS) associated with anxiety and depressive disorders.

Design and method: 46 patients with AH and ACS and with anxiety and depressive symptoms were included in open comparative prospective research. Were examined using Hospital Anxiety and Depression Scale (HADS), Beck Depression Inventory (BDI) and The Sheehan Scale (Sheehan Clinical Anxiety Rating Scale). The first

group patients were treated by conventional therapy and received additional Agomelatine (Valdoxane, SERVIER), 25 mg/day. Patients in the second group were given placebo. After 6 months we recorded the dynamics of clinical status, mental status and quality of life on the hospital stage, ABPM.

Results: The HADS survey showed clinically marked anxiety and subclinically marked depression. The Beck survey showed the level of depression in averaged 25,8 ± 7 points in the Valdoxane group, 22,2 ± 6,66 points - in the placebo group, which was an average degree of depression. The Sheehan scale was used to see the level of anxiety. At first survey patients in both groups had clinically marked anxiety (from 30 to 80 points). Both groups were put a daily monitoring of blood pressure. This showed SBP and DBP increase and increased BP variability in both groups. After 6 months in the placebo group statistically significant changes in mental status had not been identified. And in the Valdoxane group significant positive changes in evaluation of the anxiety and depression level were revealed in all scales. After 6 months of the treatment a progress of the target level of SBP, DBP was revealed in both treatment groups. BP variability in the Valdoxane group amounted to the target level. In the placebo group - remained elevated.

Conclusions: To supplement Valdoxane in standard therapy of hypertension and ACS facilitates in reducing of BP in contrast with placebo group. Where reduce BP variability failed, in spite of achieving targets blood pressure.

PP.01.03 THE TWENTY FOUR HOURS AMBULATORY BLOOD PRESSURE MONITORING AS PREDICTOR OF SEVERE CORONARY ARTERY DISEASE IN PATIENTS WITH ACUTE CORONARY SYNDROME WITHOUT PERSISTENT ST ELEVATION

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Objective: The aim of our study was to evaluate the information provided by the twenty four hours ambulatory blood pressure monitoring (ABPM), ankle-brachial index (ABI) and the pulse wave velocity (PWV) as predictors of severe coronary artery disease in patients with acute coronary syndrome (ACS) without persistent ST elevation.

Design and method: All the patients hospitalized consecutively in Hospital SLucia (Cartagena) from January to April 2014 were recruited. The ABPM, ABI and PWV were performed in the first 24 hours of hospitalization.

Results: We recruited 60 patients. The average ABI value was 0.86 ± 0.25. Fifty-seven percent had an ABI < 0.9 or > 1.3. The average PWV was 11.6 ± 3.4 m/s. Sixty-seven percent had PWV > 10 m/s. The average systolic blood pressure 24 h (SBP) was 124 ± 16 mmHg, the average diastolic blood pressure 24 h (DBP) was 68 ± 9 mmHg, the average daytime SBP was 125 ± 16 mmHg, the average daytime DBP was 69 ± 9 mmHg, the average nighttime SBP was 120 ± 23 mmHg and the average nighttime DBP was 64 ± 12 mmHg. The average variability of systolic blood pressure was 12 ± 3 mmHg. Thirteen percent had abnormal variability systolic blood pressure (> 15 mmHg). Sixty-three percent had at least one hypotensive episode (value of SBP < 100 mmHg). The average pulse pressure 24 h (PP 24 h) was 57 ± 13 mmHg. Fifty percent had an abnormal PP 24 h value (> 55 mmHg). Most patients (85%) had abnormal circadian blood pressure patterns ("non-dippers" and "riser"). The patients with ABI < 0.9 or > 1.3 presented more frequently multivessel coronary disease. The SBP 24 h (r = 0,50, p < 0,01), daytime SBP (r = 0,46, p < 0,01), nighttime SBP (r = 0,39, p = 0,01), maximum (r = 0,45, p < 0,01) and minimum SBP (r = 0,45, p < 0,01), minimum DBP (r = 0,38, p = 0,01), and the high early morning (r = 0,46, p < 0,01) were significantly associated (Spearman) with the presence of coronary disease in two or more vessels. We did not find significant association between PWV with the multivessel coronary disease.

Conclusions: The presence of a variety of these abnormalities BP and peripheral arterial disease were found to be related with coronary artery disease extension or severity.

PP.01.04 HIGH BLOOD PRESSURE AFTER CORONARY ARTERY BYPASS SURGERY IN PATIENTS REFERRED TO IN-HOUSE CARDIAC REHABILITATION. SINGLE CENTER EXPERIENCE

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Objective: After a bypass surgery blood pressure can go up for multiple reasons among which are: the pain of the cut, stress and tense of the patient unsure about the future and because some of the blood pressure medication, which the patient was receiving preoperatively may get withdrawn post operatively, thereby leading to shooting up the blood pressure. In certain patients, the blood pressure actually comes down after surgery and returns back to the pre-operative levels 4 to 6 weeks down the track, at the time the blood pressure medicines are introduced. We aimed to investigate the incidence of high blood pressure after coronary artery bypass surgery (CABG) in patients referred to our in-house cardiac rehabilitation program.

Design and method: Out of 1276 patients admitted for in-hospital cardiac rehabilitation, we studied one hundred two patients with previous CABG (62% males, aged 65.78 ± 7.01 years). Risk factors and medications were noted. Exercise test were performed on admission and after 21 days of in-hospital rehabilitation. According to the first test results patients were selected for exercises program: free walking, cycle and/or Nyllin steps. During the exercise patients were continuously monitored. Blood pressure was measured every morning, before and immediately after the exercise, after a break, and on patient demand.

Results: High blood pressure was noted in 24% of patients referred to our in-house cardiac rehabilitation program with the maximum of 200mmHg for systolic and 110 for diastolic pressure. Most of the patients (87%) were taking preoperative antihypertensive drugs. We optimized the dose in 35% while in 65% ACE inhibitors were change to ARB (irbesartan predominantly) to optimize blood pressure and achieve target levels.

None of the patient had severe complicates due to blood pressure arise. All the patients successfully finished in house cardiac rehabilitation program.

Conclusions: CABG can help to restore blood flow to an area of the heart. However, it does not stop the progression of atherosclerosis. High blood pressure can be successfully detected and treated during in-house supervised cardiac rehabilitation program.

PP.01.05 METABOLIC AND VASCULAR PROFILE IN PATIENTS WHO UNDERWENT CORONARY ANGIOGRAPHY WITH AND WITHOUT HYPERTENSION

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Objective: Assessment of metabolic and vascular profile in women and men with and without hypertension who didn't have coronary artery stenosis in the angiography.

Parameter [unit]	HT+		Statistical significance
	A	B	
	Women (SD) n=25	Men (SD) n=25	
BMI [kg/m ²]	28,41 (4,33)	29,68 (4,88)	NS
Tchol [mmol/l]	5,57 (1,02)	5,93 (1,17)	NS
Glucose [mmol/l]	5,26 (0,86)	5,53 (0,58)	*
Uric acid [mg/dl]	5,20 (1,47)	6,51 (1,41)	**
ABI	0,94 (0,16)	1,01 (0,14)	NS
IMT [mm]	0,73 (0,15)	0,81 (0,17)	*
PWV [m/s]	10,68 (2,29)	12,54 (3,01)	*
Parameter [unit]	HT-		Statistical significance
	A	B	
	Women (SD) n=25	Men (SD) n=25	
BMI [kg/m ²]	25,84 (5,11)	25,94 (2,60)	NS
Tchol [mmol/l]	5,59 (1,01)	5,37 (1,04)	NS
Glucose [mmol/l]	4,97 (0,51)	5,14 (0,64)	NS
Uric acid [mg/dl]	3,95 (1,10)	4,97 (1,07)	**
ABI	1,09 (0,14)	1,07 (0,11)	NS
IMT	0,64 (0,13)	0,62 (0,15)	NS
PWV	10,78 (2,10)	11,58 (2,29)	NS

Design and method: We divided 100 patients in two groups: HT+ patients with arterial hypertension (25 women and 25 men); and HT- patients without arterial hypertension (25 women and 25 men). All patients underwent coronary angiography because of angina.

The average age of them [yrs]: 56 and 53 (*p < 0,05).

Ankle-brachial index (ABI), pulse wave velocity (PWV) and carotid intima-media thickness (IMT) were evaluated. Following measurements were taken: BMI, total cholesterol (Tchol), fasting plasma glucose and uric acid.

Statistical calculations were performed in the StatSoft Statistica 10. For comparison of variables with a normal distribution and equal variances we used the t-test for unrelated samples.

Results: We revealed following results in both groups: HT+ and HT- respectively [* for p <= 0,05; ** for p < 0,001; NS- negligible statistically].

In hypertensive group women were characterized by lower fasting plasma glucose, uric acid level, IMT and PWV than men. In normotensive group women were characterized by lower uric acid level than men.

Conclusions: 1. There was no difference in values of: ABI, PWV and IMT between the sexes in normotensive patients who underwent coronary angiography.

2. Men without stenosis in coronary angiography with and without hypertension were characterised by worse metabolic profile than women.

3. Hypertensive women without stenosis in coronary angiography were characterized by minor vascular damages assessed by IMT and PWV than hypertensive men.

PP.01.06 INCIDENCE OF HYPERTENSION IN MEN AND WOMEN WITH CORONARY CHRONIC TOTAL OCCLUSION

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Objective: Hypertension is the one of the most common risk factor of coronary heart disease (CAD). Less is known about rate of hypertension in patients with chronic total occlusion (CTO). This study compared rate of hypertension in men and women treated by percutaneous coronary intervention of CTO.

TABLE	Men N(%)	Women N(%)	p
Hypertension	102 (79.7)	20 (90.9)	NS
Hypercholesterolemia	120 (98,4)	28 (100)	NS
Diabetes	37 (30.3)	10 (35.7)	NS
Current smoker	33 (27.1)	1 (3.6)	0.0002
Obesity	15 (53.6)	54 (44.3)	NS

Design and method: 150 patients underwent 159 procedures for percutaneous revascularization of CTO of 153 vessels. Of the 159 procedures, 124 (78%) were performed using an antegrade approach and 34 (22%) using a retrograde approach. Incidence of risk factors and success rate of procedures between men and women were compared.

Results: In the study groups 122 patients were men (81.3%). The average age of men and women were 60.9 ± 9.7 years and 67.1 ± 7.5 years, respectively (p = 0.002). The incidence of hypertension and other risk factors were presented in Table.

The success rate was similar in both groups 88.3% vs 82.1% (p = NS). No serious complication were observed.

Conclusions: Although higher age of women, main risk factors were similar in both groups and hypertension remains, next to the hypercholesterolemia, the most frequent risk factors of coronary artery disease in patient with chronic total coronary occlusion. We have to emphasize that the incidence of hypertension and hypercholesterolemia in patients with CTO is higher than other CAD patients.

PP.01.07 HOW MUCH DO THE PATIENTS WITH ESTABLISHED CORONARY HEART DISEASE KNOW ABOUT OPTIMAL BLOOD PRESSURE CONTROL?

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Objective: Hypertension is a major risk factor for the atherosclerosis. The main objectives of cardiovascular disease (CVD) prevention are to reduce morbidity and mortality, improve quality of life, and increase the chances of a longer life

expectancy. Optimal hypertension control is very important in cardiovascular risk reduction in patients with diagnosed coronary artery disease, after PCI or CABG intervention.

Objective: To analyze the level of theoretical knowledge of the aims of control of the CV risk factors in patients with established coronary artery disease (CAD) and to evaluate the accomplishment of the optimal arterial pressure control.

Design and method: 116 consecutive patients with established CAD (acute myocardial infarction and ischaemia and patients following revascularisation by angioplasty or coronary artery surgery) were enrolled in the study. They were interviewed a year after diagnosis of the CAD about optimal blood pressure level. All of them had arterial blood pressure measurement during physical examination.

Results: The mean age was 58+/-7 years. Mean arterial pressure was 134+/-86 mm Hg. Arterial tension higher than optimal (SBP < or equal 130 mmHg, DBP < or equal 80 mmHg) was registered in 68 patients (66.1%). Females had significantly better control of the arterial tension, $p < 0.05$. Mean body mass index was 24.7+/-5.3. Even 88.8% (103 patients) claimed to know target values of the blood pressure. Among them just 41.7% of them (43 patients) claimed correct values (SBP < 130 mmHg and DBP < 80 mmHg), 36% of them (37 patients) claimed higher values and 23 patients (22.3%) of them claimed even lower values. 95.1% of them (98 patients) knew that no cigarettes are allowed in their condition and 15 patients (14.9%) stated that up to 5 cigarettes are allowed.

Conclusions: Blood pressure control in patients with established CAD should be more effective. Theoretical knowledge about optimal blood pressure level in these patients should be improved.

PP.01.08

USEFULNESS OF THE POP-HT SCORE TO PREDICT ACUTE MYOCARDIAL INFARCTION EXPRESSION IN HYPERTENSIVE PATIENTS AFTER CORONARY ARTERY BYPASS SURGERY: A SUBSTUDY OF THE POP-HT STUDY

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Objective: It is well known that patients with coronary artery bypass surgery (CABS) have physiological changes in coronary artery structure. In these patients, risk factors for coronary artery disease have different influence of new coronary events expression, than in patients without CABS. Acute myocardial infarction (AMI) is one of the most important major adverse cardiovascular events (MACE) in patients after previous CABS. This substudy aimed at evaluating the usefulness of the POP-HT score (PostOperative Prognosis-HyperTension score), originally developed for the prediction of 60-day, 1-year, 5-year, 10-year, 15-year and 20-year MACE, after CABS in patients with hypertension (HT).

Design and method: From April 1988, we analyzed 2014 consecutive patients with HT who underwent CABS. Expression of AMI was the predefined end point. Models discrimination and calibration to predict AMI was tested using receiver-operating characteristics curves and the goodness-of-fit (GoF) test. Sensitivity analyses and 1000-resample bootstrapping were used to evaluate the model's performance.

Results: The rate of AMI was 32.6%, respectively. Compared with controls, the cumulative AMI group was associated with much higher rates of adverse clinical outcomes at 60-day follow-up (adjusted odds ratio (OR) for death 7.22), at 1-year follow-up (adjusted OR for death 7.38), at 5-year follow-up (adjusted OR for death 7.66), at 10-year follow-up (adjusted OR for death 7.95), at 15-year follow-up (adjusted OR for death 8.20) and at 20-year follow-up (adjusted OR for death 8.32). Internal validation confirmed a reasonably good discrimination and calibration of the POP-HT score for the prediction of AMI (area under the curve (AUC) 0.68, GoF 0.34), after CABS in patients with HT.

Conclusions: The risk of AMI in patients with HT, after previous CABS, could be accurately assessed using the POP-HT score, which might help in deciding upon measures aimed at preventing adverse prognosis.

PP.01.09

DEVELOPMENT AND VALIDATION OF A RISK SCORING MODEL TO PREDICT NET ADVERSE CARDIOVASCULAR OUTCOMES AFTER CABS IN PATIENTS WITH HYPERTENSION: RATIONALE AND DESIGN OF THE POP-HT STUDY

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Objective: The patients with coronary artery bypass surgery (CABS) have physiological changes in coronary artery structure. In these patients, risk factors for coronary artery disease have different influence of new coronary events expression, than in patients without CABS. The prognosis of patients after coronary artery

CABS has been noted in many studies, but there were no comprehensive hypertension (HT) risk model to predict net adverse cardiovascular events (NACE) after CABS. The primary hypothesis of the POP-HT study (PostOperative Prognosis-HyperTension study) is that an accurate risk prediction may be achieved by using clinical, angiographic, and procedural variables available 30-day after intervention.

Design and method: The present single-center, longitudinal, cohort study will include 3082 consecutive patients with hypertension, undergoing CABS. The primary end-points of the trial (NACE) include major adverse cardiovascular events (MACE). A logistic regression model will be developed to predict 30-day, 1-year, 5-year, 10-year, 15-year and 20-year NACE after CABS. A risk score derived from study set data will be validated using validation set data.

Results: Until April 1, 1988, 2984 patients have been enrolled. Thirty-day follow-up is available in 2912 patients, 1-year in 2836 patients, 5-year in 2618 patients, 10-year in 2445 patients, 15-year in 2112 patients and 20-year in 1845 patients.

Conclusions: The POP-HT study is designed to develop an accurate risk scoring system, using variables available 30-day after CABS, to predict long-term adverse outcomes in patients with hypertension.

PP.01.10

SECONDARY PREVENTION IN HYPERTENSIVE PATIENTS WITH CORONARY HEART DISEASE

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Objective: Our country is in high risk cardiovascular region in Europe. The aim of the study was to evaluate healthy lifestyle and pharmacological therapy effect in hypertensive patients with coronary heart disease (CHD) according to European Guidelines on Cardiovascular Prevention.

Design and method: We evaluated age, systolic blood pressure (SBP), diastolic blood pressure (DBP) heart rate (HR), total cholesterol (TC), smoking status and pharmacological therapy use in treated hypertensive patients after survived myocardial infarction or primary percutaneous coronary interventions (PCI) or coronary artery bypass grafting (CABG). We analyzed 105 CHD patients (77 men and 28 women) living in community Stari Grad, Belgrade, during their control examinations in October-December 2014, year. All data tested by Student T test.

Results: Mean age in men was 67 ± 9 and in women 70 ± 9 years ($p = 0,1$) Mean SBP in men was 137,17 ± 14 mm Hg and in women 134,68 ± 14 mm Hg ($p = 0,5$) Mean DBP in men was 79,81 ± 7 mm Hg and in women 79,44 ± 6 mm Hg ($p = 0,8$) Mean HR in men was 67,64 ± 9/sec and in women 75,10 ± 11/sec ($p = 0,004$) Mean TC was in men 5,0 mmol/L and in women 4,88 mmol/L ($p = 0,8$) Smoking status was present in 12 (16%) men and in 10 (36%) women. Beta blockers were used in 70 (91%) men and in 25 (89%) women ACE inhibitors were used in 68 (88%) men and in 23 (82%) women Calcium antagonists were used in 42 (55%) men and in 17 (61%) women Antithrombotic drugs were used in all patients Lipid lowering drugs were used in 60 (78%) men and in 22 (79%) women. Mean number drugs in men was 3,9 and in women 4,2 ($p = 0,8$) drug.

Conclusions: Life style and pharmacological therapy made optimal mean blood pressure in hypertensive men and women with CHD. HR was optimal in hypertensive men with CHD Pharmacological therapy to improve prognosis was used in great percentage. Secondary prevention in hypertensive patients with CHD needs permanent implementation in these high risk regions in Europe.

PP.01.11

THE INFLUENCE OF PRESSING HYPERTENSION ON FUNCTIONAL HEART PARAMETERS IN PATIENTS WITH MYOCARDIAL INFARCTION

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Objective: Hypertension and coexisting left ventricular hypertrophy are known to significantly affect mortality after acute myocardial infarction (AMI). One of the possible keys to negative prognosis is higher risk of heart failure development, which is still discussed.

The purpose of this study was to determine the influence of preceding hypertension on left ventricular parameters after AMI.

Design and method: 35 hypertensive patients and 31 normotensive patients with their first AMI were examined. Cardiac ultrasound was done to all patients on 3rd and 28th day after AMI. The amount of troponin, creatine phosphokinase, transaminases was determined in blood of all patients.

Results: Patients of the hypertensive group had the following dynamics of functional heart parameters from 3rd to 28th day: left ventricular end-diastolic volume (LVEDV) and left ventricular end-systolic volume (LVESV) showed a tendency to increase (+ 4.1%; 63.82 ± 5,13 mm; +13.9%; 58.16 ± 6.73 mm, respectively) as well as the ejection fraction (EF) +12.8%; 44.85 ± 2.93%. However, the men-

tioned above changes weren't reliable ($p > 0.05$). Patients of the normotensive group demonstrated reliable decrease of LVEDV (-15.3% ; 52.75 ± 4.23 mm; $p = 0.027$), as well as LVESV (-19.7% ; 38.64 ± 3.48 mm; $p = 0.031$); EF increased to 23% ($49.53 \pm 2.76\%$; $p = 0.008$). The analysis of indexes on 28th day showed increase of EF in both groups (68.85 % and 85.66% of patients respectively, $p = 0.039$); the decrease of contractile ability determined in 25.2% and 14.29% of patients respectively, $p = 0.034$.

Conclusions: Patients with AMI and preceding hypertension demonstrated worse dynamics of functional heart parameters than normotensive ones. This included insufficient improvement of left ventricular systolic and diastolic function as well as its contractile ability, tendency to left ventricular cavity dilatation. Such changes may favor the future progress of heart failure and increase the risk of life-threatening arrhythmias.

PP.01.12 LOWER SERUM TRIGLYCERIDE LEVEL IS A RISK FACTOR FOR INHOSPITAL AND LATE MAJOR ADVERSE EVENTS IN PATIENTS WITH ST-ELEVATION MYOCARDIAL INFARCTION TREATED WITH PRIMARY CORONARY INTERVENTION

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Objective: Whether serum triglyceride level correlates with clinical outcomes of patients with ST segment elevation myocardial infarction (STEMI) treated by primary percutaneous coronary intervention (pPCI) remains unclear.

Design and method: From June 2008 to February 2012, all patients with STEMI who were treated with pPCI in this tertiary referral hospital and then had fasting lipid profiles measured within 24 hours were included and dichotomized into lower- (≤ 150 mg/dl) and higher-triglyceridemic (>150 mg/dl) groups. Baseline characteristics, in-hospital outcomes, and late major adverse cardiovascular events (MACE) were compared in-between. Independent predictors for in-hospital death and late adverse events were identified by multivariate logistic and Cox regression analyses.

Results: A total of 247 patients were enrolled, including 163 lower-triglyceridemic and 84 higher-triglyceridemic subjects. The angiographic characteristics, pPCI results and in-hospital outcomes were similar between the two groups. However, multivariate logistic analysis identified triglyceride level as a negative predictor for in-hospital death (OR 0.963, 95% CI 0.931–0.995, $p = 0.023$). At follow-up for a mean period of 1.23 to 1.40 years, compared with the high-triglyceridemic group, low-triglyceridemic patients had fewer cumulative incidences of target vessel revascularization (TVR) (21.7% vs. 9.5%, $p = 0.011$) and overall MACE (26.1% vs. 11.9%, $p = 0.0137$). Cox regression analysis confirmed serum triglyceride as a negative predictor for TVR and overall MACE.

Conclusions: Serum triglyceride level inversely correlates with in-hospital death and late outcomes in patients with STEMI treated with pPCI. Thus, when managing such patients, a high serum triglyceride level can be regarded as a benign factor but not a target for aggressive therapy.

PP.01.13 EFFICACY OF COMBINATION THERAPY USING CARVEDILOL AND TRIMETAZIDINE IN PATIENTS WITH ISOLATED SYSTOLIC HYPERTENSION AND STABLE EFFORT ANGINA

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Objective: The aim of this study was to evaluate the efficacy of beta – blocker carvedilol alone or in combination with metabolic agent trimetazidine in patients with isolated systolic hypertension (ISH) and stable effort angina (SEA).

Design and method: Sixty two patients with mild ISH,SEA and documented coronary artery disease (CAD),aged 55 – 64 years, were randomly assigned to carvedilol 25 mg daily (group A-31 patients) and carvedilol 25 mg daily with trimetazidine MR 35 mg twice daily (group B-31 patients). Echocardiography and treadmill exercise tests were performed at baseline and after 6 months of therapy. The parameters of left ventricular (LV) hypertrophy were evaluated. Differences in the efficacy parameters were analysed using 2-tailed Student's t test for quantitative parameters. At baseline there were no significant differences between the groups.

Results: At the end of the study systolic BP was lowered in both groups to less than 140 mm Hg. LV mass index reduced from 154.2 ± 6.4 to 122.5 ± 2.7 g/m² with carvedilol and from 155.3 ± 6.1 to 123.1 ± 3.1 g/m² with carvedilol and trimetazidine MR in combination ($p < 0.05$ for both groups). At the end of the study time to 1 mm ST segment depression compared to baseline increased by 9,8 % in group A ($p < 0,01$) and by 19,6 % in group B ($p < 0,001$). Time to onset of angina increased by 12,1 % in group A ($p < 0,01$) and by 20,1 % in group B ($p < 0,001$). Maximum ST segment depression compared to baseline passed by 7,1 % in group A ($p < 0,01$) and by 15,1 % in group B ($p < 0,001$). Mean number of anginal attacks per week decreased by 21,9 % in group A ($p < 0,01$) and by 35,6 % in group B ($p < 0,001$). There was no significant difference between two groups for grade of anginal pain.

Conclusions: Therapy with beta-blocker induced qualitative antihypertensive effect and qualitative effect on the parameters of LV hypertrophy in patients with ISH and CAD. Combination treatment using beta-blocker and metabolic agent produced significant improvements in exercise stress tests and reduced clinical symptoms compared to beta-blocker alone.

PP.01.14 CHARACTERISTIC OF STENOCARDIAL SYMPTOMS IN PATIENTS WITH CARDIAC SYNDROME X COMPARED WITH THOSE WITH ISCHEMIC HEART DISEASE

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Objective: The Cardiac syndrome X (CSX) includes patients, mainly women, fulfilling three main criteria: angina pectoris, a positive exercise-stress test and angiographically "clear" coronary arteries. The most manifest clinical symptom in those patients is chest pain.

Aim of the current study is to assess characteristics of pain syndrome in patients with CSX compared with ischemic heart disease (IHD) pts.

Design and method: We conducted a prospective randomized study including 56 consecutive patients (women) at the mean age 54.32 ± 9.52 who fulfilled criteria for CSX, hospitalized in the Clinic of Cardiology and 49 with IHD (mean age 63.2 ± 10.1 years).

For assessment of pain syndrome in CSX we used pain index, by which could be evaluated the subjective feeling of pain in these patients.

Results: The results reveal strong statistical trend for subjective more strength feeling for pain in patients with CSX than in control group with IHD.

In investigated group of patients with CSX is established significantly longer duration of episodes of stenocardial pain (mean 28,73 min), compared with IHD pts (mean 12.75 min), well as significantly higher mean duration and duplicate maximal duration than in patients with IHD.

In pts with CSX first manifestation of typical stenocardial symptoms is mean 79,68 months after onset of menopause compared with IHD- 121,44 months.

It is found that in patients with CSX the life-threatening fear feeling during the stenocardial attack is found in significant lower number of patients then in patients with IHD, respectively 25% and 80%.

Conclusions: In patients with CSX is established increased pain perception, evaluated by pain index

The duration in stenocardial attacks in patients with CSX is significant longer than in patients with IHD; There is a strong statistical trend for earlier manifestation of typical stenocardial symptoms from the onset of menopause in patients with CSX than in these with IHD; The manifestation of feeling of life-threatening fear during the stenocardial attack is just in a quarter in patients with CSX.

PP.01.15 ECHOCARDIOGRAPHIC PARAMETERS INVOLVED IN EVOLUTION OF DIASTOLIC DYSFUNCTION IN HYPERTENSIVE PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

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Objective: Pseudonormal and restrictive diastolic pattern of mitral inflow were associated with dilatation and cardiac mortality in first year after acute myocardial infarction (AMI). Arterial hypertension before the acute coronary event is known to be a factor linked to an increased enddiastolic pressure. Purpose of the study was to find a correlation between echocardiographic parameters of filling pressure at discharge and pattern of mitral inflow at one year after AMI in hypertensive patients.

Design and method: A number of 98 hypertensive patients (56 males and 42 females), admitted with acute myocardial infarction with ST-segment elevation were evaluated during the first week by: clinical examination, 12 lead standard ECG, echocardiographic measurement of: left atrium volume index (LAVi), left ventricular mass index (LVMI) using transthoracic echocardiography; cut off levels for left ventricular hypertrophy (LVH) were $LVMI > 115$ g/m² in males and > 95 g/m² in females; mitral inflow, pulmonary venous inflow measurement using Doppler echocardiography, tissue Doppler echocardiography at lateral and medial corner of mitral annulus, color Mmode echocardiography. E/E' average ratio, E/vp ratio and ar-A duration were calculated. After one year the pattern of mitral inflow was evaluated using transthoracic Doppler echocardiography. All patients received fibrinolytic therapy. LVEF measured by Simpson method was less than 45%.

Results: 1. Mean values of parameters of filling pressure in hypertensive patients with LVH and without reperfusion were: VASi:35,04, $p = 0,00007$, E/E':14,81, $p = 0,03992$, E/vp:1,99, $p = 0,00197$, ar-A:28,79, $p = 0,00726$. 2. Using chi squared (CS), odd ratio (OR) and relative risk (RR) significant correlations were found between mitral pattern and: VASi>32 ml/m² CS:6,512834; E/E'>14, CS:10,179653, E/vp < 1.5, CS:10,637642, ar-A>30ms, CS:40,105.

Conclusions: 1. The highest mean values of echocardiographic parameters of increased filling pressure at discharge after an acute myocardial infarction were found in hypertensive patients with LVH and without reperfusion. 2. A correlation was found between these increased mean values at discharge and mitral inflow after one year suggesting a worse evolution in these patients.

PP.01.16 GENDER DIFFERENCES IN PROGNOSTIC VALUE OF CO-MORBIDITIES IN PATIENTS WITH ACUTE CORONARY SYNDROMES WITHOUT HISTORY OF ANGINA PECTORIS

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Objective: Study was designed to evaluate gender disparities in prognostic value of co-morbidities (hypertension, diabetes, chronic kidney disease - CKD, COPD), in patients with AMI manifested as first episode of heart attack (without history of angina pectoris).

Design and method: We studied 1354 patients with ACS (794 males and 560 females). Total Number of individuals without previous history of angina pectoris was 954 (70.45%), 496 of them were males and 458 females. All study patients were divided into four groups: IA and IB groups - males respectively with and without history of angina pectoris, IIA and IIB groups - females respectively with and without history of angina pectoris

Results: Rate of diabetes in IA and IB groups was 0.40 SD 0.497 and 0.59 SD 0.484 (P 0.001) and 0.42 SD 0.95 and 0.61 SD 0.455 (p 0.001) in IIA and IIB groups respectively. Rate of arterial hypertension in IA and IB groups was 0.63 SD 0.484 and 0.61 SD 0.456 (p 0.54) and 0.75 SD 0.434 and 0.69 SD 0.437 (p 0.08) in IIA and IIB groups respectively. Rate of CKD in IA and IB groups was 0.15 SD 0.356 and 0.19 SD 0.345 (p 0.09) and 0.20 SD 0.324 and 0.37 SD 0.435 (p 0.0050) in IIA and IIB groups respectively. Rate of COPD in IA and IB groups was 0.20 SD 0.325 and 0.21 SD 0.412 (p 0.31) and 0.15 SD 0.358 and 0.17 SD 0.356 (p 0.54) in IIA and IIB groups respectively. By Logistic regression analysis prognostic factor of development of AMI in females without history of angina pectoris co-existence of diabetes and CKD was found.

Conclusions: AMI without history of angina pectoris was more prevalent in males with diabetes, as well as in females. High prognostic value of co-existence of diabetes and CKD for AMI risk in female patients without previous angina has been shown.

PP.01.17 INFLUENCE OF ARTERIAL HYPERTENSION ON DIABETIC PATIENTS WITH NON-ST-ELEVATION ACUTE CORONARY SYNDROME: IN-HOSPITAL MORBIDITY AND MORTALITY

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Objective: High blood pressure (HTA) and diabetes mellitus (DM) confer a greater risk of developing coronary heart disease. It is intended to assess the impact of HTA on the in-hospital morbidity and mortality of diabetic patients diagnosed with acute coronary syndrome without ST segment elevation (ACS NSTEMI).

Design and method: Prospective study of 240 diabetic patients (pts) diagnosed with ACS NSTEMI, between October 2009 and September 2014. They were divided into two groups- diabetic pts with a history of hypertension (Group I: n=214, 89.17%, 55.1% men) and diabetic pts without a history of hypertension (Group II: n=26, 10.83%, 76.9% men) - and compared for in-hospital mortality and for the primary composite endpoint (PCE) -nonfatal myocardial reinfarction, stroke and total mortality.

Results: Group I was older [I: 71.35 (interq (iq) = 13.75) vs II: 66.57 (IQ = 14.74), p < 0.05], had higher body mass index [I: 28.32 (IQ = 6.75) vs II: 26.04 (IQ = 5.76), p < 0.05] and a higher prevalence of previous stroke [I: 14.5% vs II: 0.0%, p < 0.05]. No statistical difference in relation to other previous cardiovascular history. On admission, there was no difference in the Killip classes, nor in the analytical parameters (blood glucose, creatinine, BNP). During hospitalization, there was no difference in regard with the adopted risk stratification strategy, or the in-hospital medication, except for ACE inhibitors [I: 68.7% vs II: 4.6%, p < 0.01%] and diuretics [I: 47.2% vs II: 23.1%, p < 0.05] that were most frequently used in group I. There was also no difference for in-hospital complications, nor mortality [I: 6.1% vs II: 15.4%, p=ns] nor PCE [I: 10.7% vs II: 19.2%, p=NS] between the two groups. No difference in the secondary prevention strategy between the two groups.

Conclusions: Although there was a high prevalence of hypertension in diabetic patients with ACS NSTEMI, this was not associated with increased in-hospital morbidity and mortality in this population.

PP.01.18 BLOOD PRESSURE CONTROL IN PATIENTS WITH VS WITHOUT ISCHEMIC HEART DISEASE

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Objective: Blood pressure (BP) decreasing till target level prevents complications. Ischemic heart disease (IHD) is factor that could influence on antihypertensive effectiveness. There was not compared the predictors of target BP achievement in population of patients without and with IHD. That it was the aim of our study.

Design and method: There were included 9821 hypertensives (mean age 58.9 ± 0.24 yrs) in 3mth multicenter open trial. All were divided in 2 groups: 1st-4193 pts without IHD, 2nd-5628pts with IHD. Patients were treated by primary care physicians, who prescribed drugs according to their own view. Patients were done: office BP measurements, ECG, patient compliance (X. Girerd) and cardiovascular risk evaluations by standard tests, inquiring by author questionnaire. Multifactor regression analysis was used for evaluation of antihypertensive treatment failure predictors.

Results: It was stated that IHD in hypertensive patients was associated with more rate of complications, diabetes mellitus and risk factors, that needed more antihypertensive drugs. The systolic (SBP) and diastolic (DBP) BP levels were higher in 2nd at baseline and at end of study, in spite of more intensive treatment. The target BP (<140/90 mmHg) was achieved in 68.7% patients of 1st group and in 51.1% -2nd group (p=0.001). Common predictors of antihypertensive treatment failure were high baseline SBP (>160 mmHg) and DBP (>100mmHg) levels: risk of not target BP achievement increased in 3.83|2.81times for 1st group and in 3.92|2.5times for 2nd group. In patients without IHD the risk of antihypertensive treatment failure was associated with higher BMI (β = 1.033, p = 0.05) and rear intake of fresh fruits|vegetables (β = 12.8, p = 0.025). In 2nd group predictors of poor treatment were heart failure (β = 1.73, p = 0.001) and renal AH (β = 1.24, p = 0.05). More cardiovascular risk was associated with insufficient effectiveness in different way: in 1st it increased the probability (β = 1.46, p = 0.001), in 2nd- decreased (β = 0.52, p = 0.001). Only 28.3% of 1st group and 19.5% of 2nd (p < 0.001) had high treatment compliance. Baseline higher compliance diminished the treatment failure risk on 36% in 1st group, but not in the 2nd group. Thus high compliance at the end of study decreased the treatment failure on 46% in 2nd group.

Conclusions: Hypertensive patients with and without IHD had different BP control and different factors associated with achievement of target BP, that help to form the different strategy of patient management.

PP.01.19 THE MENTAL STATUS STATE OF PATIENTS WITH ARTERIAL HYPERTENSION ASSOCIATED WITH ACUTE CORONARY SYNDROME

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Objective: To study of mental status patients with arterial hypertension (AH) associated with acute coronary syndrome (ACS).

Design and method: There were survey of 250 patients with hypertension and acute coronary syndrome using continuous sampling method of Hospital Anxiety and Depression Scale inquirer (HADS). 85 persons (34%) of them had been identified symptoms of anxiety and depression. 165 persons (66%) had no anxiety and depressive disorders (TDS). Also 46 patients with AH and ACS, had TDS symptoms, were included in open comparative prospective research. For identification of mental maladjustment symptoms patients were examined using HADS, Beck Depression Inventory (BDI), The Sheehan Scale (Sheehan Clinical Anxiety Rating Scale) and by psychiatrist. The first group (23 patients) was treated by conventional therapy and received additional Agomelatine (Valdoxane produced by SERVIER) - the dose was 25 mg/day. Patients in the second group (23 patients) were given placebo. After 6 months we recorded the dynamics of clinical status, mental status and quality of life on the hospital stage.

Results: Both treatment groups were comparable in terms of clinical and demographic characteristics, as well as the basic treatment of hypertension and ACS. There had not been identified statistically significant changes in mental status in the group with placebo treatment after 6 months. And in the Valdoxane group there was observed significant positive changes in evaluating of the anxiety level and depression at all scales. During the control test by Beck survey there was noted 50% or more clinically significant improvement as reduction of depressive symptoms for 12 respondents (52%). 8 patients in the first group revealed 15% decreased scores by the Beck scale after 1 month of treatment. That required an increase of the Valdoxane dose to 50 mg/day. Every patient of Valdoxane group revealed improvement in sleep quality.

Conclusions: 34% of patients with hypertension and ACS revealed TDS. Valdoxane enhances efficiency of standard therapy and leads to an improvement in clinical condition and mental status.

PP.01.20 EFFICACY OF IVABRADINE IN COMBINED THERAPY IN HYPERTENSIVE PATIENTS WITH CORONARY ARTERY DISEASE AND TYPE 2 DIABETES MELLITUS

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Objective: The purpose of study was investigation of efficacy and safety of Iv inhibitor ivabradine in hypertensive patients with coronary artery disease (CAD), moderate heart failure and type 2 diabetes mellitus (DM) who received bisoprolol and ramipril.

Design and method: Thirty five patients (20 men and 15 women, average age 47,2±1,5 years) with arterial hypertension (AH) mild and moderate and CAD stable angina I-II functional classes, with moderate heart failure (NYHA class II- III) and type 2 DM were divided into 2 groups. Patients of group I (n=18) received bisoprolol 5 mg daily and ramipril 10 mg daily, patients of group II (n = 17) received same treatment, after 2 weeks 7,5 mg ivabradine twice a day was added. Echocardiographic parameters (end systolic volume (ESV), ejection fraction (EF), left ventricular mass index (LVMI)) and total cholesterol (TC), low-density lipoprotein (LDL-C), high-density lipoprotein (HDL-C), triglycerides (TG) and level of fasting glucose in blood serum were determined.

Results: Statistically significant decrease of BP up to purposed level <130/80 mm was achieved in all patients after 12 months of treatment. Decrease of angina pectoris attacks and need in sublingual use of Nitroglycerine on 54% were revealed in patients of group I and in all patients of group II. Decrease of ESV by 6,1% (p<0,05) in I and by 9,2% (p<0,05) in II group, increase of EF by 8,5% (p<0,05) – in I and by 11,3%(p<0,05) in group II were accompanied with decrease of LVMI by 12,2% (p<0,05). After 12-weeks treatment TG level had statistically significant decrease by 12,9% and 13,2% respectively (p<0,05), that became correspondent to recommended level for patients without type 2 diabetes - 1,80 mmol/l.

Conclusions: Hypotensive effect of bisoprolol and ramipril in hypertensive patients with CAD, moderate heart failure and type 2 DM accompanies with regression of left ventricular hypertrophy, decrease of numbers of angina pectoris attacks. Addition of ivabradine to bisoprolol and ramipril very early decreases of numbers of angina pectoris attacks. The negative chronotrope effect of ivabradine causes improvement myocardium contraction and decrease of functional class of heart failure.

PP.01.21 EXERCISE TOLERANCE TEST AND HEART RATE VARIABILITY IN PATIENTS WITH CORONARY ARTERY DISEASE AND ARTERIAL HYPERTENSION RECEIVING IVABRADINE IN COMBINATION WITH PERINDOPRIL

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Objective: To investigate the effects of Ivabradine in combination with Perindopril on exercise tolerance test (ETT), and heart rate variability (HRV) in patients with coronary artery disease (CAD) and arterial hypertension (AH).

Design and method: 90 subjects with mild to moderate AH and CAD were randomized into 2 groups: Group 1 - 48 patients (mean age 56,1 ± 0,8 years) received Ivabradine (mean 10,7 ± 0,4 mg) and Perindopril (mean dose 4,8 ± 0,6 mg). Group 2 - 42 patients (mean age 54,2 ± 1,3 years) – Metoprolol (mean dose 47,5 ± 5,3 mg). Groups were matched for age, sex, office blood pressure, cardiovascular risk factors. ETT, 24-hour monitoring of blood pressure and electrocardiography with HRV program were evaluated initially and after 8 weeks of therapy.

Results: At 8-week follow-up both groups showed a comparable decrease in blood pressure. In group 1 more significant decrease of heart rate especially at night time was revealed. The exercise time did not change in both groups. In group 1 revealed a decrease in the number of patients with low exercise tolerance by 9.7% and the increase in the number of patients with a high tolerance exercise by 8.6%. In group 2 increased the number of patients with a high tolerance exercise by 12.6 %. In both groups there was noted that dynamic vagosympathetic interaction in heart rate regulation increased high-frequency component and time domain PNN50% as well as SDNNind and RMSSD in group 2.

Conclusions: Combination therapy with Ivabradine and Perindopril has a positive effect on ETT and HRV (like Metoprolol) however its influence on heart rate is more significant in patients with CAD and AH.

PP.01.22 THE MUSIC THERAPY IN HYPERTENSIVE PATIENTS WITH ACUTE MYOCARDIAL INFARCTION AFTER PREVIOUS CORONARY ARTERY BYPASS SURGERY

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Objective: Patients who have clinical evidence of hypertension (HT) after coronary artery bypass surgery (CABS) have a poor prognosis in expression of acute myocardial infarction (AMI), as one of the MACE. Unrelieved anxiety can produce an increase in sympathetic nervous system activity leading to an increase in cardiac workload. The purpose of this study was to evaluate the effectiveness of music therapy on prognosis of patients with HT and AMI, after CABS.

Design and method: 296 patients (males 78.4%, mean age 59.4 ± 2.4 yrs) with AMI after previous CABS have been selected from the patients consecutively submitted from January 2013 to December 2014. HT was registered in 156 (52.7%) pts with AMI after previous CABS. All patients with HT were randomized and divided in 2 groups: Study group of 78 patients treated with music therapy and Control group of 78 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. The plasma cytokine and catecholamine were measured in both groups.

Results: In the Study group, heart rate was significantly decreased by music therapy (p = 0.3894). In the Control group, there were no significant changes in heart rate. Among cytokines (p = 0.4263), plasma interleukin-6 (IL-6) (p = 0.3982) in the Study group was significantly lower than those in the Control group, as well as plasma adrenaline (p = 0.4668) and noradrenaline (p = 0.4421) levels.

Conclusions: This study provides support for the use of musical therapy in patients with HT and AMI after previous CABS. The positive effects of music therapy, in these patients, are probably because of enhanced of parasympathetic activities and reduction of plasma cytokine and catecholamine levels.

PP.01.23 VASCULAR STIFFNESS IN WOMEN WITH CORONARY ARTERY DISEASE AND IN COMBINATION WITH ARTERIAL HYPERTENSION

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Objective: In women with coronary heart disease (CHD) to evaluate the stiffness of peripheral vessels.

Design and method: 237 women, age 51,5 ± 5,4 years. To assess the state of the vascular wall using ultrasound machine Logiq E9, USA.

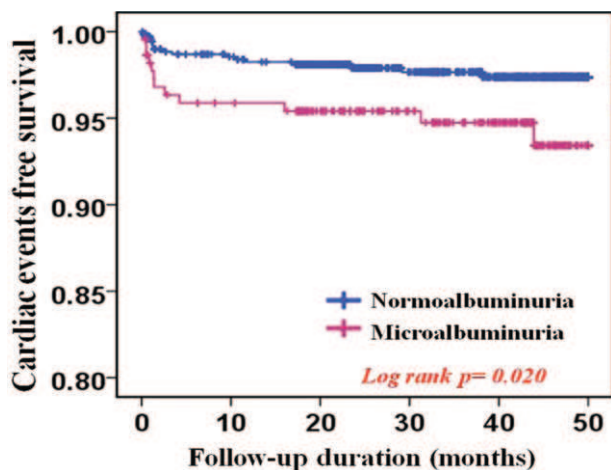
Results: The structural and functional properties of the common carotid artery (CCA) in women with coronary heart disease, as well as a separate subgroup was highlighted in conjunction with arterial hypertension. Early vascular changes most pronounced in the CCA in hypertension and CHD. In women with coronary heart disease in postmenopausal women have a decrease in the elastic properties of CCA compared with premenopausal women. There is a decrease in the elasticity of the arterial wall - the coefficient of elasticity of 44.7% in patients with coronary artery disease and 60.3% with the presence of hypertension. At the same time, the increased stiffness on CHD hypertensive 28.4% as compared to patients without coronary artery disease with 42.3% hypertension changes CCA increases with the number of risk factors. Reduction of the elastic properties expressed OCA increasing modulus Peterson CHD in women with postmenopausal 57.6% compared with women with a menstrual cycle, Young's modulus of elasticity - for 64.7%, indicating that the increase in the elasticity of the arterial wall increase regardless of thickness. Peterson CCA module in combination of hypertension with coronary artery disease reached 182,8 ± 3,18 kPa, it increased by 84.3%, the Young's modulus of the OCA was 1374,23 ± 15,6 kPa.

Conclusions: In women with coronary heart disease in postmenopausal structural and functional changes in the vascular walls of the arteries of the elastic type, mainly due to the increase in the thickness of the membrane connecting the absence of changes in the intima media and lumen diameter. Vascular remodeling of this type are also more pronounced in women with coronary heart disease in postmenopausal women. Arterial stiffness was significantly increased in patients with coronary heart disease and hypertension.

PP.01.24 MICROALBUMINURIA MIGHT BE ASSOCIATED WITH CARDIAC EVENT IN NON-DIABETES

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Objective: In recent studies, microalbuminuria has been believed to relate to progressive coronary atherosclerosis and cardiac event in diabetes. However, it has been unknown the relation between microalbuminuria and cardiac event in non-diabetics. The aim of this study accesses to relation between microalbuminuria and cardiac event in non-diabetics.



Design and method: The study was a retrospective analysis of the findings in the 828 consecutive patients at our outpatient clinic between 2009 and 2012. The patients were excluded diabetes and overt albuminuria defined as UACR > 300 mg/g. Patients were divided into 2 groups according to UACR; normoalbuminuria (n = 706, 76.1%) and microalbuminuria (n = 222, 23.9%). Normoalbuminuria was defined as urine albumin-creatinine ratio (UACR) < 30 mg/g and microalbuminuria was defined as 30 mg/g ≤ urine albumin-creatinine ratio (UACR) < 300 mg/g. All patients were followed for 33 ± 14 months. The endpoints were all cardiac events, defined as cardiac death, nonfatal myocardial infarction, and revascularization.

Results: The patients were 446 men and 482 women (76:24%) with mean age of 57.3 ± 10.1 years (normoalbuminuria: 57.5 ± 10.1 years, microalbuminuria: 57.3 ± 10.2 years) and mean UACR is 18.6 ± 26.3 mg/g (normoalbuminuria: 8.5 ± 4.7 mg/g, microalbuminuria: 50.7 ± 38.3 mg/g). There were no difference of clinical characteristics and medication history including aspirin, angiotensin converting enzyme inhibitor (ACE inhibitor) and statin between normoalbuminuria and microalbuminuria. All cardiac events were revascularization without cardiac death and nonfatal myocardial infarction. (n = 28, 3.0%) In univariate analysis, microalbuminuria was predictor of cardiac events (normoalbuminuria vs microalbuminuria: 2.3% vs 5.4%, HR: 2.5, 95% CI: 1.1–5.3, p = 0.024). In multivariate analysis after adjustment of age, sex, body mass index, hypertension, medication and ejection fraction, microalbuminuria was the independent predictor of cardiac events (HR: 2.6, 95% CI: 1.1–6.2, p = 0.003). Stratifying our population by normoalbuminuria and microalbuminuria, Kaplan-Meier curves showed that normoalbuminuria had a better prognostic result compared with microalbuminuria.

Conclusions: Microalbuminuria estimated UACR might be significantly independent predictor of cardiac event in non-diabetics.

PP.01.25 CARDIAC ARRHYTHMIAS IN PATIENTS WITH CORONARY HEART DISEASE WITH BENIGN PROSTATIC HYPERPLASIA

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Objective: Benign prostatic hyperplasia (BPH), the most prevalent disease of men over 55 years old. In the same age category shows the greatest prevalence of different forms of coronary heart disease (CHD), which is often asymptomatic. Problem of the early diagnosis of cardiac activity, in particular, arrhythmias, in this cohort of patients still remains valid.

Purpose: Identify the features of rhythm disorders and cardiac conduction in patients with CHD in BPH for the prevention and treatment of disorders of cardiac activity and reduce the risk of surgical intervention.

Design and method: We examined 127 patients with BPH aged 50–89 years. 61 patients had BPH stage I, 57-II stage, 9-III stage. Along with complaints and anamnesis, ECG by the standard technique. Clinical groups were formed: I group-52 patients with BPH combined with CHD and II group-75 patients with BPH without CHD.

Results: In both groups detected ECG signs of LVH-78% and 74% respectively. Sinus tachycardia was more frequently observed in patients with CHD-25% (13 persons) and 2 times less frequently in the group without CHD-12% (9 people). Sinus bradycardia was detected less frequently and was 6% (3 patients) and 5% (4 patients), respectively groups. In the I group of patients were significantly more likely than during the second marked sinus arrhythmia- 16% and 5% respectively groups. Of the violations conduction rate in both groups most frequently occurring ventricular premature beats, and in the first group was dominated by the type of

arrhythmia and bi-trigemini, in the absence of CHD-isolated PVCs. From conduction disturbances prevailed interventricular blocks-14 and 15%, respectively. The second place was occupied by frequency atrioventricular (AV) block-9% and 3% respectively. In all patients in II group was observed AV block I degree, in patients I group, only 6% of the detected block I and 3%-block II degree by type Mobitz I. Atrial fibrillation was observed in only 2 patients with the presence of CHD.

Conclusions: BPH patients with concomitant CHD most frequently observed sinus tachycardia and sinus arrhythmia. Often observed in the presence of ventricular premature CHD manifest by type bi- and trigemini.

In patients with BPH in the presence of concomitant CHD often observed violations of cardiac conduction were interventricular and AV blocking I degree.

PP.01.26 DIASTOLIC BLOOD PRESSURE: A NEW PREDICTOR IN ACUTE CORONARY SYNDROME?

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Objective: The predictive value of diastolic blood pressure at admission (DBP) in patients hospitalized with acute coronary syndrome (ACS) is not well defined. The objective of this study is to evaluate the role of DBP in this population.

Design and method: An observational retrospective study of 508 patients admitted to the coronary care unit for ACS for 3 consecutive years. The follow-up lasted until 31st October 2014 or until another event (new ACS, stroke, hospitalization for heart failure, hospitalization for arrhythmic event or death). The primary endpoint was defined as mortality in hospital or during follow up.

Results: The study included 508 patients, 72.3% male, mean age 66 ± 13 years. During the median follow-up of 30 ± 18 months 138 events were recorded and 43 deaths. Multivariate Cox analysis adjusted for potential confounders (sex, diabetes, hypertension, dyslipidemia, obesity, smoking, systolic blood pressure on admission, DBP and heart rate on admission) demonstrated that the only predictor of mortality was DBP (with hazard ratio of 0.972 with 95% confidence interval: 0.946 to 0.999 and p = 0.039). When patients are divided into 2 groups: diabetic versus non-diabetic, we found that in diabetic patients DBP remains as an independent predictor of mortality (with hazard ratio of 0.949 with 95% confidence interval: 0.906 to 0.995 and p = 0.03); while in non-diabetic patients DBP loses significance as a predictor of mortality.

Conclusions: DBP may be an important predictor of mortality in patients hospitalized for ACS.

PP.01.27 HYPERTENSION IN PATIENTS PRESENTING WITH ACUTE ST ELEVATION MYOCARDIAL INFARCTION: CHARACTERISTICS AND PROGNOSTIC IMPORTANCE

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Objective: In order to explain the relation between hypertension (HT) and acute ST elevation myocardial infarction (STEMI), the following considerations should be made: risk factors are shared by both diseases and hypertension is associated with the development of atherosclerosis. The aim of the present paper is to focus on hypertensive patients with acute STEMI, in order to better elucidate whether these patients are at higher risk than non-hypertensive patients.

Design and method: A retrospective study was performed on a total of 76 patients presenting with STEMI in the period July 2014 – December 2014 in the Cardiology Department of the Emergency Hospital of Bucharest. Out of the 76 patients, 49 (64.5%) were found to be hypertensive. The study was further conducted on the 49 hypertensive patients. Their blood pressure (BP) was closely monitored in the intensive coronary care unit and diagnosis of HT was based on multiple measurements: at least 3/day, for at least 3 consecutive days.

Results: The prevalence of hypertensive patients with STEMI was higher in males (71.4%) than females (28.6%). 81.6% of these patients had a BMI >25 and 55.1% were smokers. During their hospitalization, 6.1% of the cases required resuscitation due to ventricular tachycardia (VT)/ventricular fibrillation (VF), compared to 3.7% in the non-hypertensive group. Left ventricular hypertrophy (LVH) was documented by echocardiography in 36.7% in the hypertensive group and 22.2% in the non-hypertensive group. Left ventricular dysfunction at discharge was 85.7% in the hypertensive group and 81.4% in the non-hypertensive group. The management of the acute MI was PCI in 65.3% and thrombolitics in 34.7% of cases. The main cause of coronary artery obstruction was due to atherosclerosis which was present in 95.9% while embolism and thrombosis counted for 2% each. The most common treatment used for HT was the combination of a beta-blocker and an ACE inhibitor which counted for 34.7%.

Conclusions: HT is associated with an increased rate of adverse events after MI. In follow-up, efforts should target efficient long-term control of BP values, as a measure to decrease the possibility of future acute coronary syndromes.

PP.01.28 DETERMINANTS OF ANGIOTENSIN-CONVERTING ENZYME INHIBITORS AND ANGIOTENSIN II RECEPTOR BLOCKERS UNDER USE IN ACUTE CORONARY SYNDROME

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Objective: 1. To identify the percent of prescription of angiotensin-converting enzyme inhibitors (ACEI) and angiotensin II receptor blockers (ARB) in a cohort of patients admitted for acute coronary syndrome (ACS). 2. To study the determinants related with a under use of ACEI and ARB in a local cohort of acute coronary syndrome.

Design and method: From January 2012 to January 2013, we enrolled all patients with ACS discharged from two hospitals of our site. Patients with intolerance or allergy to ACEI or ARB were excluded. To identify determinants of ACEI and ARB under use we performed a multivariate logistic regression analysis.

Results: 641 patients were included (68 years means; 73.5% males). Of them, 559 (87%) received ACEI or ARB at discharge, with higher prescription of ACEI (56%) than ARB (31%). Patients who received these drugs were older (68 [62–86] vs 61 [54–73]; $p=0.001$) and had more cardiovascular risk factors like hypertension (80%(444) vs 52%(43); $p<0.001$) and Diabetes Mellitus (48%(266) vs 26%(21); $p<0.001$); reduced left ventricular ejection fraction (LVEF < 50%) (31.5%(168) vs 10.8% (8); $p<0.001$), previous STEMI (14.3% (80) vs 6% (5); $p=0.04$) and treatment with beta-blockers at discharge (95%(531) vs 87%(71); $p=0.01$). After multivariate adjustment, preserved LVEF (>50%), absence of hypertension and Diabetes Mellitus and not prescription of beta-blockers at discharge were identified as the independent predictors of under use of ACEI and ARB.

Conclusions: 1^a. There is a high use of ACEI and ARB at discharge after acute coronary syndrome, according to current clinical guidelines. 2^a Determinants of underuse of ACEI and ARB were: preserved LVEF (>50%), the absence of hypertension and Diabetes Mellitus; and not receive beta-blockers at discharge.

PP.01.29 EFFECTIVENESS OF PHYSICAL REHABILITATION IN HYPERTENSIVE PATIENTS AFTER ACUTE MYOCARDIAL INFARCTION TREATED WITH PRIMARY CORONARY INTERVENTION

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Objective: Evaluation of the efficacy of a short program of physical training (PT) in hypertensive patients (pts) after acute myocardial infarction (AMI) treated percutaneous coronary interventions (PCI).

Design and method: Hypertensive pts 1 week after PCI were randomized into 2 groups (gr): the main R (n=31, age 56 ± 7 yrs), performing a program of PT moderate intensity (50–60% of max PWC) 60 min duration 3 times in week for 6 weeks, and a control – C (n=31, age 53 ± 8 yrs). All pts were enrolled in the educational program and received standard therapy after PCI. Efficacy was assessed by results of laboratory, ECG, exercise stress-test (EST) on veloergometer, EchoCG and clinical investigations.

Results: The use of short program of PT in R gr led to the increase of duration of EST compared with initial value after 1 year (by 39%, $p<0.001$) and C gr (23%, $p<0.001$), the coefficient of economic efficiency of heart work during EST differed between R gr (by 92%, $p<0.001$) and pts C gr (by 47%, $p<0.001$). In R gr the ejection fraction (EF) LV and the stroke volume increased (by 3.2%, $p<0.05$ and by 5.1%, $p<0.05$, respectively), systolic LV diminished (by 3.4%, $p<0.05$). In C gr only EF LV increased (by 2.2%, $p<0.05$). After PT systolic (-2.6%, $p<0.05$) and diastolic blood pressure (-4.7%, $p<0.001$) decreased without significant changes in C gr. In R gr the concentrations of blood atherogenic lipids did not change and the level of HDL-C increased (by 10.8 %, $p<0.05$). In C gr level of LDL-C increased (by 13.8% $p<0.05$). In C gr there were observed increasing in the number of angina attacks for one week (by 33%, $p<0.05$). In R gr compared with C gr we observed more favorable course of disease with less end points ($p<0.01$): the total number of cardiovascular events were 0 vs 9 ($p<0.05$).

Conclusions: The obtained results evidence for sufficient efficacy of the short program of PT into ambulatory practice for rehabilitation of hypertensive pts after PCI in AMI in combination with the educational program.

PP.01.30 PROGNOSIS OF PATIENTS WITH ACUTE MYOCARDIAL INFARCTION WITH ST ELEVATION AND NEW ONSET ATRIAL FIBRILLATION IN RELATION TO FIBRINOLYTIC THERAPY OR PRIMARY PCI

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Objective: Patients with STEMI have many complications and new-onset atrial fibrillation (AF) is one of them. The aim of the study was to evaluate the prognosis of patients with STEMI and new-onset AF during the 4-year follow-up in relation to fibrinolytic therapy or primary PCI.

Design and method: We enrolled 290 patients with STEMI in the study. At entry, all patients were in sinus rhythm. The primary PCI (PPCI) group included patients with STEMI treated with primary PCI and fibrinolytic group included patients with STEMI treated with fibrinolytic therapy during the hospital course. The patients were followed up for four years with visits every 6 months.

Results: We included 53 patients with STEMI treated with primary PCI (18.28%) and 209 patients (72.07%) treated with fibrinolytic therapy, the minority of 28 patients (9.65%) were not treated either with PPCI or either with fibrinolytic therapy. There was no significant difference in mean age, male/female ratio and BMI between patients treated with PPCI and patients treated with fibrinolytic therapy. In the PPCI group there were 4 patients (7.55%) with AF and in the fibrinolytic group there were 17 patients (8.13%) with AF, $p>0.05$. During the hospital course died 1 patient (1.89%) in PPCI group without AF and 7 patients (3.35%) in fibrinolytic group, 1 of them with AF and 6 without AF, $p>0.05$. During the follow up period died 3 patients (5.66%) in PPCI group, 1 patient (1.89%) with AF and 2 patients (3.77%) without AF versus 23 patients (11.00%) in fibrinolytic group, 6 of them (2.87%) with AF and 17 patients (8.13%) without AF, $p>0.05$. After all, mortality was 25% in PPCI group with AF vs. 41.18% in the fibrinolytic group with AF, $p>0.05$.

Conclusions: There was no difference in incidence of new-onset AF in STEMI patients in relation to fibrinolytic therapy or PPCI. Mortality was lower in PPCI group (7.55%) than in fibrinolytic group (19.14%), but there was no difference in mortality in patients with new-onset AF and without AF.

PP.01.31 CARDIORENAL INTERRELATIONS IN PATIENTS WITH NON-ST-ELEVATION ACUTE CORONARY SYNDROME AND NON-INVASIVE STRATEGY

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Objective: Worsening of renal function occurs frequently in patients with acute coronary syndromes (ACS) and is associated with adverse short- and long-term outcomes. The aim of the study was to evaluate the incidence, phenotypes and prognostic value of cardiorenal interrelations in patients with non-ST-elevation acute coronary syndrome (NSTE-ACS) with conservative strategy.

Design and method: 288 patients (36% male, 72 ± 12 years (M ± SD), body mass index 28.0 ± 4.8 kg/m², arterial hypertension 92%, previous myocardial infarction (MI) 42%, diabetes mellitus (DM) 23%, heart failure 36%, atrial fibrillation 23%, baseline serum creatinine (SCr) 108 ± 55 mmol/l, GFRCKD-EPI 61 ± 23 ml/min/1.73 m²) with NSTE-ACS were examined. Based on ESC Guidelines NSTE-ACS was qualified as NSTEMI or unstable angina (UA) in 186(64.5%)/102(35.5%) patients. Chronic kidney disease (CKD) and acute kidney injury (AKI) were diagnosed according to KDIGO 2012 Guidelines. Mann-Whitney test was performed. $P<0.05$ was considered statistically significant. ±

Results: Cardiorenal interrelations were found in 130 (45%) patients. CKD was diagnosed in 46 (16%) patients: CKD with/ without AKI – in 21(46%)/26(54%). AKI occurred in 103 (36%) patients, stage 1/2/3 – in 73/14/13% of cases respectively. 82% of AKI developed in first 48 hours. The following incidence of different phenotypes of AKI was revealed: transient/ persistent 54/46%, AKI de novo/AKI on CKD 80/20%, community-acquired/ hospital-acquired AKI 46/54 %. Patients with NSTEMI versus UA had higher incidence of AKI: 46 vs 17% ($p<0.01$). Patients with NSTE-ACS with versus without AKI had worse prognosis: higher risk of recurrent MI 11 vs 2% ($p=0.0001$), in-hospital mortality 17 vs 5% ($p=0.003$).

Conclusions: Cardiorenal syndromes in patients with NSTE-ACS and non-invasive strategy were found in 45%. AKI was revealed in 36% patients. CKD - in 46 (16%) pts. AKI predominantly developed in first 48 hours and was stage 1 of severity. AKI had negative impact on outcomes and was associated with increased rate of recurrent MI and in-hospital mortality.

PP.01.32 TRENDS IN FREQUENCY OF HYPERTENSION IN PATIENTS ADMITTED FOR ACUTE MYOCARDIAL INFARCTION IN SWITZERLAND FROM 1997 TO 2014

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Objective: There are scarce data available on the temporal trends in preexisting hypertension in patients presenting with acute myocardial infarction (AMI).

Design and method: Data were used from the Swiss national registry AMIS Plus (Acute Myocardial Infarction in Switzerland), which prospectively collects data on patients with acute coronary syndrome. All patients with ST-elevation MI (STEMI) and non-STEMI (NSTEMI) enrolled from 1997 to 2014 were included. Trends in the rate of patients with preexisting hypertension were analyzed using multiple logistic regressions. Hypertension was defined if diagnosed and/or treated by a physician.

Results: From the 45,020 patients enrolled for AMI, data on hypertension history was available for 42,796 (95.1%) patients. Of these patients, 25,326 (59.2%) had a history of hypertension. The mean age of the total population was 66.1y (SD 13.2y); 66.2y (SD 12.6y) in 1997 and 65.4y (SD 13.0y) in 2014. The percentage of patients with pre-existing hypertension continually increased from 48.7% in 1997 to 63.1% in 2014 (Ptrends < 0.001). This was a 3.5% increase per year (OR 1.035, 95%CI 1.031–1.039; P < 0.001) and 3.7% per year after adjustment for age, gender and type of MI (OR 1.037, 95%CI 1.033–1.041; P < 0.001). The percentage of males with pre-existing hypertension increased in this period of 18 years from 44.6% to 59.5% (Ptrends < 0.001), and in women from 59.3% to 73.4% (Ptrends < 0.001), in STEMI patients from 48.0% to 58.2% (Ptrends < 0.001) and in NSTEMI patients from 50.2% to 71.3% (Ptrends < 0.001). Regular use of angiotensin-converting enzyme inhibitors or angiotensin II receptor antagonists increased from 30.0% to 65.0% (Ptrends < 0.001), beta blockers from 32.6% to 46.6% (Ptrends < 0.001), while no significant changes were found in the regular use of Ca-channel blockers (26.9% to 27.8%; P = 0.61) and diuretics (30.4% to 29.9%; P = 0.063).

Conclusions: The number of patients admitted for AMI with pre-existing hypertension constantly increased over the past 18 years in Switzerland. These results indicate that treatment of patients with hypertension appears insufficient and could be improved in order to possibly avoid acute cardiac events.

PP.01.33 PREDICTORS OF ACUTE KIDNEY INJURY AND SHORT-TERM MORTALITY IN PATIENTS WITH NON-ST-ELEVATION ACUTE CORONARY SYNDROME AND CONSERVATIVE STRATEGY

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Objective: Acute kidney injury (AKI) is a common and serious problem associated with poor prognosis. The aim of the study was to assess the prevalence and predictors of AKI in patients with non-ST elevation acute coronary syndrome (NSTEMI) with non-invasive strategy.

Design and method: 288 patients (36% male, 72 ± 12 years (M ± SD), arterial hypertension 92%, previous myocardial infarction (MI) 42%, diabetes mellitus (DM) 23%, heart failure 36%, atrial fibrillation 23%, chronic kidney disease (CKD) 16%, baseline serum creatinine (Scr) 108 ± 55 mmol/l, GFRCKD-EPI 61 ± 23 ml/min/1.73 m²) were examined. Based on ESC Guidelines NSTEMI-ACS was qualified as NSTEMI or unstable angina (UA) in 186(64.5%)/102(35.5%) patients. AKI was diagnosed according to KDIGO 2012 Guidelines. Mann-Whitney test and multivariate logistic regression analysis were performed. P < 0.05 was considered statistically significant. ±

Results: Incidence of AKI in NSTEMI-ACS was 36%: stage 1/2/3 – in 73/14/13% of cases. Patients with versus without AKI were older (75 ± 10 vs 70 ± 12 years, p < 0.001), had higher Scr (129 ± 73 vs 95 ± 29 mmol/l, p < 0.001), urea (11.1 ± 7.1 vs 7.8 ± 3.8 mmol/l, p < 0.001), plasma glucose at admission (9.0 ± 4.1 vs 7.8 ± 3.7 mmol/l, p < 0.001), higher rate of DM (31 vs 19%, p < 0.05), CKD (20 vs 11%, p < 0.05) anemia (35 vs 19%, p < 0.01), low left ventricular ejection fraction (EF) (44 ± 9 vs 48 ± 9%, p < 0.01), higher rate of acute heart failure (47 vs 24%, p < 0.01), MI (83 vs 55%, p < 0.001), recurrent MI (11 vs 2%, p < 0.001), in-hospital mortality (17 vs 5%, p < 0.01). Independent predictors of AKI were known CKD (odds ratio (OR) 3.9; 95% confidential interval (CI) 1.09–14.02, p < 0.05), GFRCKD-EPI < 59 ml/min/1.73 m² (OR 3.9; CI 1.53–6.31, p < 0.001), urea > 7.5 mmol/l (OR 3.8; CI 1.85–7.85, p < 0.001), MI (OR 3.6; CI 1.68–7.68, p < 0.001), EF < 35% (OR 2.6; CI 1.19–5.67, p < 0.01), plasma glucose > 7 mmol/l at admission (OR 2.6; CI 1.28–5.35, p < 0.01), DM (OR 2.4; CI 1.02–5.73, p < 0.01).

Conclusions: 36% of patients admitted to the hospital with NSTEMI-ACS developed AKI. AKI stage 1 was prevalent. Known CKD, GFRCKD-EPI < 59 ml/min/1.73 m², urea > 7.5 mmol/l, MI, EF < 35%, plasma glucose > 7 mmol/l at admission, DM independently predicted AKI.

PP.01.34 DIFFERENCES IN VALUES OF MEAN ARTERIAL PRESSURE BETWEEN PATIENTS WITH MICROVASCULAR ANGINA AND PATIENTS WITH CORONARY ARTERY DISEASE

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Objective: Microvascular angina includes a heterogeneous group of patients with typical chest pain, positive exercise stress test and angiographically smooth coronary arteries. Coronary heart disease is the most common type of heart disease and includes: stable angina pectoris, unstable angina pectoris, myocardial infarction without ST segment elevation (NSTEMI) and myocardial infarction with ST segment elevation (STEMI). The aim of this study was to examine differences in the values of mean arterial pressure in patients with microvascular angina and patients with CAD including: stable angina, unstable angina, STEMI and NSTEMI.

Design and method: This study included 375 patients, of whom 75 with microvascular angina and 300 patients with CAD (75 patients with stable angina, 75 patients with unstable angina, 75 patients with NSTEMI and 75 patients with STEMI) who were treated at the Clinic for Cardiology, Clinical Center Kragujevac in the period from 2005. to 2013. All patients with MVA were taken into account, while patients with CAD were randomised using randomising tables. Blood pressures were measured 30 minutes after admission. Mean arterial pressure was calculated as the sum of diastolic pressure and one-third of pulse pressure. All data was entered into SPSS and statistically processed using descriptive and analytical methods.

Results: Values of mean arterial pressure were significantly different between patients with MVA and patients with CAD, with higher values in patients with CAD (98.07 ± 11.67 versus 103.27 ± 14.41; p = 0.001). When comparing values of mean arterial pressure between the groups (MVA vs. stable angina, unstable angina, NSTEMI and STEMI), significantly higher values were noticed between patients with MVA and NSTEMI (98.07 ± 11.67 versus 104.38 ± 14.11; p = 0.003) and patients with MVA and STEMI (98.07 ± 11.67 versus 109.04 ± 18.05; p < 0.001), while there was no significantly difference between patients with MVA and stable angina (98.07 ± 11.67 versus 100.27 ± 11.45; p = 0.246) and patients with MVA and unstable angina (98.07 ± 11.67 versus 99.40 ± 11.12; p = 0.475).

Conclusions: Values of mean arterial pressure were significantly different between patients with MVA and CAD, more precisely between patients with MVA and patients with NSTEMI and STEMI, while the significance was not present between patients with MVA and stable and unstable angina pectoris.

PP.01.35 DIFFERENCES IN VALUES OF DIASTOLIC BLOOD PRESSURE BETWEEN PATIENTS WITH MICROVASCULAR ANGINA AND PATIENTS WITH CORONARY ARTERY DISEASE

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Objective: Microvascular angina or cardiac syndrome X, describes patients with anginal chest pain, signs of ischaemia on ECG and a positive stress test, but with non-obstructive coronary angiography. Coronary heart disease is the main cause of mortality in many Western countries and is represented by stable angina pectoris, unstable angina pectoris, myocardial infarction without ST segment elevation (NSTEMI) and myocardial infarction with ST segment elevation (STEMI). The aim of this study was to examine differences in the values of diastolic blood pressure in patients with microvascular angina and patients with CAD including stable angina, unstable angina, STEMI and NSTEMI.

Design and method: This study included 375 patients, of whom 75 with microvascular angina and 300 patients with CAD (75 patients with stable angina, 75 patients with unstable angina, 75 patients with NSTEMI and 75 patients with STEMI) who were treated at the Clinic for Cardiology, Clinical Center Kragujevac in the period from 2005. to 2013. All patients with MVA were taken into account, while patients with CAD were randomised using randomising tables. Blood pressures were measured 30 minutes after admission. All data was entered into SPSS and statistically processed using descriptive and analytical methods.

Results: Values of diastolic blood pressure were significantly different between patients with MVA and all patients with CAD, with higher values in patients with CAD (81.40 ± 10.83 versus 84.84 ± 12.53 ; $p=0.030$). When comparing values of diastolic blood pressure between the groups (MVA vs. stable angina, unstable angina, NSTEMI and STEMI), significantly higher values were noticed between patients with MVA and patients with NSTEMI (81.40 ± 10.83 versus 85.47 ± 11.40 ; $p=0.027$) and patients with MVA and patients with STEMI (81.40 ± 10.83 versus 90.51 ± 15.98 ; $p<0.001$), while there was no significant difference between patients with MVA and stable angina (81.40 ± 10.83 versus 82.20 ± 10.21 ; $p=0.642$) and patients with MVA and unstable angina (81.40 ± 10.83 versus 81.20 ± 9.58 ; $p=0.905$).

Conclusions: Values of diastolic blood pressure were significantly different between patients with MVA and CAD, more precisely between patients with MVA and patients with NSTEMI and STEMI, while the significance was not present between patients with MVA and stable and unstable angina pectoris.

PP.01.36 EVALUATION OF THE PARAMETERS OF THE EURO QOL- 5D QUESTIONNAIRE AMONG PATIENTS WITH ISCHEMIC HEART DISEASE WITH NORMAL AND ELEVATED BMI

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Objective: Obesity is currently a leading epidemic and an important public health challenge. The psychological impact of obesity in the patients with Coronary artery disease can be very disturbing. In practical terms the functional effect of an illness and its therapy upon a patient, as perceived by the patient – could be estimated by introducing the quantitative approach of –Health Related Quality of Life (HRQoL). The aim of this study is to evaluate the impact of obesity on quality of life of patients with ischemic heart disease.

Design and method: Questionnaire based cross sectional study was conducted among 520 patients who were admitted in the Cardiology Department between 1st of January 2012 and 30th June 2014 with acute coronary syndrome or coronary angiographic or Electrocardiography evidence of ischemic heart disease were included in the study, stratified by age, sex and BMI (normal weight 18.5 – 24.9, overweight 25 – 29.9, obese 30 and above). EuroQol – 5D (EQ-5D) was administered in the patients during their hospital stay. EQ-5D comprises 5 dimensions: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Each dimension has 5 levels: no problems, slight problems, moderate problems, severe problems and extreme problems. The height, weight and basic laboratory parameters were recorded.

Results: Mean age of the participants was 65.1 ± 10.6 years. The distribution of patients in BMI groups was 36.8%/ 24.4%/ 38.8%. Statistically significant differences between BMI groups were seen in Usual activity ($p=0.005$) and self-care ($p=0.044$) dimensions of EQ-5D-5L with poorest outcome in the obese. We have found significantly positive correlation between BMI and usual activities ($R=0.234$, $p=0.001$) and between age and anxiety ($R=0.366$ $p=0.045$). Mean BMI of patients with extreme problems with extreme problems with usual activities is significantly greater than those with lower intensity of problems. Patients with extreme anxiety tend to have higher mean age.

Conclusions: Our study revealed that Ischemic heart disease patients with obesity had impaired QoL in terms of health, mobility, usual activity, discomfort and anxiety. Hence non-obese ischemic heart disease patients had a better sense of overall well-being.

PP.01.37 DELETERIOUS EFFECTS OF COLD AIR INHALATION DURING EXERCISE IN CORONARY ARTERY DISEASE PATIENTS: DIFFERENTIAL EFFECTS OF ISOMETRIC AND DYNAMIC EXERCISE

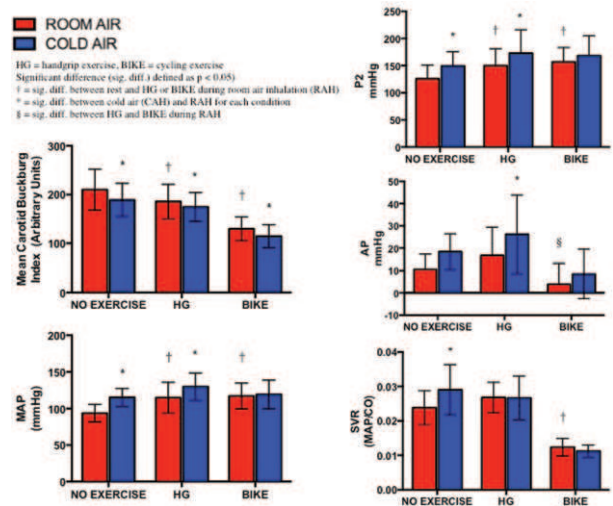
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Objective: Shovelling snow is the biggest cause of exertion-related cardiac death, involving isometric and dynamic exercise. However, mechanisms underlying deleterious effects of cold air inhalation (CAH) during different exercise stressors are poorly understood. We measured haemodynamic responses to handgrip and cycling in coronary artery disease (CAD) patients, \pm CAH, to assess the effect of CAH on afterload.

Design and method: Eight subcritical CAD patients (62 ± 9 yrs) underwent randomized stressors: -15°C cold air (CAH) or room air (RAH) inhalation for 5 minutes, combined with handgrip (30% maximal voluntary contraction) or cycling with an incremental work load for 5 minutes. Carotid pulse wave analysis and echocardiography were performed at peak stress. Heart rate (HR), mean arterial

pressure (MAP), and systemic vascular resistance (SVR) were calculated. P1, P2, augmentation pressure (AP) and Buckberg Index (BI) were derived using custom software. A lower BI ratio indicates increased risk of myocardial ischaemia. Data presented as mean \pm SD.

Results: CAH significantly reduced BI when combined with either handgrip or cycling. CAH, compared to RAH, increased afterload (MAP) when combined with handgrip (115.8 ± 22.4 vs 130.8 ± 26.7 mmHg, $p<0.001$), but not when combined with cycling (117.2 ± 16.8 vs 119.5 ± 18.9 mmHg, $p=NS$). P2 and AP, which are closely associated with myocardial contractility, increased with CAH during handgrip exercise but not during cycling. However CAH only caused a significant increase in HR when combined with cycling (130 ± 9.7 vs 140 ± 10.1 bpm, $p<0.05$). SVR decreased with cycling and increased with handgrip during RAH. CAH did not change SVR during handgrip or cycling. There were no significant differences between baseline measurements and RAH at rest.



Conclusions: This study shows, for the first time, that CAH significantly increases myocardial oxygen demand and the risk of myocardial ischaemia during isometric or dynamic exercise. However the mechanisms appear to be distinct. CAH likely causes an increase in sympathetic drive, which when combined with isometric exercise results in steady state (afterload) and pulsatile increases in arterial pressure, the latter being driven by increases in myocardial contractility. Yet dynamic exercise results in a sufficient reduction in SVR to override any increased resistance caused by CAH, with the principal determinant for increased myocardial oxygen demand being an increase in HR.

PP.01.38 IMPACT OF SHORT-TERM EXERCISE TRAINING ON ARTERIAL BLOOD PRESSURE, DOUBLE PRODUCT AND QT DISPERSION IN PATIENTS AFTER MYOCARDIAL INFARCTION

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Objective: The aim of this study was to establish the influence of short-term exercise training on arterial blood pressure (BP), double product (DP) and corrected QT dispersion (QTdc) in diabetic patients after myocardial infarction (MI).

Design and method: The study involved 375 patients after MI (mean age 57.1 years). Patients were randomly divided into the physical training group (TG: 333 patients) and non-training group (NTG: 42 patients). Diabetes was present in 107 (32.1 %) patients in the TG and in 14 (33.3 %) patients in the NTG. In all subjects exercise test were performed and after that TG patients were included in rehabilitation treatment for three weeks. TG patients were instructed to follow a training program using the bicycle ergometer (10 min, 2 times a day) and walking. The patients continued to take the same medicaments in same doses.

Results: Before starting with the program of physical training, TG patients with diabetes had significantly higher values of QTdc (81.4 ± 25.9 vs 68.9 ± 23.4 ms; $p<0.001$), while the values of DP, systolic and diastolic BP did not significantly vary in comparison to those without diabetes. After three weeks in the TG patients with diabetes, we have found significant reduction of systolic BP from 138.2 ± 13.4 to 131.7 ± 11.8 mmHg ($p<0.001$), of diastolic BP from 87.0 ± 7.8 to 83.8 ± 8.2 mmHg ($p<0.005$), of DP from 12203.7 ± 1962.2 to 11463.1 ± 1700.8 beat/min x mmHg ($p<0.005$), of QTdc from 81.4 ± 25.9 to 73.8 ± 24.1 ms ($p<0.02$) and of glycemia from 8.2 ± 3.2 to 7.2 ± 1.9 mmol/L ($p<0.005$). In TG patients with-

out diabetes, after three weeks, we have found significant reduction of systolic BP from 137.8 ± 12.3 to 128.5 ± 10.1 mmHg ($p < 0.001$), of diastolic BP from 86.8 ± 7.4 to 81.4 ± 5.6 mmHg ($p < 0.001$), of DP from 12011.4 ± 1897.3 to 11073.8 ± 1551.6 beat/min \times mmHg ($p < 0.001$) and of QTdc from 68.5 ± 23.4 to 56.9 ± 20.6 ms ($p < 0.001$). In contrast, the NTG showed no significant changes.

Conclusions: The study showed that short-term exercise training has favourable effects on arterial BP, DP and QTdc in patients after MI, especially in those without diabetes. Physical training led to the significant decrease of myocardial oxygen uptake at rest and probably decreased the possibility of arrhythmia events.

PP.01.39

NO BENEFIT ON MORTALITY IN HOSPITAL BY PRIMARY PERCUTANEOUS CORONARY INTERVENTION FOR ST-SEGMENT ELEVATION MYOCARDIAL INFARCTION IN PATIENTS AGED OVER 85 YEARS

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Objective: It is still unknown whether primary percutaneous coronary intervention in patients aged over 85 years with ST-segment elevation myocardial infarction could reduce mortality during hospitalization.

Design and method: This study involved 474 patients with ST-segment elevation myocardial infarction, who were divided into primary percutaneous coronary intervention or conservative therapy groups. Aged was analyzed continuously according to 2 groups: 80 to 84 years old ($n = 339$), and 85 years or older ($n = 135$). The main end evidence was in-hospital mortality and the composite of chronic renal failure, Killip class of 3 and 4, complete atrioventricular block and infection.

Results: The in-hospital mortality was lower for patients aged 80 to 84 treated by primary percutaneous coronary intervention compared with conservative therapy (8.4% vs. 27.0%, $p < 0.001$), and the multivariable-adjusted odds ratio was 0.247 (95% confidence interval, 0.132–0.462). In the primary percutaneous coronary intervention group, the in-hospital mortality was lower for patients aged 80 to 84 than those over 85 years (8.4% vs. 19.6%, $p = 0.034$). However, the mortality were similar for patients over 85 years by primary percutaneous coronary intervention and conservative therapy (19.6% vs. 22.5%, $p = 0.826$). After adjustment, chronic renal failure, Killip class of 3 and 4, complete atrioventricular block and infection were the independent predictors of in-hospital mortality in patients over 80 years ($p < 0.05$), and the odds ratios were 2.650, 6.345, 85.289, 6.235 and 3.674, respectively.

Conclusions: For patients aged over 85 years with ST-segment elevation myocardial infarction, performance of primary percutaneous coronary intervention was not superior to conservative therapy on in-hospital mortality. Chronic renal failure, Killip class of 3 and 4, complete atrioventricular block and infection were also independently associated with in-hospital mortality for patients over 80 years.

PP.01.40

PRESCRIPTION OF ANTIHYPERTENSIVE DRUGS AND BLOOD PRESSURE CONTROL IN PATIENTS WITH CORONARY ARTERY DISEASE

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Objective: The aim of this study is to analyse the use of antihypertensive drugs and the blood pressure (BP) control in Bulgarian patients with coronary artery disease (CAD) during the last 7 years.

Design and method: We analyse the data from Bulgarian cohort of patients with CAD included in both surveys EUROASPIRE (European Action on Secondary and Primary Prevention by Intervention to Reduce Events) III and IV, held in 2007 and 2013.

Results: The patients with CAD in EUROASPIRE III have a mean BP $138.5/83.5$ mmHg (men – $137.8/82.7$ mmHg, women – $140.1/85.2$ mmHg), 47.6% have BP levels $>140/90$ mmHg (men – 44.1%, women – 55.5%). The patients with CAD in EUROASPIRE IV have a mean BP $132.2/77.4$ mmHg, (men – $131.8/78.4$ mmHg, women – $133.2/74.8$ mmHg) 30.8% have BP levels $>140/90$ mmHg (men – 32.9%, women – 25.7%).

79.6% of the patients in EUROASPIRE III are on antihypertensive therapy (men – 77.5%, women – 84.1%) and 94.1% of the patients in EUROASPIRE IV (men – 95.2%, women – 91.4%). In EUROASPIRE III 82.3% were treated with beta-blockers, 61.8% with ACE-inhibitors, 5% with Angiotensin II receptor antagonists, 22.3% with calcium channel blockers, 43.4% with diuretics. 94.1% of patients in EUROASPIRE IV were on antihypertensive therapy, 83.3% were treated with beta-blockers, 59.2% with ACE-inhibitors, 20% with Angiotensin II receptor antagonists, 36.7% with calcium channel blockers, 30% with diuretics. The average number of drugs per patient in EUROASPIRE III is 2.7 and in EUROASPIRE IV 2.4.

Conclusions: We found a reduction of the mean BP in the cohort of patients with CAD, as well as a decrease of the number of patients with BP $>140/90$ mmHg. We found an increase in the use of ACE-inhibitors/ Angiotensin II receptor antagonists and calcium channel blockers, a decrease of the prescription of diuretics and no changes in the use of beta-blockers. Despite the reduction in the number of the prescribed drugs, the mean BP is lower.

PP.01.41

STABILIZATION OF CLINICAL OF UNSTABLE ANGINA THROUGH NURSING CONSULTATION: A CASE REPORT

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Objective: The chest pain is one of the most common problems in clinical medicine and is a main cause of hospitalization. Its risk factors are smoking, diabetes, uncontrolled hypertension, dyslipidemia, and others that are similar to the infarction. This study has emerged from the question: nursing consultation influence treatment adherence and clinical stabilization in patients with unstable angina?. To develop skills related to nursing care, implementing such care to the patient with Coronary Artery Disease (CAD), focusing on prevention and injury rehabilitation was the objective this study.

Design and method: Case study conducted at the medical clinic women in cardiology sector of the a University Hospital in Rio de Janeiro, Brazil. Data collection was conducted by interviews, physical examination and data obtained from medical records. Case: Client 53 years old, obese, diabetic and hypertensive, with stable angina for 6 years. She reports have stopped smoking after chest pain, presents unhealthy eating habits and sedentary lifestyle. The medical records has shown that in 2011 she have had Acute Myocardial Infarction (AMI) and conducted cardiac catheterization, which found bivascular lesion in the right coronary artery and circumflex branch, Introducing occlusion of both branches.

Results: After evaluation of this study was possible to understand that angina attack which led the patient to the hospital was caused by cessation of drug therapy because of related side effects.

Conclusions: The nurses develops an important role as an educator. We can conclude that the nursing appointments, focused on individual empowerment can be very effective for improving treatment adherence and self-care.

POSTERS' SESSION

POSTERS' SESSION PS02

CARDIOVASCULAR RISK, LIFESTYLE AND TREATMENT ADHERENCE

PP.02.01 PREDICTIVE FACTORS OF ATTAINMENT THERAPEUTIC GOALS OF LIPIDS IN HIGH CARDIOVASCULAR RISK PATIENTS

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Objective: Dyslipidemia is recognized as a prominent risk factor for cardiovascular disease. The recent cholesterol guidelines recommend aggressive statin therapy in patients with high cardiovascular risk. However, high-intensity statin therapy may be insufficient to achieve LDL-C targets. The aim of the study was to investigate the efficacy and predictors of attainment of target LDL-C during short-term high-intensity statin therapy in patients with high cardiovascular risk.

Design and method: In 72 patients with history of clinically evident cardiovascular disease and fasting low-density lipoprotein cholesterol (LDL-C) >1.8 mmol/l or non-high-density lipoprotein cholesterol (non-HDL-C) >2.6 mmol/l (63.9% male, 60.8 ± 8.6 (M ± SD) years, current smoking 40.3%, abdominal obesity 63.9%, arterial hypertension 86.1%, myocardial infarction 73.6%, percutaneous coronary intervention 58.3%, coronary artery bypass surgery 12.5%, non-hemorrhagic stroke 29.1%, diabetes mellitus 22.2%, symptomatic peripheral arterial disease 6.9%, chronic heart failure NYHA II 54%, chronic kidney disease 11.1%, total cholesterol (TC) 5.6 ± 1.6 mmol/l, HDL-C 1.1 ± 0.3 mmol/l, LDL-C 3.5 ± 1.3 mmol/l, triglycerides (TG) 2.2 ± 1.4 mmol/l, very LDL-C (VLDL-C) 0.9 ± 0.4 mmol/l, non-HDL-C 4.5 ± 1.5 mmol/l, previous statin therapy 73.6%) efficacy and safety of 1 month of high-intensity statin therapy (atorvastatin 80 mg/day) was assessed. Wilcoxon test and multivariate logistic were performed. P < 0.05 was considered significant.

Results: 29 patients (40.3%) achieved target LDL-C level <1.8 mmol/l. Patients who attained (G1) vs did not attain (G2) target LDL-C had lower baseline levels of TC (4.8 ± 1.1 vs 5.6 ± 1.5 mmol/l), LDL-C (2.8 ± 1.1 vs 3.6 ± 1.3 mmol/l), non-HDL-C (3.8 ± 0.9 vs 4.5 ± 1.5 mmol/l), p < 0.0001. LDL-C significantly decreased in both groups: from 2.8 ± 1.1 to 1.6 ± 0.2 mmol/l (p = 0.01) and from 3.6 ± 1.3 to 2.4 ± 0.5 mmol/l (p < 0.0001) in G1 and G2 respectively. Multivariate logistic regression analysis revealed the following independent predictors of LDL-C goal attainment: baseline LDL-C (OR = 0.042, 95% CI 0.005–0.363), baseline TC (OR = 0.053, 95% CI 0.01–0.294) and baseline non-HDL-C (OR = 0.0853, 95% CI 0.015–0.434).

Conclusions: Short term high-intensity statin therapy is effective only in 40.3% of high cardiovascular risk patients. Baseline LDL-C may be a predictor of early response in this patient population. Lower baseline LDL-C is associated with attainment of target LDL-C.

PP.02.02 SUPERIORITY OF WAIST CIRCUMFERENCE AND BODY MASS INDEX IN CARDIOVASCULAR RISK ASSESSMENT IN HYPERTENSIVE PATIENTS WITH CORONARY HEART DISEASE

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Objective: It has been reported in coronary heart disease (CHD) patients that mortality is inversely associated with body mass index (BMI), and directly associated with waist circumference (WC). The purpose of this study was to examine the association of the general obesity parameter (BMI) and the adipose tissue discrim-

inator (WC) with cardiovascular risk in patients with CHD established by coronary angiography.

Design and method: To the PROGNOSIS (Prognostic Value of Ambulatory Blood Pressure Monitoring in Patients with Coronary Artery Disease Confirmed by Angiography) study there were included 1345 subjects with CHD. A multivariate COX proportional regression model adjusted for potential confounders was used to assess the relative risk of total and CV mortality according to the parameters of general obesity (BMI) and adipose tissue distribution (WC). The mean age of subjects was 63.2 ± 9.2 years, and 57% were men.

Results: There was direct relationship between WC and both total mortality (HR 1.03 (CI 1.01–1.10), p < 0.01) and CV mortality (HR 1.03 (CI 1.01–1.07), p < 0.03), but an inverse relationship between BMI and both total mortality (HR 0.91 (CI 0.86–0.98), p < 0.03) and CV mortality (HR 0.97 (CI 0.87–0.99), p < 0.05). After combining WC with BMI, the group of subjects with BMI < 25 kg/m² and WC ≥ 104 cm had the highest rates of both total and CV mortality of all CHD patients.

Conclusions: Assessment based on a combination of WC and BMI is superior to assessment based on a separate estimation of these parameters in both total and CV mortality risk evaluation.

PP.02.03 RISK FACTORS FOR PREHYPERTENSION IN XINJIANG UYGUR POPULATION

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Objective: It has been reported that persons with prehypertension have increased risk of developing hypertension and prehypertension is associated with an increase in cardiovascular morbidity and mortality compared with normal BP. The aim of our study was to assess the risk factors for prehypertension in Xinjiang uygur population.

Design and method: Cross-section study was conducted in a Xinjiang Uygur population (438 males and 716 females, aged 30 to 70 years). The fasting lipid profiles, serum glucose, insulin, and uric acid were determined. Homeostasis model assessment insulin resistance index (HOMA-IR) was used to assess insulin resistance (IR). Binary logistic regression analysis was performed to determine risk factors for prehypertension. Blood pressure levels of normotensives and prehypertensives in different body mass index (BMI) categories were compared.

Results: Binary logistic regression analysis performed after adjustment for gender, lipids profiles, waist-to-hip ratio, uric acid, HOMA-IR, and lifestyle (alcohol drinking and smoking) showed a significantly increasing prevalence of prehypertension with BMI. The odds ratios for prehypertension against the lowest BMI group (separated by 24 and 28) were 1.934 and 2.490 (95% confidence interval: 1.435–2.606 and 1.825–3.399, respectively). Age was independently correlated to the increasing prevalence of prehypertension. HOMA-IR was not associated with prehypertensive. The mean diastolic blood pressure (DBP) were significantly increased with BMI categories in either normotensives or prehypertensives (P < 0.001) while the mean systolic blood pressure (SBP) was significantly increased with BMI only in normotensives (P < 0.001).

Conclusions: In Xinjiang Uygurs, BMI and age were the risk factors for prehypertension. DBP was significantly increased with BMI. IR was not associated with prehypertension. These findings emphasize the importance of management of obesity for the control of blood pressure and other cardiovascular complications.

PP.02.04 SERUM URIC ACID CORRELATE WITH DIPPING PATTERN IN HYPERTENSIVE PATIENTS WITHOUT HEART FAILURE

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Objective: Current evidence supports the fact that serum uric acid could increase the risk of developing cardiovascular and renal disease in patients with arterial

hypertension. On the other hand, a non-dipping blood pressure profile is associated with increased cardiovascular risk. We aimed to establish whether serum uric acid correlate with dipping pattern in hypertensive patients without heart failure.

Design and method: We studied serum levels of uric acid in a cohort of hypertensive patients without heart failure, evaluated by ambulatory blood pressure monitoring (ABPM). Comorbidities (obesity, dyslipidemia, diabetes mellitus, ischemic heart disease, chronic kidney disease) were recorded and echocardiography was performed in each subject. Patients with severe chronic kidney disease (eGFR < 30 ml/min/1.73 m²) were excluded from the study.

Results: The study group consisted in 50 hypertensive patients, aged 63 ± 12 years. 72% had dyslipidemia, 50% were obese, 26% had diabetes mellitus and 36% had chronic ischemic heart disease. Echocardiographic evaluation revealed left ventricular concentric remodeling, quantified by relative wall thickness (rwt) >= 0.42, in the majority of patients (93%), irrespective of the presence or absence of comorbidities. rwt significantly correlated with E' velocity (r = -0.614, p = 0.001), E/A ratio (r = -0.375, p = 0.016) and left atrial transverse diameter (r = 0.363, p = 0.018). Serum uric acid correlated with dipping blood pressure profile (r = -0.432, p = 0.008), left ventricular ejection fraction (r = -0.379, p = 0.032) and presence of mild to moderate chronic kidney disease (r = 0.475, p = 0.003), but not with rwt. The correlation between serum uric acid and dipping blood pressure profile remained significant after adjustment for age, sex, left ventricular ejection fraction and presence or absence of chronic kidney disease.

Conclusions: Patients with arterial hypertension without heart failure have prominent left ventricular concentric remodeling, which correlates with left ventricular diastolic dysfunction. Higher serum levels of uric acid correlate with non-dipper pattern of blood pressure, irrespective of the degree of left ventricular concentric remodeling or kidney dysfunction.

PP.02.05

ASSOCIATION OF NOCTURNAL BLOOD PRESSURE WITH 24-HOURS SODIUM EXCRETION IN HYPERTENSIVE PATIENTS. THE STYRIAN HYPERTENSION STUDY

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Objective: Dietary sodium intake has been associated with hypertension and CVD progression. However, the relationship between dietary sodium and nighttime blood pressure (BP) variations is largely unknown. We investigated the association between systolic (SBP) and diastolic (DBP) nighttime BP values and dietary sodium intake reflected by 24-hours (24-h) urinary sodium excretion in Austrian hypertensive patients enrolled in the Styrian Hypertension Trial.

Design and method: We recruited 417 hypertensive patients (mean age: 61.7 ± 10.1y; 53.4% women) at local outpatient clinics at the Medical University of Graz who underwent 24-h urine collection and in parallel 24-h ambulatory BP monitoring.

Results: Pearson correlation analysis revealed a positive association between 24-h urinary sodium levels (median: 147.0 mmol/24-h = 3.8 g/24-h) and nighttime SBP (r = 0.106; P = 0.030) and DBP (r = 0.125; P = 0.010), respectively. Using multiple regression analysis, 24-h urinary sodium concentration was independently related to nighttime SBP (adjusted beta = 0.144; P = 0.007) and with borderline significance to nighttime DBP (beta = 0.163; P = 0.073). In multivariate adjusted analyses of covariance (ANCOVA) nighttime SBP (mean difference between tertile 1 and 3: 4.3 mmHg; P = 0.030) but not nighttime DBP (mean difference between tertile 1 and 3: 1.7 mmHg; P = 0.163) values increased steadily from the first (reference) to the third tertile of 24-h urinary sodium.

Conclusions: Cardiovascular risk related to dietary sodium intake might be substantially accounted for by variations of nighttime SBP values according to urinary sodium excretion. Future mechanistic and interventional studies should explore mechanisms and therapeutic strategies behind the dietary sodium and nocturnal BP association and relevant modifying factors.

PP.02.06

ERECTILE DYSFUNCTION OF VASCULAR ORIGIN AND CARDIOVASCULAR RISK FACTORS

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Objective: Erectile dysfunction of vascular origin (EDVO) has been considered as an early marker of atherosclerosis, justifying a focus on identification of other cardiovascular risk factors (CVRF).

The aim of our study was to evaluate the prevalence of other CVRF and the commitment of endothelial function in patients with EDVO.

Design and method: We studied 26 patients followed in the Urology Service of our hospital, with EDVO diagnosed by Doppler penis. Noted the presence of other CVRF, including diabetes mellitus, dyslipidemia, high blood pressure, and smoking. We measured the waist circumference (WC) and we calculated the body mass index to all patients. We evaluated also the commitment of endothelial function by reactive hyperemia index (RHI) determined by peripheral arterial tonometry (PAT). The encoding, recording and statistical analysis was performed using Epi Info™ 7.

Results: Of the patients studied, 50% were diabetic and 31% were smokers. The dyslipidemia and hypertension were present in over half of patients (54% and 69% respectively). 58% of these patients had a WC > or = 102 cm and 92% were overweight or obese. On average, each patient had 4 modifiable CVRF. 100% of patients had endothelial dysfunction, according to the results of the PAT (RHI < or = 2.3): 4% RHI 2.1–2.3; 50% RHI 1.7–2.1 and 46% RHI < 1.7. The average age was found 60.

Conclusions: In this study, it was found that patients with EDVO have at least one modifiable CVRF and that most of these had severe or very severe endothelial dysfunction (RHI 1.7–2.1 or RHI < 1.7). It is important that all patients with erectile dysfunction even present no other manifestations of vascular disease, undergo a detailed and early cardiovascular assessment.

PP.02.07

FAILURE OF ACHIEVEMENT OF THE CHOLESTEROL GOAL BY HYPERTENSIVE PATIENTS

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Objective: 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 serum Low Density Lipoprotein Cholesterol (LDL-C).

Design and method: We conducted a cohort study with retrospective chart review, at the electronic medical record of our outpatient antihypertensive unit. Total of 210 treated hypertensive adults (aged = 57 ± 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 time). 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 time 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 (statin). Within index time, 46% (97/210) attained optimal combined cholesterol values. The remaining 54% (113/210) of the total population did not reach the cholesterol goal; among them 68% (77/113) was due to stringent target (established Cardio-Vascular Disease, Diabetes Mellitus, markedly increased lipid levels); another 20% (23/113) was due to inadequate therapy (low equipotency or low dose of statin) for the raised cholesterol values; an 8% (9/113) quit treatment for personal beliefs and 4% (5/113) were intolerant.

Conclusions: Achieving optimal cholesterol goals among hypertensives is amenable to both scientific analysis and clinical intervention but remains an odyssey. Renewed research and communication efforts must impart greater hope, confidence and increased access to treatment.

PP.02.08

AUGMENTED SALT INTAKE MAY EXPLAIN THE EXCESSIVE CARDIOVASCULAR BURDEN OF HYPERTENSIVE IMMIGRANTS

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Objective: Much of the variance in hypertension-related sequelae across ethnic groups is highly related to differences in socioeconomic conditions, nutrition, 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 native hypertensive patients.

Design and method: 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 funduscopy 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 correlation 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 partially explain the increased target organ damage burden in this group.

PP.02.09 CORRELATIONS BETWEEN CARDIO-VASCULAR RISK AND CARDIOTOXICITY INDUCED BY CHEMOTHERAPY IN BREAST CANCER

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Objective: Chemotherapy is associated with increased incidence of hypertension and heart failure. We assessed the contribution of pre-existent cardiovascular risk to severity of cardiotoxicity in breast cancer.

Design and method: The study was prospective and included 72 female breast cancer patients on trastuzumab therapy with: 1) left ventricular ejection fraction (LVEF) $> 50\%$ at inclusion, 2) no history of myocardial infarction 3) no identified cause of LVEF decrease besides chemotherapy. Blood pressure and lipids, waist circumference and body mass index were determined in all patients. Cardiovascular risk was calculated by applying the SCORE risk chart with HDL, for high-risk populations. Metabolic syndrome was diagnosed according to the International Diabetes Federation criteria. Cardiotoxicity was diagnosed by decrease of LVEF, according to the Seidman criteria recommended by the 2012 ESMO guidelines. Correlations were made between evolution of risk factors, LVEF, number of trastuzumab cycles and associations with chemotherapeutic agents, at baseline and after 12 months.

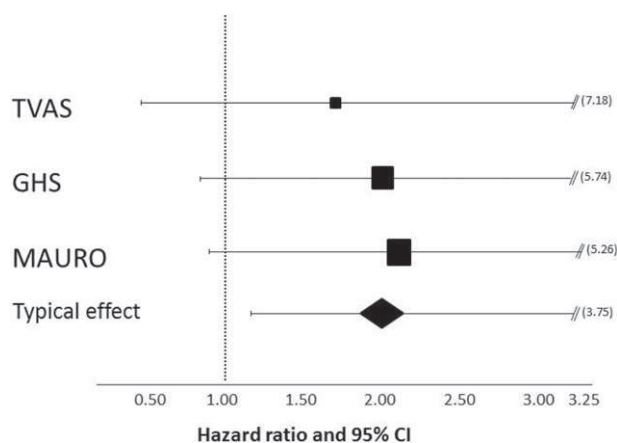
Results: The mean age of patients at inclusion was 55.4 ± 11.80 years. At inclusion, hypertension was present in 43.1% ($n=31$) patients and increased with 4.9% at 12 months (χ^2 test, $p<0.001$). The Wilcoxon test for paired values showed no significant increase of systolic blood pressure (SBP) at 12 months ($p=0.537$). Diastolic blood pressure (DBP) was significantly increased at 12 months ($p=0.019$). There was a significant negative correlation at 12 months between SBP and LVEF ($r=-0.364$, $p=0.002$), respectively DBP and LVEF ($r=-0.400$, $p=0.001$). The Spearman test showed significant correlations between the decrease of LVEF with 5–10% and $>10\%$ and the total number of chemotherapy cycles (χ^2 test, $p=0.023$). There was a significant correlation between SCORE risk and decrease of LVEF $< 55\%$ at 12 months (χ^2 test, $p=0.001$). Severe cardiotoxicity and death occurred in 2 patients with very high SCORE risk.

Conclusions: Chemotherapy in breast cancer needs a close collaboration between oncologists and cardiologists. Cardiovascular risk should be determined and managed carefully in all patients.

PP.02.10 A GENETIC MARKER OF HYPERURICEMIA PREDICTS CARDIOVASCULAR EVENTS IN A META-ANALYSIS OF THREE COHORT STUDIES IN HIGH RISK PATIENTS

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Objective: Whether hyperuricemia is causally implicated in atherosclerotic complications is one among of the most vexed questions in CV medicine and there is no randomized trial based on clinical end-points testing the hypothesis that reducing serum uric acid (UA) may reduce CV events in high risk pts. The strongest genetic marker of UA levels, the rs734553 SNP in the GLUT9 urate transporter gene, predicts progression to kidney failure in CKD patients and associates with systolic BP and carotid intima media thickness.



Design and method: We used the risk allele of this genetic polymorphism as an unconfounded research tool to explore the link between UA and CV events (Mendelian randomization) in a meta-analysis of 3 cohorts enrolling high risk patients. The three cohorts included 755 G2-G5 CKD pts (MAURO); 353 pts with type-2 diabetes and coronary artery disease (GHS) and 119 pts with severe coronary heart disease and MI (TVAS). The major clinical end point was a composite end point including CV death or nonfatal stroke, nonfatal MI. Genotyping was performed by RT-PCR. The meta-analysis was performed by the random effects approach.

Results: During follow-up, 117 CV events occurred in MAURO, 72 in GHS and 33 in TVAS. In separate analyses in the 3 cohorts, the incidence of CV events was higher in patients with the rs734553 risk allele (TT/GT) than in those without (GG patients) and the HR in the three cohorts was similar with no heterogeneity ($I^2=0.01$) among the three cohorts (fig.1). The meta-analytical estimate in the three cohorts (total patients number = 1227; total CV events = 222) of the risk for cardiovascular events in TT/GT patients was twice higher (pooled HR: 2.04, 95% CI: 1.11–3.75, $P=0.02$) than in GG homozygotes.

Conclusions: In a meta-analysis of 3 cohorts formed by patients at high cardiovascular risk, the T allele of the rs734553 polymorphism of the GLUT9 gene predicts a doubling in the risk for incident cardiovascular events. This meta-analysis is coherent with previous studies linking the same polymorphism with the risk of kidney failure, hypertension and atherosclerosis. Findings in this study supports the hypothesis of a causal role of hyperuricemia in cardiovascular disease in high risk conditions.

PP.02.11 INDEPENDENT RELATIONSHIP OF RED BLOOD CELL DISTRIBUTION WIDTH WITH OFFICE PULSE PRESSURE IN RECENTLY DIAGNOSED AND UNTREATED PATIENTS WITH MILD TO MODERATE ESSENTIAL HYPERTENSION

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Objective: Red cell distribution width (RDW), a parameter of complete blood count in routine clinical practice, is a measure of erythrocytes size variability in the peripheral circulation. Increased RDW is independently associated with morbidity and mortality in cardiovascular diseases and is elevated in hypertensive patients compared with normotensives. We aimed to study the relationship of RDW with blood pressure parameters as well as arterial stiffness indices in recently diagnosed and never treated middle-aged patients with mild to moderate essential hypertension.

Design and method: We studied 107 non-diabetic, recently diagnosed and never-treated patients with essential hypertension (mean age 49 ± 11 years, 73 males). We performed 24 h ambulatory blood pressure measurement (ABPM) as well as carotid-femoral artery pulse wave velocity (PWV). Aortic stiffness was evaluated by PWV, office pulse pressure (PP) and 24 h PP.

Results: We found that RDW was related with systolic BP ($r=0.17$, $p<0.05$) and office PP ($r=0.24$, $p=0.01$). In a linear regression analysis were age, weight, smoking, mean blood pressure and office PP were inserted as independent variables, we found an independent relationship between RDW and office PP (Beta = 0.25, $p=0.01$). Similarly, in another model in which office PP was replaced by systolic BP (due to collinearity between systolic BP and office PP), we found an independent relationship between RDW and systolic BP (Beta = 0.57, $p=0.01$) as well as mean BP (Beta = -0.44, $p<0.05$).

Conclusions: The present study provides substantial evidence that increased RDW independently relates with increased systolic blood pressure and impaired arterial stiffness in patients with essential hypertension. Further studies exploring the presence of this relationship even after antihypertensive treatment are needed.

PP.02.12 **CARDIOVASCULAR RISK FACTORS IN PATIENTS HOSPITALIZED IN AN INTERNAL MEDICINE WARD**

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Objective: Cardiovascular disease is a major cause of mortality and morbidity in Portugal, so it is important to know the prevalence of cardiovascular risk factors (CRF) to be able to optimize prevention and monitoring strategies. The aim of the study was to characterize in terms of cardiovascular risk factors a sample of patients hospitalized in an Internal Medicine ward of a Portuguese regional hospital.

Design and method: We performed a retrospective study of a sample of patients hospitalized in an Internal Medicine ward of a Portuguese regional hospital from May to October 2014. We analyzed anthropometric variables and cardiovascular risk factors (Hypertension, Diabetes mellitus, Dyslipidemia, Smoking, Physical inactivity and Obesity).

Results: The total number of patients evaluated was 181 for a total of 195 admissions. 51% of patients were women, 153 (84.5%) were aged less than 65 years and the median age was 78 years. The average hospital stay was 9 days (adjusted mean - 7.2 days). The mortality rate was 10.3%. The main hospitalization causes were neurological conditions (20.5%), including stroke, respiratory disease (19.0%), urinary disease (17.8%) and cardiovascular disease (9.7%). Regarding CRF, there was a total of 133 (73.5%) patients with hypertension (HTA), 62 (34.3%) patients with diabetes mellitus, 59 (32.6%) patients with dyslipidemia and 17 (9.4%) patients with active smoking. 47 (26.0%) patients were overweight, 28 (15.5%) patients had class I obesity, 6 (3.3%) had class II obesity and morbid obesity. It was not possible to assess the prevalence of physical inactivity since that information was usually not included in the discharge report. The prevalence of hypertension was higher in patients aged over 65 years.

Conclusions: The results confirm the high prevalence of cardiovascular risk factors, including hypertension, in patients admitted to a medical ward, even though they do not always constitute or directly relate to the main reason for hospitalization. We emphasize once again the need to know our patients as a whole and take advantage of every opportunity for prevention and control of vascular risk, including at the moment of hospital discharge.

PP.02.13 **ARE HYPERTENSIVE URGENCIES PROGNOSTIC FACTORS FOR CARDIOVASCULAR EVENTS?**

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Objective: Hypertension is a major risk factor for cardiovascular events while the role of hypertensive urgency has not been defined. Hypertensive urgencies occurred approximately in 1% of hypertensive patients and account for 2–3% of all the admissions in an emergency department. Aim of the study was to describe the clinical features of these patients on admission and after a 3 years follow-up period, considering in particular incidence of cardiovascular events.

Design and method: We enrolled patients admitted to Emergency Department of Circolo e Macchi Foundation Hospital in Varese, between January 2010 and June 2011. 406 patients (mean age 66.4 years, 33% males) were admitted for hypertensive urgency (HU) and 204 (mean age 60.3 years, 49% males) patients were admitted for grade II-III hypertension (HT, controls). HU was defined by systolic BP \geq 180 and/or diastolic BP \geq 110 mmHg without evidence of acute target organ damage. The distribution of cardiovascular risk factors (smoking, diabetes, previous cardio and cerebrovascular events, dyslipidemia, chronic kidney disease) was similar in the two groups except for diabetes mellitus (HU 15.8%, vs HT 9.8%, $p=0.058$) and chronic kidney disease (CKD) (HU 17.4% vs HT 9%, $p=0.02$).

Results: We observed a higher incidence of urgencies in winter (16% January vs 7% June $p=0.0002$) and in the evening (70% after 12 pm vs 30% before 12pm, $p=0.00001$). The main symptoms were headache (20%), dizziness (14%), fatigue (7.5%), chest pain (7.5%). Acute antihypertensive therapy has not been carried out in according to ESH recommendations. During the follow-up HU had greater recurrence of hypertensive urgency (23.2% VS 4.4%, $p=0.001$). HU experienced also an higher incidence of cardiovascular events than HT (20.4% vs 11.3%, $p=0.04$), particularly HU had higher cerebrovascular events (8.6% vs 2.9%, $p=0.01$) compared to controls. Using a Cox regression model analysis adjusted for age, gender, diabetes and CKD, HU was associated with a higher incidence of cardiovascular events than controls ($p=0.05$).

Conclusions: An hypertensive urgency should be considered a warning sign in a hypertensive patient about the future onset of cardiovascular events in the medium-long term.

PP.02.14 **SOCIAL DEPRIVATION AND CARDIOVASCULAR RISK ASSESSMENT IN FRENCH POPULATION: DECARY STUDY**

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Objective: Cardiovascular prevention and management of hypertension is mainly based on the detection and treatment of metabolic usual risk factors or dietary improvement. This approach has difficulty in assessing the risk of disadvantaged populations where social deprivation seems to play a major role.

Design and method: 263 consecutive hypertensive patients were referred to specialists and assessed for social deprivation through the EPICES questionnaire as for usual risk factors and several socio-economic data.

Results: Patients were 63 \pm 13 years old and 59% were men. Risk factors were diabetes (39%), dyslipidemia (68%), active smoking (32%). Alcoholic consumption of more than once per week was present in 28%, a physical activity for at least once a week in 30%. Systolic, diastolic and pulse pressure were 143 \pm 21, 81 \pm 13 and 63 \pm 18 mmHg. The mean number of antihypertensive drugs was 2.8 \pm 1.3. A target organ damage was frequent, including peripheral vascular disease (18% lower limbs, 15% supra aortic trunks, 5% abdominal aorta, 9% stroke/TIA), coronary heart disease (19%), heart failure (8%) and left ventricular hypertrophy (30%). EPICES score over 30, associated with a high level of social deprivation, was present in 27% of the population. The survey showed that 76% of patients had a social insurance for long duration disease, 22% lived in a city of more than 50,000 inhabitants, 35% had at least bachelor level, 59% were retired and the mean number of intervening medical, paramedical and social workers was 2.3 \pm 0.8 per patient. Social deprivation was independently associated with the lack of insurance for long duration disease, a high pulse pressure and city of over 50,000 inhabitants.

Conclusions: In this hypertensive population a third of patients may be regarded as living in social deprivation. This condition is most often associated with an urban population and low social support of their disease. These patients also have an increased arterial stiffness despite no difference in other cardiovascular risk factors.

PP.02.15 **CARDIO-VASCULAR RISK IN GEORGIAN POPULATION: MULTI-VARIANT ANALYSES**

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Objective: To determine cardio-vascular risk in Georgian population.

Design and method: Multi-variant analyses of STEPS survey data.

Results: 10-year cardiovascular risk according the Framingham Risk Score: 11% (589) are at a high risk ($>20\%$), 17% (915) are at medium risk (10–20%) and 72% are at low risk ($<10\%$). 10-year cardiovascular risk according the SCORE risk scale: 14.8% are at high risk of CVD mortality ($>5\%$), 82.9% are at medium risk (1–4%) and only 2.3% are at low risk ($<1\%$). family history of non-communicable diseases is one of the main predictors of hypertension as in general as in age-stratified groups. The individuals whose relatives of first level were diagnosed with chronic disease (hyperglycemia, diabetes, hypertension, stroke, cancer, hypercholesterolemia, myocardial infarction in young age) were at higher risk of hypertension (PR = 1.27; 95% CI: 1.15–1.40; $P < 0.000$).

Conclusions: In Georgia, like other developing countries, there is higher rates of cardiovascular disease morbidity and mortality. The main strategy for the prevention of cardiovascular diseases should be early detection and proper management of diseases in general population and especially in high risk groups. Personal cardiovascular risk calculation is exclusively valuable for the prediction of CVD in so-called asymptomatic individuals.

PP.02.16 **RESTING HEART RATE PREDICTS METABOLIC SYNDROME IN WOMEN INSTEAD OF MEN: A 15-YEAR PROSPECTIVE STUDY**

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Objective: The causality of sympathetic activity and metabolic syndrome (MS) remained to be a “chicken and egg” question. The aim of the study is to reveal the causality of sympathetic activity and MS and to investigate whether there is

gender difference in the relationship between sympathetic activity and MS in a 15-year follow-up cohort in our Chinese people.

Design and method: A total of 711 subjects aged 35 to 65 years accepted health examinations both in 1992 and 2007. Since 114 subjects were identified MS and 7 subjects with heart disease in 1992, they were excluded from the analysis. Therefore, only 590 subjects with complete data (male: 61.5%) were available and analysed.

Results: The incidences of MS according to the resting heart rate (RHR) categories showed a linear trend in women (P for trend = 0.018) instead of men (P for trend = 0.194). The ORs [95% confidence intervals (CIs)] of MS for each categorical increase in RHR was 1.514 (1.070–2.141) (P = 0.019) in a univariate model, 1.561 (1.096–2.222) (P = 0.014) in a multi-variate model adjusted for age and health related behaviors only and 1.689 (1.161–2.459) (P = 0.006) adjusted for age, exercise habits and pre-existing components of MS (model 3) in women. Otherwise, RHR did not predict the development of metabolic syndrome in men neither in a univariate model nor in multivariate models.

Conclusions: The incidence of MS increased with RHR in women while not in men. Elevated RHR can predict the development of metabolic syndrome in women instead of men independent of any of MS components.

PP.02.17 CLINICAL SIGNIFICANCE OF SERUM NORADRENALINE IN ESSENTIAL HYPERTENSION

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Objective: Higher serum noradrenaline (NA) levels have been reported to be associated with higher prevalence of future cardiac event. We examined the association between NA level and clinical profile.

Design and method: The NA levels and clinical parameters were retrospectively studied in 181 newly-diagnosed hypertensive patients (mean age 59.8 ± 11.1 years) without cardiovascular disease. The patients were divided into 2 groups based on median NA (300 pg/mL for men, 360 for women).

Results: High NA patients (mean 481.7 pg/mL) showed higher heart rate (76.5 ± 13.8 vs. 70.5 ± 11.5 bpm, $p < 0.001$), renin activity (1.39 ± 1.28 vs. 0.86 ± 1.16 ng/mL/h, $p < 0.01$), peripheral white blood cell count (6050 ± 1600 vs. 5600 ± 1280 /mm³, $p < 0.05$) and higher tendency of systolic blood pressure (168.6 ± 15.0 vs. 164.3 ± 15.0 mmHg, $p = 0.056$) compared with low NA patients (mean 236.9). The prevalence of metabolic syndrome was 40.0% in high NA and 24.2% in low NA patients ($p < 0.05$). No significant differences were found in age, body mass index and creatinine between the groups. In all patients, NA was significantly correlated with heart rate ($r = 0.326$, $p < 0.001$), renin activity ($r = 0.263$, $p < 0.001$) and high-sensitivity C-reactive protein ($r = 0.275$, $p < 0.05$).

Conclusions: Results suggest that high NA levels may be associated with neuro-humoral abnormality, inflammation and be useful to identify the high-risk patients in hypertension.

PP.02.18 CONTROL OF RISK FACTORS IN PATIENTS WITH PREVIOUS CARDIOVASCULAR DISEASE

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Objective: The aim of this study is to evaluate control of the cardiovascular risk factors in patients with previous cardiovascular disease

Design and method: Observational and cross-sectional study. We analyzed 100 patients that presented a cardiovascular event in the previous 24 months. Subjects (18–75 years of age) that suffered a stroke in the previous year were included. All patients signed an informed consent. Anamnesis and blood test was performed. 24 h Ambulatory blood pressure monitoring (SpaceLabs@ Model90207) was practiced. We evaluated control level of their cardiovascular risk factors attending to recommendations provided by recent international guidelines (2013 ESH/ESC Guidelines for the management of arterial hypertension)

Results: We studied 100 patients (70% males; mean age: $59.68 (\pm 9.5)$ years). Reason for admission was 48% ischemic heart disease, 47% stroke and 5% peripheral arterial ischemia. At discharge 49% were controlled in primary care and 45% in specialized medicine (25% cardiology, 8% neurology, 8% internal medicine and 4% nephrology). Statistical analysis showed a premature family ischemic heart disease in 34% of patients and 11% of patients had a family history of sudden death.

Obesity was found in 33% of patients (BMI > 30 kg / m²); smoking in 14%; sedentary lifestyle in 50% and alcohol drinking in 50%. [Mean alcohol consumption was 10.33 g/day (SD: 14.0) in women and 28.37 g/day (SD: 41.1) in men]. The prevalence of hypertension was 61%, 56% dyslipidemia and 27% diabetes. Objective

levels (<70 mg/dL) of LDL cholesterol were not achieved in 79.8% of patients and 32.3% had an LDL-cholesterol above 100 mg/dL. 23% of patients had SBP24hr > 130mmHg; 8% DBP24hr > 80mmHg; 37% SBP-night > 120 mmHg and 23% DBP-night > 70mmHg. Patients with diabetes showed HbA1c > 7% in 19.4%.

Conclusions: We observed no controlled cardiovascular risk factors in 3/4 of patients. Hypertension and dyslipidemia were the most prevalent cardiovascular risk factors. High nocturnal blood pressure was found in 20% of patients. Promoting lifestyle changes (including healthy eating, physical activity and smoking cessation) should be the principal aim for prevention and/or management of cardiovascular disease.

PP.02.19 PREVALENCE OF NOVEL CARDIOVASCULAR RISK FACTORS IN HYPERTENSIVE PATIENTS WITH ATRIAL FIBRILLATION

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Objective: Presence of non-classical cardiovascular disease (CVD) risk factors is associated with an increased risk of adverse events, and poorer prognosis especially in patients with established CVD. Yet, novel risk factors are largely underdiagnosed and awareness of their presence, and screening are highly unsatisfactory. The aim of the study was to investigate prevalence of novel CVD risk factors in hypertensive males with atrial fibrillation (AF).

Design and method: We prospectively enrolled in the cross-sectional, epidemiological study adult patients with primary diagnosis of AF. During the enrollment process, the study participants were either electively hospitalized with a primary diagnosis of AF, or had a scheduled outpatient visit. Patients were accordingly screened for the history of hypertension and CVD, or had a diagnosis made de novo. Novel CVD risk factors (erectile dysfunction, obstructive sleep apnea, poor sleep quality, improper sleep length or insomnia) were diagnosed by dedicated, validated questionnaires.

Results: We enrolled 129 (age 57.0 ± 11.8 years) consecutive AF patients. Previously diagnosed hypertension was present in 60.5%, mean systolic blood pressure (BP) was 134.9 ± 20.3 mmHg, and diastolic BP was 82.8 ± 13.6 mmHg. Diabetes mellitus was found in 22.5%, dyslipidemia in 46.5%, smoking in 18.6%, and family history of CVD in 45.7% of patients. As for the novel risk factors, erectile dysfunction was present in 57.4% of patients, 42.6% had obstructive sleep apnea, 60.5% had poor sleep quality, and 20.2% had improper sleep length (<6 or >8 hours per night). After dividing patients into those with and without hypertension, we observed that patients with hypertension were older (59.1 ± 13.1 vs. 52.9 ± 10.4 years; $p = 0.006$), and had higher body mass index (29.9 ± 4.0 vs. 28.3 ± 4.1 kg/m²; $p = 0.002$). There were no differences between the groups in term of prevalence of classical CVD risk factors, erectile dysfunction, and poor sleep quality ($p > 0.05$), but patients with hypertension more often suffered from obstructive sleep apnea ($p = 0.05$).

Conclusions: Novel, non-classical CVD risk factors, including erectile dysfunction, obstructive sleep apnea, and improper sleep quality and quantity are highly prevalent in hypertensive patients with atrial fibrillation. Routine screening for those factors may improve their diagnosis, treatment, and finally patients' prognosis.

PP.02.20 WORLD HEALTH ORGANIZATION CARDIOVASCULAR RISK STRATIFICATION AS A MARKER OF HYPERTENSIVE TARGET ORGAN DAMAGE

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Objective: The aim of the present study is to determine if cardiovascular risk (CVR) stratification of WHO Americas B is a marker of target organ damage (TOD) in hypertensive patients.

Design and method: Hypertensive non treated consecutive patients (p) assisted at first visit in a specialized center were included. CVR was stratified according to WHO Americas B area table. Left ventricular mass index (LVMI) and tissue Doppler diastolic and systolic function was measured as Lang RM et al JASE 2005 and Nagueh SF et al JASE 2009. Cardiac TOD was considered according to 2013 ESH/ESC Guidelines J Hypertension 2013. Glomerular filtration rate was calculated by MDRD formula, a value < 60 ml/min/1.73m² was considered TOD. Systolic aortic pressured (CAoP) was measured by radial tonometry and classified as McEnery CM et al Hypertension 2008. Continue variables are reported as means with standard deviation and discrete variables as absolute values and percentages. Statistical analysis was performed with ANOVA test, significant differences were considered with a p value < 0.05.

Results: 292 p were included; 159 p (54.5%) had CVR < 10 %, 90 p (30.8%) CVR 10%-20 % and 43 p (14.7%) CVR > 20 %. Sample mean age was 58.5±12.7 years; 151 p (51.7 %) were males. Type 2 Diabetes had 21 p (7.2%), dyslipidemia 94 p (32.2%), and smokers were 44 p (55.1%). The table shows data of TOD. (See table on the following page)

	CV RISK <10 %	CV RISK 10-20 %	CV RISK >20 %	p VALUE
N	159	90	43	---
MEAN E/A RATIO	1,096 ± 0,41	0,9 ± 0,27	0,95 ± 0,38	0,025
ABNORMAL E/A RATIO	49 p - 30,8 %	41 p - 45,6 %	21 p - 48,8 %	0,0125
MEAN e' WAVE (cm/sec)	8,7 ± 6	6,84 ± 2	7,1 ± 2	0,0005
MEAN E/e' RATIO	9,8 ± 3,21	11,8 ± 3,9	11,6 ± 3,8	0,025
E/e' RATIO >13	22 p - 13,8 %	28 p - 31,1 %	12 p - 27,9 %	0,005
MEAN s WAVE (cm/sec)	8,03 ± 8	8,1 ± 9	8,7 ± 1	0,0005
MEAN LVMI (grs/m2)	85,4 ± 19,8	92 ± 27,7	88,2 ± 22	NS
LEFT VENTRICULAR HYPERTROPHY	28 p - 17,6 %	25 p - 27,8 %	10 p - 23,3 %	0,05
MEAN GFR (ml/min/1,73m2)	104,6 ± 40,8	88,8 ± 31,5	89,9 ± 22,2	NS
GFR <60 ml/min/1,73m2	13 p - 8,2 %	14 p - 15,6 %	4 p - 9,3 %	0,05
MEAN MICROALBUMINURIA mg/gr creat	12,2 ± 23,2	14,5 ± 19,7	12 ± 11,9	NS
MICROALBUMINURIA >30 mg/gr creat	12 p - 7,6 %	12 p - 13,3 %	4 p - 9,3 %	NS
MEAN CAoP (mm Hg)	117,2 ± 11	124,4 ± 13,3	135,4 ± 18,3	0,0005
ABNORMAL CAoP	51 p - 32,1 %	21 p - 13,2 %	7 p - 16,3 %	0,01

Conclusions: 1) LVMI increases and diastolic and systolic function are more frequently altered as CVR increases; 2) GFR < 60 ml/min/1,73m2 is more frequent as CVR increases; 3) although mean CAoP in higher CVR patients, the frequency of abnormal CAoP is higher in low CVR patients.

PP.02.21 ANXIETY, DEPRESSIVE SYMPTOMS AND CARDIOVASCULAR RISK IN PRIMARY CARE

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Objective: To evaluate the symptoms of anxiety and depression, and their severity in association to cardiovascular risk (CVR) in primary care (PC) patients.

Design and method: A cross-sectional study was performed. Mental status was evaluated by Hospital Anxiety and Depression Scale (HADS). A number of possible mediators that could explain an association between mental and cardiovascular risk were evaluated. Blood pressure (BP), heart rate, pulse pressure, body mass index (BMI) were measured by standard methods. The rate of cardiovascular diagnoses was ascertained from medical-reported data.

Results: 1170 adult consecutive patients approached; the final study group consisted of 998 patients (678 (67.9%) women, 320 men (32.1%)). The median age of the sample was 51 (Q1-Q3: 33.0-66.0); range 18-89. The rate of CVR factors is shown in Table. 1.

Table 1. The rate of cardiovascular risk factors

Characteristics	All; N=998	Male, n=320	Female, N=678	p
Menopausal			349 (51.6)	
Cardiovascular diagnoses	314 (31.5)	101 (31.6)	213 (31.4)	0.51
Diabetes	19 (1.9)	8 (2.5)	11 (1.6)	0.34
Height, cm (SD)	168.9 (9.2)	177.8 (7.5)	164.8 (6.5)	<0.001
Weight, kg (SD)	74.7 (15.8)	84.5 (14.7)	70.1 (14.2)	<0.001
BMI, kg/m ² (SD)	26.2 (5.1)	26.7 (4.1)	25.9 (5.4)	p=0.008
BMI >30 kg/m ²	212 (21.3)	67 (20.9)	145 (21.5)	χ ² =0.038 p=0.87
Heart rate (SD)	77.03 (11.6)	76.9 (11.6)	77.1 (11.6)	0.854
Blood pressure				
Systolic BP(SD)	135.4 (21.3)	139.4 (20.1)	133.4 (21.6)	<0.001
Diastolic BP(SD)	82.4 (11.4)	84.4 (11.4)	81.5 (11.2)	<0.001
Hypertension (BP >140/90mmHg)	398 (39.9)	153 (47.8)	245 (36.2)	χ ² =12.2 p=0.001
Pulse pressure	52.9 (15.1)	55.1 (14.9)	52.0 (15.1)	0.003

A significantly higher rate of cardiovascular disease was observed in patients with the highest mean anxiety score (9-20). Age and sex adjusted OR was 1.49 (95% CI 1.06 to 2.08, p=0.021). The OR associated with an increased HADS-anxiety (HADS-A) was similar after adjustment for multiple covariates and it was 2.05, and still statistically significant after adjustment for cardiac medication at baseline. We found an increased systolic BP, associated with HADS-A (p=0.07) and HADS-depression (HADS-D) (p=0.001). BMI was found higher at HADS-D6 or more (p<0.001). History of coronary artery disease was associated with higher HADS-D numbers. Anxiety score alone (per unit increase) was significant in either age or multivariate adjusted models in predicting the CVR (OR 1.05 95% CI 1.01 - 1.09, p=0.010); multivariate-adjusted OR 1.07 95% CI 1.03 - 1.11, p=0.001). After dichotomizing the mean anxiety score at the predetermined cutoff point of 8, we observed an age-adjusted OR of 1.07 (95% CI 1.06 - 1.08), p<0.001, and a multivariate adjusted OR of 1.54 (95% CI 1.10 to 2.14, p=0.011).

Conclusions: Severity of anxiety and depressive symptoms is associated with higher systolic BP, and severity of depression is associated with higher BMI. The history of coronary artery disease is associated with higher severity of depressive symptoms in PC patients.

PP.02.22 RISK PROFILE OF PATIENTS WITH ACUTE MYOCARDIAL INFARCT: IS IT TIME TO RE-ASSESS THE ROLE OF SOME TRADITIONAL CARDIOVASCULAR RISK FACTORS?

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Objective: To evaluate the role of some traditional cardiovascular risk factors (RF) - smoking, arterial hypertension (HTN), dyslipidemia, diabetes mellitus (DM) for early prognosis in patients with acute myocardial infarct (AMI). This is a sub-study of a larger study, aiming to specify the causes for pre-hospital and in-hospital delay and the possibilities for optimization of the medical care to patients with acute myocardial infarct (AMI).

Design and method: A prospective study, including 682 consecutive patients with AMI, admitted to the clinic of cardiology of UMBALSM "N.I.Pirogov" in Sofia for the period May, 2008-December, 2010. Of all patients 431 (63.2%) are males, mean age of the general group - 66.6 ± 12.9 years. Detailed medical history was taken from each patient about clinical symptoms, presence of cardiovascular risk factors, concomitant diseases, demographic and socio-economic data, physical and instrumental examination were performed with focus on the cardiovascular system.

Results: Acute myocardial infarct with persistent ST-elevation (STEMI) was diagnosed in 344 (50.4%) - 231 of them (68.5%) males, p<0.05. Acute myocardial infarct without ST-elevation (NSTEMI) was also more prevalent among males - 180 (59.8%), p<0.05. The mean age of the patients with STEMI and NSTEMI was 64.5 ± 13.7 and 69.4 ± 11.4 years respectively, p<0.0001. Regarding the presence of cardiovascular RF, the results are as follows: HTN - n = 589 (86.4%), dyslipidemia - n = 347 (50.9%), current smoking - n = 178 (26.1%), DM - n = 171 (25.1%), of them 125 (73.1%) with type 2 DM. Most patients - 479 (70.2%) had a combination of 2 RF and the most frequent combination was HTN plus dyslipidemia (n = 307, 64.1%). The impact of the analyzed RF in terms of the outcome of AMI is shown in table 1.

Table 1. Impact of the analyzed RF in terms of the outcome of AMI.

Variable	P	OR	95% C.I. for OR	
			Lower limit	Upper limit
Smoking	0.005	0.353	0.170	0.733
Type 2 DM	0.003	2.201	1.304	3.717
HTN	<0.0001	3.187	1.886	5.387
Dyslipidemia	0.030	1.801	1.059	3.064

P - significance level; OR - odd ratio; C.I - confidence interval.

Conclusions: The most prevalent modifiable cardiovascular RF in patients with AMI is AH, followed by dyslipidemia and smoking. The paradoxical effect of smoking on mortality reduction in the acute phase of AMI is probably due to the ischemic preconditioning of the myocardium, but further clarification is necessary by larger studies.

PP.02.23 BLOOD PRESSURE AND ARTERIOGRAPHY VARIABLES IN CURRENT AND FORMER SMOKERS

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Objective: The present study aimed to assess the influence of tobacco exposure on blood pressure and arteriography variables in current and former smokers.

Design and method: A total of 68 current and 19 former smokers underwent arteriography and were questioned about their smoking habits: the number of cigarettes smoked a day, the number of years smoked, and the time they quit smoking; smoking pack years were calculated. Blood pressure and arteriography variables were compared between the two groups and correlations and associations were tested considering smoking load data.

Results: Systolic blood pressure (125 ± 15 mmHg and 116 ± 13 mmHg, respectively, p=0.012) and pulse pressure (53 ± 10 mmHg and 46 ± 7 mmHg, respectively, p=0.018) were significantly higher in current compared to former smokers. The time quitting smoking was 12 ± 2.5 years in former smokers. The best correlations were obtained between smoking pack years and systolic blood pressure in the aorta (r=0.430), pulse pressure in the aorta (r=0.4090) and arterial age (r=0.495), respectively, in current smokers. Regression analysis revealed significant associations between diastolic blood pressure, pulse pressure, mean arterial pressure, the products: systolic blood pressure-heart rate and mean arterial pressure-heart rate, brachial and aortic augmentation index, arterial age, pulse wave velocity and ejection duration and smoking load data in current and former smokers.

Conclusions: Smoking load impairs blood pressure variables, arterial stiffness, endothelial function and arterial age in current and former smokers, even after 12 years of quitting smoking.

PP.02.24 PROGNOSTIC VALUE OF ATHEROSCLEROTIC MARKERS IN HYPERTENSIVE PATIENTS

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Objective: The purpose of this study was to determine the prognostic value of atheromatic markers in the cardiovascular outcome of hypertensive patients.

Design and method: We studied 711 hypertensive patients (age 56 ± 13 year old, 47.8% men) under treatment and without (mean systolic/diastolic blood pressure: $149.3 \pm 21/92.8 \pm 12.7$ mmHg, mean Heart rate: 76 ± 12 bpm). The mean follow up was 9.5 ± 6 years. Serum lipid levels, apolipoprotein B/apolipoprotein A1 (apoB/apoA1) and total cholesterol/HDL cholesterol (TChol/HDL) markers were measured in all patients at the beginning of the study. Additionally, the prognostic value in the incidence of major cardiovascular events (MI, stroke, aortic syndromes, cardiovascular death) was evaluated.

Results: 59,3% (273 patients) of the total population of the study had a major cardiovascular event. The prognostic value of atheromatic markers in the outcome is presented in the following tables:

Table 1. Prognostic significance of ApoB/ApoA1			
	Hazard Ratio	95% confidence interval	P value
apoB/apoA1	1,47	1,23-2,12	0,004
ApoB/ApoA1: apolipoprotein B/apolipoprotein A1			
Table 2. Prognostic significance of nonHDL-C			
	Hazard Ratio	95% confidence interval	P value
nonHDL-C	2,7	2,70-2,72	0,004
Table 3. Prognostic significance of TCh/HDL			
	Hazard Ratio	95% confidence interval	P value
TCh/HDL	2,54	2,4-2,7	0,063
TCh/HDL: total cholesterol /HDL cholesterol.			

Conclusions: ApoB/apoA1 and nonHDL-C, but not TChol/HDL Chol were found to bear significant prognostic value for the cardiovascular outcome of hypertensive patients.

PP.02.25 CHIKUNGUNYA INDUCES PERSISTENT ARTERIAL HYPOTENSION IN HYPERTENSIVE PATIENTS

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Objective: One of the most important emerging diseases is the Chikungunya virus infection, a mosquito-borne viral disease. It has spread worldwide; local transmission has now been confirmed in Europe. Transient arterial hypotension (AH) induced by Chikungunya has been reported on occasion. The aim of our study was to investigate persistent AH induced by Chikungunya in hypertensive patients.

Design and method: A prospective multicenter observational study of patients with Chikungunya was performed from an outbreak in Venezuela. Clinical evaluation, ECG and laboratory, including virological evaluation and cardiac bio markers, clinical, and daily home blood-pressure recordings were executed in all patients. Echocardiogram, Holter, and ambulatory blood pressure monitoring were also carried out in many patients. Cardiac magnetic resonance was performed in some patients in order to rule out miocardiopathy. AH was defined as systolic blood pressure <100 mmHg in both clinical and home measurements.

Results: Of the 257 patients examined, 133 were male, with a mean age 63 ± 9 . All the patients presented with fever and polyarthralgia. From the total, 63 patients were hypertensive but stable and under treatment. Of these, 25 developed persistent AH (>5 days). AH was detected between day 1 and day 5 and ended between day 7 and 43 (mean 20 ± 8). In 13 patients the anti-hypertensive medication was stopped, and in 12, it was reduced. AH was symptomatic in 20 patients (dizziness,

lightheadedness, pre syncope, and syncope in 2). Arrhythmias occurred in 51%, including bradyarrhythmias in 33%.

Conclusions: Persistent symptomatic arterial hypotension can occur in Chikungunya patients with hypertension. Therefore, in all Chikungunya patients, blood pressure should be monitored in order to detect AH and eventually modify their treatment, either by decreasing the dosage of anti-hypertensive medication or stopping it altogether.

PP.02.26 A HOME-BASED PROGRAMME OF PHYSICAL ACTIVITY CENTERED ON "FAST WALKING" IMPROVES BLOOD PRESSURE VARIABILITY IN ESSENTIAL HYPERTENSIVES

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Objective: Blood pressure (BP) values fluctuate continuously. Blood pressure variability (BPV), that is the standard deviation around the mean of the measurements collected using an ambulatory blood pressure measurement (ABPM) device, has attracted increasing interest in clinicians. An increased variability of 24 hours BP has been associated with increased progression of organ damage and a higher incidence of vascular events. As well, recent retrospective analyses of published trial data have concluded that antihypertensive drug classes differ in their effects on BPV, thereby exerting a different reduction of cardio- and cerebro-vascular risk. Aim of our study was to ascertain whether aerobic exercise of moderate intensity was able to reduce 24 hours BP variability.

Design and method: were enrolled 158 subjects affected by essential hypertension. Physical activity program proposed to patients consisted of 24 weeks of fast walking. Every subject was requested to walk for one hour/day, at a speed of 5–6 km/hour, individually fit during the preliminary procedures of the study. Ascertainment of the number of steps, of the total distance walked and of the mean velocity was made through a podometer provided with a 2 axis accelerometer (OMRON step counter type Walking Style II).

Results: Patients walked about 9,000 steps per day (9.150 ± 1440), for a medium total distance covered every day of 5640 ± 450 meters. Variation of BPV values, obtained through two ABPM measurements, before and after the domiciliary training period are the following: 24 hours PAS variability: 16.82 mmHg vs 14.12 mmHg ($P < 0.001$), 24 hours PAD variability 11.86 mmHg vs 10.16 mmHg ($P < 0.001$), diurnal PAS variability 17.86 vs 15.47 mmHg ($P < 0.001$), diurnal PAD variability 13.43 vs 11.87 mmHg ($P < 0.001$), nocturnal PAS variability 10.47 vs 7.79 mmHg ($P < 0.001$), nocturnal PAD variability 8.44 vs 6.58 mmHg ($P < 0.001$). The results maintained the statistical significance also after correction of the variation for the different antihypertensive therapies, the weight loss, sex and other confounding factors.

Conclusions: A home based program of physical activity improves BP variability in essential hypertensives.

PP.02.27 ARTERIAL BLOOD PRESSURE BEHAVIOUR AFTER AEROBIC EXERCISE IN HYPERTENSE INDIVIDUALS THAT WERE UNDERGONE A CARDIOVASCULAR REHABILITATION PROGRAMME

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Objective: To assess which type of exercise is more effective to reach the hypotensive effect.

Design and method: This study was approved by the Ethics Committee of the University of France, No. 077/06 protocol. This study is a comparative, cross-sectional, exploratory, descriptive quantitative approach. All participants underwent single session of aerobic exercise on a stationary bicycle and another single session in a therapeutic pool. Blood pressure measurements were performed at rest, 5, 15 and 30 minutes after starting the session, and 10 minutes after the session ends. For statistical analysis, the data of systolic and diastolic blood pressure were compared by analysis of variance ANOVA and the Student t test was used to locate the significant differences considering $p < 0.05$.

Results: 30 participants, patients with Hypertension, with an average age of 55.69 ± 3.45 years, weight 84.1 ± 4.12 kg; 163.2 ± 2.31 cm height; BMI 31.74 ± 1.19 kg / cm². Systolic blood pressure measured during this post-exercise protocol on the exercise bike remained significantly lower than the value of systolic blood pressure pre-exercise (130 vs $120 + 4.71$ mmHg, $p = 0.05$), while diastolic blood pressure

did not identify significant interaction in the post in relation to pre-exercise period (80 vs 80 + 4.7 mmHg, $p=0.18$). There was no statistical difference in pre and post-exercise both SBP (120 x 120 + 4.71 mmHg) and DBP (80 x 70 + 14.14 mmHg, $p=0.18$) for the years in therapy pool.

Conclusions: A single session of aerobic exercise performed on the exercise bike in hypertensive individuals was sufficient to cause a significant reduction in systolic blood pressure after exercise, which is the most effective modality compared with exercise performed in the therapeutic pool.

PP.02.28 ANALYSIS OF BLOOD PRESSURE VALUES IN DIFFERENT TYPES OF EXERCISES

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Objective: Analyze the resting blood pressure values resulting from aerobic and resistance exercise.

Design and method: Study of hypertensive patients in Cardiovascular Rehabilitation program, submitted to perform 12 sessions of aerobic exercise on the exercise on a bike 3 times a week. Training intensity was of 60% (0.6) of maximum heart rate. All participants were using Beta Adrenergic Blockers that could alter heart rate response, interfering in the training intensity. The use of heart rate correction table for beta blocked patients minimizes errors. Afterwards they underwent 12 sessions of resistance exercise. These used dumbbell's with individual weight selection, coupled in the upper and lower limbs, and in a circuit with eight exercise stations. where 15 repetitions were performed at an average speed, maximum free and controlled by the study authors. Time between stations was controlled (30 seconds) and sufficient for the exchange of charges in stations. Heart rate was monitored through frequency meter mark Polar A3 coupled chest of individuals and blood pressure through the BD sphygmomanometer. Data are shown as means and standard deviations. The data relating to the characteristics of the samples were subjected to Student's t test, with statistical significance level adopted was $p < 0.05$.

Results: The study included 18 male participants with a mean age of 61 ± 2.11 years. There was no significant difference of the value of blood pressure before and after training home in aerobic exercise, both systolic ($112.6 + 11.44 + 11.87 \times 110.68$ mmHg; $p=0.36$) and diastolic ($75.99 + 10.15 \times 74.58 + 9$ mmHg; $p=0.60$), and the value obtained in the resistance exercise, there was no significant difference between the SBP ($120.2 + 10.95 \times 114.83 + 10.50$ mmHg; $p=0.24$) and DBP ($80.83 + 6.77 \times 77.99 + 6.76$ mmHg; $p=0.21$).

Conclusions: The combination of aerobic and anaerobic exercise may be indicated for hypertensive patients because it does not cause changes in blood pressure. This association has been widely studied, therefore, further studies of this nature should be explored, with a larger number of participants.

PP.02.29 CLINICAL OUTCOME OF HYPERTENSION THROUGH CARDIAC REHABILITATION

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Objective: To report a case of hypertensive patient and describe the cardiovascular adaptations promoted by exercise in cardiac rehabilitation program under pharmacological treatment control after one year of treatment.

Design and method: Male, 50, diagnosed with hypertension, asymptomatic from the cardiovascular point of view, in outpatient care. Drug treatment in use: Atenolol 100 mg / day and enalapril 20 mg / day. Physical examination: 80.0 kg; 170 cm; BMI: 27.68 kg / m²; eupneic; stained; hydrated; acyanotic; anicteric; head and neck: no palpable thyroid; members: without edema peripheral perfusion; clean lungs; regular heart rhythm; FC: 70 bpm at rest; BP 150/90 mmHg at rest. Admitted to the cardiac rehabilitation program in May / 2013. The rehabilitation sessions were held three times a week, lasting 30–50 minutes of aerobic exercise. Hemodynamic parameters of heart rate, blood pressure and oxygen saturation (SpO₂) were assessed using frequency meter Polar brand, pulse oximeter (Nonin 9500) and BD sphygmomanometer, while the patient was exercising on a treadmill (Biocycle eletromagnético 2600).

Results: The patient had good adherence to the rehabilitation program, attending 100% of the sessions during the entire study period. After 1 year inserted in the cardiac rehabilitation sector, the patient underwent reassessment, which was observed

reduction in HR at 13 bpm rest and a reduction in SBP of 40 mmHg, DBP remained the same values. There was also a reduction in medication use: Atenolol from 100 to 50 mg / day and maintained Enalapril 20 mg / day.

Conclusions: There were adjustments to tissue metabolic needs with improvements in the redistribution of blood flow in the modulation of vagal tone, the ability to capture and metabolize oxygen, featuring a significant hypotensive effect presented by this case.

Figure 1. Values of SBP (systolic blood pressure), DBP (diastolic blood pressure) and HR (heart rate) at rest during a year of physiotherapy.

Date	Medication	PAS rest	PAD rest	FC rest
May / 2013	Atenolol 100 mg / day Enalapril 20 mg / day	150	90	70
May / 2014	Atenolol 50 mg / day Enalapril 10 mg / day	110	90	57

PP.02.30 SMOKING CESSATION IN PRIMARY CARE. THE EXPERIENCE OF A GENERAL PRACTICE UNIT

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Objective: Smoking is the main preventable cause of death in developed countries and it is widely considered a major cardiovascular risk factor. According to the World Health Organization, smoking may kill 1000 million people in the present century if left without intervention. In that sense, it is mandatory to implement prevention measures as well as smoking cessation (SC) consultations, especially in primary care units. The objective of this research was to study a primary care unit's population in terms of their demographic characteristics, smoking habits, engagement in SC programs, type of intervention used to achieve smoking cessation and overall success rates.

Design and method: A retrospective collection of data was made from the patients' digital clinical files. Patients who engaged in at least one SC consultation between January 2012 and November 2014 were included. Descriptive statistics of the aforementioned characteristics were then performed using the IBM SPSS Statistics 20 software.

Results: From a total of 15480 patients enrolled in the practice, only 2% were coded as P17 – Tobacco use (ICPC-2 coding). Their mean age was 41,3 years old (yo) and 56% were males. Of those, 12,7% (n=29) engaged in SC consultations; they had a mean age of 49yo and 80% were males. Their mean tobacco consumption was 22,7 cigarettes per day. 93,1% of these patients preferred a SC intervention that included pharmacological therapy: 41,3% used vareniclin+benzodiazepine, 41,4% used vareniclin alone and 10,3% used a benzodiazepine alone. The overall smoking cessation rate among these patients was 44,8%.

Conclusions: Identifying smokers among the practice's population should be a priority, since the national smoking prevalence is estimated in 23%. Because of the low engagement in SC consultations, clear information about the harmful effects of smoking/health gains with SC should be delivered in every opportunity. The obtained success from this program, essentially using pharmacological aid, is significant. It allows patients to benefit from decreased cardiovascular risk and overall health gains. Considering that, dedicated SC consultations should be faced as a priority.

PP.02.31 EFFECT OF OMEGA-3 ENRICHED FOOD ON OXIDATIVE STRESS LEVELS IN YOUNG HEALTHY MEN

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Objective: Many studies have shown effect of omega-3 fatty acid pills on lipid profile, but there are no or quite few studies showing the effect of everyday food enriched with omega-3 fatty acids on lipid profile and other cardiovascular risk factors. This study aimed to determine the effect of omega-3 enriched food consumption on oxidative stress in young healthy men.

Design and method: 20 young healthy men (age 20.8 ± 1.2) were recruited and included in protocol. Protocol consisted of 3 weeks of consuming chicken eggs, 3 eggs per day. 10 men in omega group (OG) consumed omega-3 enriched chicken eggs (omega-3 content 155,72 mg per egg), and 10 men in control group (CG) consumed regular chicken eggs. Chicken omega eggs were produced by changing the diet of laying hens. Data collection was performed on the first and last day of the protocol. Oxidative stress was assessed measuring lipid peroxidation. Lipid peroxidation was measured by TBARS method (Thiobarbituric Acid Reactive Substances) in the collected blood samples. The study protocol and procedures conformed to the standards set by the latest revision of the Declaration of Helsinki and were approved

by the Ethical Committee of the Faculty of Medicine, University of Osijek. Statistical analysis was performed using Wilcoxon Signed Rank test, $P < 0.05$ (SigmaPlot v11.2, Systat Software, Chicago, USA).

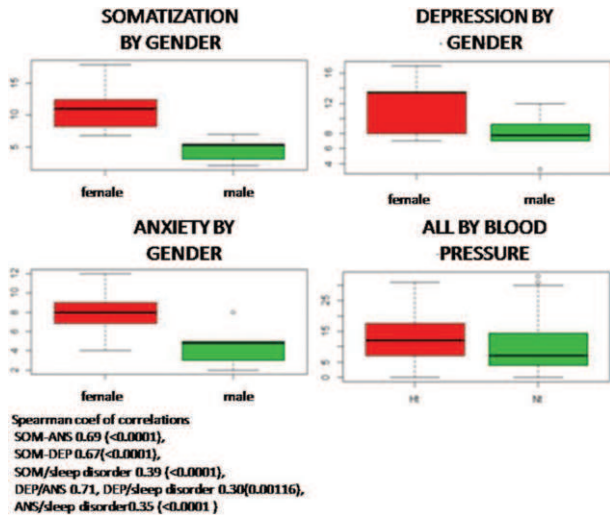
Results: The results have shown statistically significant decrease in lipid peroxidation in OG after protocol compared to the values before protocol (TBARS, OG before protocol 0.051 ± 0.02 vs. after protocol 0.54 ± 0.03). No significant changes were detected in CG after protocol (TBARS, CG before protocol 0.051 ± 0.05 vs. after protocol 0.49 ± 0.1).

Conclusions: This study showed the improving effect of omega-3 enriched food on the lipid peroxidation, which leads to the reduction of the levels of oxidative stress in young healthy population. This may be important indicator of the role of omega-3 enriched food in cardiovascular prevention.

PP.02.32 DETECTION OF SOMATIZATION RISK IN HYPERTENSION: A USEFUL TOOL TO IMPROVE CLINICAL PRACTICE AND PATIENT ADHERENCE

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Objective: From clinical experience hypertensive patients frequently reported perception of a high prevalence of symptoms that are a priori not linked to hypertension disease itself (headaches, sleep disorders, mood disorders). In this setting, somatization implies not only a health problem due to high-cost of complementary studies and consultations, but it affects patient adherence to treatment.



a) to determine the risk of somatization in hypertensive's b) to evaluate association between somatization and antihypertensive drug therapy, c) to analyze distribution of mood disorders such as depression in the population sample.

Design and method: We prospectively included 240 individuals who voluntarily complete the measurement instrument SCL-90-R(Hopkins Symptom Checklist-HSCL, Derogatis et al, 1977–1994) consisting of a symptom scale composed of 90 items grouped into 9 subscales, assigning to each of the items a possible value of 5 points accordingly to subject answer. For the purpose of this study we selected 3 subscales: a) somatization (SOM), b) depression (D) and c) anxiety (ANS). A psychological evaluation by an expert was also provided.

Results: After applying the exclusion criteria, final sample was 120 subjects (57.8 years, 50% women). BP history led to the classification in 2 groups, 1) group hypertensive (all with controlled BP at inclusion)(n:68, $131 \pm 7.6/76 \pm 9$ mm Hg), and 2) group normotensive (n: 52, MAP 99.26 ± 8.84 mm Hg.). SCL-90-R score from all population was 113.5 ± 15.87 . The interrelationship between the subscales DEP, SOM, ANS was significant (coef.Spearman, $p < 0.0001$), while women's and hypertensive's showed a higher prevalence of depression, anxiety and somatization (. Among hypertensives, a significant increase in DEP, SOM and sleep disorders were observed in those under pharmacological treatment (n: 38).

Conclusions: In a sample of subjects in primary prevention, the risk of Somatization and related disorders (anxiety and depression) was higher in women, hypertensive and especially in hypertensive patients pharmacologically treated. The possibility of detecting the individualized risk of somatizations across scales validated internationally might promote a special managing of the subject and his manifestations, beside contributing to the comprehension of the symptoms that traditionally attribute the HTA to themselves.

PP.02.33 THE LOW SALT COMMUNITY PROJECT. RATIONALE, METHODS AND PRELIMINARY RESULTS

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Objective: As a results of the MINISAL study, that indicated an excess salt intake in Italy, we planned a “The Lower Salt Community Project”, a trial of feasibility, acceptability and safety of a strategy of moderate and gradual reduction of salt intake (15% over 18 months) in an Italian community in the area of Cilento.

Design and method: The baseline salt intake was evaluated by 24-hour urinary sodium excretion in randomized samples of the Cilento community and of a control community in a separate area. The control community undertakes the same anthropometrical, nutritional, biochemical and blood pressure (BP) measurements at baseline and at end of the study as the target community, but is the object of simple observation with no kind of active intervention during the follow-up period. Main outcome measure will be the differential change in dietary salt intake at the end of the study between the two communities. Secondary endpoints will be the changes in BP, nutritional, anthropometric, metabolic and hormonal variables, potential target of dietary salt reduction.

The active intervention is currently being implemented through the collaboration with local authorities, GPs and health organizations, opinion makers and local schools. Interaction with restaurants, pizzerias, local food producers and catering organizations are being carried out. A crucial role is played by the interaction with media (private TV networks, radios and local newspapers) and by the activation of an INTERNET website and social network profiles.

Results: At baseline, the two randomized samples (aged between 35–75 years) were similar for sex, age, BMI, SBP/DBP and urinary volume. The average salt intake was 9.0 g/day and over 90% of the population had a consumption higher than the recommended standard dietary intake of 5 g/day.

Conclusions: The results of this feasibility trial will provide information on the possibility to implement similar salt reduction strategies at the regional and national levels.

PP.02.34 SAFETY OF LONG-TERM ENRICHED POTASSIUM SALT CONSUMPTION AND EFFECT ON BLOOD PRESSURE IN CHINESE

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Objective: To observe the safety of enriched potassium salt (KCl: NaCl = 1:1) long-term consumption (14 months) and effects on blood pressure (BP) in Chinese living in northern nursing houses.

Design and method: The study was a single blind prospective intervention research. Participants were living in 30 nursing houses in northern parts of China. The nursing houses were randomized into 2 groups:normal salt (control group)and enriched potassium salt (intervention group). After baseline screening, the study salt,(10 gm/person/day) was calculated and dispensed to each nursing house every 3 months. A 1st follow-up survey was carried after using study salt for 3 months. The items of the survey included questionnaire, physical examination, blood sample and urine collection. The serum potassium (SK) and creatinine (SCr) concentrations were used for the safety assessment of long-term enriched potassium salt consumption. The change of BP was used to assess efficacy of enriched potassium salt.

Results: Complete BP records of 2052 participants (1105 intervention group, 947 control group,mean age 65 years) were obtained. At baseline, there was no difference in creatinine(SCr) and spot urinary sodium to potassium ratio(U Na/K) between intervention and control groups. After using study salt 3–5 months and 1–1.5year the first and fourth follow-up were carried out. The results are listed below.

In a subsample with 24- hour urine collections, in control group the UNa/K was 8.28 ± 2.78 , 9.97 ± 4.67 and 6.57 ± 2.90 ; in intervention group 10.86 ± 3.02 , 5.56 ± 2.44 and 2.90 ± 1.54 for baseline, 1st and 4th folow-up respectively. The 24hr K excretion was significantly increased in intervention group, from baseline 25.4 ± 10.0 mmol to 4th follow-up 54.8 ± 31.2 mmol. Nevertheless, the incidence of hyperkalemia (>5.5 mmol/L) was similar in both groups at 3.8% vs. 3.6%(intervention vs. control, NS).

	Baseline		1 st Follow-up		4 th follow-up	
	Control	Intervention	control	Intervention	control	Intervention
SBP	150±26.3	150±28.0	144±27	139±20*	151±25.8	143±23.1*
DBP	82±13.0	83±12.6	83±17.7	79±10.7*	80±12.6	78±11.3*
S.Cr	69±20.4	69±18.7	74±38.4	77±19.2	68±26.2	71±18.5*
S. K	4.2±0.41	4.3±0.52*	4.1±0.42	4.6±0.62*	4.5±0.5	4.6±0.49*
U. Na/K	7.8±4.4	8.2±4.9	7.4±4.4	5.2±3.3*	4.2±2.8	2.6±1.8*

* P<0.05 between control and intervention group

Conclusions: The results suggest that long term consumption of the enriched K salt can lower blood pressure, and is safe in Chinese living in nursing houses. Follow-up is ongoing for its effects on cardiovascular events.

PP.02.35 EFFECTS OF COMMUNITY PARTICIPATION PROGRAMME FOR BLOOD PRESSURE CONTROL ON HEALTH BEHAVIOURS AND BLOOD PRESSURE IN COMMUNITY DWELLERS WITH HYPERTENSION

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Objective: This study aimed to 1) compare health behaviors and blood pressure in experimental group before and after a program for blood pressure control using community participation, 2) compare health behaviors and blood pressure between a control group and the experimental group after participating in the program for blood pressure control using community participation.

Design and method: Experimental design was used. The sample included 60 persons with hypertension in two communities of a central part of Thailand. The sample were assigned to an experimental group (n=30) and a control group (n=30). The experimental group participated in the program for 14 weeks. Data were collected using a health behavior questionnaire for persons with hypertension. Data were analyzed using descriptive statistics, Chi-square test, Fisher's exact probability test, t-test, Mann Whitney U test, and Wilcoxon signed-rank test.

Results: Results revealed that most of the samples were female, both in the experimental group (63.3%) and the control group (76.7%). There was no significant difference in mean age between the experimental group (58.8 + 8.6 years) and the control group (61.9 + 11.2 years). Overall health behaviors in the experimental group, before and after the program, were not significantly different, and no significant difference was found from the control group. Analysis of the subscales revealed that after the program, the experimental group had significantly higher scores for stress management than before (p=.029) and significantly higher than the control group (p=.044). Systolic blood pressure was significantly lower than before the program (p=.003) and significantly lower than the control group (p=.030). Diastolic blood pressure was significantly lower than before (p<.001), but not significantly different from the control group.

Conclusions: The results suggest that health teams assess and monitor stress, and promote activities with community participation, addressing stress management in persons with hypertension, to control blood pressure effectively.

PP.02.36 THE EFFECTIVENESS OF REHABILITATION PROGRAMME IN PATIENTS WITH ARTERIAL HYPERTENSION, COMPLICATED BY CHRONIC HEART FAILURE

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Objective: To evaluate the effectiveness of rehabilitation program in patients with arterial hypertension, complicated by chronic heart failure (CHF).

Design and method: 72 patients with arterial hypertension, complicated by CHF were studied (55 patients were men and 17 women, mean age 65±12 years). All patients underwent clinical and laboratory examination, pulmonary function tests and echocardiography. These patients have completed six weeks rehabilitation program. Outcome measures were breathlessness (10 point Borg scale) and exercise capacity by six-minute walk test (6MWT). These measures were assessed before and after the rehabilitation program. For all the patients rehabilitation included standard treatment with medications, aerobic exercise training, breathing control techniques, smoking cessation program and education program.

Results: We revealed significant increase in the 6MWT, distance walked passing from 210±35 m to 267±42 m (p<0.001). Also we found significant decrease in breathlessness, Borg scale score after 6MWT passing from 4.7±1.2 to 3.6±0.9 (p<0.001).

Conclusions: We conclude that rehabilitation program in patients with arterial hypertension, complicated by CHF improved exercise capacity. All patients with arterial hypertension, complicated by CHF should be included in rehabilitation program.

PP.02.37 LIFESTYLES AND VASCULAR STRUCTURE AND FUNCTION PARAMETERS. MARK STUDY

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Objective: To analyse the relationships between lifestyles and vascular structure and function parameters in patients with intermediate cardiovascular risk.

Design and method: We performed a cross sectional study including 500 subject, aged 30 to 75 years (mean: 60.31±8.44), 54.4% men, without cardiovascular diseases from the MARK study, selected by consecutive sampling from a Spanish health centres. Measurement: Cardio-AnkleVascular Index (CAVI), Ankle-brachial index (ABI) and ba-Pulse Wave velocity (PWV) were measurement by VaSera device (Fukuda Denshi) and by brachial oscillometry (Mobil-O-Graph). Aortic PWV (A-PWV), Augmentation index 75% (AIx75%), Cardiac index (CI) and Reflection coefficient (RC). Lifestyles were measurement by questionnaires of diet (Mediterranean diet and DQI), physical exercise (Minnesota), smoke and alcohol.

Results: The CAVI mean was 8.59±1.03, in men 8.62±1.16 and in women 8.55±1.03 (p>0.05). The 29.3% were less than 8 (normal), the 36.6% were between 8 y 9 (border line) and the 34.1% were equal or higher than 9 (Atherosclerosis probably). ABI mean was 14.7±2.7, baPWV 14.7±2.7, CI 2.2±0.4, AIx75% 26.7±13.8. A-PWV 8.6±1.1 and RC 66.3±8.9.

They were smoker 21.4%, heavy drinkers 17.8%, sedentary 24.2% and with unhealthy diet 44.4%. DQI Index was 31±3, Mediterranean diet score 6±2, METS standardized 14 days 3541±3358, alcohol in gr/week 74±107, years of smoking 29±12 and smoking index 26±25.

We found positive correlation of years of smoking with the CI (r=0.145, p=0.01), A-PWV (r=0.244, p<0.01), CAVI (r=0.170, p<0.01), and negative with ABI (r=-0.128, p=0.03). Alcohol consumption was negatively correlated with CI (r=-0.137, p<0.01), AIx75% (r=-0.100, p=0.03) and the RC (r=-0.137, p<0.01). Physical activity correlated only with the ABI (r=0.123, p=0.01) and the Mediterranean diet score and DQI with A-PWV (r=0.119, p=0.01) and r=0.096, p=0.03 respectively).

Conclusions: The years of smoking are associated with unfavorable vascular structure and function, while alcohol consumption is associated favorably. Physical activity is associated only with increased ABI, while better food pattern is associated with higher pulse wave velocity.

PP.02.38 THE EFFECTS OF CHRONIC EXERCISE ON BODY COMPOSITION, HEMODYNAMIC PARAMETERS AND MICROVASCULAR REACTIVITY IN YOUNG HEALTHY MEN

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Objective: The aim of our study was to evaluate: 1) how chronic exercise (CEX) modulate body composition components, 2) how CEX affects microvascular reactivity of skin microcirculation (indicator of endothelial function) and 3) is there an association between body composition components and microvascular reactivity in young healthy men.

Design and method: Young healthy lean sedentary subjects (SS) (N=8) and trained athletes (TR) (N=16) participated in this study. Blood pressure, heart rate, body mass index (BMI), waist to hip ratio (WHR), fasting lipid panel, plasma glucose and C reactive protein (CRP) were measured in all subjects. Body composition was measured with a four-terminal portable impedance analyzer (Maltron Bioscan 920-II). Empirically derived formulas were used to calculate estimated Fat Mass, Muscle Mass, Total Body Water (TBW), Intra-Cellular Water (ICW) and Extra-Cellular Water (ECW). Skin microvascular post occlusive reactive hyperemic (PORH) blood flow was assessed by laser Doppler flowmetry (LDF).

Results: All subjects were normotensive, lean, age-matched males, with no difference in BMI, WHR, arterial blood pressure and heart rate, just as in fasting lipid panel, plasma glucose and CRP between SS and TR. Fat Mass% was significantly higher in SS than in TR (Fat Mass% SS 13.8±4.2 vs. TR 8.7±1.2, P=0.012), while Muscle Mass% was significantly higher in TR than in SS (Muscle Mass% SS 45.8±1.5 vs. TR 48.4±1.4, P=0.022). TBW% was significantly higher in TR when compared

to SS (TBW% SS 61.6 ± 3.3 vs. TR 65.8 ± 1.6 , $P=0.017$), without the difference in specific water compartments (ECW% and ICW%) between groups. Skin microvascular PORH was significantly higher in TR compared with SS (R-O SS $85.5 \pm 19.2\%$ vs. TR $125.1 \pm 37.4\%$, $P=0.005$). Multiple linear regression results indicate that among body composition parameters only TBW% is significantly associated with skin microvascular PORH ($P=0.035$). There was no correlation between arterial blood pressure and TBW% in normotensive normally hydrated subjects.

Conclusions: The principle findings of our study are: 1) when trained athletes exhibits significantly better skin microvascular reactivity compared to age-matched and physical constitution-matched sedentary subjects, which presupposes better endothelial function; and 2) TBW% may be associated with vascular reactivity in normally hydrated normotensive subjects.

PP.02.39 ELEVATION OF AORTIC PULSE WAVE VELOCITY BY HIGH SODIUM INTAKE IN INDIVIDUALS WITH HYPERTENSION AND SODIUM SENSITIVITY

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Objective: We evaluated the influence of sodium intake on aortic pulse wave velocity (PWV).

Design and method: Thirty-one hypertensives and 70 normotensives were given 7 days of low sodium dietary approach to stop hypertension (DASH) diet (LSD, 100 mmol NaCl/day) and 7 days of high sodium DASH diet (HSD, 300 mmol NaCl/day) during 2 week hospitalization. Heart-femoral PWV (hfPWV) was measured and compared after the LSD and HSD.

Results: The percent change in hfPWV from the LSD to the HSD in individuals with sodium sensitivity (SS) was higher compared to that in individuals with sodium resistance (SR). Individuals with SS had higher hfPWV after HSD compared to those after LSD ($p=0.001$). The significant difference in hfPWV persisted in an analysis including mean blood pressure (MBP) as a covariate ($p=0.037$). Hypertensives tended to show higher hfPWV after HSD compared to that after 7 days of LSD ($p=0.046$). However, the difference was not significant in adjusted analysis with MBP ($p=0.210$). In a subgroup analysis, hypertensives with SS showed significantly elevated hfPWV after HSD compared to that after LSD in adjusted analysis with MBP ($p=0.003$), but hypertensives with SR, normotensives with SS and normotensive with SR did not.

Conclusions: High sodium intake elevated aortic stiffness, which was blood pressure independent in hypertensives with SS. The result suggests that increased aortic stiffness due to high sodium intake may contribute to enhanced cardiovascular risk beyond BP elevation in hypertensives with SS.

PP.02.40 RELATION OF 24-HOUR URINARY CAFFEINE AND PARAXANTHINE EXCRETIONS WITH SELF-REPORTED CONSUMPTION OF COFFEE AND OTHER CAFFEINATED BEVERAGES IN THE GENERAL POPULATION

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Objective: Caffeine has been associated with many chronic disease such as high blood pressure. Caffeine intake is generally estimated by the use of self-reported consumption of caffeine, but it is not clear how well self-reported consumption of caffeine correlates with validated method to measure caffeine intake (e.g., urinary excretion). We investigated the associations of self-reported consumption of caffeinated drinks with urinary excretion of caffeine and its major metabolite (paraxanthine).

Design and method: We used data from 267 men and 280 women to the population-based Swiss Kidney Project on Genes in Hypertension (SKIPOGH) study. Caffeinated drink consumption was assessed by food frequency questionnaire, where intake frequency was self-reported through 5 categories: "Never",

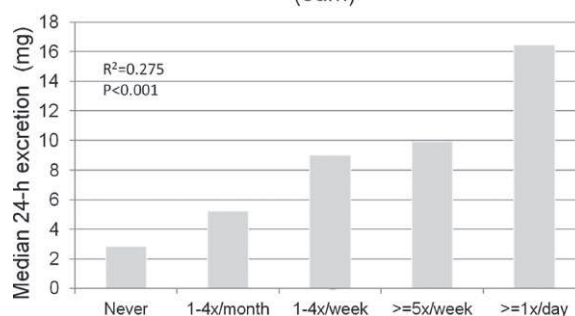
"1-4 beverages/month", "1-4 beverages/week", ">= 5 beverages/week", "1>= beverage/day".

Physiological data was collected through medical visit and 24-h urine collection (caffeine and paraxanthine urinary excretions).

Mixed linear regression was performed to test association of reported consumption of caffeinated drinks with metabolite excretions. Receiver Operating Characteristic (ROC) analysis was conducted to discriminate low vs. high caffeine exposure, defined as consuming more than 4 cups of coffee per day, or more than one beverage per day for caffeinated soft drinks and energy drinks.

Results: The 24-hour urinary excretions of caffeine and paraxanthine correlated with self-reported caffeinated coffee consumption (unadjusted $R^2=0.275$, $P<0.001$ [Figure]) but not with the consumption of other caffeinated drinks (soft drinks, energy drinks) (unadjusted $R^2=0.027$, $P=0.004$) nor with the consumption of decaffeinated drinks (unadjusted $R^2=0.008$, $P=0.382$). Reported number cups of coffee provided high sensitivity/specificity to discriminate low vs. high caffeine exposure, (>4 cups; $AUC=0.834$), whereas reported consumption of other caffeinated drinks (soft drinks, energy drinks), did not allow this discrimination (> 1 beverage; $AUC=0.535$).

Urinary paraxanthine and caffeine (sum)



Conclusions: Self-report appears to be a sensitive, specific and simple way to capture exposure to caffeine. Our findings suggest that coffee was the major source of excreted caffeine and paraxanthine, whereas the contribution of other caffeinated drinks was less clear.

PP.02.41 THE EFFECT OF IMPROVING DIETARY QUALITY ON MEASURES OF VASCULAR STRUCTURE AND FUNCTION IN A WELL-CONTROLLED POPULATION WITH DIABETES

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Objective: The aim was to determine if increasing fruit (+1 serve; 150 g/day), vegetable (+2 serves; 150 g/day) and dairy (+1 serve; 200-250 g/day) intake slows carotid intima media thickness (cIMT) progression, compared to a control group continuing on their usual diet, in people with type 1 and type 2 diabetes after 12 months. Secondary outcome measures were peripheral and central blood pressure, augmentation index (AI) and pulse wave velocity (PWV).

Design and method: A 12 month randomized controlled trial was conducted. The primary outcome was mean cIMT, measured at baseline and 12 months using B mode ultrasound. Secondary outcomes were peripheral and central blood pressure, AI and PWV, measured at baseline, 3, 6, 9 and 12 months. Participants in the intervention group received dietary counselling from a dietitian at baseline, 1, 3, 6, 9 and 12 months and compliance was measured using a food frequency questionnaire administered at baseline, 3 and 12 months. Data were analysed using mixed effect modelling.

Results: Ninety-five participants completed the study. At baseline mean HbA1c was $7.2 \pm 1.4\%$ and blood pressure (127/71 mmHg), total (3.5 ± 0.9 mmol/L) and LDL cholesterol (1.7 ± 0.7 mmol/L) were within the recommendations as defined by the 2013 ESC/EASD guidelines and approximately 60% of the cohort was taking an anti-hypertensive or lipid lowering medication. Vegetable (59 g; 95% CI 25, 94 g; $p=0.001$) and fruit (197 g; 95% CI 130, 264 g; $p=0.0001$) intake were increased at 3 months in the intervention group, compared to the control group. This increase was not maintained at 12 months but intake increased overall in the cohort (fruit 53 g/day; vegetables 17 g/day; $p<0.01$). An increase in dairy consumption was not achieved but yogurt intake was higher in the intervention group at 3 months (36 g; 95% CI 6, 66 g; $p=0.02$); this was not maintained at 12 months. At 12 months cIMT regressed (-0.01 ± 0.04 mm; $p<0.001$) with a greater effect in the treatment group (-0.02 ± 0.04 mm vs. -0.005 ± 0.04 mm; $p=0.045$). Baseline HbA1c was an independent predictor of cIMT change. There was no time by treatment effect for peripheral and central blood pressure, AI or PWV.

Conclusions: Improving dietary quality in well-controlled people with diabetes may slow cIMT progression.

PP.02.42 EFFECTS OF A LYCOPENE-RICH DIET OVER THE ENDOTHELIAL FUNCTION AND CENTRAL ARTERIAL HEMODYNAMICS IN YOUNG HEALTHY ADULTS

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Objective: The objective of this study was to ascertain the effects of lycopene over the vascular function of young and healthy individuals.

Design and method: A randomized controlled study was conducted involving 60 healthy and young sedentary subjects, randomized into two groups: control group (CG, n=30) and intervention group (IG, n=30). The IG completed a lycopene-rich dietary program, consisting in the daily ingestion of 70 g of tomato paste, over a 4 weeks period. All the individuals were submitted to two clinical evaluations, basal and after one month, in which their weight, height, body mass index (BMI), systolic blood pressure (SBP), diastolic blood pressure (DBP), heart rate (HR), flow-mediated dilation (FMD), Augmentation Index(AIX), aortic pulse wave velocity (PWV) and pulse wave analysis over the carotid artery (PWA) were assessed.

Results: CG and IG were homogeneous from the point of view of fundamental demographic characteristics. The IG showed a significant increase in the FMD values after intervention, increasing from $7.6 \pm 2.7\%$ to $11.5 \pm 4.2\%$ ($p=0.001$). No significant variations were seen in the CG for regarding FMD. A reduction in the brachial and central systolic blood pressure was also depicted in the IG, but not in the CG, reducing from $119.73 \pm 11.09\text{mmHg}$ to $115.27 \pm 10.86\text{mmHg}$ ($p=0.067$), and from $112.13 \pm 13.14\text{mmHg}$ to $108.47 \pm 12.14\text{mmHg}$ ($p=0.07$), respectively. PWV also showed a trend towards a reduction, from $6.55 \pm 1.07\text{m/s}$ to $6.38 \pm 0.85\text{m/s}$ ($p=0.153$) in the IG, but not in the CG. No significant variations were found for the other hemodynamic parameters, such pulse pressure and AIX.

Conclusions: A lycopene-rich diet is associated with vascular benefits in young and healthy individuals, increasing the FMD values and improving the global hemodynamic profile, further indicating a positive impact over the endothelial function.

PP.02.43 STATISTICALLY SIGNIFICANT CORRELATIONS WITH DIETARY MACRONUTRIENTS AND BLOOD PRESSURE IN INDIVIDUALS WITH HIGH NORMAL BLOOD PRESSURE OF BOTH SEXES IN MIDDLE AGE

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Objective: The aim of the study was to evaluate the relationship between the dietary macronutrients and blood pressure in middle age of both sexes.

Design and method: Working population aged 25–49 (n= 1197, men and women) with high normal BP were examined. Screening included physical examination, standard questionnaire, nutrition studied by 24 hour dietary recall. Statistical analysis was done in SAS.

Results: There was a significant relationship between systolic BP and Na (beta coefficient $\beta = 0.002$ $p=0.0016$), potassium ($\beta = -0.034$ $p=0.0017$), magnesium ($\beta = -1.138$ $p=0.025$) intake in women; Na ($\beta = 0.059$ $p=0.0003$), potassium ($\beta = -0.045$ $p=0.0016$), calcium ($\beta = -0.009$ $p=0.0003$), alcohol ($\beta = 6.855$ $p=0.0123$), caloric intake ($\beta = 20.312$ $p=0.0001$) in men, and with diastolic BP in women: Na ($\beta = 0.013$ $p=0.0039$), total fat ($\beta = -5.925$ $p=0.0001$), caloric intake ($\beta = 0.068$ $p=0.0091$) and in men: Na ($\beta = 0.034$ $p=0.018$), potassium ($\beta = -5.471$ $p=0.001$), caloric intake ($\beta = -6.623$ $p=0.0101$). Variability in systolic BP of 5.0% and diastolic BP of 6.3% was explained dietary patterns in women. In man it was 6.2% and 1.3% respectively.

Conclusions: These data indicating additive independent relationships of macronutrient intake to BP, independent of dietary sodium, potassium, alcohol, calcium, magnesium and calorie balance, lend further support to the concept that broadly based population-wide improvements in diet can contribute importantly to prevention and control of high normal BP.

POSTERS' SESSION

POSTERS' SESSION PS03

BLOOD PRESSURE MEASUREMENT AND VARIABILITY

PP.03.01 BP A6 PC (MICROLIFE) VS HELP CHECK (PIC SOLUTION) FOR ATRIAL FIBRILLATION SCREENING IN THE HYPERTENSIVE POPULATION: A COMPARATIVE STUDY BETWEEN TWO AUTOMATIC OSCILLOMETRIC DEVICES

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Objective: To compare sensitivity and specificity in detecting the presence of atrial fibrillation (AF) between automatic oscillometric sphygmomanometer, HELP CHECK (PIC solution) with specific algorithm to measure the hemodynamic stability (HSD) and BP A6 PC (Microlife).

Design and method: We enrolled 108 hypertensive patients. Of these 65 were suffering from atrial fibrillation and 38 were in stable sinus rhythm, 5 with frequent extrasystoles.

All were subjected to clinical measurement of systemic blood pressure with Help Check through three consecutive measurements and simultaneously at 12-lead surface ECG for the detection of the rhythm, and to measurement with Afib BP A6 PC in mode AFIB / MAM running three BP measurements automatically in timed mode and built-in algorithm detects the presence of atrial fibrillation with simultaneously ECG to each of the three pressure measurements automatically timed.

Was considered significant for the possible presence of AF, the indicator appears on the display dell'HELP CHECK during each of the three clinical measurements and the appearance of specific logo AFIB for Microlife- mode MAM / Afib that after three automatic measurements provides an average value of pressure and the appearance of the logo or less for atrial fibrillation detection

Results: Help Check with HSD showed, in detecting the presence of atrial fibrillation, a sensitivity of 100% in all three clinical consecutive measurements, an average specificity between the three measurements equal to 85.4% with an accuracy of 94%. The Microlife BP A6 PC showed sensitivity of 95.4% specificity of 92.11% and accuracy of 94%.

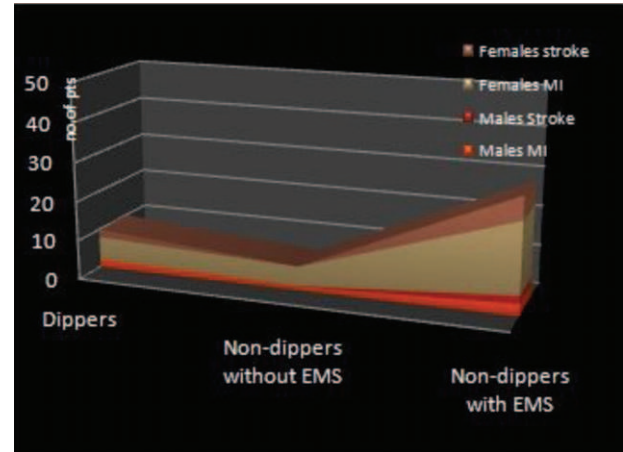
Conclusions: Our work shows with certainty that the meter automatic pressure HELP CHECK (HC) is much more sensitive of the other in the presence of fibrillation by acting as a warning bell for our patients equal anyway of diagnostic accuracy.

Data about specificity of HC is due to particularity of the algorithm in the device that evaluates the accuracy of a reading by detecting HSD, which can be influenced by different factors: physical, psychological and clinical as arrhythmias, such as atrial fibrillation, which persistently alters the period of the pulse waves revealed in the course of a reading.

PP.03.02 MORNING ISOLATED SYSTOLIC HYPERTENSION IN OLDER AGE

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Objective: Most people 65 years of age or more commonly have isolated systolic hypertension (ISH), it has also proved to be an important factor in hypertensive complications. Morning hypertension and home 24-hour blood pressure measurement has been recommended in patients with target organ damage.



Design and method: 310 treated hypertensive patients were divided into 2 major groups systolic/diastolic blood pressure hypertension (n=266) and ISH (n=44 76 ± 10 yrs). The ISH group (n=44) was further subdivided into 2 minor groups 35 nondippers and 9 dippers. EMBPS (early morning blood pressure surge), the main predictor of hypertensive target organ damage, was defined as peak BP or the average BP during morning period (4–6am early morning hours, 124.08 ± 21.91 mmHg) minus average BP during the sleep period (average of lowest 3 sleep values, 145.45 ± 22.14 mmHg), (mean 22.74 ± 11.92 mmHg, P < 0, 01). A cut off for the top decile of sleep-trough surge (37–50mmHg, n=4: the, morning surge group) versus all others (n=31: the nonsurge group).

Results: Females more than males had an early morning surge rise in nondippers. Hyperlipidemia arises equally in D and ND, 45% of ND had DM; 30 % suffered previous renal insufficiency and about 29 % of patients suffered from an endocrine disorder. Metabolic syndrome (MS) was only found to be associated with a ND pattern (3%). Left ventricular hypertrophy was in a 100% of patients, heart failure in 60% ND and 56% D, potential renal insuff in 34% ND and 22% D, retinopathy in 31% ND and 11% D, aortic aneurysm was only in ND. Stroke and myocardial infarction was associated with a ND pattern. Higher cases of stroke were reported in the EMS group.

Conclusions: EMBPS is a predictor of hypertensive target organ damage. A dipper or nondipper patient with ISH might not make a difference depending on one's own degree of target organ damage and diurnal variation.

PP.03.03 INDIVIDUAL-SPECIFIC NON-INVASIVE BLOOD PRESSURE MEASUREMENT BASED ON THE GENERATION MECHANISMS OF KOROTKOFF SOUNDS

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Objective: The amplitude ratios for systolic blood pressure (SBP) and diastolic blood pressure (DBP) in oscillometric method are determined empirically, which scatter among the population of subjects. The objective of the present research is to develop an Individual-specific blood pressure measurement method based on Korotkoff sounds principle and evaluate its accuracy.

Design and method: A blood pressure measurement method based on the generation mechanisms of Korotkoff sounds was proposed. The traditional Korotkoff sounds method determine the SBP and DBP according to the appearance and disappearance of Korotkoff sounds respectively. In previous studies the amplitude of the Korotkoff sounds was used to identify the first and last Korotkoff sounds. Unfortunately the amplitude of the Korotkoff sounds usually became faint when the cuff pressure close to SBP or DBP. In present research, the occur-

rence time of the Korotkoff sounds for each cardiac cycle under different cuff pressure was observed. The Korotkoff sounds was delayed as the cuff pressure increased, which could be utilized to distinguish the false Korotkoff sounds. To overcome the drawback of the traditional Korotkoff sounds method, in present research the Korotkoff sounds delay time was utilized to eliminate the noise and the interference.

Results: A method and corresponding instrument for blood pressure measurement base on Korotkoff sounds have been established. The instrument was validated according to the AAMI SP10. The mean deviation for SBP and DBP is 0.73 mmHg and -0.30 mmHg. The standard deviation for SBP and DBP is 2.39 mmHg and 2.85 mmHg. The percentages for the deviation of 255 pairs of measurements within 5, 10, and 15 mmHg for SBP are 94.9%, 99.2%, 100%, respectively. The percentages for DBP are 94.1%, 99.6%, 100%, respectively.

Conclusions: The blood pressure measurement method and corresponding instrument utilizing Korotkoff sound delay time have met the requirement of AAMI SP10. It is an objective individual-specific method for determining the SBP and DBP than oscillometric method. The utilizing of the time delay characteristic of Korotkoff sounds under different cuff pressure enhanced its accuracy and clinical applicability.

PP.03.04 FLOW-THROUGH WIRELESS CARDIOVASCULAR BLOOD PRESSURE MONITORING SYSTEM

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Objective: Today, different wireless blood pressure (BP) monitoring systems have been widely applied to freely moving rats and mice for life science and medical researchers. But, they are non flow-through system and impossible to perfuse drug and collect blood sample directly through their catheters. Therefore, the goal of the present study was to develop a flow-through wireless pressure monitoring system (TPMS) for freely moving small rodents and patients as well.

Design and method: The flow-through wireless TPMS consists of an implant (0.30–0.36 g) assembled by a radio-frequency identification (RFID) pressure sensor chip and a bubble-free fluid pressure chamber, a fluid-filled catheter, a heparin minipump Alzert model 2004, a software, and a notebook. The heparin minipump (1.3Unit/hr) with the implant and the central venous / left ventricular catheter was implanted in a deoxycorticosterone-acetate (DOCA/salt) or tap water (control) 4-weeks treated male Wistar rat for monitoring cardiovascular pressures in freely moving condition for 4 weeks. In the end, the cardiovascular pressures were synchronously recorded by the flow-through wireless TPMS and a conventional flow-through wire pressure Notocord HEM3.1 system. The flow-through wireless TPMS was also tested in intensive care patients in comparisons with conventional wire BP monitoring system through a 3-way stopcock. Data are presented as mean ± SD. One-/two-way ANOVA analysis was used to evaluate differences between animal groups using GraphPad PRISM 6. P < 0.05 was considered the minimal level of significance.

Table: Comparison of monitoring of LVSP, HR, and CVP in DOCA/Salt and control 4-weeks treated rats using Notocord and TPMS

Wistar rats		LVSP (mmHg)		HR (beats/min)		CVP (mmHg)	
		Notocord	TPMS	Notocord	TPMS	Notocord	TPMS
DOCA/Salt (5)	Mean	199***	199***	364	367	2.95	4.89 [#]
	SD	44	47	57	61	0.34	0.71
	Seconds	284	365	284	365	340	376
Control (6)	Mean	124	129	364	367	2.52	0.59
	SD	44	23	57	61	1.26	0.21
	Seconds	284	452	1073	1029	330	1400

LVSP: left ventricular systolic blood pressure; HR: heart rate; CVP: central venous pressure; *p < 0.05, ***P < 0.01, DOCA/Salt vs. Control. [#]p < 0.05 Notocord vs. TPMS

Results: Synchronously monitoring of BP in 6 intensive care patients with cardiovascular diseases in comparison between the portable wireless TPMS and conventional BP monitoring system was comparable.

Conclusions: This implantable and portable flow-through wireless TPMS can be applied for accurately monitoring cardiovascular blood pressure and drug perfusion for 4 weeks in freely moving rat, and potentially applied for intensive care patients. Further clinical trial is required for a validation.

PP.03.05 ASSOCIATION BETWEEN ALBUMINURIA AND BOTH OFFICE AND 24 HOURS AMBULATORY BLOOD PRESSURE

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Objective: Albuminuria has been linked more closely with blood pressure (BP) values in ambulatory blood pressure monitoring (ABPM) than with the BP in consultation. Our purpose was to analyse this association.

Design and method: Observational, cross-sectional study in patients with EH. Albuminuria was calculated as the average of 2 determinations (turbidimetry). The office BP was determined as the average of 3 measurements and ABPM was performed with a SPACELAB monitor, mod. 90217.

Results: We included a total of 1130 patients (50.3% male) with a mean age of 57 (14) years, 25% with type 2 DM. Office BP values were 147 (19)/81 (12) mm Hg and ABPM 133(15)/80 (10) mm Hg in the daytime and 121 (16)/70 (10) mm Hg in the night time. The mean values of albuminuria and eGFR-EPI-creatinine were 30 (121) mg/g creatinine and 84 (21) ml/min/1.73 m², respectively. Albuminuria, adjusted for age and sex, was positively correlated with BMI (r = .075, p = 0.038), office SBP (r = .082, p = 0.024), office DBP (r = .073, p = 0.043), daytime SBP (r = .119, p = 0.001) and night time DBP (r = .094, p = 0.010) and negatively for eGFR-EPI-creatinine (r = -.104, p = 0.004). The ratio of night-time/day-time SBP and DBP was not correlated with albuminuria. There were no differences in albuminuria within patients classified as non-dipper vs. dipper neither for the SBP (32 vs. 27 mg./gr., respectively, p = 0.581) nor DBP (34 vs. 27 mg./g., p = 0.386). In multivariate analysis the only independent determinants of albuminuria were daytime SBP (beta = 1.136, 95% CI .547–1.72, p < 0.0001) and BMI (beta = 1.80, 95% CI .082–3.52, p = 0.069).

Conclusions: In our patients with EH, albuminuria was only associated, in addition to BMI, with the values of diurnal SBP in 24h. Neither the night time BP values nor the pattern of nocturnal dipping showed this association. The 24-hour ABPM may well be a more effective tool than office BP for assessing this cardiovascular risk factor.

PP.03.06 PREVALENCE OF WHITE COAT AND MASKED HYPERTENSION WITH THREE CONFIGURATIONS OF OFFICE BLOOD PRESSURE MEASUREMENT IN PATIENTS FROM A BRAZILIAN AMBULATORY BLOOD PRESSURE CENTER

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Objective: To evaluate the prevalence four BP profiles, Hypertension, Normal, White Coat (WCH), Masked Hypertension (MH), using three configurations of office measurement blood pressure (BP).

Design and method: During a check up 426 patients have had their BP measured by doctors one time. So, they were referred to record of ambulatory blood pressure monitoring (ABPM) because of a newly diagnosed of hypertension. At ABPM center, all of them have had their BP registered by a nurse, who made 7 successive measures using automated equipment, and then they recorded 24 hour ambulatory blood pressure monitoring (ABPM), following protocols of European Hypertension Guidelines. It was calculated the percentage of four BP profiles. Searching to classify the BP profiles were used day time ambulatory average as standard, together with 3 different office measurement BP configuration: doctors measurement (OBPa), the first reading of nurse (BP1) and a average from third to seven nurse measurement (3–7BPa). Weighted Kappa was utilized to assess if OBPa, BP1 and 3–7 BPa have scored the same patients in one of the four profiles.

Results: It was analyzed data from 426 patients. Table 1 (on the following page) shows the percentage of the four BP profiles with each configuration studied. The proportion of Hypertension (39.7%) and WCH (41.5%) using OBPa was significantly higher than using BP-1 (30.0%; 16.7%, respectively) or 3–7BPa (28.6%; 14.3%, respectively). Unlike there was a significantly lower proportion of MH (3.3%) with OBPa than BP-1 (16.7%) or 3–7BPa (9.4%). The comparison of results between BP-1 and 3–7BPa hasn't demonstrated any significant difference for MH proportion. Weighted Kappa (table 2) showed fair agreement for comparisons between OBPa and both nurse measurement and good agreement between BP1 and 3–7BPa.

TABLE 1. Proportion of blood pressure profiles

B. P. Profile	Results - %, [95%CI], (n)		
	OBPa	BP1	3-7BPa
Hypertension	39.7, [35.0 : 44.3], (169)	30.0, [25.6 : 34.3], (128)	28.6, [24.3 : 32.9], (122)
MH	3.3, [1.6 : 5.0], (14)	16.7, [13.1 : 20.2], (71)	9.4, [6.6 : 12.1], (40)
WCH	41.5, [36.8 : 46.1], (117)	12.9, [9.7 : 16.8], (55)	14.3, [11.0 : 17.6], (61)
Normal	15.5, [12.0 : 18.9], (66)	40.4, [35.7 : 45.0], (172)	47.7, [43.0 : 52.4], (203)

Values are proportions, confidence intervals and absolute numbers; CI = confidence interval, n = absolute number; OBPa = doctors BP readings, BP1- first reading from successive measurements, 3-7BPa = BP3 to BP7 average from from successive measurements; Cut off values to define high blood pressure : OBPa, BP-1 and 3-7BPa, $\geq 140/90$ mmHg; day time ambulatory BP $\geq 135/85$ mmHg

TABLE 2. Weighted Kappa for agreement between the three measurement BP configurations

	Results - K, [95%CI]		
	OBPa vs BP-1	OBPa vs 3-7BPa	BP1 vs 3-7BPa
Weighted Kappa	0.23, [0.18 : 0.28]	0.27, [0.17 : 0.27]	0.75, [0.70 : 0.80]

K= Weighted Kappa; CI = confidence interval; OBPa = doctors BP readings, BP-1- first reading from successive measurements, 3-7BPa = BP3 to BP7 average from from successive measurements; Cut off values to define high blood pressure : OBPa, BP-1 and 3-7BPa, $\geq 140/90$ mmHg; day time ambulatory BP $\geq 135/85$ mmHg

Conclusions: The prevalence of blood pressure profiles is dependent of office blood pressure configuration. Compared with populations studies, OBPa overestimated the proportion of hypertension and WCH, and underestimated the proportion of masked hypertension bringing negative impacts on costs and quality management of hypertension. Reconfiguring office BP using the successive measures technique could help health care system to solve this issue.

PP.03.07 SUCCESSIVE MEASUREMENT IMPROVES DIAGNOSTIC PERFORMANCE OF OFFICE BLOOD PRESSURE

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Objective: To evaluate the diagnostic performance of successive blood pressure (BP) measurements, using as gold standard 24-hour blood pressure average (24BPa).

TABLE 1. Sensitivity, specificity, PPV and NPV - % [C95%]

	Sensitivity	Specificity	PPV	NPV
3-7BPa	52.3 [39.0 - 65.6]	83.0 [80.5 - 85.5]	80.5 [77.8 - 83.2]	66.8 [63.6 - 70.0]
1-7BPa	53.5 [60.2 - 66.8]	81.5 [78.9 - 84.1]	79.3 [76.5 - 82.0]	66.8 [63.6 - 70.0]
OBPa	39.5 [37.4 - 41.6]	26.2 [23.2 - 29.2]	57.7 [54.3 - 61.0]	68.9 [65.8 - 72.0]

Values are proportions and confidence intervals; CI = confidence interval, PPV = positive predictive value; NPV = negative predictive value; 3-7BPa = BP3 to BP7 average; 1-7BPa = BP1 to BP7 average; OBPa = doctors BP readings average BP, 24 hours BP average was used as gold standard. Cut off values to define high blood pressure : 1-7BPa, 3-7BPa, 1-7BPa and OBPa = 140/90 mmHg; 24BPa = 130/80 mmHg.

TABLE 2. Mean of tested and standard blood pressures - (mmHg)

	Mean systolic BP ± SD CI 95%	Mean diastolic BP ± SD CI 95%
3-7BPa	132 ± 15.0 - 110.9 - 133.0	84 ± 11.1 - 85.2 - 84.7
1-7BPa	135 ± 16.0 - 131.9 - 139.0	84 ± 11.0 - 85.2 - 84.7
OBPa	140 ± 19.4 - 147.7 - 150.3	92 ± 11.7 - 91.2 - 92.8
24BPa	125 ± 12.6 - 124.4 - 125.8	79 ± 10.9 - 78.3 - 79.7

BP values are mean ± standard deviation and confidence interval. SD = standard deviation; CI = confidence interval. 3-7BPa = BP3 to BP7 average; 1-7BPa = BP1 to BP7 average; OBPa = doctors BP readings average BP, 24BPa = 24 hours ambulatory BP. p < 0.0001 for comparisons between all tested BP average and 24 hours BP average. p = 0.34 for comparisons between systolic BP of 1-7BPa and 3-7BPa. p > 0.05 for comparisons between diastolic 3-7BPa and 1-7BPa.

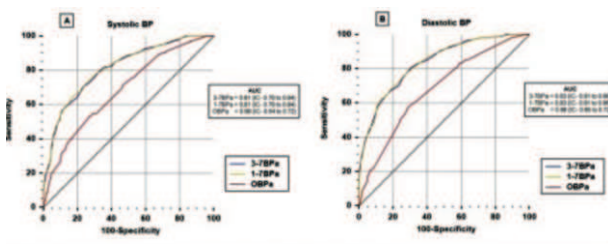


FIGURE 1. Area under the ROC curve of systolic and diastolic 3-7BPa, 1-7BPa and OBPa.

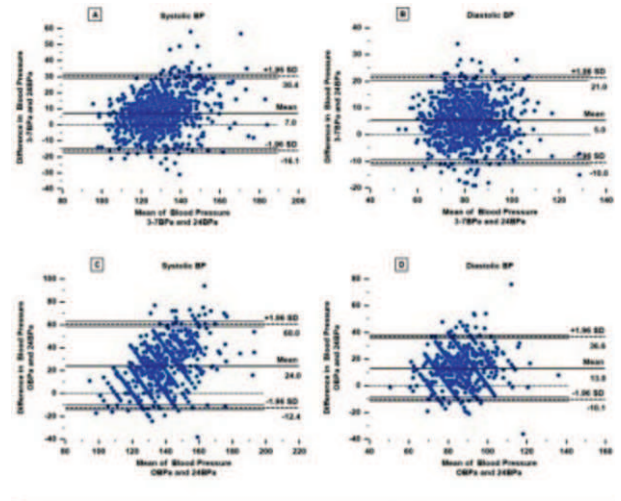


FIGURE 2. Blood Altman plot of difference in blood pressure between 3-7BPa (A and B), OBPa (C and D) against 24BPa.

Design and method: 852 patients have had their BP measured: 7 successive nurse measures using automated equipment, and 24 hour ambulatory blood pressure monitoring (ABPM), both were made following protocols of european guidelines. Also, all of them have had their BP measured in doctor's office, and they were referred to ABPM because off a newly diagnosed high blood pressure or uncontrol treated hypertension. Were compared with 24BPa, doctors readings BP average (OBPa) and 2 averages of nurse measurements: 3-7BPa (3 to 7) and 1-7BPa (1 to 7). We calculated sensitivity, specificity, area under the ROC curve (AUC), and Bland Altman plot to evaluate agreement between OBPa or 3-7BPa against 24BPa.

Results: It were analyzed data from 834 patients, after the exclusion of 18 patients whose ABPM didn't met quality criteria. The best performances of specificity occurred with 3-7BPa and 1-7BPa, (83.0% and 81.5% respectively) and sensitivity of OBPa (89.5%). The lower specificity occurred with OBPa (26.2%) and sensitivity of 3-7BPa (62.3%) (table 1). In Figure 1 are showed the results of AUC, 3-7BPa and 1-7BPa reached the same results (0.81-systolic and 0.83-diastolic) and it was better than OBPa (0.68 systolic and diastolic). Table 2 shows the systolic and diastolic BP mean of tested and standard measurements The lowest average difference between the tests and 24BPa was reached with 3-7BPa (7/5 mmHg), and highest it was with OBPa (24/13mmHg). In figure 2, there are represented Bland Altman plot of the differences in BP between 3-7BPa or OBPa and 24BPa. It can note, smaller dispersion of values in 3-7BPa than in OBPa showing a better agreement with 24 hours average.

Conclusions: 3-7BPa and 1-7BPa demonstrated high specificity and better diagnostic performance than OBPa. Health care systems of low and middle income economies, as Brazil, could have benefits in quality decision making in hypertension with adoption of this technique.

PP.03.08 AMBULATORY BLOOD PRESSURE MONITORING AFFECTS SLEEP QUALITY AND BLOOD PRESSURE

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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 exhib-

ited similar mean values of nocturnal blood pressure and heart rate (121/73 vs 119/71 mm Hg, 67 vs 65 beats/min, $p = \text{NS}$ 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.03.09 VALIDATION OF THREE AUTOMATIC BLOOD PRESSURE MONITORS FOR SELF-MEASUREMENT ACCORDING TO EUROPEAN SOCIETY OF HYPERTENSION INTERNATIONAL PROTOCOL REVISION 2010

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Objective: This validation aimed to evaluate the accuracy of three automatic blood pressure monitors for home use, namely Transtek TMB-1490, LS808-B and LS810-B according to the European Society of Hypertension International Protocol revision 2010 (ESH-IP2010) in three separate studies. The three Transtek devices use the oscillometric method and TMB-1490 and LS808-B are arm devices, while LS810-B is wrist devices.

Design and method: The International Protocol requirements were followed precisely in three studies. In each study, 33 adult individuals were finally recruited and sequentially measured systolic blood pressure (SBP) and diastolic blood pressure (DBP) using the mercury sphygmomanometer and each of the tested devices. According to the validation protocol, 99 pairs of test device and reference blood pressure measurements were obtained in each study (three pairs for each participant).

Results: All three tested devices passed the validation process. Transtek TMB-1490 produced 83, 98, 99 measurements within 5, 10, and 15 mmHg for SBP and 87, 98, 99 for DBP, respectively, 74, 95, 98 measurements for SBP and 80, 94, 99 for DBP, using LS808-B, 74, 95, 99 measurements for SBP and 83, 95, 99 for DBP using LS810-B. The mean (\pm SD) device-observer difference were 1.0 ± 3.3 and -1.3 ± 3.0 mmHg (TMB-1490) for systolic and diastolic, -0.1 ± 4.3 and -0.9 ± 3.6 mmHg (LS808-B), and -0.6 ± 4.9 and 0.5 ± 3.9 mmHg (LS810-B). The number of participants with two or three device-observer differences within 5 mmHg was 28 for SBP and 31 for DBP (TMB-1491), 24 for SBP and 28 for DBP (LS808-B), and 25 for SBP and 26 for DBP (LS810-B). None of the participant had no device-observer difference within 5 mmHg for SBP and three participants had the same for DBP using TMB-1491. For LS808-B and LS810-B, the number of participants had no device-observer difference within 5 mmHg is 0 for SBP and 3 for DBP, 2 for SBP and 3 for DBP, respectively.

Conclusions: According to the validation results on basis of the ESP-IP 2010, Transtek blood pressure monitors TMB-1490, LS808-B and LS810-B can be recommended for self-measurement use in general adult population.

PP.03.10 PREVALENCE OF MASKED HYPERTENSION IN A BI-ETHNIC AFRICAN POPULATION, AND ITS ASSOCIATION WITH HAEMODYNAMIC AND BIOCHEMICAL MARKERS OF CARDIOVASCULAR RISK

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Objective: The current study aimed to determine the prevalence of masked hypertension (i.e. normotensive office blood pressure [BP] and hypertensive ambulatory BP) in a young, bi-ethnic South African population who were recruited on to the AFRICAN-PREDICT study based on normotensive office BP readings.

Design and method: The first baseline phase of the AFRICAN-PREDICT study recruited 352 participants from within the North-West province, South Africa (54% white, 40% male). Study eligibility criteria were: 20 to 30 years of age, normal office BP, not on BP medication, black or white South African, HIV-negative, and apparently healthy. Measurements included 24-hour ambulatory BP monitoring (ABPM) (Cardio-Xplore), aortic pulse wave velocity (aPWV) and augmentation index (AIx) (SphygmoCor-XCEL), peripheral BP (DINAMAP) and the Godin exercise questionnaire. Further to this, fasted venous blood samples were collected for biochemical analyses.

Results: By office and ABPM BP, $n = 290$ (82%) were normotensive (NT), and $n = 62$ (18%) had masked hypertension (MHT). The MHT group had significantly higher clinic and ABPM (24-hour, day and night) BPs, aPWV, I-CAM, MCP-1, and insulin levels, compared to NT. There were no differences in cotinine or exercise levels.

Table 1

	NT $n=290(82.39\%)$	MHT $n=62(17.61\%)$	P-value
Age(years)	25.05 \pm 3.13	24.87 \pm 3.16	NS
Sex n(% male)	98(33.8)	42(67.7)	<0.001
Race n(% black)	136(46.9)	25(40.3)	NS
Waist circumference(cm)	76.92 \pm 10.93	89.36 \pm 16.70	<0.001
Office MAP(mmHg)	89.25 \pm 5.28	92.63 \pm 7.10	0.001
24hour MAP(mmHg)	83.26 \pm 4.67	90.11 \pm 4.95	<0.001
AIx(%)	7.09 \pm 6.83	9.37 \pm 7.05	0.099
aPWV(m/s)	6.25 \pm 0.73	6.51 \pm 0.78	0.018

NS non-significant, \pm SD

aPWV corrected for MAP, age, waist circumference, sex

AIx corrected for heart rate, waist circumference, sex, height

Conclusions: These data, obtained from a cohort recruited on the basis of their normotensive office BP, highlight the high prevalence of masked hypertension among young South Africans. Masked hypertension further demonstrated increased CV risk via unfavourably increased haemodynamic and biochemical markers. This group would have been missed without measurement of ambulatory BP and therefore unaware of the lifestyle or pharmaceutical changes required. As well as the important public health message, these data highlight the importance of using sensitive markers of BP in research if recruiting based on BP status.

PP.03.11 HOW IS TAKING BLOOD PRESSURE IN PHARMACIES OF VALENCIA? FARMAPRES PROJECT (1)

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Objective: Knowing the reality of taking blood pressure (BP) in pharmacies of Valencia.

Design and method: Survey sent to holders of the pharmacies of Valencia, through professional associations of the 3 provinces.

Results: The number of received polls was 381, which represents 16.68% of the whole. Being distribution by provinces as follows: Alicante 230 (60.4%), Castellón 70 (18.4%) and Valencia 81 (21.3%).

The material available for taking blood pressure, has the following distribution: the most frequent was the automatic sphygmomanometer arm 61.9% (26.6% of them were not validated), followed by aneroid with 21.2% (44.3% invalidated) and mercury sphygmomanometer by 16.5% (15.75% not validated).

Regarding the position of taking the blood pressure, 93.4% is performed with the patient sitting, and the 3.9% standing.

The 50.7% of pharmacists makes a single take of BP, 28.9% make 2 takes and only a 15% make 3 takes.

More than a half (66%) never measured arm perimeter before taking BP, while 11.8% do so with an obese and only 5.2% when in doubt about the perimeter of arm. Notably, 60.6% of pharmacies have a sleeve for obese patients.

Conclusions: Most pharmacies have approved devices for measuring blood pressure and up to 90% take the BP into proper position, but only 15% made 3 takes in a systematic way. Despite of having obese sleeve in a majority, their use is less than the percentage of obese people in our community.

PP.03.12 VALIDATION STUDIES OF BLOOD PRESSURE MONITORS AROUND THE WORLD: UPDATE OF IMPLEMENTATION AND RESULTS

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Objective: The wide use of blood pressure (BP) measuring devices in most countries has led to an increasing interest in performing validation studies, aiming to ensure the accuracy of BP measurement and thereby the precise evaluation and effective management of hypertension. This analysis investigated the current status regarding the implementation of established protocols for the validation of BP monitors.

Design and method: Studies reporting validation data of BP monitors in the period 2010–14 using the European Society of Hypertension International Protocol (ESH-IP), the British Society of Hypertension protocol (BHS), or the US Association for the Advancement of Medical Instrumentation / International Organization for Standardization protocol (AAMI/ISO) were identified from PubMed and the Dabl Educational Trust (DET) website. For devices evaluated in more than one studies, each study was considered independently.

Results: A total of 111 validation studies evaluating 102 devices were identified (87 for home use, 31 office and 10 for ambulatory use; some for more than one uses). The number of studies reported in 2010/11/12/13/14 were 32/29/12/15/23 respectively. Solely oscillometric devices were tested in 93.7% of the studies and upper arm monitors in 85.6%. Children/adolescents were included in 7.2% of the studies, pregnancy with preeclampsia in 2.7% and patients with chronic nephropathy in 0.9%. 43.2% were conducted in Europe, 39.6% in Asia and 10.8% in the USA. The ESH-IP protocol was used in 83.9% of the studies, the BHS in 17.1% and the AAMI/ISO in 10.8%. Finally, 94.3% of the studies were reported to pass the validation protocol.

Conclusions: These findings suggest that: (i) there is continuing interest worldwide for the validation of BP monitors using established protocols; (ii) the ESH-IP remains the preferred protocol; (iii) there are relatively few validation studies in special populations; (iv) there seems to be a publication bias with negative studies not being published.

PP.03.13 RELIABILITY OF SCIENTIFIC MEETINGS AND JOURNALS' REVIEW PROCESS IN EVALUATING VALIDATION STUDIES OF BLOOD PRESSURE MONITORS

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Objective: Reliable evaluation of blood pressure (BP) using accurate devices is essential in the effective management of hypertension. The Dabl Educational Trust (DET) (www.dableducational.org) is a non-profit website, evaluating validation studies of BP monitors using a standard procedure that assesses all the aspects of study methodology and reporting. This study compared the performance of the review process of validation studies performed by the DET compared to scientific journals (published papers) and meetings (accepted abstracts).

Design and method: The DET review process evaluates the adherence of each study to established validation protocols and classifies the devices as 'recommended', 'not-recommended', or 'questionable'. For devices tested in more than one studies, each study was considered independently. The conclusion and recommendation of each paper or abstract was compared to that of the DET. Studies with disagreement between the two procedures were further evaluated to identify reasons of the emerging diversities.

Results: A total of 397 studies were evaluated reporting on 325 devices (104 for clinic, 40 ambulatory and 253 home BP measurement). The DET classified 335 devices (studies) as 'recommended', 21 'not-recommended', and 41 'questionable'. 41 studies (10.3%) which concluded positively in papers/abstracts, were classified by the DET as 'questionable' (n=38) or 'not-recommended' (n=3). Reasons of DET conclusion were: (i) protocol violation (n=14); (ii) results in abstract form only (n=7); (iii) incomplete report (n=6); (iv) unjustified conclusion (n=6); (v) non-established protocol (n=4); (vi) only AAMI protocol criteria fulfilled (n=4).

Conclusions: The peer-review process of scientific journals and meetings often fails to identify methodological pitfalls of studies validating BP monitors and might lead to unjustified conclusion. A standardized review process as that of the DET is more efficient and reliable and should be applied for the evaluation of validation studies.

PP.03.14 THE OPTIMAL NIGHTTIME HOME BLOOD PRESSURE MONITORING SCHEDULE: AGREEMENT WITH NIGHTTIME AMBULATORY BLOOD PRESSURE AND ASSOCIATION WITH ORGAN DAMAGE

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Objective: Modern technology allows the evaluation of nighttime blood pressure with low-cost self-home blood pressure (HBP) monitors. This study assessed the optimal number of nighttime HBP measurements in terms of agreement with nighttime ambulatory (ABP) monitoring and prediction of target-organ damage.

Design and method: Untreated hypertensives were evaluated with 24-hour ABP (20 min intervals) and HBP monitoring during daytime (6 days, duplicate morning and evening measurements) and nighttime (automated monitoring, 3 nights, 3 hourly measurements/night). Target-organ damage was assessed by echocardiographic left ventricular mass index (LVMI), carotid intima-media thickness (cIMT), urine albumin excretion (UAE) and ankle-brachial index (ABI).

Results: 94 subjects with complete HBP monitoring (3-nights; 9 readings) were analyzed (mean age 51.8 ± 11.1 years, men 57%, diabetics 5%). By averaging an increasing number of nighttime HBP readings, there was a consistent trend towards stronger association of nighttime systolic HBP with (i) nighttime ABP and (ii) target-organ damage indices, with highest coefficients observed when averaging 4 or more readings (Table). The same was the case for the associations of nighttime diastolic HBP with ABP, whereas the number of readings had no impact on the associations of diastolic nighttime HBP with ABI (Table). The diagnostic agreement between HBP and ABP in detecting non-dippers was slightly improved by averaging 4 or more readings (1 reading: agreement 81%, kappa 0.37; 4 readings: 88%, 0.49; 9 readings: 84%, 0.40).

Conclusions: At least 4 readings appear to be required for optimal nighttime HBP evaluation, in terms of association with nighttime ABP and target-organ damage.

Table. Association of nighttime HBP with ABP and target-organ damage (systolic/diastolic; correlation coefficients r, *, p<0.05).

HBP readings	ABP (n=94)	LVMI (n=86)	cIMT (n=72)	UAE (n=71)	ABI (n=80)
1	0.69*/0.62*	0.13/0.10	0.12/0.20	0.33*/0.34*	-0.03/0.32*
2	0.73*/0.67*	0.17/0.14	0.17/0.19	0.37*/0.37*	-0.04/0.30*
3 (1st night)	0.76*/0.70*	0.19/0.13	0.23/0.22	0.39*/0.34*	-0.04/0.30*
4	0.78*/0.75*	0.20/0.14	0.25*/0.25*	0.39*/0.35*	-0.06/0.30*
5	0.80*/0.77*	0.21/0.14	0.27*/0.27*	0.42*/0.36*	-0.05/0.29*
6 (2 nights)	0.79*/0.78*	0.20/0.13	0.28*/0.27*	0.42*/0.36*	-0.05/0.29*
7	0.79*/0.79*	0.19/0.11	0.26*/0.27*	0.41*/0.35*	-0.06/0.29*
8	0.79*/0.81*	0.22*/0.12	0.24*/0.25*	0.41*/0.34*	-0.04/0.29*
9 (3 nights)	0.81*/0.82*	0.22*/0.13	0.25*/0.25*	0.41*/0.34*	-0.03/0.31*

PP.03.15 NIGHTTIME HOME VERSUS AMBULATORY BLOOD PRESSURE AND TARGET-ORGAN DAMAGE

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Objective: To evaluate the relationship between nighttime blood pressure assessed by home (HBP) or ambulatory (ABP) monitoring with target-organ damage.

Design and method: Untreated hypertensives were evaluated with 24-hour ABP (20 min intervals) and HBP monitoring during daytime (6 days, duplicate morning and evening measurements) and nighttime (automated monitoring, 3 nights, 3 hourly measurements/night). Target organ damage was assessed by echocardiographic left ventricular mass index (LVMI), carotid intima-media thickness (cIMT), urine albumin excretion (UAE) and ankle-brachial index (ABI).

Results: A total of 131 subjects were analyzed (mean age 52.1 ± 11.9 years, men 58%, diabetics 6.9%, cardiovascular disease 6.1%). Daytime and nighttime HBP were slightly higher than the respective ABP values (mean difference for daytime/nighttime systolic 3.5 [95% CI 1.7, 5.3]/2.6 [0.9, 4.3] mmHg, p<0.01 for both comparisons; daytime/nighttime diastolic: -0.2 [-1.4, 0.9]/1.3 [0.2, 2.4] mmHg, p=NS/0.02 respectively). There was a strong association between daytime ABP and HBP (r=0.71/0.72, systolic/diastolic), as well as between the respective nighttime values (r=0.80/0.79) (all p<0.01). Both nighttime ABP and HBP were strongly associated with all indices of target-organ damage (Table). In multivariate analyses, LVMI was best predicted (R²=0.26) by nighttime home pulse pressure (PP), age and male gender; cIMT (R²=0.21) by age and nighttime systolic HBP; UAE (R²=0.24) by nighttime systolic HBP; ABI (R²=0.20) by male gender and nighttime home PP.

Conclusions: Nighttime HBP appears to be as good as nighttime ABP in terms of its association with target-organ damage.

Table. Association of nighttime HBP and ABP with target-organ damage (correlation coefficients r, *, p<0.05; **, p<0.01)

	LVMI (n=117)	cIMT (n=102)	UAE (n=96)	ABI (n=111)
ABP systolic	0.24**	0.24*	0.44**	0.04
ABP diastolic	0.20*	0.11	0.33**	0.23*
Ambulatory PP	0.33**	0.24*	0.32**	-0.18
HBP systolic	0.37**	0.21*	0.50**	-0.01
HBP diastolic	0.22*	0.10	0.39**	0.29**
Home PP	0.37**	0.24*	0.40**	-0.29**

PP.03.16 **COMPARISON OF BRACHIAL AND CENTRAL BLOOD PRESSURES USING AN OSCILLOMETRIC DEVICE WITH 2 OR 6 METRE TUBING LENGTHS FOR ASSESSMENT OF CENTRAL PRESSURE DURING MRI EXAM**

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Objective: Magnetic resonance imaging (MRI) offers the possibility to measure local and regional indices of aortic function. However calculations of these indices usually require blood pressure (BP) values. Up to now, because of its easier availability, brachial BP was used instead of local aortic pressure. The SphygmoCor Xcel system (AtCor Medical, Australia) estimates aortic pressure non-invasively. It consists in a MRI compatible brachial cuff connected via a hose to a recording unit and computer. The aim of this study was to compare brachial and central BP values given by SphygmoCor Xcel with the standard 2 meters hose and a 6 meters hose more suitable for central BP assessment during MRI.

Design and method: After 5 min rest supine, BP was measured simultaneously on both arms with one 2m SphygmoCor Xcel and one 6m SphygmoCor Xcel. Arms were randomly assigned. Tubing were then interchanged (cuffs unchanged) and recordings repeated.

Results: 38 patients were studied (63% men). Seven (18%) were treated for hypertension, 2 (5%) for diabetes and 3 (11%) for dyslipidaemia. Median age was 36.8 years (28.5–58.4). Brachial systolic (bSBP2), diastolic (bDBP2) and central systolic BP (cSBP2) with the standard 2m hose varied from 95 to 158, from 57 to 96 and from 85 to 145 mmHg respectively. The difference between left and right arm was 3.1 ± 7.8 (mean \pm SD, $p=0.02$), 1.1 ± 5.3 ($p=0.2$) and 2.5 ± 7.2 mmHg ($p=0.04$) for bSBP2, bDBP2 and cSBP2 respectively. Values obtained on left and right sides were then averaged. There was no difference between bSBP, bDBP and cSBP obtained with the 2 and 6m tubing (-1.2 ± 3.0 mmHg, $p=0.02$, -0.7 ± 2.6 mmHg, $p=0.07$ and 0.2 ± 2.4 mmHg $p=0.56$, respectively). Augmented pressure (AP) and augmentation index (Aix) with 2m and 6m tubing were statistically different (2.7 ± 4.0 mmHg, $p<0.001$ and 5.3 ± 7.6 %, $p<0.001$, respectively).

Conclusions: Brachial and central BP recorded with SphygmoCor Xcel and a 6m hose are in agreement with measurements done with the standard 2m hose. Assessing central BP during MRI exam is hence feasible. Other parameters (AP and Aix) based on higher frequency content are however less reliable.

PP.03.17 **SEASONAL DIFFERENCES OF DAYTIME AND CLINICAL BLOOD PRESSURE IN PATIENTS WITH HYPERTENSION AND HIGH NORMAL BLOOD PRESSURE. MASKED HYPERTENSION TENDENCY IN WINTER**

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Objective: High seasonal (winter [W] vs. summer [S]) differences in cardiovascular mortality and morbidity are the basis for studies of their causes including the blood pressure (BP) values assessment. The aim of this study was to investigate ambulatory BP seasonal changes in hypertensive (H) patients and patients with high normal BP.

Design and method: The patients from the general population (Ivanovo, Russian Federation) who attended ambulatory clinics with clinical BP (CBP) $< 160/100$ mm Hg under antihypertensive treatment (AHT) or without it and the patients with CBP $130-139/85-89$ mm Hg without AHT were examined in W and S by ambulatory BP monitoring (ABPM; BPlab device, Nizny Novgorod, Russia). The selection criterion for ABPM records was the quality adequate for sophisticated analyses: duration > 24 hours, absence of data gaps > 1 hour. The patients were included both in W and in S.

Results: The total number of the patients was 498: 36.3% men, 92.4% with H (52.8% with AHT, other with 1 stage H), mean age 51.5 ± 0.4 years, BMI 28.7 ± 0.2 kg/m², CBP $132.8 \pm 0.6/80.2 \pm 0.4$ mm Hg. The seasonal BP differences are presented in the Table.

mm Hg, M \pm m	W	S	p
Systolic CBP	134.6 \pm 0.6	130.5 \pm 0.6	<0.0001
Diastolic CBP	81.1 \pm 0.4	78.1 \pm 0.4	<0.0001
SBP24	133.6 \pm 0.6	131.5 \pm 0.6	0.01
DBP24	84.0 \pm 0.4	81.1 \pm 0.4	<0.0001
SBPday (08:00-22:00)	137.7 \pm 0.6	134.6 \pm 0.6	<0.0001
DBPday (08:00-22:00)	87.6 \pm 0.4	83.9 \pm 0.4	<0.0001
SBPnight (00:00-06:00)	119.8 \pm 0.7	120.4 \pm 0.7	ns
DBPnight (00:00-06:00)	72.4 \pm 0.4	71.4 \pm 0.4	ns

Conclusions: In our trial the seasonal factor influenced the CBP and the daytime BP only. The absence of nighttime BP seasonal differences may be due to the use of traditional indoor heating systems in W. The ABPM with particular attention to daytime data should be used intensively in W due to the evident masked hypertension tendency (in sites with relatively low ambient temperature in W).

PP.03.18 **SEASONAL DIFFERENCES IN CIRCADIAN BLOOD PRESSURE IN PATIENTS WITH WELL-CONTROLLED HYPERTENSION**

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Objective: Blood pressure (BP) levels have tendency to seasonal (winter [W] vs. summer [S]) variability in hypertensive patients but some aspects of this problem are not studied yet. The aim of the study was to compare the circadian BP profile in patients with well-controlled hypertension in W and S.

Design and method: We included patients from the general population who visited ambulatory clinics for various reasons. The main inclusion criteria were clinical BP (CBP) less than 140/90 mm Hg and regular antihypertensive therapy (AHT) (2 weeks). The ambulatory BP monitoring (ABPM) was performed with the BPlab device (Nizny Novgorod, Russia) twice in each patient: in W (December-February 2012–2014) and in S (June-August 2012–2014). The interval between ABPMs was 6 months \pm 10 days. The selection criteria for ABPM records were the quality adequate for sophisticated analyses: duration > 24 hours, absence of data gaps > 1 hour, > 55 readings per 24 hours.

Results: The total number of patients was 272: 55.9% men, mean age 57.3 ± 0.7 (M \pm m) years, the average body mass index 28.1 ± 0.3 kg/m², CBP at inclusion $128.2 \pm 0.9/76.3 \pm 0.6$ mm Hg. The main results are presented in the Table. The seasonal CBP dynamic was typical. In contrast 24-hour BP (BP24) values were higher in the morning and at night in S.

mm Hg, M \pm m	W	S	p
Systolic CBP	135.1 \pm 0.1	129.1 \pm 1.0	<0.0001
Diastolic CBP	79.5 \pm 0.6	75.9 \pm 0.6	<0.001
Systolic BP24	130.3 \pm 0.8	129.7 \pm 0.7	ns
Diastolic BP24	79.9 \pm 0.5	80.5 \pm 0.5	ns
Systolic BP morning (06:00-08:00)	126.4 \pm 1.1	130.3 \pm 1.0	<0.01
Diastolic BP morning (06:00-08:00)	77.4 \pm 0.7	81.1 \pm 0.7	<0.001
Systolic BP day time (08:00-22:00)	133.4 \pm 0.8	131.7 \pm 0.7	ns
Diastolic BP day time (08:00-22:00)	82.4 \pm 0.5	82.4 \pm 0.5	ns
Systolic BP night time (00:00-06:00)	120.0 \pm 0.9	122.5 \pm 0.9	<0.05
Diastolic BP night time (00:00-06:00)	71.6 \pm 0.6	74.0 \pm 0.6	<0.01

Conclusions: The study demonstrated that the patients with well-controlled hypertension do not need the downward titration of AHT in S. The higher values of BP at night and in the morning may be due to relatively high ambient temperature in S in Saratov and absence of indoor air conditioners.

PP.03.19 **MORNING SURGE AND CARDIOVASCULAR RISK PROFILE IN DIFFERENT SUBSETS OF HYPERTENSIVE PATIENTS**

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Objective: To evaluate the relationship concerning blood pressure (BP) morning surge and cardiovascular risk profile in hypertensive patients. BP morning surge might imply higher cardiovascular risk.

Design and method: In forty-four men and 36 women, mean age 60.56 ± 12.19 yrs, hypertensive patients consecutively submitted for clinical evaluation, standard 24 h ambulatory blood pressure monitoring (ABPM) was performed using a Meditech™ ABPM-05 device; routine blood samples and echocardiography examination were assess. Sleep-through morning surge was used to define BP morning surge, as the difference between the morning pressure during the first 2 hours after awakening and the average of the lowest night-time BP, using the submission that a systolic morning BP surge less than 20 mmHg is not associated with increased risk. Ambulatory pulse pressure (PP) is a potent cardiovascular risk factor. Other cardiovascular risk factors such as smoking status, body mass index (BMI), type 2 diabetes mellitus,

total cholesterol were computed. Estimated Glomerular Filtration Rate (eGFR) and left ventricular hypertrophy (LVH) as target organ damage (TOD) markers were subtracted.

Results: Evaluating ABPM's in all patients, pulse pressure average was 56.70 ± 14.22 mmHg. In 23 hypertensive patients with widened PP (>60 mmHg), 65.2% patients presented BP morning surge but no significant correlation between BP morning surge and PP, no influence of age (>60 yrs).

BP morning surge was found not to be influenced by any independent cardiovascular risk factor taken into account: smoking status, presence of BMI, type 2 diabetes mellitus, eGFR and total cholesterol ($p > 0.05$).

Strong statistical correlation has occurred between PP > 60 mmHg and eGFR rate ($p = 0.001$).

Correlated with target organ damage, BP morning surge was strongly associated to LVH with stronger association in-group aged < 60 yrs. ($p = 0.007$).

Multivariate logistic regression applied outlines that BP morning surge is dependent influenced by the simultaneous presence of the diabetes ($p = 0.05$), widened PP ($p = 0.02$) and LVH ($p = 0.02$) in hypertensive patients.

Conclusions: In our study, BP morning surge was not identified as being influenced by the presence of individual cardiovascular risk factors, but increase the poor prognosis in hypertensive patients with different cardiovascular risk profile.

PP.03.20 CIRCADIAN RHYTHM IN BLOOD PRESSURE IN NEWBORNS AND ADULTS

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Objective: The aim of the study was the analysis of long lasting blood pressure monitoring in premature babies and newborns, lasting 14 to 45 days and in adult people monitored for seven day using ambulatory blood pressure monitoring to describe the circadian rhythm.

Design and method: Blood pressure and heart rate were monitored automatically for 14 to 45 days, mostly at 30 minutes intervals from a total of 86 premature babies. We examined 145 healthy subjects using seven-day ambulatory blood pressure monitoring (TM-2421 A and D, Japan). From the newborn babies blood pressure data and heart rate data and data from 7-day ambulatory blood pressure monitoring were analyzed using the power spectral density function, which was computed from the autocorrelation functions using the Hanning spectral window. We also evaluated blood pressure mean values for 24 hours and the blood pressure deeping.

Results: Our data showed in adults, using comparison of deeping of circadian (24 hours) and of the week component (168 hours) of systolic and diastolic blood pressure, large prominence of circadian component in systolic and diastolic blood pressure. The week variation in blood pressure in adult healthy subjects are present and are very small. Long lasting monitoring in newborns showed slow oscillations in systolic and diastolic blood pressure with a different period between 5 to 10 days and in blood pressure in all newborns. An identical period in heart rate, systolic and diastolic blood pressure was found in 31%. The peak of 24-hour periodicity in heart rate was found in 50% of newborns, in systolic and diastolic blood pressure only in 43%. The peak of 24-hour periodicity was always smaller than those found with week rhythm. Mean power spectra revealed a significant peak ($p < 0.05$) at 0.16 cycles per day in systolic and diastolic blood pressure.

Conclusions: In newborns we have found in blood pressure in deeping large prominence of the week rhythm component (168 h) in comparison to circadian variation (24 h). In adult healthy subjects the circadian rhythm is most prominent in blood pressure oscillations and week rhythm shows small oscillations.

PP.03.21 NON-DIPPING PATTERN AS PREDICTOR OF TEN-YEAR DYNAMICS OF CARDIAC STRUCTURE AND LEFT VENTRICULAR FUNCTION IN HYPERTENSIVE PATIENTS

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Objective: To estimate the association of changes in left ventricular (LV) structure, systolic and diastolic function in treated hypertensive patients after a mean period of 10 years with circadian blood pressure (BP) rhythm.

Design and method: 120 patients were examined initially and after a mean period of 10 years. All patients were underwent M-mode and Doppler echocardiography (tissue Doppler imaging was used only after 10 years), 24-h ambulatory BP monitoring. During the 10 years patients have been treated by their primary care doctor with different antihypertensive drugs. Most patients were irregularly treated.

Results: Initially all patients were classified according to decrease in nighttime BP into dippers ($n = 52$) and non-dippers ($n = 68$). There were no significant dif-

ferences in sex, body mass index, clinic BP, average daytime BP between the dippers and non-dippers at the end of follow-up. Non-dippers were older than dippers ($p < 0.05$). During 10 years in non-dippers group LV mass index (LVMI) increased from 126.5 ± 23.6 to 159.5 ± 20.8 g/m² ($p < 0.01$), relative wall thickness (RWT) - from 0.40 ± 0.03 to 0.47 ± 0.03 ($p < 0.05$), left atrial diameter - from 3.5 ± 0.30 to 4.4 ± 0.40 cm ($p < 0.05$) and ejection fraction decreased from 65.2 ± 5.5 to 57.5 ± 8.1 % ($p < 0.001$) than in dippers group. LVMI at dippers has not significantly changed ($p = 0.08$) after 10 years, although in 20 patients (38 %) the increase of LV mass as compared to 53 (78 %) patients from non-dippers group has been occurred. Impairment of LV diastolic function has occurred in groups irrespectively of the initial state but in non-dipper was found the high degree of diastolic changes. The reproducibility of non-dipping profile in hypertensive patients was 74 % at the end of follow-up. Multiple regression analysis demonstrated that diastolic night-time BP was predictor of δ RWT ($\beta = 0.273$, $\rho = 0.03$) and δ early filling velocity/late filling velocity ratio ($\beta = 0.483$, $\rho = 0.001$), 24-h systolic BP index had a prognostic value of δ isovolumic relaxation time ($\beta = -0.397$, $\rho = 0.005$) and δ LVMI ($\beta = -0.461$, $\rho = 0.001$).

Conclusions: Our findings suggest that long term reproducibility of non-dipping pattern in hypertensive patients is associated with significant structural and functional changes in the heart.

PP.03.22 SEASONAL VARIATION OF BLOOD PRESSURE IS A REAL PROBLEM. THE OPINION OF PATIENTS AND PHYSICIANS

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Objective: Blood pressure variability, both short- and long-term, is a novel important prognostic factor. Seasonal variation of cardio-vascular morbidity and mortality is observed worldwide and the major determinant of this phenomenon is the seasonal changes in blood pressure.

To assess the knowledge and understanding of the presence of blood pressure variation within the year and how it affects the antihypertensive treatment.

Design and method: We sent questionnaires to 305 patients, 91% with arterial hypertension, and 174 physicians in various living settings. Besides the demographic characteristics, we asked them whether they were acquainted with the problem seasonal variation of blood pressure and whether they accepted it. There were questions how this phenomenon affected their treatment strategy.

Results: The patients were at a mean age 57.3 ± 12.57 years (18–89 years), 42% were males and 74% were medically treated, while the physicians were mainly cardiologists (62%), at a mean age 50.80 ± 8.14 (27–73) years and with on average 25 years of professional experience. The vast majority of patients (62%) and of physicians (94%) accepted the seasonal phenomenon. The same number of patients (163 or 63%) and almost all physicians (167 or 96%) has measured lower blood pressure values during summer. This understanding lead to change in the therapeutic behavior. Only 19% did not change their treatment schemes, while 13.4% reduced or increased medications on their own. Their treating physicians changed the patients' therapy according to the season regularly in 48% of the cases and sometimes in 41%. They reported that 26 % of their patients changed their antihypertensive therapy regularly and another 66% did it from time to time. More than two thirds of the physicians (120 or 69%) admitted that changes in guidelines are needed.

Conclusions: The majority of hypertensive patients and their treating physicians accept seasonal variation of blood pressure. Moreover, a large number of patients change their treatment schemes, either alone or advised by healthcare professionals. Cardiologists in Bulgaria modify the antihypertensive treatment according to the season and recommend changes in current guidelines.

PP.03.23 JOB STRAIN IN RELATION TO ORTHOSTATIC CHANGES OF BLOOD PRESSURE VARIABILITY AMONG NURSES

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Objective: Emerging evidences suggest that orthostatic blood pressure (BP) changes are associated with the risk of cardiovascular disease. This study investigated the effect of exposure to job strain on independent predictors of orthostatic of blood pressure and heart rate variability among nurses.

Design and method: The participants comprised a homogeneous group of 100 healthy nurses (mean age 22.18 ± 2.2 years). The choice of this population minimized variance attributable to gender, socioeconomic status, and work characteristics. They underwent a simple standing-up test, brachial BP was measured every min. and the R-R intervals of ECG(LF/HF and HF power spectrum) were continuously evaluated.

Comparison examination was carried out among 2 group of an orthostatic dysregulation(OD(+)) group and a normal(OD(-)) group.

Results: SBP and DBP was variability when standing. (δ SBP1.45 \pm 7.94mmHg) We observed that orthostatic dysregulation(OD) was seen in 45 subjects. According to blood pressure changes at standing, there was a significant for the frequency of breakfast-intake and eating out. Multiple regression analysis showed that commutation-time and bathing were independent determinants of blood pressure changes at standing position.

Conclusions: We concluded that orthostatic change of BP associated with behavior and activity such as bathing and commutation-time, autonomic cardiac control.

PP.03.24 INCREASED TOTAL MORTALITY AS A FUNCTION OF 24 HOUR PULSE PRESSURE DIPPING

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Objective: Elevated values of systolic (SBP), diastolic (DBP) blood pressure and pulse pressure (PP) are known to be powerful risk factors in cardiovascular (CV) diseases. The purpose of this study was to determine the association between PP and Major Advanced CV Events (MACE), and all cause and CV mortality in different age groups of patients with CAD confirmed by angiography.

MACE	Age groups		
	< 65 y.	65y.-74 y.	\geq 75 y.
No. of cases	203	175	64
PP dipping [%] (95%CI)	0.98 (0.96-1.03)	0.98 (0.97-1.01)	0.94 (0.89-0.98)
PP dipping cutoff point [%]	24.3	22.0	13.4 [*]
PP dipping cutoff point [%](95%CI)	0.37 (0.09-1.50)	0.32 (0.08-1.02)	0.57 (0.16-0.98)
Cardiovascular mortality			
No. of cases	50	43	21
PP dipping [%] (95%CI)	0.98 (0.96-1.03)	1.03 (0.98-1.07)	0.93 (0.82-0.98)
PP dipping cutoff point [%]	25.6	24.1	14.6 [*]
PP dipping cutoff point [%](95%CI)	0.10 (0.02-1.75)	0.23 (0.17-1.83)	0.27 (0.17-0.78)
Total mortality			
No. of cases	98	102	45
PP dipping [%] (95%CI)	0.97 (0.95-1.02)	1.00 (0.98-1.03)	0.86 (0.67-0.92)
PP dipping cutoff point [%]	25.6	24.1	9.4 [*]
PP dipping cutoff point [%](95%CI)	0.16 (0.02-1.20)	0.28 (0.07-1.86)	0.36 (0.14-0.89)

^{*}p<0.01 vs. <65 y., [†]p<0.01 vs. 65 y.-74 y.

Design and method: To the PROGNOSIS study there were included 1345 subjects. From total group of 1345 subjects, 891 with significant coronary artery stenosis \geq 70% finally were included to the study. During baseline visit the following data were obtained: 1. two sphygmomanometric BP values; 2. 24-hour ABPM. PP was calculated as SBP minus DBP. The percentage decrease in mean PP during the nighttime period was calculated as 100x[daytime PP mean – nighttime PP mean]/daytime PP mean. Using this percentage ratio, subjects were classified as dippers or non-dippers (nighttime relative PP decline \geq or $<$ 10%, respectively). From the time of the baseline visit to 31 December 2013 (median follow-up 8.3 years), the survival state was ascertained. The primary endpoint was cardiovascular mortality and secondary all-cause mortality. A COX proportional hazards model was used to examine the association between PP and PP dipping and risk of MACE, revascularization, CV and total mortality after adjusting for sex, diabetes, smoking or non smoking status and LDL cholesterol. An analysis of the Receiver Operating Characteristic was used for predicting PP dipping among the age groups of patients.

Results: The study group was divided to age subgroups: <65 y. (n = 461, 352 male), 65–74 y. (n = 330, 191 male), \geq 75 y. (n = 100, 67 male). There were 245 all-cause deaths including 114 CV deaths during the follow-up period. MACE occurred in 442 subjects, but revascularisations (PCI or CABG) were performed in 578 subjects. A Cox proportional regression analysis confirmed the relationship between PP dipping and risk of MACE, CV and total mortality only in group of the oldest subjects (Table).

Conclusions: In contrast to younger CAD patients, PP dipping is related to MACE, CV and total mortality in very elderly CAD subjects.

PP.03.25 RELATIONSHIP BETWEEN 24-HOUR BLOOD PRESSURE VARIABILITY AND TARGET ORGAN DAMAGE IN PATIENTS WITH TYPE 2 DIABETES

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Objective: Blood pressure variability (BPV) is considered a novel risk factor for renal and cardiovascular disease. This study assessed whether a short-term BPV was associated with renal or cardiovascular complications in patients with type 2 diabetes.

Design and method: The study population consisted of 254 Japanese patients with type 2 diabetes (mean age 65.4 years). Office blood pressure (BP), 24-h ambulatory blood pressure monitoring (ABPM), brachial-ankle pulse wave velocity (baPWV),

blood and morning urine collection, and measurement of waist circumferences were performed in all patients. Family history and smoking habits were also recorded. Estimate glomerular filtration rate (eGFR) was calculated using the SCr-based Japanese eGFR equation. Morning BP surge was defined as the morning BP ((2-hour average of four 30-minute BP readings just after wake-up) minus the prewaking BP (2-hour average of 4 BP readings just before wake-up)).

Results: Among the study population, 113 (44%) showed normoalbuminuria, 119 (47%) showed microalbuminuria and 22 (9%) showed macroalbuminuria and 169 (67%) were treated with antihypertensive agents (angiotensin receptor blockers/ angiotensin converting enzyme inhibitors 55%, calcium channel blockers 38%, diuretics 18%, beta-blockers 10%). The coefficient of variation (CV) of 24-hour BP (24BPCV), of daytime BP (DBPCV) and night-time BP (NBPCV) were 15%, 14%, 12% for systolic values and 20%, 20% 14% for diastolic values, respectively. Antihypertensive agents did not significantly affect the CV of BPs. In the multivariate analysis, older age and albuminuria were independently associated with 24SBP. Older age also associated with DSBP and NSBP. Morning BP surge and waist circumference associated with NSBP, but not 24SBP and DSBP. CV of BPs were not associated with baPWV and eGFR.

Conclusions: These data showed that increased SBP variability was closely associated with age in Japanese type 2 diabetes. Elevation of 24SBPCV may indicate higher risk for the progression of diabetic nephropathy. NSBPCV may be a marker for sympathetic over-activity during the night-time. These results indicate that high short-term BP variability may be a marker for renal and/or cardiovascular complications in type 2 diabetes.

PP.03.26 SHORT-TERM BLOOD PRESSURE VARIABILITY AS A MARKER OF DIFFICULT HYPERTENSION. RELATION TO NUMBER OF ANTIHYPERTENSION DRUGS NEEDED

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Objective: Blood Pressure Variability (BPV) is a novel marker of cardiovascular risk and a significant contributor to target-organ-damage for hypertensive patients. The aim of the study was to investigate the relation between short-term BPV, expressed as Standard Deviation (SD) and assessed by noninvasive 24-hour Ambulatory Blood Pressure Monitoring (ABPM), and the number of oral antihypertensive drugs used, as an index of difficulty in controlling essential hypertension.

Design and method: 64 hypertensive patients (mean age 59.8 \pm 10.2 years, 42 women) underwent 24-hour ABPM and blood sample testing, and their medicinal history was recorded. 30 hypertensive patients were uncontrolled and 34 were well-controlled. 28.1% of patients received monotherapy, 29.7% received two-drug therapy, 18.8% received at least three-drug therapy, while 23.4% were newly diagnosed hypertensives and did not receive any medication. Daytime, nighttime and 24 h BP and BPV, both systolic and diastolic, were measured for the patients under none (D0), one (D1), two (D2) or three or more (D3) antihypertensive drugs. ANOVA statistical test between groups was performed (by SPSS 19).

Results: 32.8% of patients were on ACE-inhibitors, 31.3% on ARB, 39.1% on CCB, 20.3% on diuretic and 28.1% on b-blocker. Mean 24h systolic BP was 129.8 \pm 13.8 mmHg, mean 24h diastolic BP was 74.3 \pm 8.1 mmHg, mean daytime systolic BP was 133.9 \pm 14.3 mmHg, mean daytime diastolic BP was 77.4 \pm 8.6 mmHg, mean nighttime systolic BP was 121.7 \pm 16.5 mmHg and mean nighttime diastolic BP was 68.2 \pm 9.5 mmHg. Statistical differences between groups were recorded regarding daytime diastolic BPV (D0 = 6.33 \pm 2.2, D1 = 7.50 \pm 2.2, D2 = 6.26 \pm 1.9, D3 = 8.83 \pm 1.9, p = 0.005), nighttime systolic BPV (D0 = 9.67 \pm 4.0, D1 = 8.44 \pm 3.4, D2 = 10.32 \pm 2.7, D3 = 12.3 \pm 3.6, p = 0.030) and nighttime diastolic BPV (D0 = 7.07 \pm 3.0, D1 = 6.33 \pm 2.2, D2 = 6.74 \pm 1.9, D3 = 9.00 \pm 3.1, p = 0.042). The D3 group developed constantly higher BP and BPV compared with the rest of the groups, regarding systolic and diastolic and daytime, nighttime and 24 h ABPM measurements respectively.

Conclusions: These findings suggest that BPV is a vital component of the difficulty in controlling essential hypertension particularly in patients that need at least a three-drug combination therapy for achieving normal BP values.

PP.03.27 VISIT-TO-VISIT SYSTOLIC BLOOD PRESSURE VARIABILITY IS A SIGNIFICANT PREDICTOR OF ADVERSE OUTCOMES IN STABLE HEART FAILURE WITH REDUCED EJECTION FRACTION

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Objective: There is a growing evidence of the prognostic significance of visit-to-visit BP variability in different groups of patients. Several studies evaluated prognostic significance of 24-h BPV in patients with heart failure. The aim of the study was to evaluate prognostic significance of visit-to-visit BPV in patients with stable HF and reduced ejection fraction.

Design and method: Retrospective analysis included 100 pts (80 men, age 64.4 ± 9.3 yrs, BP $127.6 \pm 15.1/77.9 \pm 8.3$ mmHg, HR 72.3 ± 10.4 bpm) with stable II-III NYHA class HF with EF $<40\%$ (mean $32.3 \pm 4.3\%$). Median of baseline NT-proBNP was 1200 pmol/l (402.0–20524 pmol/l). Patients received stable standard therapy for HF with ACE inhibitors, beta-blockers, verapirone and furosemide. BP was measured with a validated oscillometric device. Visit-to-visit BPV was calculated as SD for 5 visits during 18 months. The endpoints included death, myocardial infarction (MI), stroke, hospitalization for HF.

Results: At the end of the study BP was $123.6 \pm 12.6/74.8 \pm 8.9$ mmHg, HR 69.3 ± 9.1 bpm. Visit-to-visit SBPV varied from 2.3 to 20.0 mmHg, DBPV from 1.5 to 13.0 mmHg. 47 endpoints in 37 patients were registered (21 deaths, 17 hospitalizations for HF, 6 MI and 3 strokes). There was no significant difference between groups with and without endpoints in age, gender, history of MI, baseline BP, severity of HF, EF (33.1 ± 3.5 vs $31.0 \pm 5.1\%$, respectively, $p > 0.05$). A trend to higher baseline NT-Pro-BNP level was observed in patients with endpoints (median 1921 pmol/l vs 993 pmol/l, respectively, $p = 0.17$). The patients with endpoints had higher visit-to-visit SBPV (11.2 ± 4.0 vs 9.5 ± 3.5 mmHg, $p < 0.05$). Endpoints occurrence significantly correlated with DM ($r = 0.20$), NYHA grade ($r = 0.21$) and visit-to-visit SBPV ($r = 0.22$, $p < 0.05$ for all). Nonlinear logistic regression analysis revealed higher risk of adverse outcomes in patients with higher level of visit-to-visit SBPV (OR 1.13, 95% CI 1.0–1.27, $p = 0.03$). Area under curve (AUC) for visit-to-visit SBPV > 10.9 mmHg was 0.74, 95% CI 0.53–0.94 (sensitivity 72.7%, specificity 80%, $p = 0.02$).

Conclusions: Visit-to-visit SBPV is significant predictor of adverse outcomes in patients with stable HF with reduced EF. The threshold of visit-to-visit systolic BPV > 10.9 mmHg may be used as prognostic criteria in this patient population.

PP.03.28 HIGHER ON-TREATMENT VISIT-TO-VISIT BLOOD PRESSURE VARIABILITY IS ASSOCIATED WITH HIGHER BASELINE AORTIC SYSTOLIC BLOOD PRESSURE IN CONTROLLED ARTERIAL HYPERTENSION

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Objective: Emerging evidence now suggests that central pressure is better related to future cardiovascular events than brachial pressure. Visit-to-visit systolic blood pressure variability (SBPV) in treated hypertensive patients has adverse impact on prognosis and it stimulates searching for its predictors. The aim of the study was to evaluate SBPV and its associations with central blood pressure and arterial stiffness in controlled arterial hypertension.

Design and method: 52 pts (20 men, age 58.9 ± 9.0 yrs; 4 smokers; 6 diabetics) were treated to target BP $< 140/90$ mmHg with a RAAS-inhibitor/amlodipine combination for 14 months. Baseline BP was $163.4 \pm 8.1/100.9 \pm 4.2$ mmHg; achieved- $123.7 \pm 9.7/76.8 \pm 6.7$ mmHg. SBPV was calculated as SD for 5 visits during 8 months after target BP achievement. Central BP and pulse wave velocity (PWV) were measured at baseline and in 14 months. $p < 0.05$ was considered significant.

Results: SBPV range was 1.79–16.79 mmHg (tertile I < 5.38 ; II 5.38 - 7.78; III > 7.78 mmHg). The groups were similar by age (I 56.6 ± 8.94 , II 59.4 ± 9.1 , III 60.7 ± 9.1 yrs, $p > 0.05$), gender, metabolic risk factors, baseline and achieved BP (I 162.9 ± 8.7 ; II 164.0 ± 9.0 ; III 163.4 ± 7.0 mmHg and I 122.9 ± 7.3 ; II 126.7 ± 8.8 ; III 121.6 ± 12.1 mmHg, respectively). Higher SBPV was associated with higher baseline central SBP (I 134.6 ± 15.8 ; II 132.6 ± 15.9 and III 146.1 ± 17.7 mmHg) and higher baseline central PP (47.2 ± 10.6 , 55.6 ± 11.1 , 51.1 ± 11.5 mmHg, respectively), $p < 0.05$ for both trends. Number of patients with baseline central SBP $>$ Median (140 mmHg) was 66.7%, 35.3% and 41.2% for corresponding tertiles of SBPV (Pearson's $\chi^2 = 4.9$; $p < 0.05$) No correlation was found between SBPV and any other characteristics, including baseline central SBP. No significant difference was found for PWV (13 ± 1.6 , 14.2 ± 2.2 , 12.9 ± 1.8 m/s, respectively).

Conclusions: Higher central SBP and PP despite similar levels of brachial BP may predict higher visit-to-visit SBPV in controlled hypertension. This finding confirms possible association of BPV and arterial stiffness and remodelling.

PP.03.29 VISIT TO VISIT BLOOD PRESSURE (BP) VARIABILITY AND CAROTID ATHEROSCLEROSIS IN RENAL TRANSPLANT PATIENTS

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Objective: Visit-to-visit BP variability is an independent predictor of cardiovascular events in patients with essential hypertension, chronic kidney disease and end stage kidney failure. To date, no study specifically looked at the relationship between visit-to-visit BP variability and surrogate endpoints of cardiovascular risk in renal transplant patients.

Design and method: In this study, we investigated the relationship between long term visit-to-visit BP variability (expressed in terms of standard deviation calculated throughout 6 consecutive visits at 1–2 months of interval) and a surrogate biomarker of atherosclerosis [intima media thickness (IMT) measured by eco-color Doppler study of the carotid arteries]. We studied 177 renal transplant patients with a mean age of 46 ± 12 years [Males: 68%; Diabetics: 8%; Smokers: 6%, estimated glomerular filtration rate (eGFR): 56 ± 20 ml/min/1.73 m²]. The large majority of patients (87%) were on anti-hypertensive treatment.

Results: Visit-to-visit BP variability was 11 mmHg for systolic BP (delta SBP) and 7 mmHg for diastolic BP (delta DAP). On univariate analysis, both systolic ($r = 0.33$, $P < 0.001$) and diastolic ($r = 0.16$, $P < 0.03$) BP variability were directly related to IMT and these relationships held true in multivariate linear regression models (delta SBP-IMT, beta = 0.21, $P = 0.005$; delta DAP-IMT, beta = 0.15, $P = 0.03$) adjusting for average systolic and diastolic BPs across the follow-up as well as for other potential confounders (age, gender, smoking, diabetes, cholesterol, albumin, C-reactive protein, 24 h urinary protein, eGFR and anti-hypertensive treatment).

Conclusions: Visit-to-visit BP variability is an independent correlate of carotid atherosclerosis in renal transplant patients. Randomized, placebo controlled, clinical trials testing the potential effect of anti-hypertensive drugs specifically affecting BP variability are needed to clarify the nature (causal/non causal) of the relationship between visit-to-visit BP variability and IMT in renal transplant patients.

PP.03.30 THE TRUTH BEHIND NUMBERS REMAINS WELL HIDDEN. BLOOD PRESSURE VARIABILITY PROFILES AND PATTERNS

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Objective: Hypertension guidelines offer no recommendations on documenting and targeting blood pressure variability (BPV), even though evermore research has documented its role in residual cardiovascular (CV) risk in patients with controlled and uncontrolled hypertension (HTN). Our aim is to underline the significance of novel BPV indicators beyond the dipping pattern on the 24 h ambulatory blood pressure monitoring (ABPM) evaluation as part of the thorough risk profile assessment of the uncontrolled hypertensive patient referred to an emergency hospital.

	Dippers	Non-Dippers	Dippers vs. Non-Dippers
No pts	407	337	
Sex (M)	205 (50.36%)	127 (37.68%)	
Average Age	56.38 ± 14.13	65.37 ± 11.24	< 0.01
Average SBP	129.82 ± 13.21	128.28 ± 15.27	ns
Average DBP	75.82 ± 10.28	71.42 ± 10.17	< 0.01
Average Daytime SBP SD	13.61 ± 3.47	13.24 ± 3.56	< 0.01
Average Nighttime SBP SD	11.67 ± 3.74	11.81 ± 4.42	< 0.01
Average Dip	18.38 ± 6.57	2.31 ± 6.41	< 0.01
Average Daytime SBP Load	45%	34%	< 0.01
Average Nighttime SBP Load	15%	31%	< 0.01
Average Weighted SD	12.38 ± 2.75	11.91 ± 2.93	< 0.01

Design and method: We included hypertensive patients referred to our department for uncontrolled hypertension between 2012–2014, with a minimum of 40 successful daytime and 8 successful night-time readings on ABPM monitorings (Meditech-05 ABPM). Exclusion criteria were presence of secondary HTN, eGFR (glomerular filtration rate) < 30 ml/min/1.73m². BPV was expressed as dipping pattern, standard deviation (SD) of mean 24 h (BP recordings at 15 min intervals during day-time and 30 min intervals during night-time), BP load and average weighted SD.

Results: All patients were known hypertensives, however their average BP values on 24hABPM were below 135/85 mmHg. Analyzing beyond dipping profiles, we found significant differences between BPV indicators in the dippers vs non-dippers groups (see table).

Conclusions: In the emergency hospital setting hypertensive patients may show distinctive CV risk profiles, with normal BP values but a very high variability even beyond dipping profiles. In these cases, the guideline definition of controlled hypertension may become an understatement and thus, one should rather revise the patient's drug therapy and adjust it to his/hers chronobiology.

PP.03.31 **OPPOSITES ATTRACT: THE SAME CARDIOVASCULAR PROFILE? HOW BLOOD PRESSURE VARIABILITY AFFECTS THE EXTREMES**

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Objective: Blood pressure variability (BPV) has been proven to correlate with an increased risk of cardiovascular (CV) events even in controlled hypertension. Different BPV indicators have been tested to correlate with increased CV risk, however none, except for dipping profile, have become a standard of measure well enough to enter the guidelines. Average real variability (ARV) of daytime SBP and not high SD has been proven to associate with increased risk of CV events and has been recently proposed as a more reliable representation of BPV than SD as it is less sensitive to the low sampling frequency of ABPM. Incidence of CV events is higher in patients with a lesser drop in nocturnal BP, however data on a possible increased CV risk in extreme dippers are inconsistent thus far. Our aim was to compare novel BPV indicators between the two extremes of the dipping profile and thus prove their importance in the evaluation of the high risk hypertensive patient.

	Extreme dippers	Risers	Extreme dippers vs Risers
No pts	127	100	
Sex (M)	52	37	
Average age	54.5 ± 13.2	69.29 ± 10.54	<0.01
SBP	132.72 ± 13.34	131.46 ± 16.92	ns
Daytime	138.99 ± 13.7	129.77 ± 16.83	<0.01
Night-time	113.6 ± 13.34	136.58 ± 17.72	<0.01
DPB	78.7 ± 11.15	70.74 ± 10.56	<0.01
Daytime	83.24 ± 11.82	70.9 ± 10.41	<0.01
Night-time	64.75 ± 10.0	70.33 ± 11.4	<0.05
SD(SBP)	18.09 ± 3.41	14.13 ± 3.98	<0.01
Daytime	14.73 ± 3.94	13.91 ± 3.94	ns (0.06)
Night-time	12.11 ± 4.36	12.35 ± 6.23	ns
SD(DBP)	13.28 ± 2.5	8.98 ± 2.42	<0.01
Daytime	10.68 ± 2.99	9.05 ± 2.49	<0.01
Night-time	9.12 ± 3.19	7.94 ± 3.58	<0.04
Average dip	26.39 ± 5.27	-5.81 ± 4.89	<0.01
SBP Load Daytime	56%	36%	<0.01
SBP Load Night-time	12%	47%	<0.01
Weighted SD	13.33 ± 3.09	12.43 ± 3.37	0.02
Average real variability	11.63 ± 2.54	11.71 ± 3.81	ns (0.4)

Design and method: We included hypertensive patients referred to our department for uncontrolled hypertension between 2012–2014, with a minimum of 40 successful daytime and 8 successful night-time readings on ABPM monitoring (Meditech-05 ABPM, recordings at 15 min intervals during day-time and 30 min intervals during night-time). Exclusion criteria were presence of secondary HTN, eGFR (glomerular filtration rate) < 30 ml/min/1.73m². Extreme dippers – patients with a nocturnal dip > 20%; risers – patients with a nocturnal dip < 0%. Other BPV indicators calculated: standard deviation (SD) of mean 24h BP, BP load, average weighted SD and average real variability.

Results: In our study average SBP, daytime and night-time SBP SD and ARV did not differ significantly between the two extreme groups, as opposed to classical indicators such as SBP load and weighted SD.

Conclusions: At least in the clinical setting of an emergency hospital, hypertensive patients may show distinctive CV risk profiles, with normal average BP values but high BPV. In these patients, the guideline definition of controlled hypertension becomes an understatement and, thus, drug therapy in their case should respect the patients' chronobiology.

PP.03.32 **24-HOUR AMBULATORY CENTRAL VERSUS PERIPHERAL BLOOD PRESSURE VARIABILITY IN YOUNG INDIVIDUALS**

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Objective: Comparative data of peripheral versus central ambulatory blood pressure (ABP) monitoring suggest there are considerable differences in average levels as well as in diurnal variation. This study assessed the short-term variability of peripheral versus central systolic ABP in young individuals.

Design and method: Apparently healthy adolescents/young adults referred for elevated blood pressure and healthy volunteers were subjected to 24-hour peripheral and central ABP monitoring simultaneously using a noninvasive brachial cuff-based oscillometric device (Mobil-O-Graph 24 h PWA). Variability was quantified using the standard deviation (SD) of systolic ABP (24-hour weighted, awake, asleep), as well as the respective coefficients of variation (CV).

Results: Data from 68 subjects were analyzed (mean age 18.7±4.7 years, range 12–26 years, 52 males, mean BMI 24.5±4.7 kg/m², 24 volunteers, 15 with hypertension [24-hour peripheral BP ≥95th percentile for adolescents or ≥130/80 mmHg for adults]). Mean peripheral ABP was consistently higher than central ABP during all periods of monitoring (24-hour/awake/asleep: 122.9±10.8/128.6±10.9/113.0±11.0 versus 109.7±9.5/112.4±9.9/104.8±10.5 mmHg, respectively, all p<0.001). Although 24-hour weighted SD of peripheral ABP was higher than that of central ABP (10.5±2.2 versus 9.8±2.0 mmHg, p<0.01), the respective CV was lower (0.08±0.01 versus 0.09±0.02, p<0.01). Moreover, SD of awake peripheral ABP was higher than that of central (10.8±2.7 versus 9.3±2.3 mmHg, p<0.01), but there was no difference between the respective CVs (0.08±0.02 versus 0.08±0.02, p=NS). The variability of central asleep ABP was consistently higher than that of peripheral ABP (SD 10.5±2.8 versus 9.9±2.6 mmHg, respectively; CV 0.10±0.03 versus 0.09±0.02; all p<0.01). The CV of asleep central ABP was higher than that of awake central ABP (p<0.01), whereas no such difference was observed for peripheral ABP. CV of asleep central ABP was correlated with BMI (r=0.30, p=0.01), whereas no effect of age and gender was observed.

Conclusions: These preliminary results suggest that in young individuals variability of central ABP is higher than that of peripheral BP when accounting for the average ABP levels. This was mainly attributed to the higher variability of central ABP during nighttime.

PP.03.33 **IMPACTS OF AMLODIPINE, VALSARTAN AND THE TWO DRUGS COMBINATION ON BLOOD PRESSURE VARIABILITY AND PULSE WAVE VELOCITY**

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Objective: To investigate the impacts of amlodipine, valsartan and the two drugs combination on blood pressure variability (BPV) and pulse wave velocity (PWV)

Design and method: It's a prospective, open, parallel control study. 119 participants who were newly diagnosed essential hypertension or receiving single antihypertensive drug were recruited and divided into three groups (amlodipine, valsartan and two drugs combination treatment). Each patient's relevant demographic data and laboratory indicators were collected, in line with his/her 24 hours ambulatory blood pressure monitoring and brachial ankle pulse wave velocity monitoring taken. All participants were given treatment respectively for 10 weeks, and then rechecked the baseline indicator, comparing their effects on BPV and PBV.

Results: Amlodipine can most effectively reduce 24-hour systolic blood pressure variability and diurnal systolic blood pressure variability. Amlodipine is the most effective and valsartan is the least in terms of reducing 24-hour diastolic blood pressure variability (P<0.05). Three kinds of antihypertensive scheme can reduce arterial stiffness (baPWV), degree from strong to weak is: valsartan, two drug combination, amlodipine. The relationship between baPWV and 24 h average systolic blood pressure, 24 h systolic/diastolic blood pressure variability, 24 h average pulse pressure, daytime highest/average systolic blood pressure, daytime systolic/diastolic blood pressure variability, daytime highest diastolic blood pressure, daytime average pulse pressure, nighttime minimum systolic blood pressure are all positively correlated (P<0.05 or P<0.01). Between baPWV and nocturnal systolic blood pressure drop rate is a positive correlation (P<0.05). The relationship between baPWV and nighttime diastolic blood pressure drop rate, however, has no statistical significance.

Conclusions: Three treatments can all effectively control blood pressure. Amlodipine has the strongest antihypertensive effect and can effectively reduce BPV. Valsartan has independent effect in improving arterial stiffness. Arterial stiffness is associated with blood pressure levels and BPV, and its relationship between systolic blood pressure is greater than diastolic blood pressure.

POSTERS' SESSION

POSTERS' SESSION PS04 ORGAN DAMAGE

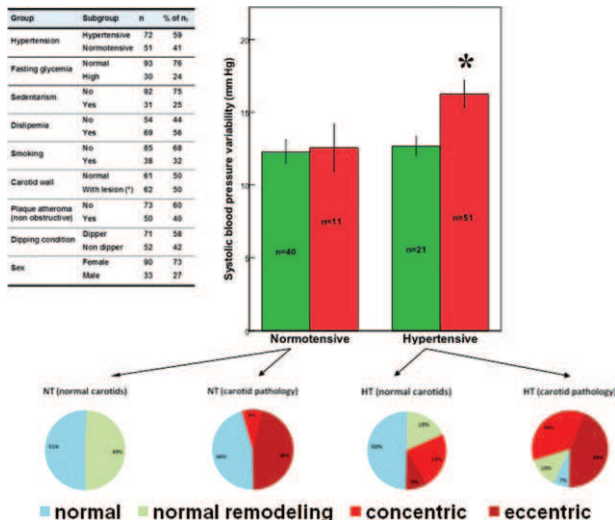
PP.04.01 CAROTID PATHOLOGY: EXTRA-CARDIAC END-ORGAN DAMAGE IN ELDERLY HYPERTENSIVES?

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Objective: This study examines carotid artery lesions as a sign of preclinical TOD in relation with cardiac remodeling in elderly hypertensives.

Design and method: Consecutive outpatients (32 men, 91 women, over 65 y.o.) were clinically and neurologically evaluated: 51 were normotensive controls and 72 were treated hypertensives. Patients continued with their antihypertensive treatments. Laboratory and electrocardiographic evaluations were performed. Blood pressure was measured 5-min after resting in the sitting position. Twenty four-hour ambulatory blood pressure monitoring (ABPM) was performed recording data every 15 min/ day time and every 20 min/ at night. Morning surge (MS) was calculated as the difference between mean systolic blood pressure (SBP) within 2 hours after awakening and mean SBP within the hour of the lowest sleep SBP. Ambulatory blood pressure variability (BPVar) was estimated as the SD of the 24-hr mean blood pressure recording. Carotid artery evaluation was performed in the dorsal decubitus.

Results: All treated hypertensive patients had normal office BP at the study time. Carotid pathology was found in 22% of controls and 71% of hypertensives. Prevalence of LVH was 33% in controls and 67% in hypertensives. Increased SBPVar was observed in 51/72 hypertensives (71%) and in 11/51 controls (22%). Carotid injury and increased 24-hr SBPVar were correlated ($p < 0.01$) in hypertensives. Hypertensives showing carotid injury had the highest SBPVar ($p < 0.005$). Frequency of cardiac remodeling increased according to the presence of carotid injury in hypertensives. Overall correlation was found between cardiac remodeling and presence of carotid plaque ($p < 0.001$). Eccentric remodeling was related to the presence of plaque ($p < 0.001$) compared with patients showing normal LV geometry. These correlations were independent from age, sex, BMI, dislipemia and fasting hyperglycemia. Antihypertensive treatments were not associated with differences in the variables measured in this study.



PP.04.02 EXTREME DIPPING AS AN INDEPENDENT PREDICTOR OF LEFT VENTRICULAR HYPERTROPHY

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Objective: Development of left ventricular hypertrophy (LVH) is a multifactorial and incompletely understood process. Aim of our study was to determine the effect of blood pressure's (BP) circadian abnormalities on LVH.

Design and method: We studied 780 consecutive newly diagnosed, never treated, non-diabetic, hypertensive patients stage I-III (51 ± 13 years old, 45.3% females). Echocardiographic left ventricular mass calculation was performed from parasternal long axis and normalized for height in meters to the power of 2.7 (LVMi). Using established cutoffs (>49 for males and >45 g/m^{2.7} for females), the study population was split in group with normal ($n = 649$) and increased LVMi ($n = 131$). Dipping status was defined according to day-night SAP circadian variation from 24 hour ambulatory blood pressure monitoring.

Results: Patients with LVH were older (54 ± 13 vs 51 ± 13 , $p = 0.018$), while there was no difference regarding gender (females 43.7 vs 45.6, $p = 0.693$). Prevalence of dippers was higher in patients with no LVH (50% vs. 35.6%), while there was no difference in the prevalence of non-dippers between the two groups (34.2 vs. 35.6). Moreover, prevalence of extreme dippers and reverse dippers was higher in patients with LVH (18.6% vs. 9.3% and 10.2% vs. 6.5%). Logistic regression analysis revealed that, compared to dippers, extreme dippers had 2.9 higher odds (95% CI: 1.5–5.5, $p = 0.001$) of LVH, independent of age, gender and body mass index, while reverse and non-dippers had no significant difference (OR: 1.8, 95% CI: 0.8–4, $p = 0.132$ and OR: 1.3, 95% CI: 0.8–2.3, $p = 0.315$, respectively).

Conclusions: Extreme dipping status is an independent predictor of left ventricular hypertrophy.

PP.04.03 LEFT VENTRICULAR SYSTOLIC DYSFUNCTION AND CHRONIC KIDNEY DISEASE IN HYPERTENSIVE PATIENTS

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Objective: Heart failure (HF) is a common feature in hypertensive patients, increasing the risk of mortality. Chronic kidney disease (CKD) is also known to be involved in the etiology of HF. However, among hypertensive patients the associations of different stages of CKD and changes in cardiac structure, respectively in left ventricular systolic function are not well described. A cross-sectional study was performed to evaluate the impact of different stages of CKD concerning left heart failure.

Design and method: 79 hypertensive patients, mean age 64.09 ± 10.05 years were evaluated. Left ventricle dimensions and ejection fraction (EF) were assessed by 2D echocardiography and CKD by determining estimated Glomerular Filtration Rate (eGFR) using MDRD formula. Subjects were divided in two subgroups (49 pts. – 62.03% with CKD hemodialysis naive and 30 pts. – 37.97% without CKD). Other variables: presence of diabetes mellitus, total cholesterol, triglycerides were also considered.

Results: In hypertensive patients over 60 years of age CKD was diagnosed more frequently. The prevalence of left ventricular hypertrophy (LVH) assessed by echocardiography (35 patients of 79 total) was 0(0%), 11 (13.92%), 12 (15.19%),

6 (7.59%), 3 (3.8%), for eGFR categories over 90, 60–89, 45–59, 30–44, and <30 ml/min per 1.73m², respectively.

Systolic dysfunction (defined as EF less than 45%) was present in 6.32% of the cohort. The majority of patients (78.49%) had an EF>50%; only 15.18% of patients had EF=46%–50%, 6.32% of patients had 36%–45%, and none had EF less than 35%. There was no association between kidney function and systolic dysfunction in demographic, multivariate, or fully adjusted models. Average EF in CKD stages was 62% in stage 2, 61% in stage 3A/3B and 55% in stage 4, with no significant statistical difference with group without CKD (64%).

Multivariate logistic regression applied did not outlined any statistical significance between the groups.

Conclusions: Chronic Kidney Disease hypertensive patients have higher prevalence of left ventricular hypertrophy, which was more pronounced in CKD stage 2–3. In our study, we did not detect significant associations between different stages of CKD and decreased ejection fraction after adjusting for potential confounding variables in hypertensive patients.

PP.04.04 SYSTOLIC BLOOD PRESSURE AND WAIST CIRCUMFERENCE ARE THE PREDICTORS OF LEFT VENTRICULAR HYPERTROPHY IN HEALTHY ADULTS

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Objective: Obesity is one of the risk factor of cardiovascular disease (CVD). Especially, it is important to diagnose metabolic syndrome (Mets) by waist circumference (WC) for prevention of CVD. On the other hand, blood pressure is associated with left ventricular mass (LVM) which independently predicts CVD. The aim of our study was to identify CVD and major organ dysfunction factors as predictors of LVM with thorough medical examinations in healthy subjects.

Design and method: A total of 1056 participants without diabetes mellitus, systolic dysfunction, chronic kidney disease or other heart diseases underwent a thorough physical examination including transthoracic echocardiography. LVM index (LVMI) >= 51 g/m^{2.7} was regarded as the left ventricular hypertrophy (LVH). We performed single and multiple logistic regression analyses of LVMI and cardiovascular risk factors, including MetS factors and indicators of major organ dysfunction. Obesity subjects (WC >= 85 cm in male, and >= 90 cm in female) and non-obesity subjects were also separately analyzed.

Results: One thousand and ten adults (Age 62.8 ± 12.8, male 621) were analyzed in this study, and LVH was observed in 20.7% of subjects (n=228, male 167/621). In obesity subjects (n=433), 33.0% (n=143) of subjects showed LVH. LVH was correlated with age, systolic blood pressure (SBP), diastolic BP, estimated glomerular filtration rate, total bilirubin, fasting blood sugar, HbA1c, and WC. Multiple logistic regression analysis indicated that aging, high SBP (>=130mmHg) and abnormal WC were the independent predictors of LVMI (odds ratio; 1.05, 1.99, 3.03, 95% confidential interval; 1.01–1.06, 1.42 – 2.79, 2.16 – 4.25, respectively, P<0.01).

Moreover, the average of LVMI in obesity subjects was significantly higher in both male and female (47.7 ± 13.5, 47.9 ± 14.1 g/m^{2.7}) than its in non-obesity subjects (41.1 ± 10.3, 37.8 ± 10.1 g/m^{2.7}).

Conclusions: Systolic blood pressure and waist circumference were the independent risk factors for Left ventricular hypertrophy in healthy individuals, and therefore might be useful for predicting cardiovascular disease during routine physical checkups.

PP.04.05 CALCIFIED EVALUATING AORTIC PLAQUES USING TRANSTHORACIC ECHOCARDIOGRAPHY CAN PREDICT CARDIOVASCULAR OUTCOMES IN HYPERTENSIVE PATIENTS

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Objective: Evaluating plaque composition using echocardiography may be important stratifying patients at high risk for cardiovascular disease (CVD). We investigated the ability of calcified aortic plaques identified using echocardiography to predict cardiovascular outcomes.

Design and method: We evaluate 150 hypertensive and 150 normotensive adults (54% males, medium age 46 ± 15) using echocardiography to identify the presence of calcified aortic plaques. All participants were followed for incident cardiovascular events and death for a maximum of 10 years.

Results: Hypertensive patients not treated with medication significantly associates higher time-to-any CVD event [relative risk (RR) 2.77, 95% confidence interval (CI) 2.08–4.27, P<0.0001] and mortality (RR 3.21, 95% CI 1.72–4.74, P<0.0001) when compared to the normotensive group. Participants with calcified aortic plaques had higher cardiovascular event rates (RR 5.88, 95% CI 1.92–18.4, P=0.0017) and

mortality (RR 5.40, 95% CI 1.57–28.6, P=0.010) when compared to those without plaque. After controlling for age, male sex, blood pressure status, glucose, IMT, and FMD endothelial dysfunction, the presence of calcified aortic plaques remained predictive of CVD events (RR 2.38, 95% CI 1.4–3.6, P=0.0006) and mortality (RR 2.53, 95% CI 1.3–5.4, P=0.0021).

Conclusions: In hypertensive patients calcified aortic plaques appreciated through echocardiography can predict cardiovascular outcomes and mortality independent of traditional CVD risk factors, and serve in CVD risk assessment.

PP.04.06 ECG LVH IS A STRONGER RISK FACTOR FOR INCIDENT CARDIOVASCULAR EVENTS IN WOMEN THAN IN MEN IN THE GENERAL POPULATION

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Objective: Left ventricular hypertrophy (LVH) is a strong risk factor for cardiovascular events. ECG is the most widely used method for LVH detection. Despite the abundance of ECG LVH criteria, their prognostic values have been compared in only a few studies, and little has been known about how gender modifies the prognostic value LVH. We assessed the relationship between ECG LVH and incident cardiovascular events in the general population.

Design and method: Several ECG LVH criteria were measured in 3059 women and 2456 men participating in the Health 2000 Study, a national general population survey. Association between ECG LVH and cardiovascular events were analyzed with Cox proportional hazards models adjusted for age, body mass index, systolic blood pressure, current smoking, use of antihypertensive medication, history of hypercholesterolemia and history of diabetes mellitus. We used a composite end point that included cardiovascular mortality, nonfatal myocardial infarction, nonfatal stroke, hospitalization for heart failure, percutaneous coronary intervention, and coronary artery bypass surgery.

Results: ECG LVH was more prevalent in women than in men when measured with Cornell-based criteria but less prevalent or non-different when measured with other criteria. 334 women suffered a cardiovascular event during a follow-up of 10.6 ± 2.3 years while 328 men had a cardiovascular event during a follow-up of 10.4 ± 2.6 years. The association between ECG LVH and events showed higher hazard ratios for women than in men (Table). Gender × LVH interaction terms were statistically significant in part of the LVH criteria. In adjusted Cox models, Sokolow–Lyon voltage performed the best (Table). The composite of Sokolow–Lyon voltage and Cornell voltage was statistically significantly associated with events in women (P=0.001) and in men (P=0.02).

Cardiovascular event hazard ratios for ECG LVH criteria used as dichotomous variables

ECG LVH criterion	Women (n=3059)		Men (n=2456)	
	HR (95% CI)	P	HR (95% CI)	P
Lewis voltage	1.5 (1.1–1.9)	0.004	1.1 (0.8–1.4)	0.754
Gubner–Ungerleider voltage	1.7 (1.2–2.5)	0.007	0.9 (0.5–1.6)	0.786
Sokolow–Lyon voltage	2.0 (1.5–2.7)	1.7 × 10 ⁻⁵	1.3 (0.997–1.8)	0.052
RaVL voltage >1.1 mV	1.4 (1.02–1.9)	0.035	1.1 (0.7–1.6)	0.728
RaVL voltage >0.7 mV	1.1 (0.9–1.4)	0.359	1.2 (0.9–1.5)	0.233
Cornell voltage	1.3 (0.99–1.6)	0.063	1.0 (0.6–1.7)	0.924
Cornell product	1.4 (1.1–1.7)	0.014	0.9 (0.6–1.4)	0.689
Left ventricular strain	1.8 (1.2–2.9)	0.010	1.0 (0.5–2.1)	0.892
Romhilt–Estes score ≥5	3.0 (1.6–5.7)	8.8 × 10 ⁻⁴	1.1 (0.5–2.6)	0.751
Romhilt–Estes score ≥4	2.3 (1.5–3.6)	1.5 × 10 ⁻⁴	1.2 (0.8–1.9)	0.387
Framingham criterion	2.1 (1.2–3.7)	0.006	0.8 (0.3–2.1)	0.698
Perugia criterion	1.4 (1.1–1.7)	0.014	1.0 (0.7–1.4)	0.999

Adjusted for age, body mass index, systolic blood pressure, current smoking, history of diabetes mellitus, use of antihypertensive medication (yes/no), history of hypercholesterolemia

Conclusions: Gender affects both the prevalence rates and prognostic values of ECG LVH criteria in the general population, with showing higher prognostic value of ECG LVH in women than in men. For clinical use, the composite of Sokolow–Lyon voltage and Cornell voltage seem to be a good option.

PP.04.07 DEPRESSIVE SYMPTOMS, SYMPATHETIC ACTIVITY AND RETINAL MICROVASCULAR CALIBRE IN A COHORT OF SOUTH AFRICAN MEN: THE SABPA STUDY

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Objective: Autonomic system dysfunction is associated with various changes in the retinal vasculature. Depression has recently been acknowledged as a risk factor for poor prognosis in patients with acute coronary syndrome and was associated with cardiac remodelling in Black Africans. In this study we investigated the possible

association between depressive symptoms, autonomic system activity and retinal microvasculature calibre.

Design and method: A total of 89 Black and 91 White men (28–68 years of age) from the follow-up phase of the Sympathetic activity and Ambulatory Blood Pressure in Africans study were included in this sub-study. Ambulatory blood pressure and depressive symptoms (PHQ-9) were obtained, while metabolic and autonomic variables were measured from fasting venous blood samples and 24-hour urine samples. Retinal vascular calibre was quantified from digital photographs using standardized protocols.

Results: The Blacks had a poorer health profile than the Whites with blood pressure and glycated haemoglobin values above the cut-off for hypertension and a pre-diabetic state. They demonstrated more depressive symptoms (PHQ=7.37, SD=4.54), lower catecholamines and retinal arteriolar-to-venular ratio. Depressive symptoms were associated with arteriolar narrowing in the White group only. Epinephrine was positively associated with arterial narrowing and venular calibre in the Black men.

Conclusions: A profile of β -adrenergic hyporesponsivity was evident in Blacks. They revealed more depressive symptoms, a chronically challenged SNS associated with retinal vascular remodelling and possible vascular hypertrophy. Whether these changes precede or result from hyperpulsatile pressure impacting on retinal autoregulation is still debatable. A β -adrenergic hyporesponsiveness was previously observed in this cohort emphasizing central control of the brain on the circulatory system irrespective of the vascular bed. Early ocular and mental health screening is recommended to prevent microcirculatory pathology.

PP.04.08 LEFT VENTRICLE HYPERTROPHY IN PATIENTS WITH NEW DIAGNOSED HYPERTENSION: ARE WE LATE?

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Objective: Left ventricular hypertrophy (LVH) is a structural remodeling of the heart developing as a response to volume and/or pressure overload. Previous studies have shown that in patients with long duration of hypertension, hypertension is not an independent factor in the development of LVH and occurrence does not depend on the length and severity of hypertension, but the role played by other comorbidities such as triglycerides, age, gender, genetics, insulin resistance, obesity, physical inactivity, increased salt intake and chronic stress.

To evaluate incidence of LVH in patients with newly diagnosed hypertension and to define combined risk factors for LVH in newly diagnosed hypertensive patients.

Design and method: 126 consecutive patients with newly diagnosed hypertension were enrolled in the study. Echocardiography was done in all of them within the first month following the diagnosis. LVH was defined according to the latest ESH guidelines for hypertension management suggest that LVMI above 115 g/m² for men, and 95 g/m² for women determine LVH. In all patients we determined BMI, cholesterol and triglycerides level.

Results: LVH was diagnosed in 33 patients (26.2 %). There was no significant difference in arterial tension measured during the first physical examination between patients with and without LVH (156+/-92 mmHg vs 152+/-93 mmHg, p=0.089). There was higher incidence in females compared to males (21 or 63.3% vs 12 or 36.7 %) p<0.001. Patients with LVH had significantly higher BMI (24.6+/-2.4 vs 28.5+/-2.9), triglycerides (1.7+/-0.35 vs 1.9+/-0.49, p<0.05) cholesterol (6.2+/-0.8 vs 6.9+/-1.1 mmol/l, p<0.001) and they were highly significantly older (48+/-7 yrs. vs 54+/-6 years, p<0.001) compared to patients without LVH.

Conclusions: LVH is present in high proportion in patients with newly diagnosed hypertension in Belgrade region. Other cardiovascular risk factors as BMI, pathological lipodogram and age are strongly associated with the LVH in our population. Therefore these risk factors should be promptly eliminated in hypertensive patients besides antihypertensive therapy.

PP.04.09 LYSYL OXIDASE OVEREXPRESSION ACCELERATES HYPERTENSIVE CARDIOMYOPATHY

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Objective: Lysyl oxidase (LOX) is a key enzyme in extracellular matrix (ECM) remodelling. Because LOX deficiency is lethal, we have developed a transgenic mouse model to study the impact of LOX overexpression on cardiovascular remodelling.

Design and method: A new mouse model that over-expresses human LOX was generated by conventional methods. Transgene expression was determined by real time PCR in 8 different tissues including aorta, heart, kidney, white adipose tissue (WAT), brown adipose tissue, lung, liver and skeletal muscle. We tested the impact of LOX over-expression on cardiovascular remodelling in TgLOX mice and their wild-type (WT) littermates mice after chronic infusion with Ang II (1.4 μ g/kg/min) or saline (n = 10 per group). Aortic diameter and cardiac function were evaluated by ultrasonography.

Results: The maximum expression of human LOX was found in aorta followed by heart and WAT. Neither the expression of endogenous LOX nor that of LOX-Like (LOXL) isoenzymes was modified by transgene expression in these tissues.

Ang II-induced aortic diameter dilation was similar in TgLOX and WT mice after Ang II infusion. However, the mortality rate due to aortic rupture was higher in WT mice (20 %) compared to TgLOX mice (0 %).

The quantification of heart function showed that Ang II infusion decreased ejection fraction (EF) and fractional shortening (FS) in TgLOX mice, while they were augmented in WT mice. A stronger hypertrophic response induced by Ang II occurred in TgLOX mice as evidenced by an increased LV mass and left ventricle posterior wall (LVPW) thickness. Accordingly, the left ventricular inner diameter (LVID) was significantly lowered in TgLOX mice. After Ang II infusion, cardiac output, stroke volume and mRNA levels of hypertrophic markers such as ANP and B-HMC remained similar in both, transgenic and WT mice. Finally, LOX overexpression increased the Ang II-induced expression of pro-inflammatory (Emr-1, IL6, Mmp-9) and fibrosis-related (Serpin-1, Col-1a1) markers in cardiac tissue compared with WT mice

Conclusions: We have developed a valuable model to improve our knowledge about LOX biology in the cardiovascular system. Our data evidence that LOX over-expression impairs cardiac function under hypertensive conditions.

PP.04.10 RELATIONSHIP BETWEEN PLASMA ALDOSTERONE LEVELS AND LEFT VENTRICULAR DIASTOLIC DYSFUNCTION IN ESSENTIAL HYPERTENSION

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Objective: Recent evidence indicates that inappropriately elevated aldosterone has pro-fibrotic effects on the heart and therefore might affect left ventricular (LV) diastolic properties. We have investigated the relationship of plasma aldosterone (PA) levels with LV diastolic function in patients with primary hypertension free of overt cardiovascular complications.

Design and method: In 171 untreated, grade 1–2, hypertensive patients (age 49 \pm 13 yr.; 92 males) we measured anthropometric variables, plasma biochemistries, glomerular filtration rate (GFR), PA and active renin, and assessed by conventional and tissue Doppler (TDI) echocardiography the morphology of the LV and variables of LV diastolic function (E/A, e-wave velocity, e' and E/e' ratio).

Results: LV diastolic dysfunction with a pattern of abnormal relaxation was detected by TDI echocardiography in 101 patients (59%) who were older, more frequently males and diabetics, and had higher body mass index (BMI), systolic blood pressure (SBP), and LV mass index, and lower PA levels (134 \pm 77 pg/ml) than patients with preserved LV diastolic function (168 \pm 94 pg/ml, P=0.014). Variables of diastolic function measured both at conventional and TDI echocardiography were significantly related to increasing age, BMI, duration of hypertension, and LV mass index and to decreasing GFR (Table). TDI e-wave velocity was also directly related to SBP and PA levels and its relationship with age (B = -0.436, P<0.001), LV mass index (B = -0.167, P=0.036), and PA levels (B = 0.144, P=0.027) resulted independent of other confounders in a multiple regression model. Multivariate logistic regression indicated that diastolic dysfunction as detected at TDI was independently predicted by older age (B = 0.289, P=0.001), higher BMI (B = 0.193, P=0.017) and SBP (B = 0.149, P=0.043), and lower PA levels (B = -0.153, P=0.034).

Conclusions: LV diastolic dysfunction is associated with lower plasma aldosterone levels in patients with uncomplicated hypertension suggesting that this hormone does not contribute to LV stiffening.

PP.04.11 LEFT VENTRICULAR HYPERTROPHY IS MORE IMPORTANT WHEN HIGHER IS CENTRAL SYSTOLIC BLOOD PRESSURE IN MILD TO MODERATE HYPERTENSIVE PATIENTS

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Objective: Left ventricular hypertrophy (LVH) in hypertensive patients (P) is an independent marker of mortality and it is important to evaluate the effect of treatment

on this parameter. However, little is known about the relationship between LVH, central pressures and arterial stiffness.

To evaluate the relationship between LVH and central pressures, as well as arterial stiffness in mild to moderate hypertensive patients with appropriate treatment.

Design and method: We studied 146 P (58 ± 7 years old) with well controlled hypertension and divided them into two groups: Group I: 66 P that had LVH by echocardiography measures and group II: 80 P without LVH receiving antihypertensive therapy to maintain blood pressures below 140/90 Hgmm in office. In all of them we measured central systolic and diastolic pressures (CSBP, CDBP), augmentation index (AI), the pulse wave velocity (PWV) and total peripheral resistance (TPR). Results were compared and are shown in the following table:

Results: TABLE 1:

DATE	CSBP	CDBP	AI	PWV	TPR
GROUP I	112±2*	79±2	25±3*	9±2	1.4±0.2*
GROUP II	98±2	78±3	19±2	7±2	0.9±0.2

* Denotes p-value less than 0.05

Conclusions: P with LVH had significantly higher levels of CSBP and AI with TPR also more elevated, indicating that the presence of LVH is associated with increased arterial stiffness and consequently increased cardiovascular risk in patients with mild to moderate hypertension, despite having apparently well controlled peripheral pressures.

PP.04.12 PREVALENCE AND CAUSES OF MICROALBUMINURIA IN HYPERTENSIVE SUBJECTS IN SPECIALIZED CONSULTATION IN THE AREA OF BLIDA (ALGERIA)

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Objective: Microalbuminuria (MA) is known to predict the onset of clinical proteinuria and chronic renal failure in diabetes mellitus. More recently, MA has been found to be an independent risk factor for cardiovascular disease in non diabetic populations. The present study was designed to investigate the prevalence of microalbuminuria and factors that associate with urine excretion of albumin in the population of Blida.

Design and method: 2920 Participants in our specialized consultation were enrolled in this study. Besides the routine checkup program (an interview regarding health status, physical examination, chest X-ray, electrocardiography, and laboratory assessment of cardiovascular risk factors). For MA, spot urine samples were collected in the early morning and microalbuminuria was defined as, a urinary albumin excretion between 30 and 300 mg/l. These patients also underwent determination of ambulatory blood pressure monitoring. All calculations and statistical analyzes are processed by the SPSS 17.0.

Results: The prevalence of MA in hypertensive population was 32%. The blood pressure of participants was 138 ± 16/78 ± 13 mmHg and 39.8% and 14.1% of participants were with hypertension and diabetes mellitus, respectively. Urine albumin was detected in 40.1% of cases. Mean age of 59.71 ± 13.56 years. Body mass index was > 30 kg/m² in 58.2% of cases. Prevalence of Hyperglycemia was 23% with MA > 30 mg/l. Multivariate regression analysis revealed that abnormal albuminuria was correlated with systolic blood pressure, estimated 24 hours urinary salt excretion, and fasting plasma glucose after adjustment for possible factors (p < 0.0001).

Conclusions: The prevalence of microalbuminuria increases with increase in age, body mass index and duration of hypertension. From this study, it is conceived that MA can be used as a predictor of future cardiovascular events in hypertensive patients.

PP.04.13 PREVALENCE OF LEFT VENTRICULAR HYPERTROPHY IN THE ELDERLY ESTONIAN POPULATION

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Objective: A random sample of men and women of Tallinn aged 65–74 was examined in 2002–2005 (n = 434). The aim of the study was to determine the prevalence of left ventricular hypertrophy (LVH) and different left ventricular geometric patterns and also to study the features of its geometry in relation to blood pressure (BP) and obesity.

Design and method: The screening procedure included systolic and diastolic blood pressure (SBP, DBP), height and weight measurements, BMI and waist-to-hip ratio (WH) calculations. An examinee was considered hypertensive if mean values of two BP measurements exceeded 140/90 mmHg (or on medication). Echocar-

diography by M-mode was carried out in 168 men and 165 women. LVH was defined if left ventricular mass (LVM); LVM/height and LVM/BSA were 198 g, 121 g/m, and 120 g/m². LVH was classified into the four types: concentric hypertrophy (CH), eccentric hypertrophy (EH), concentric remodeling (CR), and normal geometry.

Results: The prevalence of arterial hypertension (AH) and obesity was significantly higher in women – 82.1 and 39.5% vs 71.3 and 24.6%, accordingly. Women had a considerably higher prevalence of LVH (75.2 vs 47.6%), EH (44.2 vs 25.6%), and CR (7.9 vs 2.4%), but there were no changes in prevalence of CH between men and women. Obese and hypertensive men showed most frequently the eccentric type of LVH (48.9 and 30.4%, respectively), but this type was exclusively found only in hypertensive women (46.8%). The frequency of concentric hypertrophy was higher in patients with elevated BP, but was equal in examinees with obesity and without. Mean values of SBP and DBP were significantly higher both men and women with CH and the smallest in patients with CR. Women with CH showed the highest mean values of height, weight, BMI, waist/hip circumferences (WaHC), and WH that were the smallest in women with CR. Correlation analysis between LVM and above-mentioned parameters found significant associations (correlative coefficients p < 0.001) for SBP, DBP, weight, BMI, WaHC, and WH.

Conclusions: The data demonstrated the high prevalence of LVH in elderly population. The most widespread LVH type in obese and hypertensive men and women was eccentric hypertrophy.

PP.04.14 TREATMENT-INDUCED BRAIN NATRIURETIC PEPTIDE REDUCTION AND PROTECTION FROM ORGAN DAMAGE IN HYPERTENSIVE INDIVIDUALS

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Objective: High brain natriuretic peptide (BNP) levels are associated with severe hypertension level and effective blood pressure (BP) control is related with decline in BNP levels.

To investigate the association between treatment-induced BNP reduction and organ protection in hypertensive individuals.

Design and method: A total of 186 naïve hypertensive individuals without target organ damage (TODs) were initially evaluated and BNP levels were measured at baseline and after 3 months of antihypertensive medication. An initial 86 were re-examined after an average period of 8 years. Incident cardiovascular disease and asymptomatic TODs were recorded.

Results: Patients with reduced BNP levels after the 3-month period were less likely to develop left ventricular (LV) diastolic dysfunction (63% vs. 83%, p = 0.06) during the years of follow up. Left ventricular mass (LVM) was also lower in the reduced BNP group (165 ± 44 vs. 173 ± 47 p = 0.5). An association between BNP reduction and carotid artery intima-media thickness was noted for both the right and left common carotid and internal carotid arteries. Overall, a slightly smaller percentage of patients in the reduced BNP group had had a cardiovascular event (10% vs. 12%, p = 0.8).

Conclusions: These preliminary results indicate that hypertensive individuals with higher initial BNP levels are more at risk of developing cardiovascular organ damage, as opposed to those with lower BNP levels induced by antihypertensive treatment.

PP.04.15 TGF-β1 IS A MARKER FOR LEFT VENTRICULAR HYPERTROPHY IN HYPERTENSIVE SUBJECTS IN A GENERAL POPULATION

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Objective: Transforming growth factor β1 (TGF-β1) is a multifunctional cytokine. There is accumulating evidence that TGF-β1 is involved in the pathogenesis of hypertension and the development of hypertensive target organ damage. Several studies have shown that TGF-β1 also induced vascular hypertrophy and remodelling in various vascular diseases. However, there are no reliable data on hypertension and cardiac hypertrophy in an epidemiological study. Accordingly, we investigated that a relationship between circulating TGF-β1 and left ventricular hypertrophy (LVH) in a general Japanese population.

Design and method: Data for fasting serum TGF-β1 levels were obtained from 528 enrolled subjects. TGF-β1 was measured by Enzyme immune-assay method. We measured body mass index (BMI), blood pressure (BP), total cholesterol, HDL-cholesterol, triglycerides, fasting plasma glucose (FPG), insulin, blood urea nitrogen (BUN), creatinine, intima-media thickness (IMT). Uni- and multi-variate analyses were applied for determinants of serum TGF-β1 levels.

Results: The average levels were 6.7 ± 4.9 ng/ml in males and 6.5 ± 5.4 ng/ml in females. In a univariate analysis, only systolic BP level ($p < 0.001$) was significantly associated with TGF- β 1 level. Determinants of TGF- β 1 in hypertensive subjects ($n = 243$) were estimated by multiple linear regression analysis adjusted for age and sex. LVH ($p < 0.01$), LV mass index ($p < 0.05$) and smoking ($p < 0.01$) were significantly associated with TGF- β 1 levels.

Conclusions: Our data suggested that elevated TGF- β 1 was significantly associated with systolic BP and left ventricular hypertrophy in hypertensive subjects in a Japanese general population.

PP.04.16 SERUM ZINC- α 2-GLYCOPROTEIN LEVELS WERE ASSOCIATED WITH CAROTID INTIMA MEDIA THICKNESS IN FEMALES IN A POPULATION OF COMMUNITY-DWELLING JAPANESE

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Objective: Zinc- α 2-glycoprotein (ZAG) is a novel adipokine. A downregulation of ZAG expression in obesity has recently been reported in mice as well as in humans. However, in contrast, the other reports revealed that serum ZAG levels were positively associated with metabolic syndrome. We investigated whether serum ZAG levels could be used as a potential biomarker for subclinical atherosclerosis in a general population.

Design and method: A total of 223 residents (85 males and 138 females, mean age 67.1 ± 9.7 years old) underwent a physical examination. They received data for fasting blood samples including ZAG.

Results: The mean serum ZAG levels were 49.2 ± 13.7 μ g/mL in males, and 41.7 ± 9.0 μ g/mL in females, respectively. The ZAG levels were significantly associated with age ($p < 0.05$), insulin ($p < 0.05$, inversely) and HOMA-IR ($p < 0.05$, inversely) in males, and with age ($p < 0.01$), waist ($p < 0.05$, inversely), systolic blood pressure ($p < 0.05$), microalbuminuria ($p < 0.05$) and carotid intima media thickness ($p < 0.01$) in females using by univariate analysis. In multiple stepwise regression analysis, age ($p < 0.05$), and insulin ($p < 0.05$, inversely) were significantly associated with serum ZAG in males, whereas in females, carotid intima media thickness ($p < 0.01$) was strongly associated with serum ZAG levels.

Conclusions: The present study demonstrated serum ZAG levels might be a biomarker of subclinical atherosclerosis in females.

PP.04.17 GENETIC AND ENVIRONMENTAL DETERMINANTS OF INAPPROPRIATE LEFT VENTRICULAR MASS. A TWIN STUDY

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Objective: Left ventricular mass (LVM) and its major anthropometric and hemodynamic determinants (body size, blood pressure, stroke volume) are all highly genetically determined. Independently from its absolute value, the amount of LVM that adapts to measures of body size and cardiac workload may be separated from its inappropriate component, namely inappropriate LVM (iLVM), which results from the difference between observed and predicted LVM. An excess of iLVM carries an adverse prognosis in hypertension and in other clinical settings. We evaluated the genetic and environmental components of iLVM in a cohort of monozygotic (MZ) and dizygotic (DZ) twins.

Design and method: A cohort of 114 Hungarian and Italian twin pairs ($n = 228$, mean age 51 ± 13 years, 34% men; Italy = 49 twin pairs, Hungary = 65 twin pairs) underwent M-mode echocardiography for the evaluation of LVM (Devereux formula) and stroke volume (Teichholz method). The inter-individual degree of iLVM was calculated as the ratio between observed-to-predicted LVM, the latter estimated from published equations (de Simone, Hypertension 1998). Intra-class correlation coefficients (ICC) between MZ and DZ and structural equation models were employed to discriminate between the degree of genetic and environmental components of iLVM.

Results: Average observed-to-predicted LVM ratio (iLVM) was 1.35 ± 0.36 , which did not differ between MZ and DZ couples (1.32 ± 0.34 vs 1.39 ± 0.39 , $p = 0.20$). Age- and sex-adjusted ICC was 0.49 (C.I. 0.28–0.64) in MZ twins and 0.33 (C.I.

0.06–0.54) in DZ twins. Structural equation modelling showed that a considerable proportion of total variance of iLVM is attributable to unique (51%, 95% C.I., 36% to 77%) and shared (18%, 95% C.I., 0% to 54%) environmental factors, while the additive genetic component explained the remaining 31% (95% C.I., 0% to 64%) of the iLVM trait variance.

Conclusions: A consistent proportion of total variance of iLVM is explained by acquired environmental factors. Behavioural and therapeutic interventions aiming at reducing the effects of non-hemodynamic factors responsible for the increase of LVM may considerably reduce the burden of iLVM.

PP.04.18 DISTRIBUTION OF TYPES OF CARDIAC REMODELING AMONG HYPERTENSIVE PATIENTS BY ETHNICITY

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Objective: To study ethnic characteristics of cardiac remodeling and distribution of various types of remodeling in arterial hypertension (AH).

Design and method: Participants were 66 patients (21 men and 45 women) with hypertension II degree, aged 30–65 years. Two ethnic groups were presented: Russian - 31, Kazakh - 35. The average age was 58.1 (CI 54.9; 61.3) years. For presentation, the following parameters by echocardiography were determined: end-diastolic dimension (CRA) of the left ventricle (LV), interventricular septum thickness (IVST) and posterior wall of the left ventricle (TPWL), left ventricular mass (LVM), the index of left ventricular mass (LVMI). Depending on the values of the index of relative wall thickness (RWT) index and left ventricular mass (LVMI) patients were divided into 4 groups: 1 - patients with normal LV geometry (RWT < 0.45); 2 - patients with concentric left ventricular restructuring (RWT > 0.45); 3 - patients with concentric LV hypertrophy (OTS > 0.45 and increased LVMI); 4 - patients with eccentric LV hypertrophy (RWT < 0.45 and increased LVMI).

Results: All types of cardiac remodeling were identified among hypertensive patients. Frequently diagnosed type is concentric LVH (42%), less often - the type of eccentric LVH (20%) and significantly less - concentric LV restructuring (8%), while 30% patients were identified with normal LV geometry. Hypertensive patients among Russian population most frequently have concentric type of LVH (38%, $p = 0.75$), less often - the type of eccentric LVH (31%, $p = 0.098$) and left ventricular concentric restructuring (8%, $p = 0.78$). Normal LV geometry was found in 21% of cases ($p = 0.23$). Hypertensive patients among Kazakh population concentric LVH was significantly prevailed in 42% of cases, normal LV geometry (in 35% of patients). Concentric restructuring was found in 10% of cases and eccentric LVH - 13% of male.

Conclusions: Various types of remodeling and ethnic differences were identified. Concentric LVH was determined as a leading option of cardiac remodeling among Russian and Kazakh patients with hypertension, concentric left ventricular restructuring - less often. Significant percentage of patients with normal LV geometry was diagnosed in both study groups.

PP.04.19 TWELVE YEARS OF FOLLOW-UP OF PATIENTS WITH HYPERTENSIVE LEFT VENTRICULAR HYPERTROPHY

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Objective: The aim 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 the twelve years of follow-up.

Design and method: All 104 pts with AH and LVH (55.3 ± 8.4 years; 61 male and 43 female) were examined by means of echocardiography (two independent examiners - Acuson-Sequoia), exercise testing, 24-h Holter monitoring, 24-h ambulatory blood pressure monitoring, heart rate variability and QTc interval dispersion. Patients used regular medication therapy during the period of follow-up.

Results: During the twelve years period of follow-up in 31 (29.8%) pts occurred cardiovascular and cerebrovascular adverse events (AE). At the beginning of the study pts with AE had greater: LVMI (190.4 ± 38.0 g/m² vs. 162.5 ± 25.2 g/m²; $p < 0.001$), left ventricular mass (367.2 ± 85.0 g vs. 320.2 ± 63.9 g; $p < 0.01$), septum thickness (14.5 ± 3.0 mm vs. 13.2 ± 2.0 mm; $p < 0.05$), posterior wall thickness (12.1 ± 1.3 mm vs. 11.6 ± 1.0 mm; $p < 0.05$) and left atrial diameter (41.5 ± 6.2 mm vs. 39.0 ± 4.5 mm; $p < 0.05$). In pts with AE QTc dispersion was greater than in pts without AE (73.1 ± 19.7 ms vs. 54.0 ± 19.6 ms; $p < 0.001$). AE occurred in 20 (52.6%) pts of 38 pts with QTc dispersion greater than 65 ms and in 11 (16.7%) pts of 66 pts with QTc dispersion lower than 65 ms (odds ratio 5.56; 95% CI 2.24 to 13.77). Using multiple linear regression analysis the best predictors of

worse prognosis were QTc dispersion and LVMI (standardized coefficient beta: for QTc dispersion 0.380; $p < 0.001$ and for LVMI 0.370; $p < 0.001$ and for the model: $R = 0.551$, $R^2 = 0.303$, adjusted $R^2 = 0.290$, standard error of the estimate = 0.38743; $p < 0.001$).

Conclusions: Patients with greater QTc dispersion, especially greater than 65 ms, and greater left ventricular mass index have worse outcome during the twelve years in spite of regular medical treatment.

PP.04.20 LEFT VENTRICULAR HYPERTROPHY AT THE VERY BEGINNING OF HYPERTENSION

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Objective: Development of left ventricular hypertrophy (LVH) is a multifactorial and incompletely understood process. Aim of our study was to determine the contributory factors for this maladaptive phenomenon, at the very beginning of essential hypertension.

Design and method: We studied 780 consecutive newly diagnosed, never treated, non-diabetic, hypertensive patients stage I-III (51 ± 13 years old, 45.3% females). Echocardiographic left ventricular mass calculation was performed from parasternal long axis and normalized for height in meters to the power of 2.7 (LVMI). Using established cutoffs (>49 for males and >45 g/m^{2.7} for females), the study population was split in group with normal (n = 649) and increased LVMI (n = 131).

Results: Prevalence of normal geometry and concentric remodeling in patients with normal LVMI was 53% and 47%, while prevalence of concentric and eccentric hypertrophy in patients with LVH was 71.4% and 28.6%, respectively. LVMI was significantly correlated with age, BMI, waist and hip circumference, metabolic syndrome, snoring, hs-CRP, HbA1c, GFRCKD-EPI, uric acid, triglycerides and HDL-cholesterol, aortic pulse wave velocity, microalbuminuria, left atrial volume index, diastolic dysfunction grade, carotid IMT and plaques, severity of hypertension, number of CV risk factors and TODs. Patients with LVH were older, with higher general and abdominal obesity, impaired metabolic, hemodynamic and TODs profile (Table).

	No LVH	LVH	P value
Age, years	51±13	54±13	0.018
BMI, kg/m ²	28±4	32±6	<0.001
Waist, hip, cm	94±12, 104±10	102±14, 110±11	<0.001
MS, %	40.2	65	<0.001
Snoring, %	57.1	69.8	0.008
hs-CRP, mg/L	1.4 (0.6-3)	2 (0.64-5.4)	0.043
ACR, mg/g	9 (5-14)	10 (7-21)	0.021
PWV, m/sec	8±1.7	8.9±2	0.001
Em/Am	0.97±0.34	0.82±0.28	<0.001
LAVI max	26±8	30±9	<0.001
clMT, mm	0.68±0.14	0.75±0.17	<0.001
24hr SAP, mmHg	125±11	131±14	<0.001
24hr DAP, mmHg	76±10	78±11	0.065
24hr PP, mmHg	49±8	53±9	<0.001
CV Risk Factors 0/1-2/≥3, %	4.8/45.1/50.1	3.2/23.8/73	<0.001
Total TODs, %	1 (0-1)	1 (1-2)	<0.001
BP severity Masked/stage 1/2/3, %	6.2/58.5/26.9/7.9	2.4/38.9/31.7/27	<0.001

Conclusions: In newly diagnosed hypertensive patients left ventricular hypertrophy is already present in a sizable proportion being the result not only of BP levels but also of numerous metabolic and CVD risk factors.

PP.04.21 BODY MASS INDEX AS THE KEY OBESITY-RELATED PREDICTOR OF CHANGES IN ECHOCARDIOGRAM PARAMETERS INDICATIVE OF LEFT VENTRICULAR HYPERTROPHY

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Objective: The aim of our study was to identify whether body mass index (BMI), waist circumference (WC) or waist-to-height ratio (WHtR) is the best predictor of left ventricular hypertrophy described by echocardiogram findings.

Design and method: The study analyzed a cohort of 4866 middle-aged patients taking part in the second stage of the Lithuanian High Cardiovascular Risk preven-

tion program (LitHiR). The patients were divided into obese and non-obese groups based on BMI (division point at 30), WHtR (division point at 0.577) and WC (division point at 88 cm for female and 102 cm for male participants) and later compared regarding values of echocardiogram parameters. Left ventricular mass (LVM), left ventricular end-diastolic diameter (LVEDD), left ventricular posterior wall thickness (PWT) and interventricular septum thickness (IVS) served as the dependent variables of the study. Stepwise multiple regression analysis was used to establish the relationship between the aforementioned dependent and the independent obesity-related variables.

Results: 2972 (61.6 %) of the participants were female. The mean age of the study population was 53.96 ± 6.23 years. 2983 (61.3 %), 590 (12.1 %), 3053 (62.7 %) and 3319 (64.1 %) of the patients presented with increased LVM, LVEDD, PWT and IVS values, respectively. Patients of both genders within the three obese groups described by BMI, WC and WHtR had significantly higher mean LVM, LVEDD, PWT and IVS values when compared to subjects in the non-obese groups (P-value < 0.001). Stepwise multiple regression analysis declared BMI as the predictor of the best predictive value of changes in all of the geometric left ventricular parameters, whereas WHtR was of the least significance.

Conclusions: A large proportion of the middle-aged high cardiovascular risk study population presented with echocardiogram changes indicative of left ventricular hypertrophy. Obesity was associated with increased LVM, LVEDD, PWT and IVS values while the most accurate obesity-related predictor of these changes was BMI.

PP.04.22 RELATIONSHIP BETWEEN OBESITY AND LEFT VENTRICULAR MASS IN CAUCASIAN HYPERTENSIVE SUBJECTS. DOES SEX MATTER?

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Objective: The excess of adiposity affects the heart through haemodynamic and non haemodynamic mechanisms leading to left ventricular hypertrophy (LVH) and ultimately to heart failure. It has been observed, in a large study performed in American Indians, that the impact of obesity on left ventricular mass (LVM) is greater in women than men, while the results of other investigations carried out in other ethnic groups have yielded conflicting results. The aim of our study was to evaluate the potential influence of gender on the relationships between obesity and LVM in Caucasian patients with essential hypertension (EHs).

Design and method: We enrolled 724 subjects with EH (mean age 45 ± 12 years, 63 % men) without cardiovascular complications. In all subjects the anthropometric indices (weight, height and waist circumference) and the routine biochemical parameters were determined. Furthermore, all patients underwent a 24-h blood pressure monitoring and an echocardiogram. LVM was indexed for body surface area (LVMI) and for height^{2.7} (LVMH^{2.7}).

Results: The univariate correlations of LVM, LVMI, LVMH^{2.7} with body mass index (BMI) and the comparison of Pearson coefficients between the two sexes, evaluated using the Fisher r-to-z transformation, are shown in the following table.

	LVM		LVMI		LVMH ^{2.7}	
	r	p	r	p	r	p
Overall population	0.302	<0.0001	0.129	= 0.001	0.316	<0.0001
Men (n = 456)	0.235	<0.0001	0.052	= 0.264	0.242	<0.0001
Women (n = 258)	0.411	<0.0001	0.217	<0.0001	0.381	<0.0001
P =	0.01		0.03		0.045	

The greatest strength of the association of obesity with LVM, LVMI, LVMH^{2.7} in women than in men was also confirmed (p always < 0.01) in multivariate models, where the interaction term "sex x obesity" was added along with multiple confounding factors. Similar results were obtained when as an index of adiposity waist circumference was used instead of BMI.

Conclusions: Our study seems to indicate that in Caucasians hypertensive subjects the impact of obesity and overweight on LVM is greater in women than in men.

PP.04.23 ARTERIAL ELASTIC PROPERTY CORRELATES WITH TARGET ORGAN DAMAGE IN ELDERLY PATIENTS WITH HYPERTENSION

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Objective: To investigate the relationship between arterial elastic property and target organ damage(TOD) in elderly patients with hypertension.

Design and method: One hundred and fifty-five elderly hypertensive inpatients divided into A and B two subgroups according to 24 h average blood pressure level were enrolled, sixty-one elderly patients without hypertension during the same period were enrolled as the control(group C).The body mass index(BMI), urinary albumin to creatinine ratio(ACR)and blood biochemical indicators were collected. Twenty-four hour ambulatory blood pressure monitoring(ABPM), carotid intima-media thickness(IMT) measurement and ultrasonic cardiogram(UCG) were recorded. The association between AASI and 24hPP was analyzed. AASI, ambulatory pulse pressure(24hPP), ACR, IMT and LVMI were compared between patients with hypertension and without. And analyzed the correlation between risk factors and ACR, IMT,LVMI and TOD principal component with multiple linear regression analysis.

Results: There was a significant association between AASI and 24hPP ($r=0.39, P<0.01$). Compared with the non-hypertensive group, the AASI, 24hPP, ACR, and LVMI were significantly higher in hypertensive patients [0.50 vs 0.43, 57.7 vs 44.5 (mmHg), 8.1vs3.7 (mg/g), 120.4 vs 96.9 (g/m²), $P<0.05$ or $P<0.01$], and the estimated glomerular filtration rate was lower[84.4 vs 76.6 (ml/min/1.73m²), $P<0.01$]. A subgroup analysis in hypertensive patients found that 24 h SBP, AASI, 24hPP, ACR were all higher in group A than those in group B[135.0 vs 120.5 (mmHg) ($P<0.05$), 0.53 vs 0.48, 64.1 vs 53.0(mmHg), 12.9 vs 5.5 (mg/g)(SNK method)]. The multivariable regression analysis showed that AASI was correlated with LVMI, IMT and TOD principle component(all $P<0.05$).

Conclusions: High AASI is associated with target organ damage in elderly patients with primary hypertension. AASI can be used as the evaluation index of arterial elastic property.

PP.04.24 CORRELATION BETWEEN LEFT VENTRICULAR HYPERTROPHY AND MILD COGNITIVE IMPAIRMENT

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Objective: One of the major risk factors for mild cognitive impairment (MCI) is arterial hypertension. Hypertension induced changes in one target organ may correspond to changes in the others. That may be of great importance for the risk assessment in everyday practice. We tried to find if there is correlation between MCI and left ventricular hypertrophy (LVH) as manifestations of hypertensive damage of different target organs.

Design and method: 931 hypertensive patients, mean age 65.90 ± 10.00 years, underwent complete physical examination, office and home blood pressure measurement (HMBP), ambulatory blood pressure monitoring (in 450 of the patients). Echocardiographic screening for concentric LVH and screening for MCI were conducted in all of them. The neuropsychological tests that were used were: Mini Mental State Examination (MMSE) and Montreal Cognitive Assessment (MoCA). 263(28.25%) of the patients were reevaluated after a mean follow-up period of 12 months (6–20 months). All of the patients were on combination treatment. SPSS 19 was used for the statistical analysis.

Results: 329 (35.34%) of the patients were with HMBP in the recommended range. 558 (59.93%) were with MCI when assessed with MoCA (the more sensitive of the two tests). The majority of the patients were with high and very high cardiovascular risk. On inclusion: 532(57.70%) of the patients had LVH - 357(61.10%) were with MCI and 397(74.63%) - with suboptimal HMBP. During the follow-up 110(74.83%) were with LVH and 79(65.83%) with suboptimal HMBP control. T-test showed that the patients with LVH had significantly lower ($p<0.0001$ for both MMSE and MoCA) results from the neuropsychological tests than those without LVH.

Conclusions: The correspondence between LVH and MCI in patients with treated hypertension underlines the significance of the screening for various target organ damage in hypertensive patients. Detection of changes in one should provoke screening in the others. The use of short, specific and sensitive screening neuropsychological tools is of great importance in the everyday practice for the quick assessment of the risk for MCI and for the follow-up.

PP.04.25 RELATIONSHIP BETWEEN SUBCLINICAL ORGAN DAMAGE AND CIGARETTE SMOKING IN BOTH GENDERS OF HYPERTENSIVE PATIENTS

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Objective: Assessment of correlation between subclinical organ damage and cigarette smoking in both genders of hypertensive patients.

Design and method: We divided 50 patients with arterial hypertension in two groups: A: 25 women; B: 25 men. The average age of them: A: 55 yrs and B: 57 yrs. Ankle-brachial index (ABI) and carotid intima-media thickness (IMT) were evaluated. We noted the number of pack-years in all patients. Statistical calculations were performed in the StatSoft Statistica 10. The t-student test was used for the statistical analysis, ρSpearmann was taken to analyze the correlation of statistically significant values.

Results: We revealed following results in both groups: comparison A vs B respectively (SD) [*for $p<=0.05$; **for $p<0.001$; NS- negligible statistically]: ABI: 0,94(0,16) and 1,01(0,14) NS; IMT [mm]: 0,73(0,15) and 0,81(0,17) *; number of pack-years: 9,64(11,23) and 15,22(20,47) *.

Women were characterized by a lower IMT and lower number of pack-years than men.

In this group the above-mentioned parameters were correlated together.

Parameter	ABI	
	Women A (n= 25)	Men B (n= 25)
IMT [mm]	**	NS
	R= - 0,52	R= - 0,37
Number of pack-years	NS	**
	R= - 0,18	R= -0,58

In this group there were significant negative correlations between ABI and IMT in women and between ABI and number of pack-years in men.

Conclusions: 1. Women with hypertension were characterized by minor vascular damages assessed by IMT than men. This is probably due to lower number of pack-years in this group. 2. ABI in hypertensive men was inversely proportional to the number of pack-years. 3. IMT in hypertensive woman was inversely proportional to the ABI.

POSTERS' SESSION

POSTERS' SESSION PS05

DIABETES, OBESITY AND METABOLIC ASPECTS

PP.05.01

AORTIC AND BRACHIAL BLOOD PRESSURE PATTERNS IN HYPERTENSIVE SUBJECTS WITH NON-ALCOHOLIC FATTY LIVER DISEASE

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Objective: Non-alcoholic fatty liver disease (NAFLD) is often associated with metabolic syndrome (MS). MS promotes arterial stiffness and is associated with abnormal BP diurnal variations. Ambulatory monitoring (AM) of central blood pressure (BP) and arterial stiffness parameters is a new method that extends understanding of the characteristics of BP and arterial properties. The aim of the study was to explore characteristics of central pulse wave and AIx on brachial and central BP AM in hypertensive subjects with non-alcoholic fatty liver disease (NAFLD).

Design and method: The study included 30 untreated non-diabetic hypertensive patients with NAFLD (diagnosed according to ASSLD Practice Guidelines, 2012) and metabolic syndrome (47% men, 51.3 ± 4.2 years, 50% of smokers, BMI 31.3 ± 2.2 kg/m², clinical BP $163.4 \pm 12.5/102.6 \pm 9.7$ mm Hg). The effects on 24-h, day- and night-time brachial and central BP were evaluated with oscillometric BPLab VASOTENS system (OOO Petr Telegin, Nizhniy Novgorod, Russia).

Results: 24-h systolic/diastolic brachial BP was $143.5 \pm 6.2/89.2 \pm 5.4$, PP 55.1 ± 4.8 , central systolic BP 132.7 ± 7.9 , PP 44.8 ± 5.2 mmHg. Daytime was $144.4 \pm 7.0/92.1 \pm 5.3$, 55.2 ± 5.0 , 134.2 ± 7.7 , 43.1 ± 5.3 mmHg, respectively. Nighttime was $132.3 \pm 6.6/79.1 \pm 5.9$, 55.8 ± 5.3 , 121.4 ± 5.3 , 45.2 ± 4.1 mmHg, respectively. Difference between brachial and central SBP and PP was greater in daytime 12.3 ± 2.2 and 12.1 ± 2.0 than in nighttime 10.2 ± 1.2 and 10.1 ± 1.8 mmHg. Nighttime decrease in SBP for brachial BP was greater $8.9 \pm 2.3\%$ than for central $7.2 \pm 3.1\%$. AIx@75 in daytime was less ($18.7 \pm 12.7\%$) than in nighttime ($26.2 \pm 14.2\%$).

Conclusions: In hypertensive patients with NAFLD and MS there is disproportionately higher nighttime central SBP and PP. Increase of nighttime AIx@75 may explain this finding and reflect advanced arterial stiffness.

PP.05.02

DIFFERENCE IN INTERARM BLOOD PRESSURE, CARDIOVASCULAR RISK FACTORS AND ORGAN DAMAGE IN TYPE 2 DIABETES

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Objective: In type 2 diabetes mellitus (DM2) patients at high risk for atherosclerosis, we have examined the prevalence of an inter-arm difference of BP (IAD), its influence in hypertension detection and its association with cardiovascular risk factors and eGFR.

Design and method: Height-hundred consecutive patients with DM2 and 213 controls selected on the basis of low cardiovascular risk or known severe peripheral arterial disease were studied with a validated device for simultaneous bilateral BP measurements. Association with eGFR was analyzed in a subgroup of 399 DM2 patients.

Results: A prevalence of 43.6% for a systolic IAD ≥ 5 mmHg, 13.1% ≥ 10 mmHg and 4.8% ≥ 15 mmHg was found in DM2. More than 20% of DM2 patients were at risk for BP underestimation when the arm with lower-readings was taken. The most important baseline factors associated with increasing prevalence of IAD were higher

BP (for each mmHg an OR from 1.014 to 1.021 depending by the IAD severity), dyslipidemia (OR 2.0) and smoking but only for an IAD ≥ 15 mmHg (OR: 2.6). The prevalence of systolic IAD increased with the overlapping of atherosclerosis risk factors. The expected association of higher BP with worsening eGFR was completely confirmed only when considering SBP values of the arm with higher readings.

Conclusions: In conclusion, IAD prevalence is high in DM2, increasing with increasing atherosclerosis risk factors and is highly relevant for hypertension detection and management. Moreover, discordant data regarding the association of BP with organ damage is erroneously obtained if the arm with higher BP readings is not identified. These results should stimulate physicians and personnel involved with BP measurements to consider IAD carefully, especially in high risk patients.

PP.05.03

THE EFFECTS OF INITIAL AND SUBSEQUENT OVERWEIGHT OR OBESE ON HYPERTENSION

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Objective: The aims of our study were to examine whether becoming nonobese could reverse the adverse effects of initial overweight or obesity on hypertension in adulthood.

Design and method: We collected the data in 1992 and again in 2007 from the same group of 577 individuals. The subjects were classified into four groups: individuals with a normal BMI (body mass index) in 1992 and 2007 were in group I; those with a normal BMI in 1992 but overweight or obese in 2007 were in group II; those who were overweight or obese in 1992 but normal BMI in 2007 were in group III; and those who were kept overweight or obese in 1992 and 2007 were in group IV.

Results: The cumulative incidence of hypertension was 36.2%, 62.2%, 38.7% and 62.0% for group I to IV, respectively. Compared with group I, the HR is 1.817 for group II ($p < 0.001$), 1.065 for group III ($p = 0.746$) and 2.254 for group IV ($p < 0.001$). There was not significantly different between groups I and III, and the same as between groups II and IV.

Conclusions: Compared with the individual who persist being overweight or obesity, becoming nonobese could reverse the adverse effects of overweight or obesity on hypertension; compared with who were persisted in normal BMI, being overweight or obese will increase the morbidity of hypertension. In short, overweight or obese would increase the risk for hypertension, and loss weight might reverse the adverse effect.

PP.05.04

STUDY OF THE RELATIONSHIP BETWEEN THE INDICES OF OVERWEIGHT AND HEMODYNAMIC PARAMETERS IN PATIENTS WITH ARTERIAL HYPERTENSION

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Objective: To study of the relationship of overweight and hemodynamic echocardiographic indices of cardiac activity study in hypertensive patients.

Design and method: Participants are 112 patients with hypertension of II degree, aged 30–65 years. The average age of the patients was 54.5 (CI 52.3; 56.8) years. Following criteria were taken into account: age, systolic and diastolic blood pressure (SBP, DBP), heart rate (HR), height, weight, body mass index (BMI), waist and hips circumference indicators (WCI, HCI), the ratio WCI/HCI. Following parameters during echocardiography were studied: left ventricle end-diastolic dimension (LVEDD), interventricular septum thickness (IVST) and left ventricular posterior wall (LVPW), an index of relative wall thickness (RWT) and left ventricular myocardial mass (LVM) and the left ventricular mass index (LVMI). "STATISTICA" software was used for statistical processing.

Results: 95% confidence interval was applied. SBP was 150.4 (145.8; 155.0); DBP - 90.7 (87.8; 93.4); HR - 75.3 (72.9; 77.7). The growth indicators - 165.5 (163.9; 167.2); body weight - 75.8 (73.1; 78.6); BMI - 27.2 (26.4; 28.0); WCI - 91.8 (89.5; 94.1); HCI - 104.6 (102.6; 106.6); WCI / HCI - 0.88 (0.86; 0.90). EF - 64.0 (63.4; 64.6); LVEDD - 45.8 (44.2; 47.3); LVPW - 11.2 (10.7; 11.7); IVST - 10.2 (9.5; 10.8).

RWT - 0.48 (0.45; 0.51); LVM - 208.5 (190.8; 226.2); LVMMI - 111.3 (102.3; 120.3). Spearman's rank correlation was identified at the level of $p < 0.05$ in the whole group: between the indices WC and DBP ($r = 0.39$); HCI and DBP ($r = 0.35$); between SBP: DBP ($r = 0.37$), LVPW ($r = 0.33$), IVST ($r = 0.25$), RWT ($r = 0.24$), MMLV ($r = 0.32$), LVMI ($r = 0.30$); between BMI: CRA ($r = 0.30$), LVPW ($r = 0.30$), IVST ($r = 0.41$), RWT ($r = 0.25$), MMLV ($r = 0.40$), LVMI ($r = 0.25$); between WCI / HCI: RWT ($r = 0.37$), IVST ($r = 0.27$), RWT ($r = 0.34$).

Conclusions: In the group of hypertensive patients a correlation between the indices pointing to overweight and echocardiographic indices of myocardial remodeling was found.

PP.05.05 PREDICTIVE VALUE OF LEPTIN AND ADIPONECTIN-TO-LEPTIN RATIO FOR HYPERTENSION AND INSULIN RESISTANCE IN SUBJECTS WITH LOW CARDIOVASCULAR RISK

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Objective: Leptin is an important predictor of cardiovascular (CV) risk. Some studies found that adiponectin-to-leptin ratio (A/L) is a better predictor of hypertension (HT) and insulin resistance (IR) than leptin alone. Our goal was to evaluate whether A/L improves the predictive value of leptin for HT and IR in subjects with low cardiovascular risk.

Design and method: Participants (N = 208; 135 females; 171 normotensives (NT) and 37 untreated HT (uHT)) were selected from a random sample of 2487 subjects enrolled in cross-sectional study. Subjects with diabetes, chronic kidney disease, pregnancy, terminal illness and treated hypertensives were excluded. BP was measured using Omron M6 device following ESH/ESC guidelines. IR was defined as HOMA-IR > 3. Adiponectin and leptin concentrations were determined by ELISA.

Results: There were 147 insulin resistant (IR), 61 non-IR subjects. Leptin concentration was lower in NT than in HT (11.05 (5.85–16.75) vs. 8.44 (3.60–14.61), $p = 0.05$), while there was no difference in A/L ($p = 0.56$). Leptin was significantly higher in IR than non-IR subjects (12.00 (6.00–17.50) vs. 7.64 (3.25–13.64), $p = 0.002$) while A/L was lower (0.73 (0.43–1.12) vs. 1.35 (0.59–3.20), $p < 0.001$). Using receiver operating curves (ROC) to examine the predictive value of leptin and A/L for HT and IR we found that leptin values > 5.4 ug/L had a sensitivity of 81% and specificity of 34% for HT (AUC = 0.604, $p = 0.04$), while A/L was not a significant predictor of HT (AUC = 0.531, $p = 0.53$).

Conclusions: Untreated HT significantly differ from NT in leptin but not in A/L values. However, neither leptin nor A/L are sufficiently significant predictors of HT and IR in subjects with low cardiovascular risk.

PP.05.06 LEPTIN AND HEART RATE IN SUBJECTS WITH LOW CARDIOVASCULAR RISK

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Objective: Several studies showed that leptin may be associated with faster heart rate (HR) and it was questioned whether this could be associated with increased cardiovascular risk. Our goal was to examine the possible association of leptin and HR in subjects with low cardiovascular risk.

Design and method: Participants (N = 208; 135 females; 137 normotensives, 34 prehypertensives and 37 untreated hypertensives) were selected from a random sample of 2487 subjects enrolled in an observational study. Subjects with diabetes, chronic kidney disease, pregnancy, terminal illness and treated hypertensives were excluded. BP was measured using Omron M6 device following ESH/ESC guidelines. Leptin concentration was determined by ELISA.

Results: In the whole group leptin concentration was higher (12.10 (6.12–17.50) vs. 4.01 (1.70–8.17), $p < 0.001$) in women than in men. There were no significant differences in leptin concentrations between normotensives (NT), prehypertensives (PHT) and untreated hypertensives (uHT). However, uHT (11.20 (6.00–16.90)) had significantly higher leptin concentration than NT (8.60 (3.60–14.65); $p < 0.05$)

and non-significantly higher than PHT (8.04 (3.60–12.60; $p > 0.05$)). There were no differences between NT and PHT ($p > 0.05$). HR was similar in all three BP groups ($p = 0.82$). Leptin was positively correlated with BMI, albuminuria, CRP and insulin concentrations ($p < 0.05$). HR was positively correlated with eGFR and insulin and negatively with HDL. There were no significant correlations of leptin and HR in any of three BP groups. In multivariate analysis leptin was not a significant predictor of HR (Beta = -0.01, $p = 0.90$), systolic (Beta = -0.06, $p = 0.27$) or diastolic BP (Beta = 0.03, $p = 0.58$). BMI and female sex were positively associated with leptin concentration in multivariate analysis ($p < 0.05$).

Conclusions: In our group of subjects with low cardiovascular risk leptin was not associated with HR. Hypertensive patients had higher leptin concentrations than NT and non-significantly higher than PHT subjects, latter two having similar leptin concentrations.

PP.05.07 ASLEEP, BUT NOT DAYTIME CLINIC OR AWAKE MEAN, BLOOD PRESSURE IS AN INDEPENDENT PREDICTOR OF CARDIOVASCULAR EVENTS IN PATIENTS WITH DIABETES: THE HYGIA PROJECT

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Objective: Recent guidelines suggest relying on the ambulatory blood pressure (BP) monitoring (ABPM) derived awake mean to corroborate the diagnosis of hypertension suspected by elevated clinic BP measurement. However, several prospective ABPM studies have found elevated sleep-time BP is a better predictor of cardiovascular disease (CVD) risk than awake BP mean, also in diabetes. We evaluated the combined contribution to CVD risk of clinic, awake, and asleep BP among patients with diabetes participants in the Hygia Project, designed to evaluate prospectively CVD risk by ABPM in primary care centers of Northwest Spain.

Design and method: This study involved 2632 patients with type 2 diabetes, 1589 men/1043 women, 65.1 ± 11.6 years of age, with baseline BP ranging from normotension to sustained hypertension according to ABPM criteria, prospectively evaluated throughout a 4.1-year median follow-up. BP was measured at 20-min intervals from 07:00 to 23:00 h and at 30-min intervals at night for 48 h. During monitoring, subjects maintained a diary listing the times of going to bed at night and awakening in the morning.

Results: The hazard ratios (HR) of total CVD events for each 1-SD elevation in clinic, awake, and asleep systolic BP (SBP) analyzed separately (adjusted for the significant influential characteristics of age, sex, chronic kidney disease, cigarette smoking, waist perimeter, and history of previous CVD event) were 1.25 [95%CI: 1.17–1.35]; 1.39 [1.30–1.50], and 1.51 [1.41–1.62], respectively (always $P < 0.001$). Exploration of the combined contribution of all three BP measurements revealed elevation in asleep SBP (HR = 1.55 [1.38–1.75], $P < 0.001$) but not in clinic BP (1.08 [0.99–1.18], $P = 0.082$) or awake BP (0.93 [0.82–1.06], $P = 0.270$) was the only independent BP parameter significantly associated with increased CVD risk.

Conclusions: In patients with diabetes, sleep-time SBP mean, but not daytime clinic BP measurement or ABPM-derived awake BP mean, is the only significant and independent prognostic marker of CVD morbidity and mortality. These findings indicate ABPM, but not conventional clinic BP so far mistakenly used to diagnose hypertension and establish therapeutic targets, is a clinical necessity to accurately detect abnormal sleep-time BP and assess CVD risk in diabetes.

PP.05.08 INVESTIGATION OF THE APELIN'S ACTIVITY IN HYPERTENSIVE PATIENTS WITH DYSGLICAEMIA AND OBESITY

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Objective: Aim of the study was to investigate apelin's expression in patients with essential hypertension (EH) with obesity in Ukraine patients.

Design and method: 96 patients with EH were recruited in the investigation. Apelin-12 was estimated in blood plasma using ELISA technique (Kit Apelin-12, Phoenix, USA), IL-6 ELISA. Patients were categorized into 4 cluster groups based on k-means according apelin and BMI data.

Results: The most amount of lean patients were in 1st cluster (21,7 %); 78,3 % were pre obese. The prevalent amount of the 2nd cluster – 59,1 %, were hypertensive patients with 2st of obesity. 50 % patients of 3rd cluster had obesity of 1st and 45 % - were pre obese. In 4th cluster the 70,3 % of patients with hypertension had 1st of obesity, and 24,3 % - pre obese. The significant increasing level of apelin in all the patients with EH was detected.

The smallest percentage of accompanied carbohydrate disorders 60,8 % was in hypertensive patients of 1st cluster. In the 2nd cluster there was 68,4 % patients with EH and dysglycemia. Patients of 3d and 4th clusters had hypertension and comorbid carbohydrate pool abnormalities in 85,6 % and 91,8 % correspondingly. Numerous positive correlations of apelin were found: with fasting insulin ($R = 0,29$, $p < 0,05$), -post OGTT glucose and insulin levels ($R = 0,39$ and $R = 0,41$ respectively, $p < 0,05$), -HOMA index ($R = 0,24$, $p < 0,05$) and HbA1c ($R = 0,24$, $p < 0,05$). In patients of cluster 1 the significant correlation of apelin and HbA1c was estimated ($R = 0,53$, $p < 0,05$). In patients of 2nd and 4th clusters significant negative correlations of apelin with BMI were detected ($R = -0,72$ and $R = -0,41$ respectively, $p < 0,05$).

Conclusions: Obesity is not always associated with expression of adipokine, but depends from pronunciation of accompanied dyslipidemia and carbohydrate metabolism disturbances. Significant dyslipidemia with high atherogene index, dysglycemia, hyperinsulinemia, and pronounced expression of pro-inflammatory cytokine are accompanied with decreasing of apelin level and negative correlation of BMI with peptide. Overexpression of apelin in hypertensive patients with moderate abnormalities in lipid and carbohydrate metabolism is considered as compensatory reaction.

PP.05.09 REDUCING ENDOTHELIAL DYSFUNCTION AND ARTERIAL STIFFNESS USING OMEGA-3 POLYUNSATURATED FATTY ACIDS IN HYPERTENSIVE PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Objective: The aim is to reduce endothelial dysfunction (ED) and arterial stiffness (AS) using omega-3 polyunsaturated fatty acids (PUFAs) in patients with arterial hypertension (AH) and concomitant type 2 diabetes mellitus (T2DM).

Design and method: We examined 63 hypertensive patients with T2DM (34 males, aged 61.3 ± 4.2 years). Baseline characteristics included history of AH (5.2 ± 2.6 years) and T2DM (6.1 ± 0.5 years). The level of HbA1c was less than 7.5%. All patients had the second stage of AH. Patients were divided into 2 groups: the 1st ($n = 34$) - received the standard therapy including ramipril 10 mg and atorvastatin 20 mg, the 2nd ($n = 29$) - in addition to the standard therapy received omega-3 PUFAs 2 g/day. Control groups consisted of 20 healthy individuals of appropriate ages. AS was measured as carotid-femoral pulse wave velocity (PWV). ED evaluated by flow-mediated dilation (FMD) of the brachial artery by ultrasound imaging. Serum levels of asymmetric dimethylarginin (ADMA) were measured by ELISA. These parameters were evaluated at baseline and in 6 months.

Results: Addition of omega-3 PUFAs to the standard therapy increased FMD ($3.57 \pm 2.21\%$ vs $7.72 \pm 4.17\%$, $p < 0.05$) and significantly reduced the level of ADMA (0.65 ± 0.12 vs 0.51 ± 0.09 ng/ml) in the 2nd group after 6 month of treatment. ADMA levels inversely correlated with FMD in all patients ($r = -0.47$; $p < 0.05$). Treatment with omega-3 PUFAs resulted in a significant decrease in fasting triglyceride levels in the 2nd group of patients (2.1 ± 1.23 vs 1.5 ± 0.83 , $p < 0.05$) and in serum total cholesterol levels (5.67 ± 1.62 vs 4.8 ± 1.41 , $p < 0.05$). In the 2nd group we registered the greatest reduction of PWV (18.8 ± 1.08 to 17.9 ± 0.92 m/s). In the 1st group of patients there wasn't significant difference in PWV values after therapy. The largest decline in PWV was accompanied with significant supplementary blood pressure (BP) decrease, and was observed only in the 2nd group after 6 months of treatment ($r = 0.34$; $p < 0.05$).

Conclusions: Addition of omega-3 PUFAs to the standard therapy decrease ED and AS in hypertensive patients with T2DM and can promote supplementary BP decrease.

PP.05.10 COMBINATION OF ANGIOTENSIN II RECEPTOR ANTAGONIST WITH CALCIUM ANTAGONIST IN PATIENTS WITH ESSENTIAL HYPERTENSION COMPLICATED BY TYPE 2 DIABETES MELLITUS

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Objective: Patients with essential hypertension (EH) complicated by type 2 diabetes mellitus (DM) have a high risk of cardiovascular events. The aim of the present study was to evaluate the effects of combination therapy with Valsartan and Amlodipine on BP, left ventricular (LV) hypertrophy, LV diastolic function in patients with EH, type 2 DM and LV hypertrophy.

Design and method: Fifty-eight patients with moderate EH, type 2 DM and LV hypertrophy were randomly assigned to Valsartan (80 mg)+Amlodipine (5 mg) in combination once a day (30 males and 28 females). Doppler - and 2-dimensional echocardiography were performed at baseline and after 12 months of therapy. The parameters of LV hypertrophy, ratio of the early filling velocity (E) to the late filling velocity (A)-E/A ratio, isovoluming relaxation time (IVRT) and deceleration time (DT) were evaluated. LV mass index (LV mass/body surface area) was calculated

according to the Devereux formula. Statistical comparisons were performed by 2-tailed Student's t test for quantitative parameters.

Results: All patients completed the study without showing intolerance or side effects to the drugs. At the end of the study therapy normalized BP ($126,2 \pm 3,3/74,5 \pm 1,9$ mm Hg vs $166,41 \pm 5,4/104,3 \pm 4,1$ mm Hg, $p < 0,01$) in 94,8% of patients. LV mass index reduced from $158,1 \pm 5,7$ to $132,5 \pm 2,8$ g/m². ($p < 0,01$) in 79,3 % of patients. At the end of the study E/A ratio increased from $0,91 \pm 0,01$ to $1,36 \pm 0,02$ ($p < 0,001$) in 82,8 % of patients. IVRT decreased from $103,2 \pm 5,2$ to $74,2 \pm 3,1$ msec ($p < 0,01$) in 81,0% of patients. DT passed from $168,2 \pm 7,9$ to $128,1 \pm 3,0$ msec ($p < 0,01$) in 84,5% of patients.

Conclusions: BP control was stable and effective until the end of the study. Combination therapy with Valsartan+Amlodipine, which have complementary mechanisms of action, demonstrated qualitative regression of LV hypertrophy and improvement of LV diastolic function in patients with moderate EH complicated by type 2 DM. In addition, this combination attenuated the side effects of each component.

PP.05.11 ARTERIAL STIFFNESS IS INCREASED IN PATIENTS WITH DIABETES MELLITUS INDEPENDENT OF BP LEVELS

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Objective: The aim of this study was to identify if patients with diabetes mellitus present increased arterial stiffness compared to non diabetic subjects.

Design and method: 423 consecutive subjects (51.7% male) with age 38.5 ± 24.7 years were included in the study. Subjects were never treated before for hypertension. A physician measured CBP three times in each subject using a mercury sphygmomanometer. All the subjects underwent 24h-ABPM on a usual working day. Pulse wave velocity (PWV) was measured after 15 min of rest in the supine position. The subject was not speaking or sleeping in a quiet, semi-darkened, temperature-controlled laboratory. Participants had advised to refrain from eating, smoking and drinking caffeine beverages and alcohol before measurement. PWV was calculated as the transit time of the arterial pulse along the carotid-femoral distance divided with the distance that measured directly.

Results: Carotid-femoral PWV was independently associated (ANCOVA analysis) with age ($B = 0.098$, $P < 0.001$), 24h average SBP ($B = 0.058$, $P < 0.000$) and presence of diabetes mellitus ($B = 1.7$, $P = 0.0003$), but not with office BP values, 24h DBP, 24h SD SBP, 24h SD DPB and 24h PP. Carotid-femoral PWV was found 10.073 ± 0.133 (SE) in patients without diabetes and 11.773 ± 0.545 (SE) m/sec in patients with diabetes after adjustment for age, gender, office BP, 24h SBP, 24h DBP, 24h pulse pressure, and 24h BP SDs. The difference in carotid-femoral PWV between non diabetic and diabetic patients was -1.700 ± 0.566 (SE). This difference was statistically significant at the 0.01 level after Bonferroni's adjustment for multiple comparisons.

Conclusions: Arterial stiffness was found increased in patients with diabetes mellitus suggesting a role for diabetes in the large arteries arteriosclerosis independent of age, gender and blood pressure levels.

PP.05.12 DIABETIC HYPERTENSIVES ARE CHARACTERISED BY POOR QUALITY OF LIFE

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Objective: Mounting evidence suggests that essential hypertension (EH) has a negative impact on 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.

Design and method: 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 hypertensives demonstrated lower scores in all SF-36 dimensions compared to non-diabetics (Table on the following page).

SF-36 Scales	Diabetes (n=37)	No Diabetes (n=108)	P-Value
Physical functioning	40.01	51.02	0.21
Role physical	49.82	51.12	0.86
Bodily pain	48.72	50.64	0.87
General health	34.91	51.78	0.05
Role emotional	48.89	57.62	0.27
Mental Health	49.82	54.79	0.28
PCS	41.74	51.04	0.21
MCS	47.74	52.38	0.27
Total SF-36 Score	43.52	51.37	0.24

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.05.13 THE PREVALENCE OF SYSTEMIC HYPERTENSION AND DIABETES MELLITUS IN PATIENTS WITH A HISTORY OF ACUTE CORONARY SYNDROME

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Objective: To assess the prevalence of systemic hypertension and diabetes mellitus type 2 in ambulatory patients with a previous acute coronary syndrome in the last 4 years.

Design and method: All the patients with a documented admission in hospital for an acute coronary syndrome in the last 4 years that had been seen in both ambulatory of Coltea Hospital and MEDIS between January 2011 and November 30th 2014 were included. It was a cross-sectional study. In all patients were recorded retrospective data regarding ACS and diabetes mellitus duration, stroke history and were determinate during the visit: blood pressure, lipids levels and actual treatment.

Results: We have included 148 patients, 65% males and 35% females; with an average age of 62.3 years. In these patients 31.4% had diabetes mellitus type 2 (from this 15% newly diagnosed during ACS hospitalization), 64.5% had SH (84% known, 16% newly diagnosed), 62.1% dyslipidemia (80.4% high LDL-C, 32, 6% low HDL-c, 41, 2% high TG – according to European guidelines of dyslipidemia). Other risk factors: 65% obesity (BMI>24Kg/m2); 20% smokers, 18% lack of activity. In patients with diabetes mellitus the stroke prevalence was 25.5% compared with 16.5% in patients without DM (p<0.05). Patients were treated with: statins (78%), AAS (91%), clopidogrel (64%) – 31% in association, ACEIs (68%), ARBs (34%), beta-blockers (65.7%), CCB (34.6%), diuretics (48.9%). 34.2% of patients not at LDL-c target.

Conclusions: Systemic hypertension and diabetes mellitus are common conditions in hospitalized patients with acute coronary syndromes. For all these patients dyslipidemia is another common condition and despite treatment with statins in these patients the value of LDL-c are still high. The presence of diabetes in patients with previous acute coronary syndrome might increase significantly the risk of stroke (a further study with this prespecified objective must be done to confirm).

PP.05.14 IMPACT OF ORTHOSTATIC HYPOTENSION FOR LEFT VENTRICULAR HYPERTROPHY IN DIABETIC PATIENTS WITH AUTONOMIC NEUROPATHY

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Objective: Autonomic neuropathy is one of the major complications of diabetes which induces arrhythmia or orthostatic hypotension that would be the potential cardiac dysfunction resulting in morbidity and mortality of cardiovascular disease (CVD). The aim of this study is to investigate the impact of autonomic neuropathy toward left ventricular mass in diabetic patients.

Design and method: Consecutive 132 diabetic patients (81 men, age 59 ± 14 years) were examined LV structure and autonomic nerve system. We exclude patients with alpha or beta blockade treatment. LV ventricles, septal wall thickness (STd), posterior wall (PWTd), and left ventricular end-diastolic dimension (LVdD) were measured by echocardiography. LV mass was calculated according to Penn's formula and was indexed by body surface area (LVMI). Autonomic nerve system assessed with R-R interval variation and postural blood pressure testing. R-R was examined after 10 minutes rest, and R-R interval measured every 6 deep breath in 1 minute. Results were expressed as heart rate differences. Orthostatic hypotension (OH) was defined as a reduction of systolic blood pressure at least 20mmHg within 2minutes of standing.

Results: HbA1c 8.9 ± 2.2%, and blood pressure 132 ± 20/ 71 ± 10 mmHg. In LV structure measurement, mean STd was 9.3 ± 1.4 mm, PWTd 9.3 ± 1.3 mm, LVdD 48.2 ± 4.9 mm, and LVMI 111.5 ± 29.6 g/m2. In autonomic neuropathy, 27% of patients had OH and mean R-R intervals was 10 ± 7. R-R intervals have negatively correlation with age, duration of diabetes, presence of hypertension and LVMI. In multiple regression analysis, LVMI was excluded as an independent risk factor of R-R interval. Then, we compared LV structure and clinical characteristics between OH (+) and OH (-) group. LVMI was significantly increased (120.8 ± 29.4 vs 106 ± 27.8 g/m2) and BMI was significantly decreased (23.4 ± 3.3 vs 25.4 ± 5.0) in OH(+) group as compared with OH(-) group, while there was not a significant difference in LV ventricles between two groups. In logistic regression analysis, LVMI and BMI were independent risk factors of OH(+) (p=0.003, p=0.009).

Conclusions: It suggested that autonomic neuropathy may affect increased left ventricular mass by blood pressure variation due to orthostatic hypotension in diabetic patients.

PP.05.15 SOME ASPECTS OF CARDIOVASCULAR DISEASE TREATMENT IN TYPE 2 DIABETES MELLITUS PATIENTS IN TYPICAL APPROACHES

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Objective: Evaluation of frequency, peculiarities of treatment and monitoring cardiovascular disease (CVD) in patients with type 2 diabetes mellitus (DM).

Design and method: 200 patients with type 2 DM, who consented to take part in the questionnaire, were examined. Evaluation questionnaire, clinical examination and checking levels of glucose, glycosylated hemoglobin (HbA1c) and lipids in plasma were used.

Results: Among 200 patients there were 77% women and 23% men; 65.5% lived in a region center. Frequency of arterial hypertension was 83%. Target blood pressure (BP) levels (<=130/80 mm Hg) were stated in 49 (29.5%) patients with DM. In doctors' opinion, 94% patients with type 2 DM and hypertension had regular treatment of lowering blood pressure drugs. However, only 77% patients admitted regular low-blood pressure therapy. Monotherapy low-blood pressure medication was given to 24.5% patients, fixed combination 2 low-blood pressure medication – 5.5%, free combination 2 low-blood pressure medications – 44%, 3 low-blood pressure medication – 22%, and 4 low-blood pressure medication – 4% patients (median 2 [1; 3] drugs). 79.5% patients had tonometers; 25.9% patients check their blood pressure (BP) twice a day and more, and 26.5% - only when feeling worse. 49% patients had glucometers, but only 11.5% do self-monitoring once a day and more. In doctors' opinion, stenocardia was revealed in 17% patients, but 33% out of the 200 examined patients registered presence of typical symptoms. Statins were given to 23.5% of the examined group. Target-level degrees of glycosylated hemoglobin (HbA1c) (<7.0%) were stated in 34 (17%) patients with DM due lack of knowledge, inadequate frequency or absent glucose self-monitoring, low frequency of the use of combined glucose-lowering therapy, frequent monotherapy of sulphourea.

Conclusions: Optimization of diagnostic tactics and education patients with type 2 DM and hypertension is necessary as well as therapy correction due to multifactorial treatment conception.

PP.05.16 ASSOCIATION BETWEEN QUALITY OF AMBULATORY CARE AND SUMMARY MEDICAL COST AT PATIENTS WITH ARTERIAL HYPERTENSION AND TYPE 2 DIABETES MELLITUS

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Objective: To analyze of association between quality of ambulatory care and summary medical cost at patients with arterial hypertension and type 2 diabetes mellitus (DM).

Design and method: We analyzed 438 outpatients files patients with type 2 DM and arterial hypertension from Kirov Region (North-East of European Russia). 211 files were selected at 7 outpatients territorial medical centers of city Kirov (Regional Centre, Group 1), 227 – from 36 Kirov Region districts (Group 2). All patients had type 2 DM and regularly examined during 2009. VEN-, ABC-analyses, frequency and cost-of-illness analyses were conducted.

Results: Quality of ambulatory care was worse at Group 2. HbA1c level tested with inadequate frequency (34 (15%) patients at Group 2, and 84 (39.8%) patients at Group 1 (p<0.001) and thus complicated antihyperglycemic therapy efficacy assessment. Goals of antihypertensive treatment were achieved (according of office measurement) only in 57 (25.1%) patients at Group 2, 72 (34.1%) – Group 1 (p=0.05). Prescription of statins in Group 2 remained insufficient: only 46 (20.3%) vs 104 (49.3%) patients Group 1 (p<0.001). Rare testing for LDL complicated assess-

ment of low-lipids therapy adequacy. Prescription percentage for medications with proved prognosis improvement in Group 2 was rarely than Group 1 ($p < 0.001$); inexpensive medications without proven efficacy (class N) were prescribed more frequent in Group 2 (and more than medications improved life quality (class E). Main direct expenditures in both groups were related to antihyperglycemic and anti-hypertensive, third were statins (class V) at Group 1 and inexpensive medications without proven efficacy (class N) at Group 2 (10.8% ambulatory care costs). In Group 2 were more patients, whose hospitalization due DM, hypertension and cardiovascular complications: 95 (41.9%) vs 50 (23.7%) patients ($p < 0.001$), number of hospitalizations were 128 and 54 accordingly. Direct medical cost for 1 patients at Group 2 was more in 2.36 times, indirect medical cost - in 2.77 times than 1 patients Group 1.

Conclusions: We revealed, that worse quality of ambulatory care increase direct medical cost in 2.36 times, indirect medical cost - in 2.77 times.

PP.05.17 INCIDENCE, DETERMINANTS AND MORBI/MORTALITY OF NEWLY DIAGNOSED DIABETES MELLITUS TYPE 2 IN HYPERTENSIVE PATIENTS

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Objective: The primary objective was to determine the incidence of newly diagnosed Diabetes mellitus type 2 (DM2) in hypertensive patients as well as to assess their morbi/mortality compared to non-diabetics. Secondary objective was to identify variables associated with the appearance of DM 2.

Design and method: Observational, longitudinal, retrospective study of hypertensive patients treated at a Hypertension Unit, between the years 1986 and 2014.

A total of 5877 were recruited. 1485 (25.3 %) with baseline DM2 and further 386 patients (8.8 %) with previous cardiovascular event were excluded, 446 patients (12.1 %) were lost from follow-up, study population consisted finally of 3242 non-diabetic, hypertensive patients with at least 12 months follow-up. DM2 was defined either as fasting glucose > 125 mg/dl or HbA1c > 6.5 %. The differences in time between visits in each patient and between patients were very variable. To account for these differences, repetitive measures according to the program STATA were used.

Results: Mean follow-up time was 4.9 years. At baseline mean age was 53.2 years, 1758 patients (53.8 %) were women, 19.1 % were current smoker, 1797 patients (54.6 %) were treated, average number of antihypertensives was 1.2 drugs. At follow-up 2769 patients (84.7 %) were under pharmacologic treatment, mean number of drugs was 1.9. 459 (14.0 %) patients became diabetic (2.9/100 patient-years). Associated, independent factors in multivariate analysis related to developing DM2 were age (HR 1.01; $p = 0.03$), HOMA index (HR 1.01; $p < 0.001$), elevated fasting glucose (HR 4.9; $p < 0.001$), BMI > 30 kg/m² (HR 1.7; $p < 0.001$), CRP > 1.5 mg/dl (HR 1.3; $p = 0.047$), use of betablockers (HR 1.4; $p < 0.02$), use of HCTZ (HR 1.5; $p < 0.003$) and use of fibrates (HR 2.3; $p = 0.001$). Cardiovascular events during subsequent follow-up were documented in 71/459 patients (15.6 %) who became diabetics vs. 178/2609 patients (6.4 %) who did not, showing a 2.4-fold higher probability of events.

Conclusions: During a follow-up of almost 5 years, the proportion of hypertensive patients becoming diabetic was 14 %, the incidence of cardiovascular events was 2.4-fold in these patients compared to non-diabetic hypertensives.

PP.05.18 PREVALENCE AND CONTROL OF DIABETIC PATIENTS ADMITTED DUE TO AN ACUTE VASCULAR EVENT TO THE EMERGENCY ROOM

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Objective: Cardiovascular diseases represent the mortality main cause in diabetic population.

To evaluate prevalence and control of Diabetes Mellitus (DM) in patients admitted to the emergency room due to an acute vascular event.

Design and method: We analyzed retrospectively 3635 patients (65.5% men) with a mean age of 71,15 (SD:12,6) that were admitted to the emergency room consecutively since January 2009 until December 2011 due to an acute vascular event; acute coronary syndrome (ACS), stroke or peripheral acute arterial disease (PAD). Patients were classified in two groups: those with known DM ($n = 1265$) and patients with not known diabetes mellitus, NDM ($n = 2253$).

Results: DM group had elderly patients [72,9 (SD:9,8) vs. 70,1(SD:13,9)*]. DM group presented more ACS (47,7 vs. 43,5%*) and PAD (21 vs. 11,5%*) and an inferior ratio of Stroke (31,3 vs. 44,9*).

HbA1C was performed in 881 patients (66,3%) in the DM group and 1024(44,4%) in NDM group. 18,1% (186 patients) with not known diabetes mellitus presented a HbA1C $> 6,5$ %.

DM patients receiving insulin treatment had worse controls than patients with oral treatment (8.0 vs. 7.6 % $p > 0.05$). In-hospital mortality was greater in DM patients than in NDM (11.0% vs. 9.6% *). (* $p < 0.01$).

Conclusions: Prevalence of Diabetes Mellitus was high (34.8%). From the not known diabetic patients group a 18% had a recent diagnose of diabetes with an HbA1c $> 6,5$ %. This test should be performed in all patients that are admitted due to an acute vascular event. Patients on oral antidiabetic agents presented better controlled than patients receiving insulin but differences were not statistically significant. In-hospital mortality was greater in diabetic population than in non-diabetic patients.

PP.05.19 EFFECTS OF LINAGLIPTIN ON RENAL ENDOTHELIAL FUNCTION IN TYPE-2 DIABETES

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Objective: Animal experiments and human studies indicate an increased nitric oxide (NO) activity and endothelial NO synthase (NOS) expression in type-2 diabetes. The exaggerated NO production, compensatory to the increased oxidative stress in diabetes, lead to early hemodynamic changes characterized by hyperfiltration, hyperperfusion and increased vascular permeability.

Design and method: In this randomized, double-blind, investigator-initiated trial, 62 patients (57 ± 9.3 years) with type-2 diabetes were randomly assigned to linagliptin 10 mg ($n = 30$) or placebo ($n = 32$) for 4 weeks. Endothelial function of the renal vasculature was assessed by constant-infusion input-clearance technique with p-amminohippurate and inulin, as well as urinary albumin creatinine ratio (UACR), both before and after blockade of NOS with NG-monomethyl-L-arginine (L-NMMA).

Results: Treatment with linagliptin for 4 weeks tended to reduce fasting (137 ± 26 versus 129 ± 30 mg/ml, $p = 0.072$), postprandial (171 ± 22 versus 160 ± 45 mg/ml, $p = 0.076$) blood glucose and HbA1c (6.98 ± 0.7 versus 6.86 ± 0.8 %, $p = 0.089$), whereas no change occurred with placebo. Renal plasma flow (RPF) and glomerular filtration rate did not change after linagliptin and placebo, without any difference between the groups. After 4 weeks the absolute [percentual] change in RPF due to L-NMMA was lower in linagliptin group (-46.8 ± 34 [-7.61 \pm 5.3] versus -65.1 ± 36 [-10.4 \pm 5.6] ml/min [%], $p = 0.045$ [0.046]) compared to placebo group, indicating a lower basal NO activity after treatment with linagliptin. Consistently, UACR due to L-NMMA did not clearly change in linagliptin group (22.2 (11.6–40.3) versus 28.2 (16.5–50.3) mg/g, $p = 0.061$), but increased significantly in placebo group (13.5 (8.6–25.9) versus 20.9 (15.9–33.5) mg/g, $p < 0.001$), pointing to an upregulation of NO activity in the placebo group.

Conclusions: Thus, our data suggest that linagliptin normalizes increased renal endothelial function, and hence NOS-dependency of vascular tone, in patients with type-2 diabetes.

PP.05.20 CAMEL-CONTAINING SOFT DRINKS IMPAIR PANCREATIC FUNCTION AND INSULAR MORPHOLOGY IN RATS

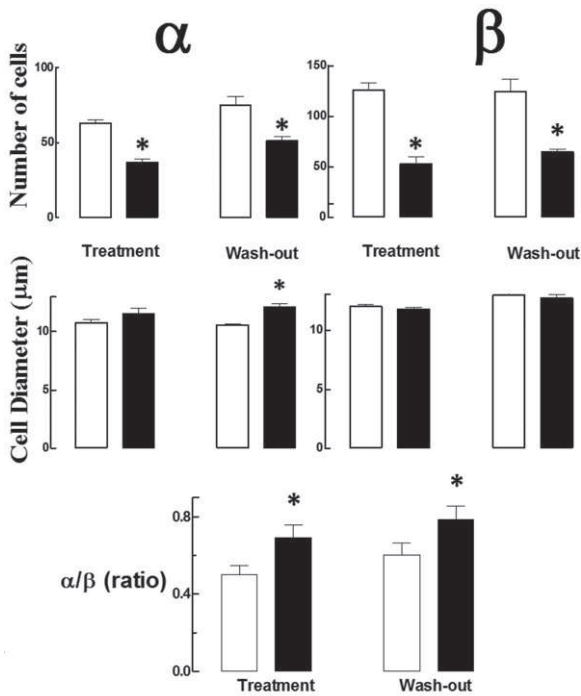
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Objective: This study was carried out in order to examine the impact of long-term consumption of caramel-containing soft drinks (cola beverages) on glycemic balance and endocrine pancreas function and morphology in rats.

Design and method: Sixty-four Wistar rats drank water (W), regular cola beverage (C, sucrose sweetened) for 6 months (treatment). Euthanasia was performed in 50 % of the animals in each group. The remaining animals carried on drinking water for the next 6 months until euthanasia administration (wash-out). Insulinemia, plasma biochemistry and pancreas morphometry and immunohistochemistry evaluations were performed. Insulin resistance (HOMA-IR) was computed.

Results: Hyperglycemia (16%, $p < 0.05$), CoQ10 (coenzyme-Q10) decrease (-52 %, $p < 0.01$), strong hypertriglyceridemia (2.8-fold, $p < 0.01$), hyperinsulinemia (2.4 fold, $p < 0.005$) and HOMA-IR increase (2.7 fold, $p < 0.01$) were observed in C. Group C showed a decrease in number of α cells (-42 %, $p < 0.01$) and β cells (-58 %, $p < 0.001$) and a mild increase in size of α cells after wash-out (+14 %, $p < 0.001$). Regular cola drinking caused increase in α/β -cell ratio which did not

normalize after wash-out ($\alpha/\beta = +38\%$ in C6 vs W6, $+30\%$ in C12 vs W12, $p < 0.001$). Group C showed a remarkable increase in the cytoplasmic expression of Trx1 (Thioredoxin-1) (2.25-fold in C6 vs. W6; 2.7-fold in C12 vs. W12, $p < 0.0001$) and Prx2 (Peroxiredoxin-2) (3-fold in C6 vs. W6; 2-fold in C12 vs. W12, $p < 0.0001$). The nuclear expression of either PCNA (proliferating cell nuclear antigen) or caspase-3 was not affected by treatment.



Conclusions: Sucrose-sweet cola drinking resulted in loss of β cell function and depletion of insulin content. Treatment had no effect on either proliferation or apoptosis in β cells. Activation of dedifferentiation or trans-differentiation mechanisms might account for the loss of β cells. Oxidative stress is likely involved as suggested by increased expression of thioredoxins and low circulating levels of CoQ10. Results support a glucotoxic effect of sucrose-sweet cola drinking in rat pancreas.

PP.05.21 STRUCTURAL AND FUNCTIONAL PROPERTIES OF ARTERIES ACCORDING TO VOLUME SPHYGMOGRAPHY IN PATIENTS WITH DIABETES MELLITUS AND ARTERIAL HYPERTENSION

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Objective: To conduct a comparative assessment of parameters characterizing the structural and functional properties of the major arteries in patients with diabetes combined with arterial hypertension (AH) and patients with hypertension without metabolic disorders.

Design and method: The total number of examined was 73 people aged 40 to 65 years. The first group consisted of 46 patients with diabetes and hypertension of 1–2 degrees, including 22 men and 24 women, mean age 56.4 ± 8.6 years. In the second group 27 patients with arterial hypertension have been included: 15 men and 12 women, mean age 53.7 ± 9.0 years. The structural and functional properties of the main arteries were assessed by volume sphygmography with the device VS-1000 («Fukuda Denshi», Japan) on the following parameters: pulse wave velocity (PWV) in the arteries of predominantly elastic type on the left and right (R-/L-PWV), in the arteries mostly muscle-type (B-PWV), in aorta (PWVao), and cardio-ankle vascular index - L-/CAVII.

Results: Office blood pressure (BP) in the 1st group was 146.6 ± 12.7 and 88.1 ± 8.9 mmHg; body mass index (BMI) - 35.3 ± 5.9 kg/m²; waist circumference (WC) - 116.5 (99; 122) cm. In the 2nd group - systolic blood pressure (SBP) - 140.5 ± 10.7 mmHg; diastolic (DBP) - 95 (90; 100) mm Hg; BMI - 24.1 (23.2; 27.5) kg/m²; WC - 88.5 (78; 95) cm. Comparison groups were matched for age, sex, SBP. DBP values were significantly lower in patients with diabetes compared to patients with hypertension. In group 1 parameters of arterial stiffness according to the volume sphygmography were: PWVao - 7.1 (5.5; 8.5) m/s, R/L-PWV - 15.8 ± 2.2 m/s, B-PWV - 7.4 ± 1.4 m/s, L-/CAVII - 8.5 (7.7; 9.4). The vascular wall stiffness values in group 2 were: PWVao - 6.8 ± 3.1 m/s (ns), R/L-PWV - 14.4 ± 3.1 m/s ($p < 0.05$), B-PWV - 8.1 ± 1.5 m/s ($p < 0.05$), L-/CAVII - 7.9 ± 1.3 ($p < 0.05$).

Conclusions: The differences identified in patients in the comparison groups, presumably caused by loss of elasticity of large arteries in diabetic patients due to the wall restructuring. Whereas in patients with hypertension without metabolic disorders with high diastolic blood pressure on the foreground is the damaging of small arteries.

PP.05.22 IMPACT OF TYPE 2 DIABETES MELLITUS ASSOCIATED WITH HTA, IN CARDIOVASCULAR RISK

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Objective: Type 2 diabetes is a cardiovascular risk factor. The coexistence of hypertension in diabetic patients greatly enhances their likelihood of developing CVD. Other important risk factors for CVD in these patients include the following: obesity, atherosclerosis, dyslipidemia, microalbuminuria, inflammation, retinopathy, and “diabetic cardiomyopathy.” We aimed to assess the impact of type 2 diabetes mellitus associated with high blood pressure over these cardiovascular risk factors.

Design and method: We performed a transversal study, lasting 12 months, in which 100 patients with essential hypertension, and type 2 diabetes, with medium age 60.7 ± 9.3 years were evaluated in comparison with 100 patients with only hypertension. We evaluate these patients for: BMI; waist circumference; IMT by carotid ultrasonography; microalbuminuria in a spot morning urine; fundus oculi, LVMI for left ventricular hypertrophy by echocardiography. Serum PCR and lipid concentrations were measured.

Results: The diabetic hypertensive subjects significantly had higher BMI ($p = 0.01$) and waist circumference statistically significant ($p = 0.005$). Patients with hypertension and diabetes had a greater left ventricular mass index (66% vs 51% ; $P = 0.04$). Mean value for IMT was 1.1 ± 0.3 mm for diabetic patients and 0.93 ± 0.2 mm for the other group ($P < 0.001$) and its prevalence was high in diabetics (75% vs 64% , $P = 0.1$). Prevalence of microalbuminuria was significantly high in diabetics (44% vs 14% , $P < 0.001$). PCR as marker of inflammation was prevalently high in people with diabetes and hypertension (32% vs 16% , $P = 0.013$). Also, prevalence of retinopathy was significantly high in people with diabetes and hypertension compare to other group (27% vs 12% , $P = 0.012$). There was strong relation between LVMI, microalbuminuria, IMT and PCR. Waist circumference had correlation with IMT and microalbuminuria.

Conclusions: DM is an independent risk factor for the increased LV mass and impaired diastolic function regardless of association with hypertension or not. Central obesity is associated with an increase risk for cardio metabolic diseases such as atherosclerosis and diabetic nephropathy. Atherosclerosis is characterized by chronic inflammation affecting the arterial intima. Thus, individuals with type 2 diabetes and hypertension had increased risk for CVD.

PP.05.23 LEFT VENTRICULAR HYPERTROPHY AND INSULIN RESISTANCE IN HYPERTENSIVE PATIENTS

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Objective: The purpose of this study was to investigate the relationship between insulin resistance and left ventricular (LV) hypertrophy in hypertensive patients.

Design and method: We studied 1019 hypertensive patients (46,5% men, mean age 56.8 ± 11 year old), newly diagnosed untreated hypertension or under hypertension (mean systolic/diastolic arterial pressure $150.5 \pm 21/93.3 \pm 12.3$ mmHg). In all patients BMI (mean 28 ± 1.5 kg/m²) and waist circumference (98 ± 3 cm) were measured. Fasting blood samples were taken for the evaluation of serum glucose and insulin at baseline and in 120 minutes after oral administration of 75 grams of glucose. Moreover, All patients were assessed by ultrasonography for left ventricle mass index (LVMI) measurement. Based on the presence or not of LV hypertrophy the population of the study was divided in two groups (group A: LVMI = < 115 g/m² for men and < 95 g/m² for women, group B: LVMI > 115 g/m² for men and > 95 g/m² for women).

Results:

Table. Comparison between groups			
	Group A (n=360)	Group B (n=659)	P value
HOMA0	2.86±3	3.1±3.3	NS
HOMA120	14.7±17.3	20.7±25.1	0.011

HOMA0: homeostatic model assessment at baseline, HOMA120: Homeostasis model assessment at 120 minutes

Conclusions: Insulin resistance after oral glucose intake was significantly higher in hypertensive patients with LV hypertrophy compared with control.

PP.05.24

THE SODIUM GLUCOSE COTRANSPORTER 2 INHIBITOR EMPAGLIFLOZIN REDUCES WEIGHT AND MARKERS OF VISCERAL ADIPOSITY IN TYPE 2 DIABETES

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Objective: Empagliflozin increases urinary glucose excretion and reduces blood pressure (BP) and body weight. We explored the impact of empagliflozin versus placebo on surrogate markers of visceral adiposity (VA) in patients with type 2 diabetes.

Design and method: Using pooled data from 2477 patients with type 2 diabetes from four 24-week phase III randomised trials of empagliflozin 10 mg or 25 mg (n = 1652) versus placebo (n = 825) as monotherapy or add-on therapy (mean [SD] age 55.6 [10.2] years, HbA1c 8.0 [0.9]%, office SBP 129 [15] mmHg and BMI 28.7 [5.5] kg/m²), we assessed changes from baseline in HbA1c, body weight, validated markers of VA (waist circumference [WC], index of central obesity [ICO; ratio WC/height], visceral adiposity index [VAI; VAI_{men}: (WC/[39.68 + (1.88 × BMI)] × (TG/1.03) × (1.31/HDL)); VAI_{women}: (WC/[36.58 + (1.89 × BMI)] × (TG/0.81) × (1.52/HDL))), and changes in estimated total body fat (eTBF) using the YMCA-formula (eTBF_{men}: 100*[−98.42 + (4.15*WC) − (0.082*weight)]/weight; eTBF_{women}: 100*[−76.76 + (4.15*WC) − (0.082*weight)]/weight).

Results: In placebo and empagliflozin groups, respectively, baseline mean weight was 78.0 and 78.9 kg, WC was 97.7 and 98.0 cm, ICO was 0.594 and 0.593, VAI was 2.7 and 2.9, and eTBF was 33.8 and 32.9%. At week 24, compared with placebo, empagliflozin significantly reduced HbA1c (mean [SE] difference: −0.65% [0.03]; p < 0.001), body weight (−1.9 [0.1] kg; p < 0.001), WC (−1.3 [0.2] cm; p < 0.001), ICO (−0.008 [0.001]; p < 0.001) and VAI (−0.4 [0.1]; p < 0.01) but not eTBF (−0.3 [0.2]%; p = 0.08).

Conclusions: Empagliflozin may directly reduce VA and potentially alter TBF beyond its effects on glycaemia.

PP.05.25

CLASSIFICATION OF BLOOD PRESSURE BY OFFICE AND AMBULATORY RECORDINGS IN HYPERTENSIVE TYPE 2 DIABETIC PATIENTS. RESULTS OF THE GERMAN T2-TARGET REGISTRY IN PRIMARY CARE

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Objective: The target blood pressure for hypertensive patients with type 2 diabetes according to current ESH guidelines is below 140/85 mmHg. Tight blood pressure control down to a mean office blood pressure of 135/75 mmHg reduced cardiovascular mortality by 18% compared to placebo (140/75 mmHg) in the ADVANCE trial. It is not known how these target blood pressure values, as assessed by office readings, correspond to the respective values of ambulatory-24-h blood pressure measurements (ABPM). Furthermore we investigated classification of blood pressure as assessed by the two different measurement techniques.

Design and method: A total of 919 ABPM recordings of patients with type 2 diabetes (age 64.4 + 12.3 years) with treated hypertension were obtained using validated recorders. Corresponding values of office and day-time-ABPM values were analysed by the percentile method. ABPM recordings were analysed by a central, independent and blinded reference centre according to recent ESH guidelines.

Results: Mean office blood pressure was 151.7 ± 19.6/87.5 ± 11.5 mmHg. ABPM daytime values were 141.3 ± 15.2/81.8 ± 10.2 mmHg, night-time values were 131.1 + 18.3/72.6 + 11.1. During night-time 285 patients showed non-dipping and 139 patients showed isolated nocturnal hypertension. Masked treated hypertension was more common (14%) than white-coat hypertension (8%). The predominant form of hypertension (as assessed by ABPM) was combined systolic/diastolic hypertension (58%) followed by isolated systolic hypertension (21%). Corresponding ABPM values for stage 1 hypertension (day-time: 134/86 mmHg) and stage 2 hypertension (day-time: 151/96 mmHg) were in excellent agreement with previously published NICE guidelines. In our study an office target blood pressure of 140/85 mmHg corresponds to an ABPM day-time value of 134/81, an office blood pressure of 135/75 mmHg corresponds to an ABPM day-time value of 129/71 mmHg.

Conclusions: Interestingly the predominant form of hypertension was combined systolic/diastolic hypertension as assessed by ABPM. In hypertensive patients with type 2 diabetes misclassification of normotension/hypertension was observed in 22% of patients. As long as data from outcome studies are lacking corresponding values for ABPM readings can be used preliminarily for the clinical management of hypertensive patients with type 2 diabetes.

PP.05.26

CARDIOVASCULAR RISK AND AMBULATORY 24-H-BLOOD PRESSURE ARE UNDERESTIMATED IN HYPERTENSIVE TYPE 2 DIABETIC PATIENTS. RESULTS OF THE GERMAN T2-TARGET REGISTRY STUDY IN PRIMARY CARE

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Objective: Tight blood pressure control with a mean office blood pressure of 144/82 mmHg in patients with hypertension and type 2 diabetes achieves a clinically important reduction in hypertension related complications such as stroke (UKPDS). Further blood pressure reduction to an office blood pressure of 135/75 mmHg reduced cardiovascular mortality by 18% compared to placebo (140/75 mmHg) in the ADVANCE trial. The objective of the present registry study was to investigate the role of ambulatory-24-h-blood pressure measurement (ABPM) for the clinical management of hypertensive patients with type 2 diabetes in the general physicians (GP) office.

Design and method: 919 ABPM recordings of type 2 diabetic patients (age 64.4 + 12.3 years) with treated hypertension were obtained at 306 GPs using validated recorders. Hypertension management based on ABPM recordings of the 306 GPs was compared to a central, blinded and independent analysis of ABPM recordings in accordance with the recent ESH guidelines.

Results: Mean office blood pressure was 151.7 ± 19.6/87.5 ± 11.5 mmHg. Mean ABPM daytime values were 141.3 ± 15.2/81.8 ± 10.2 mmHg and night-time values were 131.1 ± 18.3/72.6 ± 11.1 mmHg. The predominant form of hypertension based on ABPM was systolic/diastolic hypertension (58%) followed by isolated systolic hypertension (21%).

Control rate of hypertension based on ABPM was estimated to be 64% by GPs. In contrast a control rate of 14% was calculated based on a central analysis according to ESH-ABPM guidelines.

The GPs assessed the 10-year cardiovascular risk to be “very high” as to the definition of the ESH in 11% of their patients, while the estimated 10-year risk was “very high” in 892 patients (97%) based on the central, independent analysis. Despite 784 patients were deemed uncontrolled, antihypertensive therapy remained unchanged in 322 patients (41%).

Conclusions: Blood pressure control was grossly overestimated in patients with hypertension and type-2 diabetes. This resulted in an underestimation of the total cardiovascular risk and a lack of efforts to control blood pressure more tightly. Whether a lack of therapeutic decision making of GPs was caused by inertia or a lack of knowledge of ABPM normal values remains to be determined.

PP.05.27

ARTERIAL STRUCTURAL AND FUNCTIONAL EFFECTS OF INCRETIN THERAPY IN TYPE 2 DIABETES MELLITUS PATIENTS: PRELIMINARY RESULTS

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Objective: The introduction of Incretin Therapy (IT - GLP-1 analogous and DPP-IV inhibitors) has determined an important change in the therapeutic approach to type 2 Diabetes Mellitus (DM2). Along with a better glycemic control, extra-glycemic properties have been observed such as a reduction in blood pressure (BP), weight and cholesterol. Whether these properties can be accounted for an overall effect of the drug on cardiovascular target more favorable than traditional approaches is still unknown and studies are currently ongoing in order to evaluate surrogate markers of arterial diseases. The present study is aimed at assessing arterial function and structure in 30 DM2 patients at time 0 and after 6 and 12 months from the initiation of IT.

Design and method: We analyzed preliminary data belonging to the first 8 patients enrolled in the study at time 0 and 1 (58.4 ± 10.3 years; female 37.5%). Measurements included anthropometric variables, office and ambulatory (ABPM) systolic (S) and diastolic (D) BP, blood glucose, HbA1c, serum lipid variables. Arterial properties were assessed by the analysis of Pulse Wave Velocity (PWV, complior), Pulse Wave Analysis (PWA, Sphygmocor), Carotid Distensibility (Esaote-WTS), carotid Intima Media Thickness (IMT, Esaote-WTS) while endothelial function was assessed by Flow Mediated Dilation (FMD, Esaote-WTS).

Results: At time 1 we observed a not statistically significant trend to an improvement in glycemic control (HbA1c 7.6 ± 0.8 vs 6.7 ± 0.5%; p = ns) associated with a reduction in office SBP (135.1 ± 18.2 vs 127.1 ± 17.3 mmHg; p = 0.04) while DBP, BMI and serum lipids did not change. Accordingly Aortic SBP and PP decrease significantly (122.1 ± 14.9 vs 113.1 ± 12.1 mmHg, p = 0.04; 46.5 ± 13.5 vs 37.7 ± 11.3 mmHg, p = 0.001) while ABPM measurement were superimposable at follow-up. Arterial markers didn't shown any significant changes in the 6 months

of observation but carotid distensibility improve from 1.6 ± 0.9 to 2.8 ± 1.2 with a P value close to statistical significance ($P = 0.058$).

Conclusions: The preliminary results of the present study suggest that 1) IT therapy reduces office SBP but not ambulatory BP and that 2) this effect is associated with a clear tendency of improvement in arterial distensibility.

PP.05.28 DEGREE OF CONTROL AND COMPLICATIONS IN TYPE 2 DIABETES ACCORDING TO DISEASE EVOLUTION

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Objective: Analyze the progression time of type 2 diabetes in order to assess the relation between the length of disease and the existence of cardiovascular complications.

Design and method: A descriptive cross-sectional study based on 207 type 2 diabetic patients was conducted considering age, sex, anthropometric characteristics, cardiovascular risk factors, existence of target organ damage and biochemical variables.

Results: The average age of included patients in Group A (less than 15 years of disease development) was 64.2 ± 12.2 and 64.5 ± 11.4 in Group B (15 or more years of disease development), (non-significant, ns). 15.2 % of the Group A-patients and 16.1 % of the Group B-patients were smokers (ns). The average BMI was $30.5 \pm 4.2 \text{ kg/m}^2$ in Group A and $30.5 \pm 4.3 \text{ kg/m}^2$ in Group B (ns). The average LDL/cholesterol was $112.1 \pm 22.3 \text{ mg/dl}$ in group A and $111.6 \pm 20.4 \text{ mg/dl}$ in Group B (ns). The HbA1c was $7.8 \pm 2.6\%$ in Group A and $7.7 \pm 2.5\%$ in Group B (ns). There were no significant differences in blood levels of insulin, fibrinogen, homocysteine, Lp (a) and blood pressure. The 9.9% of Group A patients had ischemic heart disease diagnosis compared to 14.3 % in Group B ($p < 0.05$). The 11.9% of Group A patients and the 17.9 % of Group B patients had retinopathy ($p < 0.05$). There were no differences between both groups in case of arteriopathy, renal and cerebrovascular disease.

Conclusions: There is no evidence of worst biochemical control in long-term patients (15 or more years of evolution, Group B) compared to Group A patients.

PP.05.29 GENDER RELATED DIFFERENCES IN INTRARENAL VASCULAR RESISTANCE IN HYPERTENSIVE DIABETIC PATIENTS

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Objective: The aim of the study was to compare the intrarenal vascular resistance (IRVR) levels and 24-h ambulatory BP monitoring parameters in middle-aged hypertensive diabetic males and females.

Design and method: A total number of 130 hypertensive pts with type 2 diabetes mellitus were included (m/f 40/90, 55.4 ± 7.4 yrs, office BP $142.2 \pm 14.3/86.3 \pm 9.7 \text{ mm Hg}$, HbA1c $8.7 \pm 2.3\%$, duration of hypertension $10(5-20)$ yrs, duration of diabetes $6.5(5-12)$ yrs, eGFR $81.9 \pm 18.7 \text{ ml/min/1.73 m}^2$). Renal blood flow velocities profiles were detected by duplex scanning of both main renal arteries and intrarenal arteries and resistive index (RI) levels in the main renal arteries, interlobar and arcuate intrarenal arteries were calculated. Twenty four hour ambulatory BP recordings were performed. Plasma levels of the glucose and insulin were measured and insulin resistance ratio was calculated as a HOMA-IR index.

Results: The mean values of RI in the interlobar and arcuate intrarenal arteries were higher in females than in males: 0.67 ± 0.06 vs 0.64 ± 0.06 ($p = 0.013$) and 0.64 ± 0.07 vs 0.60 ± 0.06 ($p = 0.017$), respectively. There were no significant differences in age, office BP, HbA1c, HOMA-IR, eGFR levels and type of therapy between males and females, whereas in the latter the mean values of body mass index were higher: 32.6 ± 4.4 vs $30.6 \pm 4.3 \text{ kg/m}^2$. Furthermore, females demonstrated lower levels of diastolic 24h-BP load: $22.6(9.2-42.3)\%$ vs $34.5(22.7-64.9)\%$ ($p = 0.02$) and higher levels of pulse BP-day and of pulse BP-night: 57.4 ± 10.9 vs $52.9 \pm 9.0 \text{ mm Hg}$ ($p = 0.02$) and 59.4 ± 12.1 vs $52 \pm 8.2 \text{ mm Hg}$ ($p = 0.001$), respectively.

Conclusions: Our data demonstrate gender related differences in IRVR levels in middle-aged hypertensive diabetic patients. Higher levels of IRVR and an increase in pulse 24h-BP due to a lower diastolic BP load in females do not exclude differences in systemic arterial stiffness between diabetic males and females, what could explain the revealed gender related differences in renal hemodynamics.

PP.05.30 ASSOCIATION BETWEEN INTRARENAL VASCULAR RESISTANCE, GLOMERULAR FILTRATION RATE AND TWENTY FOUR HOUR AMBULATORY BLOOD PRESSURE PARAMETERS IN HYPERTENSIVE DIABETIC PATIENTS

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Objective: The aim of the study was to assess the relationship of intrarenal vascular resistance level with 24-h ambulatory BP monitoring parameters and glomerular filtration rate in hypertensive diabetic patients.

Design and method: We studied 130 hypertensive patients with type 2 diabetes (m/f 40/90, 55.4 ± 7.4 yrs, office BP $142.2 \pm 14.3/86.3 \pm 9.7 \text{ mm Hg}$, HbA1c $8.7 \pm 2.3\%$, eGFR $81.9 \pm 18.7 \text{ ml/min/1.73 m}^2$) and 14 healthy people (control group). Intrarenal vascular resistance (IRVR) was estimated by renal duplex ultrasound. The resistance index (RI) levels in the main renal arteries, interlobar and arcuate intrarenal arteries were calculated. Twenty four hour ambulatory BP recordings were performed. An estimated GFR (eGFR) was calculated using the MDRD equation.

Results: In total group of pts RI was positively correlated ($P < 0.001$) with age ($R = 0.48$), pulse 24h-BP ($R = 0.49$), pulse BP-night ($R = 0.51$). We found no correlation between RI levels and SBP at the nighttime but RI levels in the interlobar arteries were higher in night-pickers compared with dippers: 0.70 ± 0.06 vs 0.64 ± 0.06 ($P < 0.01$). There was a negative correlation of RI with eGFR ($R = -0.34$, $P < 0.001$). Pts with stage 3 CKD (eGFR $< 60 \text{ ml/min/1.73 m}^2$, Gr.1, $n = 13$) showed higher levels of RI in the interlobar and arcuate arteries than pts with eGFR $> 60 \text{ ml/min/1.73 m}^2$ (Gr.2, $n = 117$): 0.71 ± 0.08 vs 0.65 ± 0.06 and 0.68 ± 0.08 vs 0.62 ± 0.06 ($P < 0.001$), respectively. Compared with Gr.2, pts of Gr.1 were older, demonstrated longer hypertension duration and higher values of pulse BP-night: 58.1 ± 8.6 vs $56.9 \pm 8.9 \text{ mm Hg}$ ($P < 0.001$) due to a lower DBP. Among non-dippers and night-pickers of Gr.2 we selected pts with increased (Gr.2a, $n = 44$) and normal values of RI in arcuate arteries (Gr.2b, $n = 39$) and compared their clinical data and 24h-BP parameters. Pts of Gr.2a showed higher pulse BP-night: 60.3 ± 12.9 vs $54.1 \pm 9.5 \text{ mm Hg}$ ($P < 0.05$) due to a lower DBP. Moreover, pts of Gr.2a and pts of Gr.1 showed identical clinical data and 24h-BP parameters including pulse BP-night.

Conclusions: Our data show close relationship of the renal hemodynamics, eGFR and pulse BP-night and suppose that the increase in IRVR accompanied with disturbed circadian rhythm of BP may be a potential predictor of eGFR reduction in hypertensive diabetic patients. Prospective studies are needed to clarify these hypothesis.

PP.05.31 ELEVATED C-REACTIVE PROTEIN IN PATIENTS WITH ARTERIAL HYPERTENSION AND DIABETES MELLITUS TYPE 2 IS ASSOCIATED WITH IMMUNOREGULATORY IMBALANCE

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Objective: Mild elevation of the C-reactive protein level, which can be detected by the high sensitive tests (hsCRP), is considered to be the sign of the low-grade inflammation and is associated with the high risk of cardiovascular complications. The aim of the present study was to determine the connection between hsCRP level and immunoregulatory parameters (relative number of regulatory FoxP3+ lymphocytes (FoxP3+ Treg), concentrations of the matrix metalloproteinase type 2 (MMP-2), MMP-9, tissue inhibitor of MMP type 1 (TIMP-1)) in patients with arterial hypertension (AH), associated with diabetes mellitus type 2 (DM2).

Design and method: 20 patients with AH associated with DM2 were recruited (9 women and 11 men), among whom 10 patients had concentration of hsCRP $< 5 \text{ mg/l}$ (5 men and 5 women), 10 patients had hsCRP concentration $> 5 \text{ mg/l}$ (6 men and 4 women). Control group consisted of 13 healthy volunteers comparable for age and gender to the groups of patients. Concentration of TIMP-1, MMP-2, MMP-9 and hsCRP was detected by enzyme-linked immunosorbent assays. Relative number of FoxP3 Tregs was detected by flow cytometry. Concentrations of glucose, insulin, HbA1c and different lipid fractions were estimated and HOMA index was calculated.

Results: Both groups of patients had elevated concentrations of glucose, HbA1c, insulin, triglycerides (TG), high-density lipoprotein cholesterol were elevated (in all the cases $p < 0.05$). Patients with hsCRP $> 5 \text{ mg/l}$ were characterized by the reduced numbers of FoxP3 Treg lymphocytes and elevated concentration of TIMP-1 com-

pared to healthy volunteers ($p=0.030$ and $p=0.015$, respectively). In patients with $\text{hsCRP}<5$ mg/l the duration of DM2 was higher ($p=0.046$) and negatively correlated with MMP-9 concentration ($R=-0.765$; $p=0.016$). While in the group of patients with $\text{hsCRP}>5$ mg/l concentration of MMP-9 positively correlated with the level of glucose ($R=0.656$; $p=0.004$). Negative correlation was revealed between the numbers of FoxP3+ Treg and TG concentration in patients with $\text{hsCRP}<5$ mg/l.

Conclusions: Elevation of the hsCRP concentration > 5 mg/l in patients with AH and DM2 is associated with immunoregulatory imbalance revealed in the reduced numbers of FoxP3+ Treg lymphocytes and elevation of TIMP-1 which correlates with metabolic disturbances.

PP.05.32 VARIABILITY OF THE GLYCEMIA MEASURED BY CONTINUOUS GLUCOSE MONITORING IN HYPERTENSIVE PATIENTS

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Objective: Type 2 diabetes mellitus (T2DM) is a highly prevalent disease among hypertensives, conferring an increase in cardiovascular (CV) risk, independently of their blood pressure (BP) level. Evidence have recognized the need to individualize glucose-lowering therapies due to a likely appearance of hypoglycaemias possibly secondary a high variability in glucose control. This situation drives to an increase in morbidity and mortality. Continuous glucose monitoring (CGM) is a promising diagnostic tool to address this condition.

To evaluate glycaemic variability and further requirement of hypoglycaemic drugs, via CGM, in a hypertensive, T2DM population who have not received any antidiabetic.

Design and method: Individuals who met inclusion/exclusion criteria and had a glycated Hb 6,5–7%, naïve of glucose-lowering drugs, were evaluated by a CGM device (iPro2, Medtronic Inc.) throughout 72 hours.

Results: 16 patients were included (62,5% male, age 59,2), mean time of T2DM diagnosis 3,81 years, BMI 30,275 kg/m², Glycated Hb 6,75%, non-smokers 87,5%, mean office BP 136/77 mmHg, dyslipidemic 100%.

Mean fasting plasmatic glycaemia was 139 mg/dl [90–211], SD 28,12 [11–52]. Percentage of mean absolute difference was 10,57% [4,3–17,5], mean number of hyperglycaemic excursions was 7,12 [0–15] and hypoglycaemias 0,75 [0–5]. There was a good tolerance to the device and an optimal compliance by the patients.

Conclusions: Variability of mean glucose levels in T2DM-hypertensive patients, not receiving any glucose-lowering drug, is quite elevated. This results suggests that optimal therapeutical individualization should consider this variable to avoid iatrogenic decisions.

PP.05.33

LIRAGLUTIDE DECREASES MICROALBUMINURIA AND BLOOD PRESSURE IN HYPERTENSIVE OBESE PATIENTS WITH TYPE 2 DIABETES

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Objective: Liraglutide, a novel glucagon-like peptide-1 receptor agonist drug, has been associated with blood pressure decrease, but few reports exist about its role in albuminuria. In this study, we aimed to evaluate if liraglutide possesses any potential efficacy on albuminuria reduction in hypertensive obese patients with type 2 diabetes mellitus (T2DM).

Design and method: Retrospective observational study, including obese hypertensive patients with T2DM and microalbuminuria who were started on liraglutide (0.6 mg/daily first week, 1.2 mg/daily afterwards). Microalbuminuria was defined as present if albumin/creatinine ratio was 30–299 mg/dl. During the study period, no modifications in antihypertensive therapy were done. Baseline and 4 months evaluations were performed

Results: 17 obese (mean weight 104.8 ± 17 kg, mean BMI 40.3 ± 4.3 kg/m²) hypertensive (mean number of antihypertensives 1.86 ± 0.6) T2DM patients (mean age 50.3 ± 9.7 years, women 82.4%) were included in the study. Mean albuminuria levels were 56 ± 26.3 mg/dl and baseline eGFR was 93.9 ± 18 ml/min/1.73m². Also, mean baseline HbA1c was $8.6 \pm 1.3\%$, mean baseline systolic blood pressure (SBP) levels were 150.5 ± 17.7 mmHg and mean diastolic blood pressure (DBP) levels were 89.4 ± 10 mmHg.

After 18 ± 4 weeks of average follow-up, albuminuria decreased 21.36 mg/dl ($p=0.04$), eGFR remained unchanged, SBP was reduced 10 mmHg ($p=0.04$), DBP decreased 3.2 mmHg ($p=0.23$), body weight decreased 4.9 kg ($p=0.015$) and HbA1c was reduced 1% ($p<0.01$). Also, in 12 patients (70.5% out of total) microalbuminuria was restored to normoalbuminuria ($p<0.05$).

Conclusions: Liraglutide decreases albuminuria and lowers blood pressure in hypertensive obese patients with T2DM. Further clinical trials are needed to confirm the antiproteinuric effect of liraglutide.

POSTERS' SESSION

POSTERS' SESSION PS06

LARGE ARTERIES AND CENTRAL BLOOD PRESSURE

PP.06.01 CLINICAL CHARACTERISTICS OF SIMPLE PARAMETERS RELATED TO ARTERIAL STIFFNESS

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Objective: Recently, simple parameters related to arterial stiffness, which simultaneously obtained by oscillometric blood pressure measurement {arterial pressure volume index (API) and arterial velocity pulse index (AVI)}, are applicable in clinical settings. We examined the association of these parameters with conventional markers of arterial stiffness [i.e., brachial-ankle pulse wave velocity (baPWV) and radial augmentation index (rAI)] and also evaluated the influence of anthropometric variables on these parameters.

Design and method: In 376 subjects who admitted to hospital for the management of cardiovascular disease (66 years old, 288 men and 88 women), API, AVI, baPWV and rAI were measured simultaneously.

Results: The association between API and AVI was modest ($R=0.32$). While baPWV had similar relationship with API and AVI ($R=0.37$), rAI had more close relationship with AVI rather than with API ($R=0.48$). Both API and AVI were higher in women than in men. Age, heart rate and obesity significantly affected AVI. On the other hand, blood pressure had a close association with API ($R=0.68$).

Conclusions: API and AVI reflect different pathophysiological abnormalities related with arterial stiffness, and they have gender difference. AVI may be a marker reflecting abnormal pressure wave reflection rather than increased arterial stiffness. Age, blood pressure, heart rate and obesity differently affect both parameters.

PP.06.02 THE RELATED PROGRESSION OF ARTERIAL STIFFNESS AND CALCIUM METABOLISM

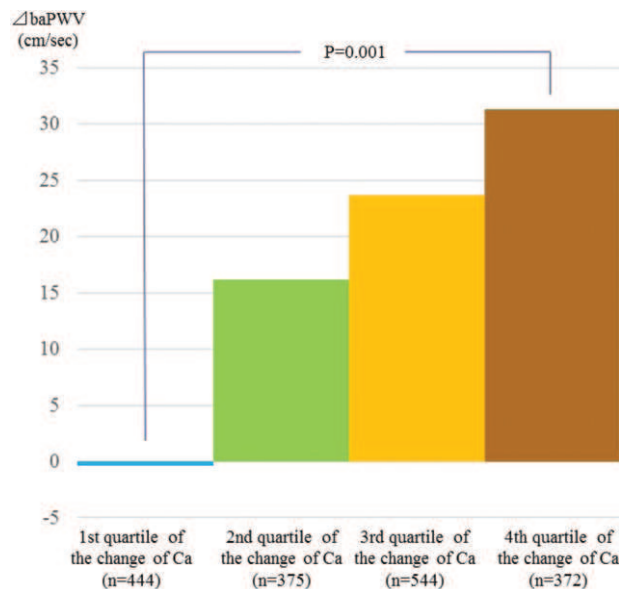
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Objective: Several cross sectional studies reported the association of arterial stiffness with calcium/phosphate metabolism in general population. But no longitudinal study has confirmed this association. This 3-years' observation study was conducted to examine the association between the changes of arterial stiffness during the observation period and serum calcium (Ca) and phosphate (P) levels.

Design and method: Ca, P, and brachial-ankle pulse wave velocity (baPWV) were measured in 3-year interval in 1735 middle-aged Japanese men (45 ± 9 years).

Results: The relationships among the change of Ca, P, Calcium phosphate products ($Ca \times P$), and baPWV during the observation period (ΔCa , ΔP , $\Delta Ca \times P$, and $\Delta baPWV$) were examined by univariate linear regression analysis. Only ΔCa had a significant relationship with $\Delta baPWV$ (ΔCa : $r=0.099$, $P<0.001$; ΔP : $r=0.003$, $P=0.891$; $\Delta Ca \times P$: $r=0.064$, $p=0.440$). Then, subjects were divided into quartile ranges by the ΔCa . The $\Delta baPWV$ was significantly larger in the highest quartile range ΔCa ($n=372$) (31 ± 120 cm/sec) than that in the lowest quartile range ΔCa ($n=444$) (0 ± 112 cm/sec) ($p=0.001$) (figure). This difference was significant even after the adjustment of confounding variables. On the other hand,

$\Delta baPWV$ was similar between the groups with and without Ca was maintained high range during the study period (i.e. subjects whose Ca was ranked in the highest tertile at both baseline and 3-years after).



Conclusions: Abnormal calcium metabolism, especially elevation of serum calcium levels during the observation, may be associated with age-related increase in arterial stiffness even in middle-aged healthy men.

PP.06.03 LIPIDOGRAM AND ELASTICITY OF GREAT ARTERIES IN HYPERTENSIVE INDIVIDUALS

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Objective: With aging lipidic parameters tend to modify. This represents a risk factors which is useful to monitor in Primary Practice. Vascular elasticity is a parameter which correlates indirectly with arterial rigidity and shows how elasticity decreases with time.

Design and method: 110 hypertensive individuals aged between 40 and 80 years have been selected for the study. Secondary hypertension has been excluded. Lipidogram of these individuals has been performed using the Guide for the Management of Hypertension of the European Cardiology Society. Also Pulse Wave Velocity (PWV) of the aorta has been measured (gold standard for arterial rigidity) using an arteriograph. We have then tried to establish a correlation between lipidic parameters and PWV

Results: $PWV = 9.30$ m/s, Standard Deviation (SD) = ± 1.92 ; Total Cholesterol (TC) = 208 mg/dl SD = ± 47.2 , which linearly correlate with Pearson index $r = 0.481$. PWV and LDL cholesterol ($LDLc = 118$ mg/dl ± 49.7) correlate with $r = 0.501$. Triglycerides (TG) = 145 mg/dl SD = ± 111 correlate to PWV with $r = 0.379$, also HDL cholesterol ($HDLc = 47.1$ mg/dl SD = ± 11.9) correlate with PWV with $r = 0.353$.

Conclusions: Evaluating aortic rigidity and lipids are useful in the evaluation of hypertensive patients with cardiovascular risk. Arterial rigidity measured by the arteriograph directly correlates directly with TC, LDLc and indirectly with HDLc.

PP.06.04 BIOMECHANICAL MODELING OF ABDOMINAL AORTIC ANEURYSMS BEHAVIOUR AND THE THROMBUS EFFECT ON THE RUPTURE RISK IN XENOGRAFT RAT MODEL

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Objective: Current treatments of abdominal aortic aneurysm (AAA) can be achieved either by aortic replacement during surgery or by deploying endovascular prosthesis. Regenerative medicine to substitute these conventional surgery or an endovascular stent constitutes currently a challenge to treat abdominal aneurysm artery (AAA)

It is worth reminding that in the case of xenograft in rat, it was shown that cellular therapies with mesenchymal stem cells (MSCs) stabilize the diameter of AAA. At this stage, the study of the mechanical behavior of artery appears necessary to investigate the impact of MSCs therapy on the rupture risk of the arterial wall after treated AAA diameter stabilization. Therefore, each groups of samples (healthy, untreated and treated) should be investigated. So, the aim of this paper is to determine the mechanical behavior of already formed healthy, untreated and treated abdominal aortic aneurysms and study the effect of the thrombus on arterial wall stiffness and strength in the Xenograft rat model AAA.

Design and method: For that, the xenograft rat model that mimics arterial dilatation due to aneurysmal disease is used to study the effects of the proposed cellular therapy. To investigate the changes in the mechanical behavior of the arterial wall, the artery is assumed to be made of a hyperelastic and incompressible material characterized by a strain energy function fitted to the average data set of uniaxial tests of AAA tissue samples. In order to compute the stresses in the artery by using an analytical approach, the 3D aneurysm geometric is obtained based on "parabolic-exponential" profil.

Results: When compared to healthy, untreated and treated arteries, the obtained results demonstrate that the cellular therapy stabilizes the geometry of AAAs, improves the stiffness of the tissue and decreases stress variations in the arterial wall.

Conclusions: *Based on both in vivo and in vitro data, the study helped to evaluate the ability of MSCs to repair AAA and the Intraluminal thrombus can effectively reduce wall stress in abdominal aortic aneurysms.

PP.06.05 BOTH CALIBRATION MODE AND SEX DIFFERENCE AFFECT THE CENTRAL BLOOD PRESSURE MEASURED BY A BRACHIAL CUFF-BASED MONITORING DEVICE IN JAPANESE CARDIOVASCULAR PATIENTS

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Objective: As central blood pressure (cBP) shows actual pressure load on the heart and proximal large arteries, it is deemed to be superior to brachial blood pressure in predicting cardiovascular events. Essentially invasive nature of this parameter long limited its widespread use, however, recent advances in pulse wave analysis of the peripheral limb made it possible for noninvasive cBP monitoring devices to become relatively common in clinical practice. But there is no consistent agreement on the calibration mode that is critical for data calculation. Furthermore, influence of sex difference is unknown despite women are known to have greater arterial stiffness than the age-matched men.

The aim of this study was to compare the accuracy of the data attained by Mobil-O-Graph®, brachial-cuff based cBP monitoring device, between two available calibration modes and sex category, respectively.

Design and method: We enrolled consecutive 283 patients who underwent elective coronary angiography for suspected coronary artery disease. We simultaneously measured systolic blood pressure (cSBP) invasively with a fluid-filled catheter, and noninvasively with Mobil-O-Graph®. After excluding perturbing clinical factors that can affect data acquisition, we calibrated the noninvasive data with systolic and diastolic BP (Cal1) or mean and diastolic BP (Cal2). We validated these calibrated data against invasive data, and compared between two calibration modes. We further examined the accuracy of the data according to sex difference.

Results: Cal2 showed much less error (mean difference; Cal1: 17.5 ± 16.5 mmHg, Cal2: -4.9 ± 17.0 mmHg), although correlation was comparable between modes (correlation; Cal1: 0.75, Cal2: 0.76; both p < 0.01).

In female, Cal2 further improved accuracy (mean difference; Cal1: 27.7 ± 17.0 mmHg, Cal2: 2.4 ± 15.0 mmHg) and correlation (correlation coefficient; Cal1: 0.77, Cal2: 0.85; both p < 0.01), whereas no change in male. Multivariate linear regression analysis revealed that sex difference was significant factor that is independent of other hemodynamic indices and conventional risk factors.

Conclusions: In Japanese cardiovascular patients, both calibration mode and sex difference affect the central Blood Pressure measured by a Brachial Pulse Wave Analysis-Based cBP monitoring device.

PP.06.06 REPRODUCIBILITY OF CENTRAL SYSTOLIC BLOOD, SECOND SYSTOLIC SHOULDER AND AUGMENTATION INDEX MEASUREMENTS CALCULATED WITH THE OMRON HEM-9000AI DEVICE IN A MEXICAN POPULATION

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Objective: To assess the agreement and reproducibility of the non-invasive measurement of the central systolic blood pressure (cSBP), second systolic shoulder (SYS2), and augmentation index (AIX) with the OMRON HEM-9000AI.

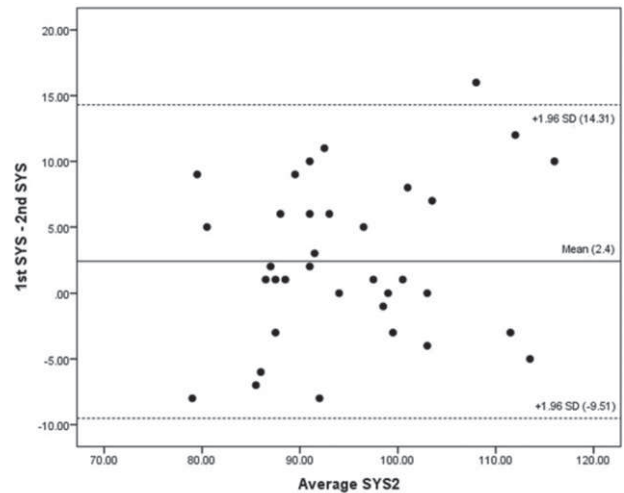


Figure 1. The mean 2.4 ± 6.07 and standard deviation (y) of the first and second Second Systolic Shoulder measurements

Design and method: This cross-sectional study was conducted in 36 healthy Mexican individuals. The cSBP, SYS2, and AIX were measured. All values are expressed as mean ± SD; the correlation was analyzed using Pearson's correlation coefficient and the Bland-Altman method for agreement. All p-values were two-tailed, and p < 0.05 was accepted as statistically significant.

Results: The mean age of participants was 20.6 ± 1.6 years, mean BMI was 23.5 ± 3.5 and mean waist circumference was 82.5 ± 9.3 cm. Good correlation between the first and second measurements was exhibited by cSBP (r2 Pearson = 0.680), SYS2 (r2 Pearson = 0.680), and AIX (r2 Pearson = 0.675) (p < 0.001 for all). The Bland-Altman plots of the first and second SYS2 and AIX measurements also demonstrated good agreement (respective mean differences: 2.4 ± 6.07 mmHg and 0.029 ± 8.39%). Figure 1.

Conclusions: The results obtained demonstrate that there are strong and significant correlations between the first and second measurements of cSBP, SYS2, and AIX, respectively.

PP.06.07 COMPARISON OF INVASIVE AND NONINVASIVE METHOD FOR ASSESSMENT OF PULSE PRESSURE AMPLIFICATION

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Objective: There is a substantial gradient between aortic and brachial pulse pressure (PP), generally called pulse pressure amplification (PPA). Several studies have reported that PPA is related to cardiovascular risk factors and predicts cardiovascular mortalities. PPA was usually calculated with noninvasively measured (NIM) brachial and aortic PP, but there are few studies that have evaluated the accuracy of NIM PPA compared with invasively measured (IM) PPA. The aim of this study was to compare the value of PPA assessed with invasive and noninvasive method.

Design and method: 88 patients undergoing elective coronary angiography were enrolled in this study. Brachial and central BPs were measured noninvasively with Mobil-O-Graph®, invasively with a fluid-filled catheter. PPA was defined as brachial PP minus aortic PP.

Results: The mean values of BP indices are shown in Table. NIM brachial SBP was underestimated by about 19 mmHg and DBP was overestimated by about 15 mmHg, resulting in underestimation of NIM brachial PP by about 34 mmHg (IM vs NIM brachial PP: 87.3 ± 23.3 vs 53.4 ± 14.8 mmHg, p < 0.001). NIM aortic SBP was slightly and DBP was considerably overestimated, leading to underestimation of NIM aortic PP by about 13 mmHg (IM vs NIM aortic PP: 72.9 ± 22.5 vs 60.0 ± 18.2 mmHg, p < 0.001). As a result, NIM aortic PP was higher than brachial PP in contrast to IM PPs (IM vs NIM PPA: 14.4 ± 9.5 vs -6.6 ± 7.6 mmHg, p < 0.001). The difference between IM and NIM PPA was 20.9 ± 11.0 mmHg.

Table: The mean values (±SD) of BP indices

Variable	Invasive method	Noninvasive method
bSBP	160.9 ± 25.5	141.8 ± 21.6**
aSBP	146.2 ± 26.5	151.0 ± 24.6*
bDBP	73.6 ± 12.3	88.4 ± 11.6**
aDBP	73.2 ± 13.3	91.0 ± 11.5**
bPP	87.3 ± 23.3	53.4 ± 14.8**
aPP	72.9 ± 22.5	60.0 ± 18.2**
PPA	14.4 ± 9.5	-6.6 ± 7.6**

Note: (b) brachial, (a) aortic
*p < 0.05, **p < 0.001

Conclusions: The mean value of invasively measured PPA was positive in consistent with general understanding that is brachial PP is higher than aortic PP. However, the mean value of NIM PPA was negative mainly due to the considerable underestimation of NIM brachial SBP. In addition to substantial differences between aortic BP estimating methods, we should take into consideration the measurement error of brachial BP when assessing the PPA value.

PP.06.08 VALIDATION OF A NEW PIEZO-ELECTRONIC DEVICE FOR NON-INVASIVE MEASUREMENT OF ARTERIAL PULSE WAVE VELOCITY

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Objective: our aim was to validate a new device for pulse velocity (PWC) measurement-Aortic- according to the recommendations of the Artery Society and using SphygmoCor as the comparator device..

Design and method: 85 subjects 18–80 years-old from both sexes were included, divided into 3 age groups: < 30, 30–60 and > 60 years (minimum of 25 individuals per group) and with an equal number of hypertensive and normotensive subjects per group. Weight, height, blood pressure (BP) and PWV were assessed, performing 6 PWV determinants per subject: 3 with Aortic and 3 with SphygmoCor, in an alternative fashion. The Bland-Altman method was used to establish the level of agreement between the two devices..

Results: PWV was 6.96 (±1.84) and 7 (±1.54) m/s with Aortic and SphygmoCor, respectively, showing a high correlation: r = 0.89, p < 0.001. The coefficient of repeatability was 16.87 for Aortic and 4.22 for SphygmoCor. Applying the Bland-Altman method, the mean difference between devices was 0.02 (±0.84) m/s, which is considered an excellent level of agreement. Of the study population, 75.3% (n = 64), 15.3% (n = 13) and 9.4% (n = 8) reached an excellent (mean difference < = 0.5 ± 0.8 m/s), acceptable (mean difference < = 1.0 ± 1.5 m/s) and poor (mean difference > = 1.0 ± 1.5 m/s) level of agreement, respectively.

Conclusions: Aortic showed an excellent level of agreement with SphygmoCor, the reference method, according to the Artery Society recommendations for PWV measurement.

PP.06.09 THE VALUES OF 24-HOUR AUGMENTATION INDEX IN PATIENTS WITH HIGH NORMAL BLOOD PRESSURE AND HYPERTENSION

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Objective: The 24-hour monitoring of arterial stiffness may have some potential advantages in comparison with standard methods, but its clinical value needs further investigation. The aim of the study was to assess the values of 24-hour augmentation index in patients with high normal blood pressure (BP) and hypertension and their association with 24-hour BP.

Design and method: The database of the trial on the influence of the seasonal factors on BP was used. Patients from the general population who visited ambulatory clinics for various reasons were included. The main inclusion criterion was office blood pressure 130/85–159/99 mm Hg or long-term antihypertensive therapy. The ambulatory blood pressure monitoring (ABPM) was performed with the BPLab device (Nizny Novgorod, Russia) twice in each patient: in winter (December-February 2012–2014) and in summer (June-August 2012–2014). The interval between ABPMs was 6 months ± 7 days. The selection criterion for ABPM records was the quality adequate for sophisticated analyses: duration > 24 hours, absence of data gaps > 1 hour, > 55 readings per 24 hours. The ABPM waveforms were analyzed by a special automatic algorithm using BPLab Vasotens technology, which allows calculation of central pulse wave parameters from the peripheral pulse wave. The data analyses were adjusted for age, sex, and patient position at each measurement.

Results: 1766 patients were enrolled, and 1423 of them completed the first visit - 641 from Ivanovo (mean age 52 ± 9 years, 244 men), and 782 from Saratov (mean age 58 ± 12 years, 449 men). The data of the first visit were used in cross-sectional analyses. The values of both 24-hour brachial (AIX) and aortic (AIXao) augmentation indices were minimal in patients with high normal blood pressure (HNBP) and maximal in untreated hypertension (UH). At the same time, the minimal ambulatory BP levels were found in the treated hypertension group (TH - see table).

Group	n	age	24-h SBP (mm Hg)	24-h DBP (mm Hg)	AIX (%)	AIXao (%)
HNBP	56	49,7±1,1	136,6±1,5 [^] [^]	80,9±1,0 [^]	-14,1±2,0 [^]	22,2±1,3 [^]
UH	330	51,0±0,5	140,4±1,2 ^{***}	85,4±0,8 ^{****}	-4,8±1,7 ^{****}	27,9±1,1 ^{****}
TH	1307	56,6±0,4	128,4±0,9 ^{####}	78,6±0,6 ^{####}	-9,6±1,3 ^{####}	24,8±0,8 ^{####}

** - p < 0,01 HNBP vs. UH; **** - P < 0,0001 HNBP vs. UH; ^ - p < 0,05 HNBP vs. TH; ^ - p < 0,01 HNBP vs. TH; ^^^ - P < 0,0001 HNBP vs. TH; #### - p < 0,001 UH vs. TH; #### - p < 0,0001 UH vs. TH.

Conclusions: 24-hour monitoring of arterial stiffness appears to be a promising diagnostic method in hypertension, which provides some additional information for risk stratification.

PP.06.10 SEASONAL CHANGES OF 24-HOUR ARTERIAL STIFFNESS PARAMETERS DERIVED FROM OSCILLOMETRIC METHOD IN HYPERTENSIVE PATIENTS

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Objective: The variability of arterial stiffness may be one of the causes of well-known seasonal variations of blood pressure (BP). The investigation of this problem in Russia deserves particular interest due to great contrasts in climate conditions across different regions. The aim of the study was to assess the dynamics of 24-hour arterial stiffness (winter vs. summer) in two sites – Ivanovo (relative “north”) and Saratov (relative “south”) in hypertensives and patients with high normal BP.

Design and method: We included patients from the general population who visited ambulatory clinics for various reasons. The main inclusion criterion was office BP 130/85–159/99 mm Hg or long-term antihypertensive therapy. The ambulatory BP monitoring (ABPM) was performed with the BPLab device twice in each patient: in winter (December-February) and in summer (June-August). The interval between ABPMs was 6 months ± 10 days. The selection criterion for ABPM records was the quality adequate for sophisticated analyses: duration > 24 hours, absence of data gaps > 1 hour, > 55 readings per 24 hours. The ABPM waveforms were analyzed by a special automatic algorithm using BPLab Vasotens technology, which allows calculation of central pulse wave parameters from the peripheral pulse wave. 11 oscillometric parameters of arterial stiffness have been estimated. The data analysis was adjusted for age, sex, and patient status (high normal BP, untreated hypertension, medicated hypertension).

Results: 1766 patients were enrolled, and 1423 of them completed the first visit - 641 from Ivanovo (mean age 52 ± 9 years, 244 men), and 782 from Saratov (mean age 58 ± 12 years, 449 men). The data of the first visit were used for preliminary analysis. We found no seasonal or intraregional differences in 24-hour pulse wave velocity. At the same time, the values of both 24-hour brachial and aortic augmentation indices were higher in winter ($-5.9\% \pm 2.0\%$ vs. $-13.1\% \pm 2.7\%$; $27.4\% \pm 1.3\%$ vs. $22.5\% \pm 1.7\%$, respectively, $p < 0.05$).

Conclusions: Despite some limitations of preliminary analyses, our results show the decrease of 24-hour arterial stiffness associated with higher temperature. 24-hour oscillometric monitoring seems to be a promising method of arterial stiffness measurement. Further individual analysis of these data is needed.

PP.06.11 GENDER PECULIARITIES OF CENTRAL AORTIC PRESSURE AND CENTRAL AUGMENTATION INDEX IN THE YOUNG

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Objective: For use of indicators of Central aortic pressure (CAP) for the purpose of early diagnosis of preclinical atherosclerosis it is necessary to consider sexual features of the specified parameters. We investigated distinctions of indicators of the Central aortic haemodynamic between young men and girls.

Design and method: Overall, 52 students from 19 to 23 years of age (25 boys and 27 girls) were recruited in this study according results of preventive medical examination. Investigation includes the BPLab@Vasotens Office device (Petr Telegin, Russia), which has passed quality ESH-2011 test. Waveforms were analyzed using the special automatic Vasotens@ algorithm, which allows the calculation of central systolic (SYSao), diastolic (DIAao), mean (MBPao) and puls (PPao) blood pressure, central augmentation index (AIXao), amplification of the pulse pressure (PPA) and ejection duration (ED). We used BPStat software, version 05.00.04 (BPLab) to tabulate all the indices of every office measured wave form automatically. The data are presented as the median (25–75 percentile). An alpha level of 5% was considered to be statistically significant. The study was approved by the local ethics committee.

Results: More significant differences ($p < 0.05$) between boys and girls were detected from AIXao -4 (-10 – -4)% opposite 5 (0 – 12)%. Levels of amplification of the central systolic and central pulse pressure were more higher in boys - 16 (13 – 19) opposite 10 (8 – 14) mm Hg and 18 (13 – 20) opposite 12 (10 – 15) mm Hg in girls. There were less significant differences between boys and girls from following signs: SYSao 109 (101 – 112) and 105 (100 – 103), DIAao 71 (66 – 79) and 73 (70 – 80), MBPao 86 (84 – 94) and 88 (82 – 93), PPao 35 (32 – 44) and 32 (28 – 37).

Conclusions: Boys are characterized by presence of higher SYSao, PPao and level of amplification. In girls there were more higher indicators of DIAao, MBPao and ED. The obtained data aim on the need of the differentiated assessment of indicators of CAP at youth taking into account gender. Such approach will promote more effective formation of groups of risk among youth.

PP.06.12 CENTRAL AORTIC PRESSURE IN YOUNG PERSONS IN VIEW OF RISK FACTORS

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Objective: Features of the central aortic pressure (CAP) at the young are studied insufficiently. There are no data on the occurrence isolated central, the system and isolated peripheral arterial hypertension (AH) and prehypertension (PH) at the young. We investigated the effects of risk factors (RF) on indicators of CAP at the young in the process of preventive medical examination.

Design and method: 78 students in the age from 19 to 23 years were surveyed within the framework of the regular medical inspections on the basis of the Center of Student's Health in the project 'University-the Territory of Health'. In addition to screening the RF we studied parameters CAP by oscillometric method using diagnostic complex BPLab (company 'Peter Telegin', Russia) on technology Vasotens Office. In addition traditional parameters BP of the brachial arterial, also provided systolic BP aortic, diastolic BP aortic, pulse BP aortic, average BP aortic, index of augmentation in aorta, pulse pressure amplification. Surveyed students were distributed on two groups of supervision: 1 g. - RF are not present; 2 g. - RF are present. Statistical processing was spent by means of applied programs «Statistica 8».

Results: Presence of RF already at young age associates with increase of parameters not only peripheral, but also aortic BP, especially systolic and pulse pressure, as well as an AI central BP. Availability of RF at students combined with preferential increase of aortic BP type as the isolated central (masked) AH/PH or system ones, meaning simultaneous increase as peripheral and aortic BP. The isolated increase peripheral BP on the brachial artery is found among students-carriers of RF with frequency, similar for group without these factors.

Conclusions: Procedure of the planimetric analysis central puls wave at the young allows to define participation of various mechanisms in increase of pressure at the earliest stages of formation of AH/PH. Data provide the way of realization of differentiated preorbital diagnostic of hemodynamic status in young representatives from the group of risk. Such approach will assist the realization of more individualized preventive actions among the young.

PP.06.13 SIMULTANEOUS INVASIVE AND NONINVASIVE MONITORING OF CENTRAL BLOOD PRESSURE ON CRITICALLY ILL PATIENTS SUFFERING FROM CARDIOGENIC SHOCK TREATED WITH IABP

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Objective: Intraaortic balloon counterpulsation (IABP) is a method of temporary mechanical circulatory support in patients suffering from cardiogenic shock to improve the balance of myocardial oxygen supply and demand by using systolic unloading and diastolic augmentation. Arteriograph is an oscillometric device which measures central blood pressure (SBPao) noninvasively. It was validated against invasive measurement during coronary angiography. The recently developed Arteriograph24 is a combination of a 24-hour BP-monitor and a single-measurement Arteriograph which provides both peripheral and central BP profile during a day. Comparison of simultaneous invasive measurements by IABP and noninvasive ones by oscillometric device of SBPao was never published yet.

The aim of this work was to compare the SBPao values measured with these two modalities.

Design and method: 10 patients placed on IABP treatment were included into this study who suffered from cardiogenic shock due to ischemic/congestive origin. Noninvasive monitoring of SBPao was carried out by Arteriograph24 simultaneously with IABP. Descriptive statistics were calculated for both the invasive and noninvasive measurements and the variables were indicated as means and standard deviations. Linear regression analysis was carried out to define the relationship between the invasive and noninvasive variables.

Results: A strong and linear correlation was found between the invasively recorded and Arteriograph-calculated SBPao values, Pearson's correlation coefficient was $R = 0.76$; $p < 0.001$. The simultaneously registered noninvasive measurements proved that the diastolic counterpulsation pressure waves could be correctly identified on Arteriograph-registrations. Furthermore, the onset and the end of counterpulsation were also exactly defined on noninvasive registrations.

Conclusions: SBPao measured by oscillometric method, showed strong correlation with the invasively obtained values. Our results confirm that the SBPao values, measured by Arteriograph, are close to the true aortic SBP, determined invasively. This is the first investigation when Arteriograph24 is validated against invasive SBOao measurement by IABP.

PP.06.14 COMPARATIVE STUDY OF TWO AMBULATORY BLOOD PRESSURE MONITORS THAT USE DIFFERING METHODS OF CALIBRATION TO DETERMINE CENTRAL AORTIC BLOOD PRESSURE FROM THE BRACHIAL WAVEFORM

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Objective: Central aortic blood pressure (aBP), a potentially superior indicator of cardiovascular risk, can be measured non-invasively using ambulatory blood pressure monitors (ABPM). Current devices utilize differing methods of calibration to determine aBP from the brachial pulse waveform. Calibration methods affect accuracy of measurements and the ability for interchangeable measurements between devices. This study aims to compare simultaneous measurements from two ABPM devices to determine differences in peripheral pressure and derived aBP.

	BPLab	M-o-G	p-value	Slope†	Correlation coefficient (r)
SBP (mm Hg)	125 ± 13	123 ± 12	0.234	1.066	0.933
DBP (mm Hg)	75 ± 8	77 ± 9	0.004	0.915	0.970
MAP (mm Hg)	92 ± 10	98 ± 10	0.002	0.926	0.891
HR (bpm)	71 ± 6	72 ± 6	0.311	0.968	0.990
pPP (mm Hg)	50 ± 8	45 ± 7	0.005	0.987	0.872
aSBP (mm Hg)	114 ± 11	114 ± 12	0.881	0.859	0.911
aDBP (mm Hg)	77 ± 8	79 ± 9	0.004	0.935	0.967
aPP (mm Hg)	37 ± 5	34 ± 5	0.051	0.710	0.779
aAIX (%)	3.3 ± 9	26.0 ± 8	<0.005	0.852	0.719
pAmp	1.4 ± 0.1	1.3 ± 0.1	0.216	0.590	0.374

†linear regression, SBP (systolic blood pressure); HR (heart rate); aSBP (aortic systolic blood pressure); aPP (aortic pulse pressure); p-value for difference: 2-tailed t test.

Design and method: Eleven participants (3 male, aged 33 ± 15 years) simultaneously wore the Mobil-O-Graph (M-o-G; I.E.M, Germany) and BPLab (Petr Telegin, Russia) ABPM with arm assignment randomized. The devices utilize differing calibration methods for the brachial pulse wave (MoG: mean/diastolic; BPLab: systolic/diastolic). Brachial and aBP readings were taken simultaneously (3 minute range) every 15 minutes over a period of 7 hours during the day. Parameter means produced by each device for the 7-hour period were analysed for significant differences using paired t-tests, linear regression and Blant-Altman plots.

Results: Despite small differences between overall means, the Mobil-O-Graph produced significantly higher estimations of diastolic blood pressure (DBP), mean arterial pressure (MAP) and aortic diastolic blood pressure (aDBP), while the BPLab produced a significantly higher estimation of peripheral pulse pressure (pPP) (Table). There was a very large difference in aortic augmentation index (aAIx, %), with the Mobil-O-Graph consistently producing a higher value. Linear regression indicated strong correlation coefficient for all parameters except pressure pulse amplification (pAmp).

Conclusions: The two devices with differing calibration methods produced essentially comparable results for calibrated parameters of blood pressure. However, large differences were observed in aAIx, an uncalibrated, waveform-dependent parameter. Further studies on larger sample sizes and additionally taking into account potential inter-arm differences are advised.

PP.06.15 CONDITION AORTIC STIFFNESS AND CONTENT OF ADIPOKINES IN THE SERUM OF PATIENTS WITH ESSENTIAL HYPERTENSION IN YOUNG AND MIDDLE-AGED

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Objective: The aim of our study was to evaluate the performance of adipokines levels in interrelation with the state of aortic stiffness in patients with essential hypertension in young and middle-aged.

Design and method: The study included 50 patients with essential hypertension II stage in 25–60 years. Control group included 20 healthy non-smoking volunteers. All participants was determined by height, weight, waist circumference, calculated body mass index, the level of glucose, total cholesterol, low and high density, triglycerides, adiponectin and leptin. Aortic stiffness was estimated by non-invasive arteriography using arteriographer TensioClinic TL1.

Results: Our study included 23 men and 27 women. Averages of body weight, BMI, waist circumference were higher normal levels. The levels of total and LDL cholesterol levels were higher in the group of patients with essential hypertension ($p < 0.05$). SPVA in groups of patients was significantly higher by almost 1.5 times. However, differences in pulse wave velocity in the aorta in patients with essential hypertension according to gender has not been received ($p > 0.05$). Augmentation index in patients with essential hypertension was higher than the control ($p < 0.05$). It was found that women indicators augmentation index were more significantly changed compared to men ($p < 0.05$). The average concentration of adiponectin in patients was $5,07 \pm 1,1$ mg / ml, whereas in healthy this index was $7,0 \pm 1,2$ ug / ml. Average value of adiponectin of women was higher compared with healthy women ($p < 0.05$). The median concentration of leptin in hypertensive patients was $2,8 \pm 0,8$ mg / ml in healthy figure was slightly lower, but no significant difference ($p > 0.05$), at the level of $2,1 \pm 1,1$ g / ml.

Conclusions: On the basis of our data, in hypertensive patients young and middle-aged according to the non-invasive arteriography, regardless of sex increased aortic stiffness and violated the conditions of coronary perfusion. Leptin and adiponectin content in blood of such patients is characterized by certain features with the greatest changes in female patients.

PP.06.16 ARTERIAL STIFFNESS IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Objective: Chronic obstructive pulmonary disease (COPD) is linked to a higher incidence rate of cardiovascular events. Increased arterial stiffness has been proved to be an independent predictor of cardiac mortality, a possible link between the two being the presence of chronic inflammation. The present study aims to evaluate the arterial rigidity in patients with COPD.

Design and method: The study has included 46 patients from the Medical Clinic of Timisoara Emergency Municipal Hospital, divided into two groups. A group was comprised of 24 patients diagnosed with COPD and group B consisted of 22 patients without pulmonary disease. All the patients had their pulse wave velocity (PWV) measured, systolic and diastolic blood pressure. The two groups were further

subdivided in two subgroups depending of the presence or absence of the metabolic syndrome A-, A+, respectively B-, B+.

Results: The mean PWV in group A was 10.96 m/s (CI 10.23–11.69) and in group B the mean PWV was 9.74m/s (CI 9.36–10.12). PWV value in the COPD group patients (group A) was statistically higher than those in patients without pulmonary pathology (group B) ($p = 0.004$). Subgroup A+ had higher PWV values than subgroup A- ($p < 0.01$). Also statistically higher PWV values had the subgroup B+ comparative with B- ($p < 0.05$).

Conclusions: Patients that have COPD present higher PWV values than patients without pulmonary disease. Also metabolic syndrome is associated with an increased arterial rigidity independently of concomitantly present pulmonary disease.

PP.06.17 ARTERIAL STIFFNESS MEASURED WITH POPMÈTRE® IN AFRICAN SICKLE CELL TRAIT CARRIERS

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Objective: The benign form of the sickle cell (SC) trait is the heterozygous of the SC disease. The SC trait carriers have hemorheological disturbances and increased oxidative stress leading to structural and functional changes in large arteries. The aim of the study is to compare arterial stiffness of Symptomatic Sedentary Africans with SC trait (SCs) with asymptomatic sedentary patients (SCas) to subject with normal hemoglobin (AA) and to an athletic group (SCat).

Design and method: One hundred and four subjects (55 women, mean age 33.08 ± 11.52 years, BMI = 23 kg/m^2) were enrolled in a prospective cross-sectional study. Subjects with SC (n=78 aged 16 to 61 years) were compared to controls (AA, n=26, range [22–58] years) according to their level of fitness and symptoms of vaso-occlusive crises, and divided to 4 groups: SCas asymptomatic sedentary; SCss symptomatic sedentary; SCat athletics, and controls (AA). The blood pressure (oscillometric device), viscosity (viscometer, cone type plane) and foot to toe Pulse Wave Velocity (ftPWV, pOpmètre®, Axelifé sas, France) were assessed once in each group.

Results: Compared to AA (n=26; ftPWV = 7.7 ± 0.7 m/s), SCas patients had stiffer arteries (n=10; ftPWV = 10.9 ± 1.0 m/s), than SCss patients (n=44; ftPWV = 8.5 ± 0.5 m/s) and than SCat (n=22; ftPWV = 6.7 ± 0.7 m/s, ANOVA F = 4.58; $p < 0.01$). 50% of SCas were hypertensive. Considering the hole population, a significant correlation was found for ftPWV and age ($r^2 = 0.36$; $p < 10^{-4}$), and a weak but positive relationship between PWV and Viscosity ($r = 0.19$; $p < 0.05$). ftPWV correlated also with SBP and DBP ($r^2 = 0.16$; $r^2 = 0.14$; $p < 10^{-4}$). There were no difference between groups for blood pressure (SBP 128 / DBP 75 mmHg).

Conclusions: A high level arterial stiffness was associated with Sickle Cell trait carriers, especially in sedentary patients. Exercise training exerts a beneficial effect on arterial stiffness. Arterial Stiffness is associated with viscosity.

PP.06.18 DOES THE SPINE DEFORMATION IN ANKYLOSING SPONDYLITIS AFFECT CENTRAL AORTIC PRESSURE? THE RELATIONSHIP BETWEEN THE CENTRAL AORTIC PRESSURE AND A CHANGING POSITION OF THE AORTA

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Objective: Central aortic blood pressure (CABP) is defined, as the blood pressure in the aortic root. It can be measured directly by catheters. It can also be measured by arteriograph device working on ossilometric basis via pulse pressure waves. Ankylosing spondylitis (AS) is a chronic progressive, systemic disease and the main pathology is in the spine. Patients are usually followed-up with hand-ground distance in physical exam to detect spine deformation basically. In patients with AS, due to changes in the spine, the aorta also detected in a different position. As the disease progresses, the hand to ground distances increases and the aorta changes its position due to spine deformation. This novel study aims to find the relationship between the changing position of the aorta and the central aortic pressure.

Design and method: Twentyfour patients with ankylosing spondylitis (21 men, mean age 32 ± 3), without any known coronary/peripheral/carotid artery disease, hypertension, hypercholesterolemia and diabetes mellitus are recruited. Twenty age-sex matched, healthy subjects (18 men, mean age 31 ± 2) were accepted as control group. Atherosclerosis risk factors in both groups were the same. The central aortic

pressure values are obtained by an arteriograph device in a silent room, at rest. Hand-ground distances were measured by physical and rehabilitation specialist. Their hand-ground distances are compared with the central aortic pressure. The correlation between the hand-ground distance and the central aortic pressure in the ankylosing spondylitis in both groups is studied with pearson correlation analysis. The relationship between the ankylosing spondylitis and central aortic pressure compared with the control group is studied with independent samples test.

Results: The mean systolic CABP in AS group was 130,2±16,5 and the mean systolic CABP in the control group was 120,2±8,2. There is a significant increase in CABP in AS group compared to healthy subjects (t=0,019). An insignificant relationship found between hand-ground distance and central aortic pressure in both group (r=0,082, sig=0,7).

Conclusions: It seems like there is a relationship between the CABP and AS. But increase in CABP doesn't seem like because of the disease progression or by a changing position of the aorta.

group	N	Mean	Std. Deviation	Std. Error Mean
SAKB 1	24	118,992	19,3522	3,9503
2	24	107,742	11,9946	2,4484

Independent Samples Test

		Levene's Test for Equality of Variances		t-Test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	Lower	Upper
SAKB	Equal variances assumed	3,158	,082	2,421	48	,019	11,2500	4,8475	1,8951	20,6049
	Equal variances not assumed			2,421	39,399	,020	11,2500	4,8475	1,8449	20,6551

PP.06.19 PREDICTORS OF HIGH AORTA BLOOD PRESSURE IN YOUNG MEN WITH ISOLATED SYSTOLIC HYPERTENSION

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Objective: The isolated systolic hypertension (ISH) in young has many unclear questions, one of which is necessity of treatment. According to ECS|ESH-2013 this state needs aorta blood pressure (BP) evaluation, but using of special devices is not common, especial in Ukraine, where only few centers have these devices. We try to evaluate the clinical predictors of high aorta BP presence in young men with ISH.

Design and method: In study there were included 44 young men (mean age 32,2±1,3 yrs) with ISH (mean systolic(SBP)/diastolic(DBP) BP 153,4±2,1|86,9±1,7 mmHg), whom were done office and 24-h (for exclusion of white coat hypertension) BP measurements, central SBP (cSBP) and pulse wave velocity (PWV) evaluations by Sphygmocor, ECG, EchoCG, anthropometric measurements. Multifactorial regression and incremental analysis were used for evaluation of the high aorta SBP predictors.

Results: There were found that among ISH men 17 (38.6%) had normal cSBP (<125 mmHg). In comparison with high cSBP pts, they were characterized by less age (28,2±1,7 vs 34,7±1,6 yrs, p=0.012), more height (186,5±1,6 vs 176,3±1,8 sm, p<0.001), less BMI (25,2±0,7 vs 29,7±0,8 kg|m2, p=0.001), lower level of office SBP (146,1±1,7 vs 156,5±2,7 mmHg, p<0.002), but no 24-h SBP (137,7±1,8 vs 138,8±2,4 mmHg, NS), lower aorta PWV (9,3±0,5 vs 11,2±0,5 m/s, p=0.019). No any other significant differences were found. The presence of high cSBP was correlated with age (r=0.31, p=0.04), height (r=-0,30, p<0.05), weight (r=0,32, p<0.034), BMI (r=0.45, p=0.002), office SBP (r=0.38, p<0.01) and DBP (r=0.57, p=0.001). After incremental regression analysis there were found that independent predictors were height < 178 sm (β=7.038, p=0,05), weight > 91 kg (β=5,53, p=0,033) and office DBP > 80 mmHg (β=4,43, p=0,05). Two or three predictors were found in 85.2% pts with higher cSBP and only in 17,6% pts with normal sSBP.

Conclusions: In 38.6% of young men with ISH the aorta SBP is normal. The predictors of high cSBP in young men with ISH were height < 178 sm, weight > 91 kg and office DBP > 80 mmHg. Young patients with ISH and two or three these factors could be treated without aorta BP evaluation.

PP.06.20 INDEPENDENT DETERMINANTS OF PULSE PRESSURE AMPLIFICATION VALUES IN UNCOMPLICATED HYPERTENSIVES YOUNGER THAN 75 YEARS

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Objective: Pulse pressure amplification (PPA) is important novel marker of cardiovascular risk. Purpose of our study was to identify its independent determinants in uncomplicated hypertension (UH) patients (pts) <75 years of age.

Design and method: In 91 consecutively recruited pts with newly diagnosed or treated but uncontrolled UH (BP < 200/120mmHg) aged 35–75 years, 37 (40,7 %) males with sinus rhythm and resting heart rate (HR) of 50–100 bpm office brachial blood pressure (BP) measurement with Microlife BPW200 and pulse wave analysis with SphygmoCor were performed. Based on results of linear correlation analysis of PPA with anthropometric data, traditional risk factors, UH characteristics, resting HR, left ventricular hypertrophy by ECHO, glomerular filtration rate, ROC-analysis for estimate critical values and odds ratio were performed.

Results: Mean (M±SD) age was 56.04±10,3 years, brachial BP - 153.2±18,7/94.3±10,3 mmHg, HR - 72.07±11,6 bpm, 8 (8,8%) had diabetes. PPA correlated with age (r=-0,26), height (r=0,36), waist circumference (r=0,34), weight (r=0,21, p<0,05) and HR (r=0,58, all p<0,01). Independent determinants for PPA < 130% (mediana) were female sex - OR=3,3 (95%CI:1,4–7,9), p=0,007, height 170 cm or less (AUC=0,68, p=0,018); OR=4,6 (95%CI:1,8–11,3), p=0,0008 and HR 73bpm or less (AUC=0,78, p=0,0002); OR=9,2 (95%CI:3,4–25,1), p<0,0001).

Conclusions: Independent predictors of PPA < 130% in UH pts < 75 years are female sex, height 170 cm or less and HR 73bpm or less.

PP.06.21 THE MODIFIED FACTORS IN THORACIC AORTIC ANEURYSM DEVELOPMENT

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Objective: The aim of the study was to identify the main risk factors, which determine the progression of thoracic aorta(TA) dilatation.

Design and method: 94 pts with TA dilatation and 50 pts with risk factors and without aortic pathology were examined. In basic group 25 pts had bicuspid aortic valves (BAV) (mean age 52.5+/- 8.4 yrs) and 69 pts had tricuspid valves (TAV) (mean age 59.3+/- 7.7). The aorta size was estimated according to the standard ECHO protocol (Vivid 7). Lipid profile, homocysteine, glucose, insulin, CRP levels were done. Arterial stiffness was assessed by SphygmoCor device (Australia) using indirect carotid-femoral distance.

Results: Positive correlation between the aorta maximum diameter index and augmentation index was revealed (r=0.284; p=0.0096), especially in pts with TAV (r=0.443;p=0.0003). Instead low pulse wave velocity in BAV pts correlation between augmentation index and index of aortic root was identified (r=0.431; p=0.02). Besides, positive correlation between peripheral pulse pressure and aorta diameter at the level of sinus of Valsalva were found in BAV pts (r=0.550; p=0.012). The association between ascending aorta diameter and lipid pattern indication, glucose level, insulin at TAV and BAV pts group was not revealed. At once, the positive correlative relationship between aorta diameter index on the sinus of Valsava and the level of homocysteine in blood serum (r=0.246; p=0.004) was determined. It is found that aorta diameter increase on the sino-tubular junction was associated with serum ADMA in TAV and BAV pts (r=0.227; p=0.013)

Conclusions: Besides, haemodynamic factors are important changes of vascular wall stiffness in the pathogenesis of TA dilatation. Due to the low pulse wave velocity in patients with BAV, aortopathy can not be excluded as the cause of aortic dilatation. Endothelial dysfunction is an additional factor of TA aneurysm development.

PP.06.22 AMPLIFICATION BLOOD PRESSURE CHARACTERIZATION IN YOUNG HEALTHY MALES

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Objective: Reference values for central blood pressure and its amplification in a general healthy population have been described by A. Herbert et al (Eur Heart Jour 2014). These large study and others authors as well, have characterized young males as showing a higher blood pressure amplification pattern. Authors have proposed that this condition could increase young subjects risk of presenting spurious systolic hypertension and that this would be at least partially related to an hyperkinetic heart.

Our AIMS were to evaluate the amplification blood pressure pattern in young healthy males and to determine its association with cardiac index and glucemia as its physiological mechanism or consequences.

Design and method: We evaluated 140 normotensive, non treated, healthy subjects, from 18 to 76 years old, in the context of a primary cardiovascular prevention program. Determinations of cardiac index and pulse wave velocity were obtained by non-invasive measurements (Mobil-O-Graph™), BP amplification rate was calculated and biochemical determinations were obtained in a 12 hour-fasting blood sample.

Results: After applying exclusion criteria (diabetes, metabolic syndrome, new onset hypertension, drug treatment, thyroid abnormalities) we finally included 30 subjects and classified them into age tertiles (18-44; 45-64, >65). Male sex was correlated with higher amplification than females in all age groups, but strongly in the youngers (inverse linear correlation -0.133, p<0.001). A positive direct linear correlation was observed between amplification-glucemia (0.202, p<0.001) and amplification-cardiac index (0.224, p<0.001). Multivariate analysis demonstrated that sex, cardiac index and glucemia were associated with amplification in all groups with higher predictive value in the youngers.

Conclusions: Our pilot sample-study contributes to test the hypothesis proposing that those amplification increased values described in young healthy males could be related to a hyperkinetic condition which seems to be also related with higher glucemia, although into normal rank.

While autonomic disbalance can partially explained this data (hemodynamic pattern and disglucemia), we consider that its clinical implication could be a spurious hypertension phenomena that should be identified in this subjects.

PP.06.23 GENDER AND HEIGHT DIFFERENCE OF CENTRAL BLOOD PRESSURE AND 24HR AMBULATORY BLOOD PRESSURE IN PATIENTS WITH HYPERTENSION

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Objective: Central pressure may better represent the load imposed on the coronary and cerebral arteries and thereby bear a stronger relationship to cardiovascular outcomes.

Table. Multiple logistic regression analysis of an independent risk factor for the highest quartile of the augmentation index 75 (AIx75) values (≥ 89%)

Variables	Odds ratio (95% confidence interval)	p
Age (years)	1.044 [1.003-1.086]	0.034
Male gender	0.811 [0.296-2.219]	0.683
Height (cm)	0.987 [0.925-1.054]	0.705
Augmentation index 75	0.998 [0.968-1.032]	0.919
Office DBP (mmHg)	0.998 [0.971-1.025]	0.863

Design and method: Patients who confirmed hypertension by 24hr ABPM (>= 135/85mmHg) were enrolled. All patients underwent radial applanation tonometry (HEM-9000AI) and calculated central BP. We investigated the differences of 24-hour ABPM parameters and central BP parameters according to the gender and height

Results: Male group showed higher stature than female group (169.5 ± 6.8 vs. 157.3 ± 5.8, p<0.001). Various BP parameters were significantly different by sex. The 24-hour average and day-time and night-time systolic BP (SBP) and diastolic BP (DBP) were significantly increased in male group. However, central SBP (145 [135.5-155] vs 152 [141.8-170.3] mmHg, p=0.001), central pulse pressure (54 [47-66.5] vs. 61 [55-73.3] mmHg, p<0.001) and augmentation index 75 (AIx 75; 73.8 ± 13.3 vs. 86.9 ± 9.3, p<0.001) were significantly increased in the female group. Multivariate analysis showed female sex and lower height were independent risk factors of the highest quartile of the augmentation index 75 (AIx75) values (>= 89%).

Conclusions: Central blood pressure parameters including AIx 75 were significantly elevated in female and patients with lower height. This gender and height differences in central pressure are the most likely explanation of higher cardiovascular mortality in women.

PP.06.24 CENTRAL AND PERIPHERAL HAEMODYNAMICS IN A MULTI-ETHNIC POPULATION IN SURINAME: THE HEALTHY LIFE IN SURINAME (HELISUR) FEASIBILITY STUDY

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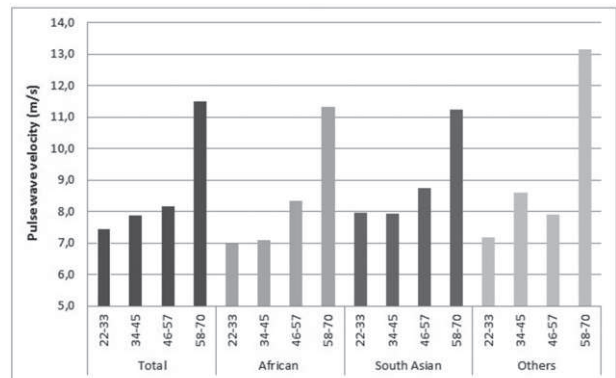
Objective: Cardiovascular disease is the leading cause of death in Suriname, a middle-income country in the Caribbean Community. However, there is a paucity of data on risk factors. Therefore, we designed the Healthy Life in Suriname (HELISUR) study, a cross-sectional population-based study that will explore car-

diovascular health among urban population groups by ethnicity. We hereby report the results of the feasibility study.

Design and method: Non-institutionalized volunteers aged between 18-70 years were eligible for inclusion. After a brief health questionnaire including self-identification of ancestry, physical examination was performed including anthropometry, sitting, supine and standing blood pressure, and cardiac output and peripheral resistance, using the Nexfin HD monitor (BMEYE, The Netherlands). Furthermore, we assessed pulse wave velocity and augmentation index (Arteriograph, TensioMed, Hungary). Hypertension was defined as a blood pressure greater than or equal to 140 mmHg systolic or 90 mmHg diastolic, or antihypertensive drug use; prehypertension as 120-139 mmHg systolic or 80-89 mmHg diastolic without antihypertensive drugs.

Results: We included 67 volunteers (29 men; 12 of African, 8 of South Asian and 9 of other ancestry and 38 women; 17 of African, 15 of South Asian and 6 of other ancestry), mean age was 43.6 years (SE 1.52), mean BMI 28.1 (SE 0.64); African 29.0 (SE 0.98), South Asian 27.7 (SE 1.16) and other ancestry 26.8 (SE 1.18). Only 31.3% were normotensive: hypertension and prehypertension were found in respectively 38.8/29.9% of the subjects (African 41.4/41.4%, South Asian 34.8/21.7% and others 40.0/20.0%). Despite lower hypertension rates, higher pulse wave velocity (Figure) and augmentation index profiles (not shown) were seen in young South Asians, compared to African and other groups.

Figure. Arterial stiffness measured from pulse wave velocity



Arterial stiffness by age in each ethnic group. Threshold levels for PWV are: optimal: <7.0 m/s, normal: ≥ 7.0 - < 9.7 m/s, elevated: ≥ 9.7 - ≤ 12.0 m/s, abnormal: > 12.0 m/s. Measured by TensioMed Arteriograph. Number of subjects in each group: African origin: 22-33 (n=9), 34-45 (n=2), 46-57 (n=14), 58-70 (n=4); South Asian origin: 22-33 (n=6), 34-45 (n=5), 46-57 (n=8), 58-70 (n=4); Others: 22-33 (n=4), 34-45 (n=6), 46-57 (n=3), 58-70 (n=2)

Conclusions: It is feasible to study central and peripheral haemodynamics in a population setting of a middle-income country. These and other measurements in the HELISUR study are expected to provide extensive cardiovascular data needed for the early prevention of cardiovascular disease in Suriname.

PP.06.25 CARDIO-ANKLE VASCULAR INDEX AND AORTA-ANKLE PULSE WAVE VELOCITY AS THE PARAMETERS OF ARTERIAL STIFFNESS IN HYPERTENSIVE URBAN ADULTS IN RUSSIAN SIBERIAN REGION

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Objective: Cardio-ankle vascular index (CAVI) is the blood pressure (BP) independent new parameter of arterial stiffness and so it seems more preferable than pulse wave velocity (PWV) for using in hypertensive patients. The aim of this research is to study the arterial stiffness by using CAVI and PWV in adults with arterial hypertension (AH) in one of the major cities of Russian Siberian region (Tomsk).

AGE	20-29		30-39		40-49		50-64	
	(1) n=45	(2) n=54	(1) n=103	(2) n=54	(1) n=184	(2) n=36	(1) n=533	(2) n=50
a-a PWV m/s	6.6±0.6	6.1±0.5	6.9±0.8	6.3±0.7	7.4±0.8	6.8±0.6	8.3±1.1	7.4±0.8
	p<0.0001		p<0.0001		p<0.0001		p<0.0001	
CAVI	5.9±0.6	6.1±1.0	6.3±1.0	6.3±1.0	7.0±1.0	6.9±0.8	8.0±1.2	7.7±1.0
	p=0.24		p=1.00		p=0.57		p=0.09	

Design and method: Arterial stiffness in 1348 adult, 24–64 (47.4 ± 11.6) years old, men (40.4%) and women (59.6%) in Tomsk were studied by using volumetric sphygmography VaSera VS-1500 (Fukuda Denshi, Japan) in the framework of the epidemiological study ESSAY- RF. The values of CAVI and aorta- ankle pulse wave velocity (a-a PWV) were studied in 865 patients with AH (30% treated, SBP/DBP = 145.8 ± 18.0/92.1 ± 11.5 mmHg) versus the practically healthy 224 persons (SBP/DBP = 122.6 ± 10.0/76.9 ± 6.9 mmHg)

Results: CAVI and a-a PWV (m/s) values (M ± STD) in different age groups of AH (1) (n = 865) and practically healthy persons (2) (n = 224) are presented in Table 1. There are significant difference between PWV in hypertensive and practically healthy persons in all age groups and perhaps it is BP reaction, because there is no significant difference between CAVI values.

Conclusions: Aorta- ankle pulse wave velocity but not blood pressure independent index CAVI demonstrated the increase of arterial stiffness in hypertensive persons with wide range of age represented the urban adult population of Russian Siberian region.

PP.06.26

CARDIO-ANKLE VASCULAR INDEX AS A MARKER OF ARTERIAL STIFFNESS IN ADULT POPULATION OF TOMSK

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Objective: Cardio-ankle vascular index (CAVI) is a new marker of arterial stiffness and it is independent of the blood pressure (BP) versus traditional marker of arterial stiffness pulse wave velocity (PWV). The values of CAVI in Japanese population have been shown in some investigations. The aim of this study is to study the age dependent cut-off values of CAVI in adult urban population of Russian Siberian region.

Design and method: Arterial stiffness in 1348 adult, 24–64 (47.4 ± 11.6) years old, men (40.4%) and women (59.6%) in Tomsk were studied by using volumetric sphygmography VaSera VS-1500 (Fukuda Denshi, Japan) in the framework of the epidemiological study ESSAY- RF. The values of CAVI and aorta- ankle pulse wave velocity (a-a PWV) were considered in group of practically healthy 224 persons without CVD and risk factors (arterial hypertension, diabetes mellitus, smoking) and without lipid-lowering treatment.

Results: CAVI and a-a PWV values in different age groups of practically healthy persons (n = 224) are presented in Table 1.

We did not find significant difference between men and women values, but the depending CAVI on the age was $CAVI = 4.60 + 0.053 * (AGE)$. In whole group (n = 1348) increased a-a PWV (more than 90 pc) was found in 37.8% and increased CAVI in 16.6%. In 14.6% we found the increase of both parameters and in 23.2% only a-a PWV increasing as a BP reaction.

Table 1. Average (M), median (MED), M+2STD and 90-percentile (90 pc) of a-a PWV (m/s) and CAVI in different age groups of practically healthy persons (n=224).

	a-a PWV					CAVI				
	N	M	M+2STD	MED	90 pc	N	M	M+2STD	MED	90 pc
54	6,1	7,1	6,1	6,8	54	6,1	8,0	6,1	7,1	7,1
54	6,3	7,6	6,4	7,1	54	6,3	8,3	6,5	7,5	7,5
36	6,8	8,0	6,8	7,5	36	6,9	8,5	6,8	7,8	7,8
50	7,4	8,9	7,6	8,2	50	7,7	9,7	7,6	8,9	8,9

Conclusions: The study of arterial stiffness by volumetric sphygmography VaSera VS-1500 (Fukuda Denshi, Japan) in epidemiological project in Russia has been shown as an effective method. Age depending cut-off values of CAVI were considered in adult urban population of Russian Siberian region.

PP.06.27

AN EXAMINATION ABOUT EVALUATION OF BLOOD PRESSURE AND PULSE WAVE VELOCITY IN HEALTHY YOUNG PEOPLE

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Objective: Pulse Wave Velocity (PWV) was an examination to measure the level of atherosclerosis in many medical institution in recent years. Previous report showed that Risk factor of atherosclerosis as hypertension, diabetes mellitus, hyperlipidemia, aging, smoking made the PWV fast.

On the other hand, PWV in youths were correlative with obese and hyperlipidemia in previous report, but correlation PWV with other risk factors were not elucidated. Here, in this study, we paid attention to the relationship between PWV and Familial History (FH) and Blood Pressure (BP) in Healthy, non-smoking youths without

abnormal data of blood test in medical examination (blood sugar, lipid, liver and renal function).

Design and method: Non-smoking healthy youths, 72 men and 30 women, without abnormal data of blood test in medical examination was entry in this study. Medical examination by interview was done to all of them. If he or she had a familial history of hypertension, diabetes mellitus, hyperlipidemia, ischemic heart disease, cerebrovascular disease in father or mother, it counted as two point, and also in grandfather or grandmother, as one point by each risk factor. And in this study, called three former risk factors as “disease risk (DR)”, two latter risk factors as “outbreak risk (OR)”.

Results: Mean PWV was 1191.5 cm/s in men, 1119.5 cm/s in women. Next we sort these data into ascending-order, and divided into “low PWV (LP)” and “high PWV (HP)” bound on the median. Men recorded LP 1088.0 cm/s vs HP 1298.0 cm/s, women recorded LP 1004.5 cm/s vs HP 1234.5 cm/s. (P < 0.05, Both LP and HP) DR of men in LP 0.40 vs HP 1.32, women in LP 0.44 vs HP 1.56. (P < 0.05, Both LP and HP).

In BP, Men recorded LP 117.9/65.7 mmHg vs HP 125.6/71.5 mmHg, women recorded LP 106.0/62.2 mmHg vs HP 111.2/65.9 mmHg. (P < 0.1, Both LP and HP).

Conclusions: In this study, we conclude that familial history and BP may correlate with PWV in healthy youths especially in HP. These result was appropriate because of the median of PWV was equal the previous data of healthy people.

PP.06.28

THE EFFECT OF NITROGLYCERIN ON ARTERIAL STIFFNESS OF VARIOUS PORTIONS OF THE ARTERIAL TREE IN ARTERIOSCLEROTIC PATIENTS

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Objective: The different effects of nitroglycerin on the arterial stiffness of the aorta and the arteries of lower extremity in arteriosclerotic patients were clarified.

		Healthy		Arteriosclerotic patients	
CAVI	0 min.	6.73	19% down	10.72	8% down
	After 5min.	5.45	p<0.001	9.83	p<0.05
lower limbs stiffness	0 min.	10.6	14% down	15.32	27% down
	After 5min.	9.08	p<0.001	11.14	p<0.05
femoral-ankle β	0 min.	5.22	19% down	10.04	4% down
	After 5min.	4.22	p<0.001	9.61	Not significant

Design and method: Arterial stiffness was measured as Cardio-Ankle Vascular Index (CAVI). The subjects were healthy people (CAVI < 7.5, n = 25) and arteriosclerotic patients (CAVI > 9, n = 25). Modified stiffness parameter β measurement of the aorta (heart –femoral β) and of the arteries of lower extremity (femoral-ankle β) were obtained according to the equation of Cardio-Ankle Vascular Index [(haPWV)² / (2/Psys-Pdia)] ln(Psys/Pdia)]. Nitroglycerin 0.3 mg was orally administered. The arterial stiffness was measured every one minute for 20 minutes.

Results: After administration of nitroglycerin in healthy people, CAVI decreased at 5 min (6.73–5.45) significantly, and recovered after 15 min. faβ (10.6 - 9.08) and hfβ (5.22–4.22) also significantly decreased. In arteriosclerotic patients, CAVI decreased at 5 min (10.72–9.83) and recovered after 15 min. faβ also decreased (15.32–11.14) significantly, but hfβ did not significantly change (10.04–9.61). The decreasing rate of CAVI was mostly in the arteries of lower extremity of arteriosclerotic patients, and was little in the aorta of arteriosclerotic patients.

Conclusions: These results indicated that nitroglycerin decreased the arterial stiffness at different rates for different portion of arterial tree, and suggested that nitroglycerin might decrease the arterial stiffness much more of muscle artery than of elastic artery in arteriosclerotic patients.

PP.06.29

THE INCREMENTAL EFFECT OF ALCOHOL CONSUMPTION ON REDUCED ARTERIAL ELASTICITY IN EASTERN EUROPEAN IMMIGRANTS

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Objective: The association between excessive alcohol consumption and cardiovascular (CV) risk is robust.

Arterial stiffness is an established down-stream marker of CV risk. We assessed the hypothesis that possible different alcohol consumption patterns between first gen-

eration Eastern European immigrants and native Greeks reflect different vascular age in the above mentioned populations.

Design and method: We studied 67 immigrants with newly diagnosed untreated stage I-II essential hypertension (EH), (aged = 51.5 ± 15 years, 35 male, office blood pressure (BP) = 158/92 mm Hg) coming from Eastern Europe to Greece within the previous two years and 61 EH natives matched for age, gender and office BP. Arterial stiffness was evaluated on the basis of carotid-femoral pulse wave velocity (c-f PWV). Current alcohol intake was assessed by responding to a question on how many alcohol units they consumed during the day (0, < 1, 1–2, 3–5 and > 5 units/day).

Results: Hypertensive immigrants compared to natives exhibited significantly higher values of c-f PWV (8.4 ± 0.3 vs 7.1 ± 0.5 m/sec, p = 0.003). A significant greater proportion of immigrants reported excessive alcohol intake compared to natives (18% vs 5%, p = 0.02 - Image). In the immigrants group, c-f PWV was positively associated with alcohol intake (r = 0.28, p = 0.004).

Conclusions: Hypertensive immigrants in the setting of similar hemodynamic load 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.06.30 PREVALENCE OF EARLY VASCULAR AGEING ACCORDING TO VASERA EXAMINATION IN RUSSIAN POPULATION

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Objective: Vascular age is the apparent age of the arteries that can be affected by genetic predisposition, lifestyle and other factors. Subjects whose vascular age is higher than chronological age may have higher cardiovascular risk. The aim of our study was estimate prevalence and risk factors of early vascular aging (EVA) in Russian population according to VaSera examination results.

Design and method: 1600 apparently healthy participants aged 25–65 years were randomly selected from Saint-Petersburg inhabitants (sample from ESSE-RF study). Data of 1361 subjects were available for analysis. Fasting lipids, glucose (Abbott Architect 8000 (USA)) and blood pressure (BP) measurement by Omron (Japan) were performed. Cardio-ankle vascular index (CAVI) was detected by VaSera VS-1500 (Fukuda, Japan). We presumed new definition of EVA - vascular age calculated from pressure independent stiffness index (CAVI) exceeded the biological age > 4 years. EVA was revealed in 289 participants (21,2%). Elevated BP was considered as BP > 140/90 mm Hg or antihypertensive treatment; increased total cholesterol (TC) > 4.9 mmol/l; low-density lipoproteins (LDL) > 3.0 mmol/l; triglycerides (TG) > 1.7 mmol/l, high density lipoproteins (HDL) < 1,0 (M) and 1,3 (F) mmol/l. Multiple regression analysis was applied (SPSS Statistics 20)

Results: Subjects with increased vascular age had significantly higher biological age comparing with other participants (52,1 ± 10,4 vs 45,8 ± 11,8 years, p < 0.001). The main determinants of increased vascular age are presented in the table.

Table 1. Risk factors of increased vascular age in general population

	OR	95% CI	P
BP	2,81	2,11-3,74	<0.001
TC	1,38	1,01-1,90	<0.05
LDL	1,52	1,10-2,09	<0.05
TG	1,61	1,19-2,18	<0.05
HDL	1,19	0,85-1,66	>0.05
Diabetes	1,97	1,17-3,34	<0,05

Conclusions: Chronological aging facilitates accumulation of risk factors that lead to advanced vascular aging. Hypertension has the greatest contribution to the early vascular aging, hyperlipidemia and diabetes are less important.

PP.06.31 CALIBRATION MODE AFFECTS THE SIGNIFICANCE OF PULSE WAVE VELOCITY MEASURED BY A BRACHIAL CUFF-BASED MONITORING DEVICE FOR PREDICTION OF SIGNIFICANT CORONARY ARTERY DISEASE

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Objective: As previously reported, calibration mode significantly affects the reliability of central hemodynamic data measured by noninvasive brachial cuff-based

blood pressure (BP) monitoring device, Mobil-O-Graph®. This device can also evaluate pulse wave velocity (PWV) that is regarded as a marker for arterial stiffness such as atherosclerosis, which as well needs calibration. But it is unknown which calibration mode is better for predicting coronary heart disease. The aim of this study was to compare the predicting value of PWV attained by Mobil-O-Graph® (mogPWV) between two available calibration modes in Japanese cardiovascular patients. We also compared the same way between mogPWV with brachial-ankle PWV (baPWV).

Design and method: We enrolled 138 patients who underwent elective coronary angiography for suspected coronary artery disease. Significant coronary artery disease (sCAD) was defined to have at least one stenosis over 50% or history of coronary angioplasty. Prior to angiography, we measured mogPWV and calculated mogPWV1 and mogPWV2 through calibration with systolic/diastolic and mean/diastolic BP, respectively. With logistic regression analysis, we evaluated the contribution of these PWV parameters for the presence of sCAD. In selected 121 patients, we also measured baPWV and analyzed same way.

Results: Two mogPWV values well correlated with each other (correlation coefficient: 0.97, p < 0.001), but differed significantly (mogPWV1: 10.1 ± 2.1 m/s, mogPWV2: 11.1 ± 2.4 m/s; p < 0.01). We found markedly higher baPWV than mogPWVs (baPWV: 17.9 ± 3.9 m/s). Next we evaluated the relative risk of PWV indices for sCAD. In univariate logistic regression analysis, mogPWV1 and mogPWV2 were associated with sCAD, whereas baPWV was not. In multivariate analysis, only mogPWV2 remained significant after adjusting traditional risk factors and other potential confounders (odds ratio: 1.25 [1.00–1.56]; p < 0.05).

Conclusions: In utilizing a brachial Pulse Wave Analysis-Based monitoring device, PWV calibrated with mean/diastolic BP better predicts the presence of significant coronary artery disease in Japanese cardiovascular patients.

PP.06.32 ASSOCIATION BETWEEN URIC ACID, METABOLIC VARIABLES AND ARTERIAL STIFFNESS IN THE EARLY PHASE OF HYPERTENSION

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Objective: High serum uric acid (SUA) is often associated with the metabolic syndrome and is a risk factor for cardiovascular disease. Whether high SUA is associated with arterial stiffness in the early stage of hypertension is not well known.

Design and method: We addressed this issue in 340 non-diabetic subjects from the HARVEST study (73% males) with a mean age of 31 ± 8 years and a mean blood pressure (BP) of 145 ± 11/92 ± 6 mmHg. Patients were divided into SUA tertiles (T1: 1.30–4.47, T2: 4.50–5.50, T3: 5.55–8.60 mg/dl). Arterial stiffness was assessed by pulse wave velocity (PWV), augmentation index (AIx), pulse pressure (PP) amplification and systolic BP (SBP) amplification.

Results: Patients in the highest SUA tertile were heavier (BMI, T3: 25.7 ± 0.3 kg/m², T2: 24.9 ± 0.3 kg/m², T1: 24.4 ± 0.3 kg/m²; p = 0.031) and had a worse metabolic profile, with higher age-and-sex-adjusted total cholesterol (TC) (T3: 201.5 ± 3.8 mg/dl, T2: 188.8 ± 3.6 mg/dl, T1: 193.2 ± 3.8 mg/dl; p = 0.048), triglycerides (T3: 150.9 ± 7.8 mg/dl, T2: 99.6 ± 7.5 mg/dl, T1: 96.3 ± 7.7 mg/dl; p < 0.0001) and glucose (T3: 93.0 ± 1.1 g/dl, T2: 92.6 ± 1.1 g/dl, T1: 89.5 ± 1.1 mg/dl; p = 0.059), and lower HDL-C (T3: 50.6 ± 1.6 mg/dl, T2: 54.9 ± 1.6 mg/dl, T1: 56.8 ± 1.7 mg/dl; p = 0.033) than subjects in the lower SUA tertiles. No significant difference in peripheral BP and central BP was found according to SUA tertile. Patients in the highest SUA tertile showed lower SBP amplification (p = 0.037 adjusted for age, sex, BMI, and metabolic data). This difference remained significant after inclusion in the model of lifestyle habits (p = 0.021) and of 24-h BP and heart rate (p = 0.034). Patients in the highest SUA tertile also presented a lower PP amplification even though the difference was of borderline significance after adjustment for age, sex and metabolic data (p = 0.08). No significant difference in PWV and AIx was found across SUA tertiles.

Conclusions: These data show that among young to middle-age stage I hypertensives higher SUA is associated with metabolic abnormalities and initial impairment of arterial elasticity.

PP.06.33 HYPERTENSION IS AN INDEPENDENT DETERMINANT OF AORTIC ANATOMY

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Objective: Hypertension and age have been associated with changes in aortic and left ventricle anatomy in general population. Our objectives were to assess deter-

minants of aortic anatomic indices in hypertension using cardiovascular magnetic resonance (CMR).

Design and method: Heart and of proximal aorta CMR exam (1.5T Siemens) was performed. Ascending aortic diameters (D) were calculated using the ARTFUN software and an automated segmentation of SSFP cine acquisitions acquired in the axial view, during breath-holding, at the level of pulmonary bifurcation perpendicular to the aorta. Aortic arch (AoA) width (W) defined as the distance between the center of the ascending and descending aorta cross-sections. AoA height (H) defined as the length of the orthogonal projection of the inflection point of the AoA centerline, positioned at the top of the arch, on the width of the aortic arch. AoA length (L) was estimated from SSFP acquisitions as the distance between the ascending and proximal descending aorta locations used for flow measurements. Telediastolic Left Ventricle indexed mass (M) and volumes (V) were semi-automatically calculated using the QMASS® software on small axis Cine sequences. Central Blood pressures (BP) recorded using SPhygmocor® just before MRI were used to define BP levels.

	Normotensives	Controlled hypertensives	Uncontrolled hypertensives	Across groups p value
Aorta Structure				
AA diastolic diameter -cm	2.57 ± 0.08	2.93 ± 0.07*	3.09 ± 0.06*	<0.0001
DA diastolic diameter -cm	2.05 ± 0.06	2.33 ± 0.06*	2.37 ± 0.05*	0.0003
Aortic Arch Length -cm	118.4 ± 4.9	131.0 ± 4.5	136.3 ± 4.5*	<0.0001
Aortic Arch Width -cm	84.1 ± 1.9	89.3 ± 1.7	77.0 ± 1.7*	<0.0001
Aortic Arch Height -cm	39.7 ± 2.0	41.8 ± 1.8	44.6 ± 1.8*	<0.0001
LV remodeling				
LV Mass -g/m ²	58.8 ± 2.7	60.3 ± 2.5	65.2 ± 2.3	0.04
LV EDV -mL/m ²	79.2 ± 2.8	79.3 ± 2.5	74.4 ± 2.4	0.30
M/V ratio	0.75 ± 0.03	0.76 ± 0.03	0.88 ± 0.03*	0.01

AA is Ascending Aorta, DA is descending aorta, LV is Left ventricle, EDV is End Diastolic Volume, M/V is Mass/volume ratio * p value < 0.05 at least vs. normotensives † p value < 0.05 at least vs. controlled hypertensive

Results: Population included 80 subjects (mean age 52 ± 13; 53% male): 23 controls and 57 treated hypertensives (28 controlled and 29 uncontrolled). Male proportion was 51%. Demographics were comparable in the 3 groups but age was a slightly younger in controls. M/V differed between the 3 groups (p < .03): 3.8, 3.9 and 4.4 in control subjects, controlled and uncontrolled hypertensives respectively. AoA W, L, H and D differed between control subjects and uncontrolled hypertensives (Figure 1 p < .001). Univariate analysis showed that significant associations of W and M/V with age, central mean BP (cMBP), BMI and gender whereas L and H only correlated to age and gender. Multivariate analysis showed after adjustment for age, gender, BMI, cMBP, independent influence of cMBP, and age on AoW and D as well as with M and M/V ratio.

Conclusions: Along with age, hypertension is an independent determinant of aortic anatomy

PP.06.34 CAROTID ARTERIES REMODELING DUE TO DISEASE DURATION IN HYPERTENSIVE WOMEN

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Objective: To investigate the influence of age and duration of arterial hypertension (HTN) on remodeling of carotid arteries wall in hypertensive women.

Design and method: Intima-media thickness (IMT), intima thickness (IT), media thickness (MT) and the diameter of carotid arteries were investigated in 98 women with HTN stage I - II, 1-2 grade, from 35 to 60, mean 48.6 ± 7.4 years, disease duration from 2 to 16 years. Spearman correlation method and the impact strength indicator (K2) were used for statistical analysis.

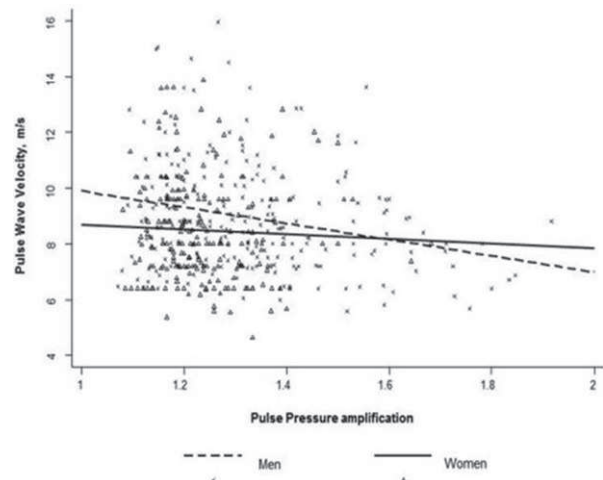
Results: The mean value of IMT was 0,068 ± 0,009 cm, IT - 0,024 ± 0,005 cm, MT - 0,042 ± 0,008 cm, the inner vessel diameter - 0,58 ± 0,067 cm. Mild direct correlation of the structural components of the arterial walls with patients age (R from 0.26, p < 0.01 to 0.4, p < 0.001) and duration of HTN with IMT (R = 0.41; p < 0.001) MT (R = 0.43; p < 0.001) and a diameter (R = 0.23; p = 0.024) were observed. IMT and MT abnormalities by 30-32% (K2 = 0.30 and K2 = 0.32; p < 0.001) due to the presence of HTN, and only 11-14% (K2 = 0.14 and K2 = 0.11; p < 0.001) due to age. Effects of HTN duration on IT were not significant, so IT abnormalities in hypertensive women may be due to physiological vessels aging (K2 = 0.035; p = 0.027).

Conclusions: Duration of HNT impacts on IMT, mostly by MT and the diameter of the carotid arteries, and IT for a long time do not change.

PP.06.35 GENDER DIMORPHISM IN THE RELATIONSHIP BETWEEN PULSE PRESSURE AMPLIFICATION AND PULSE WAVE VELOCITY

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Objective: Pulse pressure (PP) amplification reflects pulsatile arterial pressure and is mainly determined by the cardiac output, arterial stiffness (AS) and the returning pulse wave. Pulse wave velocity (PWV) is considered gold standard in the assessment of AS. The aim of the present study was to analyze the difference between genders in the relationship between PP amplification and PWV.



Design and method: Patients attending the HTN Unit of the Clinical Hospital of Valencia were included. Central BP was assessed using the SphygmoCor device (Atcor medical, Australia) and PWV was determined using the Complior device (Artech, France). PP amplification was defined as ratio between peripheral and central PP. ANCOVA, partial correlation and multiple linear regression models were used for statistical analysis.

Results: 445 patients (50% women; mean age 57.5 ± 11.4 years; 196 hypertensives (44%); 316 (71%) under BP treatment) were involved. PP amplification was higher in men than in women (1.33 and 1.24, respectively, p < 0.001) after adjusting for age, height, HR and PWV. Likewise, PWV was higher in men than in women (9m/s and 8.4m/s respectively, p = 0.003) after adjusting for age, height, HR and PP amplification.

PP amplification showed significant correlation with gender and age (r = -0.27 and -0.18, respectively, p < 0.001) as well as with HR and height (r = 0.63, p < 0.001 and 0.1, p = 0.028, respectively). No significant correlation with PWV was found after adjusting for covariates.

Main determinants of PP amplification were female sex, age, HR and height (beta = -0.28, -0.18, 0.59, p < 0.001 and beta = 0.12, p = 0.035, respectively). PWV was significantly associated with PP amplification in men (beta = -0.25, p < 0.001), but not in women (beta = -0.04, p = 0.513; p-value for the difference in beta values between gender 0.002; figure).

Conclusions: PP amplification and PWV are higher in men than in women. Female sex, age, HR and height are determinants of PP amplification. PP amplification and PWV are inversely associated in men but not in women.

PP.06.36 PULSE PRESSURE AMPLIFICATION AND ITS DETERMINANTS ACROSS THE BP SPECTRUM

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Objective: PP amplification is an independent risk factor for cardiovascular mortality. The aim of this study was to investigate the relationship between PP amplification and Augmentation Index (AIx) in subjects with a broad spectrum of BP values, from optimal BP to HTN grade III.

Design and method: Patients attending the HTN Unit of the Clinical Hospital of Valencia were included. Central BP, AIx and augmentation pressure (AP) were assessed using the SphygmoCor device (Atcor medical, Sydney, Australia). PP amplification was defined as ratio between peripheral and central PP. Study participants were divided in groups according to BP values. ANCOVA, Cuzick's test for trend, partial correlation and multiple linear regression models were used for statistical analysis. Data were adjusted for age, gender, HR and height.

Results: 741 patients (48% women; mean age 53.2 ± 13.6 years; 343 hypertensives (46%); optimal BP n = 123 (17%), normal BP n = 125 (17%), high normal BP n = 150 (20%), HTN grade I n = 245 (33%), HTN grade II n = 73 (10%), HTN grade III n = 25 (3%). PP amplification was higher in normotensives than in hyperten-

sives (1.31 y 1.28 respectively, $p < 0.001$). Likewise, a significant difference in PP amplification among BP groups was found (PP amplification 1.33, 1.3, 1.31, 1.29, 1.27 y 1.25 for optimal BP, normal BP, high normal BP, HTN grade I, HTN grade II, HTN grade III, respectively, $p = 0.001$). AIx and AP were higher with rising BP values.

PP amplification showed significant correlation with AIx, AP and BP ($r = -0.77, -0.47$ and -0.12 , respectively, $p < 0.001$). Main determinants of PP amplification were female sex, age, HR, systolic BP ($\beta = -0.35, -0.39, 0.53, -0.09$, respectively, $p < 0.001$) and cholesterol ($\beta = -0.58, p = 0.022$). BMI, BP treatment and presence of DM type 2 were not significant. Main determinants of AIx were female sex, age, HR, systolic BP and cholesterol.

Conclusions: PP amplification is related to BP categories, the higher the BP the lower the PP amplification and an inverse relationship were observed with AIx and AP after adjusting for covariates. Female sex, age, systolic BP, HR and cholesterol are the main determinants of PP amplification.

PP.06.37 ANKLE-BRACHIAL INDEX AND BRACHIAL-ANKLE PULSE WAVE VELOCITY IN A MEXICAN POPULATION OF HEALTHY INDIVIDUALS. A REPRODUCIBILITY RESEARCH

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Objective: To assess the agreement and reproducibility of the non-invasive measurement of baPWV and ABI with the (VP1000) proving its utility in 36 Mexican healthy individuals.

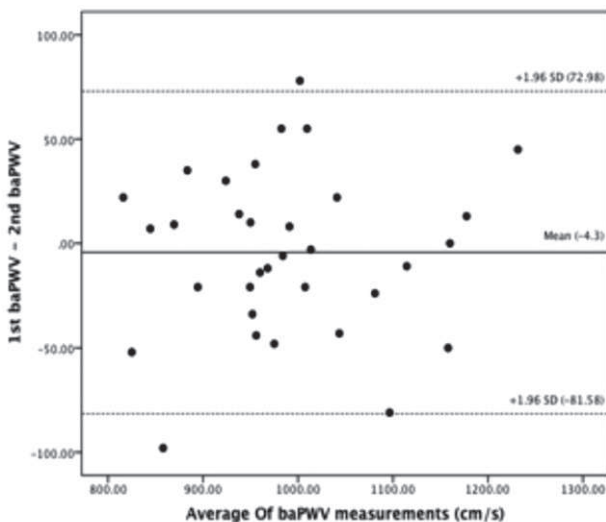


Figure 1. Average (x) and the standard deviation (y) of the first and the second brachial-ankle pulse wave velocity measurements.

Design and method: A cross-sectional study was carried out in thirty-six healthy subjects (20 men and 16 women) from Guadalajara, México. The measurement of the baPWV and ABI was performed with the device VP1000, all the values are expressed as an average \pm SD; the correlation between the first and the second measurements was analyzed using Pearson's correlation coefficient and the Bland-Altman method. All p values were two-tailed, and $P < 0.05$ was accepted as statistically significant.

Results: The average age was 20.6 ± 1.6 years, with a BMI of 23.5 ± 3.5 and a waist circumference of 82.5 ± 9.3 . The right and left baPWV showed a good correlation between the first and second measurements with statistical significance respectively (r^2 Pearson = 0.810, $p < 0.001$, r^2 Pearson = 0.831, $p < 0.001$). The arterial ABI showed good correlation between the first and the second measurement with statistical significance, (r^2 Pearson = 0.730, $p < 0.001$, r^2 Pearson = 0.599, $p < 0.001$). The Bland-Altman plot of the first and the second baPWV and ABI measurements, demonstrate good agreement (mean difference -4.3 ± 39.43 cm/s), (mean difference -0.0071 ± 0.43) respectively. (figure 1).

Conclusions: The results obtained by the OMRON VP1000 device, demonstrate that there is a high and significant correlation as well as good agreement between the left and right baPWV arterial stiffness values, as well as right and left ABI.

PP.06.38 ARTERIAL STIFFNESS AND VASCULAR ACCESS IN PATIENTS UNDERGOING HEMODIALYSIS

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Objective: Arterial stiffness (AS) is significant independent cardiovascular (CV) risk factor in patients undergoing hemodialysis (HD). Reports on impact of different vascular access on AS are inconclusive and our aim was to analyse whether patients with arteriovenous fistula (AVF) differ from those dialysed via central venous catheters (CVC) in markers of AS.

Design and method: We have enrolled 230 HD patients (median 65 yrs. (IQR 61–76), men 52%, dialysis vintage 67 (24–120) months. Out of them 167 (72.6%) patients had AVF and 63 had CVCs. All patients were on erythropoietin therapy and on active vitamin D as recommended by guidelines. They were dialyzed with standard bicarbonate hemodialysis solutions and synthetic dialyzers, with blood flow rates of 300–350 ml/min and dialysate flow rates of 500–800 ml/min. We have assessed AS i.e. pulse wave velocity (PWV) and augmentation index (Aix) by Arteriograph device, blood pressure (BP) was measured with Omron M6 device by ESH/ESC guidelines. All measurements were performed before mid-week dialysis.

Results: There were no differences in age, sex, body height, body mass index, hypertension, diabetes, smoking status, Kt/V, serum calcium and cholesterol between two group of patients. Patients with AVF had significantly higher ultrafiltration rates, hemoglobin, phosphates, CaxP and serum iron ($p < 0.002$) with longer dialysis vintage ($p = 0.02$) as well higher values of brachial and central systolic BP, pulse pressure, AIx and PWV ($p = 0.004$; $p = 0.001$; $p < 0.001$; $p = 0.014$; $p = 0.058$). Using multiple linear regression models, PWV was positively associated with central systolic BP, ultrafiltration and CaxP ($p = 0.02$; $p = 0.009$; $p = 0.001$), while AIx was positively associated with central systolic BP ($p < 0.001$), and negatively with CaxP, heart rate and systolic BP ($p = 0.028$; $p < 0.001$; $p < 0.001$). In multiple linear regression models the type of vascular access was not associated with AS markers.

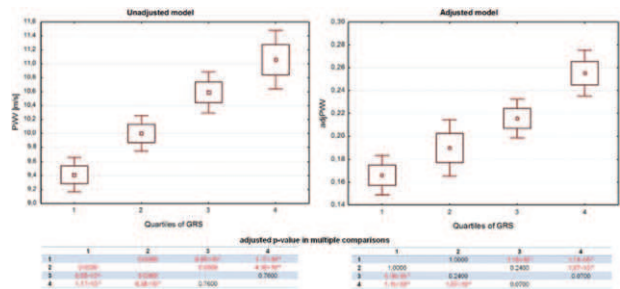
Conclusions: Patients with AVF had higher AS. However, the type of vascular access was not independently associated with wither PWV or AIx. Based on our results it could be concluded that vascular access type does not have impact on CV risk by modifying AS markers.

PP.06.39 GENETIC RISK SCORES AND VASCULAR STIFFNESS IN PATIENTS WITH ARTERIAL HYPERTENSION

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Objective: Single nucleotide polymorphisms (SNPs) can contribute to differences in the prevalence of common complex diseases such as cardiovascular disease (CVD). The arterial stiffness (AS) is well recognized as an intermediate phenotype of CVD. AS is complex in origin, with contributions from lifestyle and genetic factors. However, the association between SNPs and generally increased AS remains unclear. In the current study we assessed whether or not the multi-locus genetic risk score (GRS) based on selected SNPs are associated with AS in Polish hypertensive cohort.

Design and method: The study population included subjects (N = 669, mean age 54.45 ± 13.53) from the Care North cohort. AS was assessed as carotid-femoral pulse wave velocity (PWV). All subjects were genotyped for 171 SNPs previously shown to be associated with CVD and its risk. Linear regression assuming an additive model was applied to identify and compare the effect size of tested SNPs. For GRS construction, SNPs significant at p -value < 0.1 were selected. The association between GRS and PWV was analyzed using linear regression and Kruskal-Wallis test in unadjusted and adjusted models.



Results: Factors such as age, gender, 24-hour pulse pressure, kidney function and obesity explained 41.41% PWV variance and were included into adjusted model. In unadjusted and adjusted model 15 and 17 SNPs were selected, respectively. SNPs were associated with blood pressure, lipid concentration and risk of myocardial infarction and coronary artery disease. Each genetic risk score explained a greater proportion of PWV variance than any individual SNP (from 0.24 to 0.89% variance explained). Adjusted and unadjusted GRS explained 8.42% and 6.83% PWV variance, respectively. Similar results were obtained by internal validation what confirmed the good quality of models. The linear associ-

ation between GRS and PWV was observed. The differences between the PWV mean values in quartiles of GRS were highly statistically significant: p-value $2,48 \times 10^{-11}$ and $8,06 \times 10^{-9}$ for unadjusted and adjusted models, respectively (Fig.).

Conclusions: Our findings indicate that GRS was associated with AS independently of age, gender, blood pressure, kidney function and obesity in Polish hypertensive population. This implies that GRS may help to identify patients at greater risk for increased AS.

POSTERS' SESSION

POSTERS' SESSION PS07 PHARMACOLOGICAL TREATMENT

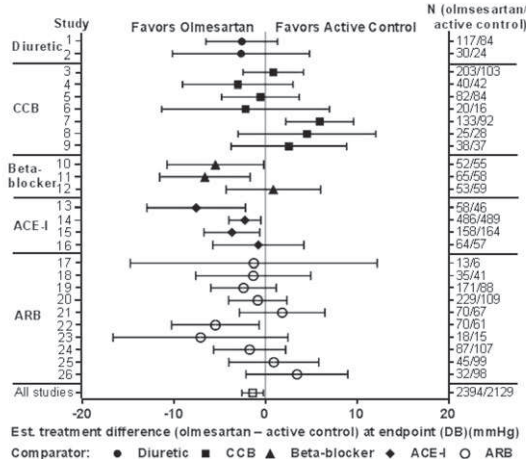
PP.07.01 META-ANALYSIS OF OLMESARTAN MEDOXOMIL MONOTHERAPY IN REDUCING BLOOD PRESSURE IN ELDERLY PATIENTS WITH HYPERTENSION

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Objective: Blood pressure (BP) control is often more difficult to achieve in elderly patients. Hypertension guidelines recommend specific BP goals for various age categories of elderly patients. This meta-analysis evaluated the efficacy of olmesartan medoxomil (olmesartan) vs Active-Comparator (comparator) monotherapy for the subgroup (aged greater than or equal to 60–<80 years) of elderly patients with hypertension.

	Baseline Demographics			BP at Study Endpoint**		BP Goal (%)		
	Age, y	Male, %	White, %*	SBP/DBP**	SBP/DBP	Mean Change	<140/90**	<150/90**
OM	68	52	86	163/97	143/85	-19/-12	44	60
AC	68	53	85	162/97	146/87	-17/-11	37	51

*Race; **mmHg. AC, active comparator; OM, olmesartan medoxomil.



Design and method: A meta-analysis of 26 studies (between 1998 and 2010) from a clinical trials database was conducted. Patients were randomized to receive olmesartan or comparator monotherapy (Figure). Endpoints included mean change from baseline (BL) in seated cuff (Se) SeBP at 12 weeks (study endpoint [EP]), and percent of patients achieving BP goal <140/90 or <150/90 mmHg by EP. Statistical analysis results (2-way ANCOVA, study and treatment as factors, BL SBP as covariate) on absolute change on mean SBP from BL to EP (LOCF) are presented (Figure).

Results: Demographics and mean BL for olmesartan (N=2,394) vs comparator (N=2,129) treatment groups were similar (Table). Olmesartan monotherapy resulted in a greater BP reduction vs comparator monotherapy at EP and enabled more patients to achieve BP < 140/90 mmHg or <150/90 mmHg (Table). Forest Plot ANCOVA analysis (Figure) of the absolute change on mean SBP from BL to EP (LOCF) showed an estimated overall treatment difference of -1.38 mmHg (95% CI: -2.55, -0.21) in favor of olmesartan vs comparator.

Conclusions: In conclusion, this meta-analysis showed improved BP reduction and greater BP goal achievement for elderly patients receiving olmesartan vs comparator.

PP.07.02 SHORT-TERM EFFICACY AND SAFETY OF HIGH-INTENSITY STATIN THERAPY IN PATIENTS WITH HIGH CARDIOVASCULAR RISK

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Objective: Dyslipidemia is recognized as a prominent risk factor for cardiovascular disease. The recent cholesterol guidelines recommend aggressive statin therapy in patients with high cardiovascular risk. The aim of the study was to investigate the efficacy and safety of short-term high-intensity statin therapy in patients with high cardiovascular risk.

Design and method: In 72 patients with history of clinically evident cardiovascular disease and fasting low-density lipoprotein cholesterol (LDL-C) >1.8 mmol/l or non-high-density lipoprotein cholesterol (non-HDL-C) >2.6 mmol/l (63.9% male, 60.8 ± 8.6 (M ± SD) years, current smoking 40.3%, abdominal obesity 63.9%, arterial hypertension 86.1%, myocardial infarction 73.6%, percutaneous coronary intervention 58.3%, coronary artery bypass surgery 12.5%, non-hemorrhagic stroke 29.1%, diabetes mellitus 22.2%, symptomatic peripheral arterial disease 6.9%, atrial fibrillation 14%, chronic heart failure NYHA II 54%, left ventricular ejection fraction 48 ± 8%, chronic kidney disease 11.1%, high-sensitivity C-reactive protein (hsCRP) mediana 5.3 mg/dl (min; max 0.5; 97.9), hsCRP >2.0 mg/dl 41.7%, total cholesterol (TC) 5.58 ± 1.63 mmol/l, HDL-C 1.09 ± 0.32 mmol/l, LDL-C 3.49 ± 1.33 mmol/l, triglycerides (TG) 2.16 ± 1.40 mmol/l, very LDL-C (VLDL-C) 0.88 ± 0.37 mmol/l, non-HDL-C 4.52 ± 1.51 mmol/l, previous statin therapy 73.6%) efficacy and safety of 1 month of high-intensity statin therapy (atorvastatin 80 mg/day) was assessed. Wilcoxon test was performed. P < 0.05 was considered significant.

Results: 29 (40.3%) patients achieved target LDL-C level <1.8 mmol/l, 31 (43.5%) patients achieved target non-HDL-C level <2.6 mmol/l, 14 (19.4%) achieved both target levels after 1 month of therapy. Atorvastatin 80 mg decreased lipids significantly in the group with achieved target LDL-C-level: TC from 4.81 ± 1.1 to 3.33 ± 0.36 mmol/l; LDL-C from 2.83 ± 1.12 to 1.57 ± 0.23 mmol/l; VLDL-C from 0.91 ± 0.52 to 0.63 ± 0.33 mmol/l; non-HDL-C from 3.75 ± 0.89 to 2.2 ± 0.26 mmol/l; TG from 1.98 ± 1.13 to 1.38 ± 0.72 mmol/l, (p < 0.05 for all trends). Changes of HDL-C were insignificant. No hepatobiliary and musculoskeletal adverse events were observed.

Conclusions: Short-term high-intensity statin therapy is effective only in 40.3% of patients with high cardiovascular risk but is well-tolerated.

PP.07.03 EFFICACY OF TWO REGIMENS OF MORNING AND NIGHTTIME ADMINISTRATION OF THE SAME LONG-ACTING ANTIHYPERTENSIVE DRUGS IN HYPERTENSIVE PATIENTS

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Objective: It has been suggested that nighttime administration of anti-hypertensive drugs may produce globally a much better 24h blood pressure (ABP) control as compared with the morning administration of these drugs. We evaluate with ABP the efficacy of two regimens of administration (in the morning and at night) of the same long-acting antihypertensive drugs in hypertensive patients

Design and method: Randomized cross-over study in 30 adult hypertensive patients ageing 18–75 years, under antihypertensive therapy with 2 or more antihypertensive drugs. Patients were aleatorized to start at night or in the morning a first period of 6 weeks of intake of all drugs previously prescribed. At the end of this period patients crossed over to the other regimen for another 6 weeks period. At the end of each 6 weeks period ABP was performed at similar conditions.

Results: Data from all patients will be presented. At the moment 21 patients completed the study. Globally after 6 weeks of morning drug administration the mean values of ABP of 24 h, daytime, nighttime, morning surge of systolic BP, percentual fall of nocturnal systolic BP were respectively 128/77+13/9; 131/80+13/11; 119/71+14/9; 16+19 mm Hg; 9+7% whereas the ABP values after 6 weeks of drug administration at night were 125/76+10/8; 129/79+11/9; 118/69+14/9; 23+10 mm Hg; 8+5%. All differences between these data from both regimens were $p > 0.12$. No differences were found between both sequences of drugs administration.

Conclusions: We did not find any significant difference of ABP control between both regimens using long acting drugs despite a small tendency for lower daytime BP values and higher morning BP surge during nighttime administration was present.

PP.07.04

EFFECTS OF MONGOLIA ASTRAGALUS ON EARLY CARDIAC AND NEPHRITIC FUNCTION IN PATIENTS OF HYPERTENSION WITH METABOLIC SYNDROME

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Objective: To investigate the effect of Mongolia Astragalus originating in Longxi of Gansu Province on cardiac and nephritic function in patients of essential hypertension (EH) with metabolic syndrome (MetS).

Design and method: This study was designed as a prospective, open label, parallel randomized controlled trial. Two hundred and twenty-six EH patients with MetS over the age of 18 years were selected. Patients were randomly assigned to control group (adopted conventional medical treatment), Astragalus group 1 (added Astragalus capsules 10 g/d) and Astragalus group 2 (added Astragalus capsules 5 g/d). Some indicators of the cardiac anatomy structures, the cardiac systolic function and diastolic function were measured by M-mode echocardiography, two-dimensional echocardiography, doppler echocardiographic determination and tissue Doppler imaging. The level of urinary microalbuminuria (MAU) was evaluated by radioimmunoassay. In addition, the estimated glomerular filtration rate (eGFR) was calculated by Modification of Diet in Renal Disease (MDRD) formulas. The changes of related indicators for cardiac and nephritic function were compared between pre-treatment and post-treatments after 12 months follow-up. Research programs was registered with the Chinese Clinical Trial Register Website and approved by The Ethics Committee of Lanzhou University Second Hospital. Each patient signed an informed consent.

Results: The all metabolic related indicators did not differ in three groups ($P > 0.05$). The cardiac anatomy structure and the indicators of cardiac systolic function have no significant difference in these three groups ($P > 0.05$). The ratio of early diastolic peak flow velocity and early diastolic mitral annular velocity ratio (E / E') was reduced in Astragalus group1 than those of in Astragalus group 2 ($P < 0.05$). And it in both Astragalus group1 and Astragalus group2 were all superior to that in conventional treatment group ($P < 0.05$). Astragalus had a significant effect on MAU reduction ($P = 0.044$), and this effect was dosage related of astragalus ($P = 0.036$).

Conclusions: Comparing with only conventional treatment, Astragalus combined with conventional treatment could improve the left ventricular diastolic function and reduce the MAU at certain extent in EH patients with MetS. These effects were more superior within high-dose of Astragalus than those of low-dose Astragalus in some aspects.

PP.07.05

EFFECTS OF MONGOLIA ASTRAGALUS IN PATIENTS OF HYPERTENSION WITH METABOLIC SYNDROME

N. Li, X. Li, X. Zhai, Q. Wang, X. Zhang, F. Zhao, X. Wang, J. Fan, F. Bai, J. Yu. Lanzhou University Second Hospital, Lanzhou, CHINA

Objective: To investigate the effect of Mongolia Astragalus that is one of Chinese herbal medicine originating in Longxi of Gansu Province on cardiac and nephritic function in patients of essential hypertension (EH) with metabolic syndrome (MetS).

Design and method: This study was designed as a prospective, open label, parallel randomized controlled trial. Two hundred and twenty-six EH patients with MetS over the age of 18 years were selected. Patients were randomly assigned to control group (adopted conventional medical treatment), Astragalus group 1 (added Astragalus capsules 10 g/d) and Astragalus group 2 (added Astragalus capsules 5 g/d). Some indicators of the cardiac anatomy structures, the cardiac systolic function and diastolic function were measured by M-mode echocardiography, two-dimensional echocardiography, doppler echocardiographic determination and tissue Doppler imaging. The level of urinary microalbuminuria (MAU) was evaluated by radioimmunoassay. In addition, the estimated glomerular filtration rate (eGFR) was calculated by Modification of Diet in Renal Disease formulas. The changes of related indicators for cardiac and nephritic function were compared between pre-treatment and post-treatments after 12 months follow-up. Research programs was

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Conclusions: Comparing with only conventional treatment, Astragalus combined with conventional treatment could improve the left ventricular diastolic function and reduce the MAU at certain extent in EH patients with MetS. These effects were more superior within high-dose of Astragalus than those of low-dose Astragalus in some aspects.

PP.07.06

ROLE OF AMBULATORY BLOOD PRESSURE MONITORING ASSESSMENT REPLACEMENT THERAPY OF HYPOCORTICISM IN ALLGROVE SYNDROME

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Objective: Allgrove (Triple A) syndrome is a rare autosomal recessive hereditary disorder that is characterized by: adrenocorticotrophic hormone (ACTH) resistant Adrenal insufficiency (AI), Achalasia and Alacrimia, autonomus symptoms and neurodegeneration. A typical phenotype consisting of short stature, microcephaly, small spastic tongue with atrophy of the papillae, osteoporosis and pes kavus. Responsible AAAS gene on 12q13. Described about a hundred cases so far.

Design and method: To illustrate the two cases of a rare hereditary syndrome and ABPM importance in assessing replacement therapy.

Results: The first patient, 21 year old boy, at the age of five achalasia cardia determined and committed cardiomyothomy. Then set up and alacrimia. Problems with walking and progression of neurological symptoms. At the age of 11 AI diagnosed and set the clinical diagnosis of Allgrove sy. Introduced hydrocortisone. Occasionally, difficulty swallowing, weakness, fatigue, expressed excavatus feet, lower TA and bradycardia. The younger brother, 13 years old, also has Allgrove sy. Short stature, gracile and characteristic stigmata at examination, normal findings on heart and lungs, TA 125/75 mmHg, pulse 86/min. No orthostatic hypotension. ABPM at Hydrocortison 10 + 5 + 5 mg (7 h, 16 h, 22 h) showed normal systolic and diastolic blood pressure during the day and night. Diastolic blood pressure during the day were at the upper limit. Day 127/86 mmHg Night 108/64 mmHg. Second patient, 39 years old man, at age of 21 AI diagnosed and hydrocortisone introduced. In 2003 achalasia and diverticulum of the esophagus diagnosed after which he underwent surgery. He lacks of strength for heavy physical labor sometimes. Normally fed, dark skin and scar from the surgery. The normal respiratory sound. Telesystolic ejection murmur 1/6 above the top, TA 120/70 mmHg, pulse 70/min. ABPM at Hydrocortison 10 + 5 + 5 mg (8 h, 13 h, 17 h) showed lower systolic and diastolic blood pressure during the day and night. The values were lower during the night compared to daytime. Advised to add fludrocortisone.

Conclusions: ABPM could be very important for assessing the adequacy of replacement therapy of hypocorticism especially when accompanied with another problems and conditions.

PP.07.07

CLASSES OF ANTIHYPERTENSIVE DRUGS AND THEIR COMBINATIONS AMONG PEOPLE WITH HYPERTENSION IN THE PUBLIC HEALTH SYSTEM

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Objective: The aim of this study was to characterize the antihypertensive classes most prescribed and the amount of these drugs consumed daily in the pharmacological treatment of hypertension in the public health system.

Design and method: This is a descriptive study of a quantitative approach performed in 2014 with 757 people registered in the Family Healthcare Units of a municipality of Minas Gerais and São Paulo from a sample calculated by the Open Epi Version 2 software. The study was approved by the Research Ethics Committee of the Ribeirão Preto School of Nursing of University of São Paulo, CAAE: 02313012.4.0000.5393. For data collection instruments were used to validate and characterize the sample and to survey the antihypertensive medications used.

Results: This study showed the predominance of women aged between 50 and 69 years with incomplete primary education and hypertension diagnosis time of more than 10 years. At the time of data collection, 218 (54.9 %) people in the state of Minas Gerais had normal blood pressure and 158 (43.8%) people in the state of São Paulo. It was found that drug treatment occurs predominantly in combination with the class of thiazide diuretics associated with angiotensin II antagonists. The study shows that 253 (63.7 %) people with hypertension enrolled in the Family Healthcare Units consume more than one drug per day in the last week in Minas Gerais and 201 (55.8 %) in São Paulo.

Conclusions: The data presented supports the conclusion that the antihypertensive prescriptions for the sample are consistent with the recommended guidelines for the primary care documents of the Ministry of Health, since the antihypertensives consumed by users of the public health system are in a combination recognized as effective.

PP.07.08 EFFECTS OF METOPROLOL AND NEBIVOLOL ON EXERCISE BLOOD PRESSURE IN PATIENTS WITH MILD HYPERTENSION

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Objective: Development of exaggerated blood pressure response to exercise is shown to be associated with increased cardiovascular morbidity and mortality. We planned to compare the impact of two beta blockers, metoprolol and nebivolol, on arterial blood pressure during exercise in patients with mild hypertension.

Design and method: A total of 60 patients (13 males, 47 females; mean age: 54.3 ± 10.7 years) were enrolled in the present study. The patients were randomly selected to receive either nebivolol 5 mg/day (n=30) or metoprolol 50 mg/day (n=30) for 8 weeks. At the end of the 8th week, each of the patients received exercise stress test according to Bruce protocol and their blood pressures were remeasured after rest, exercise, and recovery.

Results: Blood pressures were determined to be similar between metoprolol and nebivolol groups during rest, exercise, and recovery periods. Metoprolol and nebivolol achieved similar reductions in blood pressures during rest and exercise. However, five patients in nebivolol group and four patients in metoprolol group developed exaggerated BP response to exercise but the difference between metoprolol and nebivolol was not meaningful ($P=0.37$).

Conclusions: The results of the present study showed that metoprolol and nebivolol established comparable effects on the control of blood pressures during exercise in the patients with mild hypertensions. Both metoprolol and nebivolol can reduce cardiovascular risk via reducing exaggerated BP response to exercise in hypertensive patients.

PP.07.09 EFFECT OF SINGLE TABLET OF FIXED-DOSE AMLODIPINE AND ATORVASTATIN ON BLOOD PRESSURE AND LIPID PROFILE IN YOUNG PATIENTS

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Objective: Hypertension and dyslipidemia are two of the most commonly co-occurring cardiovascular risk factors which together cause an increase in coronary heart disease-related events that is more than simply additive for anticipated event rates with each condition. Data have shown that even relatively small reductions in both blood pressure and cholesterol levels can lead to large reductions in the risk for cardiovascular events. Furthermore, it is very important to treat young patients adequately in order to prevent cardiovascular complications. The objective of this study was to investigate the effects of a single pill of amlodipine (5 mg)/atorvastatin (10 mg) on blood pressure and lipid profile and adherence to medication in young hypertensive patients with dyslipidemia and no history of ischaemic heart disease.

Design and method: This combination tablet was administered to 59 patients (36 males) with mean age 47 ± 2.4 years, and blood pressure, lipid profile, renal/liver function were measured at baseline, 1, and 3 months. Medication adherence was examined using a questionnaire at 3 months.

Results: LDL-Cholesterol, triglycerides and total cholesterol were significantly decreased at 1 and 3 months compared with baseline. Data shows that mean baseline office BP of 164/98mmHg reduced by 19/9 mmHg to 145/90 mmHg at 1 month, and to 139/88 at 3 months. Mean systolic pressure decreased significantly at 1 and 3 months. The results of the questionnaire showed that 94 % of patients were satisfied with this medication. No severe adverse events were observed.

Conclusions: This combination tablet controlled both hypertension and dyslipidemia well in young patients. The control of two of the major cardiovascular risk factors might suggest the prevention of atherosclerosis by this medication. In addition, this medication is expected to improve medication adherence which is a very important prerequisite for successful treatment and prevention especially in young patients.

PP.07.10 THE EFFECT OF STATINS IN ERECTILE DYSFUNCTION

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Objective: The term erectile dysfunction (ED), which replaced the emotive word 'impotence,' is the inability to start and maintain an erection sufficient to achieve sexual intercourse. The etiology of this condition is multifactorial but it is usually attributed to vascular lesions caused by endothelial dysfunction. Many recent studies have attempted to link the growing incidence of erectile dysfunction with other causes, especially in patients suffering from cardiovascular diseases. This study aims to investigate the relationship of erectile dysfunction with dyslipidemia and the possible impact of statins on erectile dysfunction (not receiving phosphodiesterase inhibitors).

	STATINS	CONTROL GROUP
Before treatment	11.4*	10.8*
After treatment	16.3*	11.2*

* Mean (average) score IIEF (International Index of Erectile Dysfunction)

- $p < 0,05$

Design and method: The study included 100 male patients (aged 40–70 years) with unique risk factor dyslipidemia (none of them was receiving lipid-lowering treatment) and erectile dysfunction. The diagnosis of erectile dysfunction and its extent were assessed using the international questionnaire erectile function (IIEF). The lowest prices of the international questionnaire indicate significant erectile dysfunction. Total cholesterol (CHOL), low (LDL) and high (HDL) density lipoproteins and triglycerides (TRG) were assessed in all participants. The study group was divided in two subgroups each consisting of 50 patients. In the first subgroup patients received a statin (atorvastatin) while the second subgroup received no treatment (control group). All the participants were reexamined using the same processes (completion questionnaire IIEF-determination in blood levels of CHOL, LDL, HDL, TRG) after three months.

Results: In the subgroup of patients receiving statins the IIEF score emerged a statistically significant increase after three months of treatment (16.3 from 11.4 prior treatment, $P < 0,05$) compared to the control group reflecting an important improvement in erectile dysfunction (Table 1).

Conclusions: Patients receiving lipid-lowering therapy for 3 months significantly improved both lipid profiles and erectile dysfunction compared to the control group. Therefore men using statins to improve their cholesterol levels may emerge a significant improvement in erectile function. Although statins are not recommended as primary treatment for erectile dysfunction in men with normal cholesterol levels, this effect could improve compliance in hypercholesterolemic patients treated with statins.

PP.07.11 IGNORED AND NEGLECTED CAUSE OF ACUTE LEFT HEART FAILURE. PHOSPHORUS DEFICIENCY IN MASSRY'S PHOSPHATE DEPLETION SYNDROME. GIVING I.V. OR ORAL PHOSPHATE MIGHT SAVE THE LIVES

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Objective: In this study we investigated serum phosphorus levels in patients with acute left heart failure.

Design and method: A total of 215 participants, 115 patients with acute left heart failure and 100 controls, were enrolled in the study. Patients applied to emergency room with the complaints of heart failure were assessed by echocardiography. Ejection Fraction (EF) levels lower than 50% were accepted as heart failure. Patients with renal disorders, hyperparathyroidism, chronic heart failure, alcoholism, intake of medications that alter phosphorus level were excluded. Mean phosphorus levels of each group were measured and compared each other. SPSS 12.0 package program (SPSS Inc., Chicago, Illinois) was used for statistical analysis. Chi square test was used to compare categorical measures between the groups. Mann Whitney U or T test was used for comparison of numerical measurements between the two groups. Level of statistical significance was considered as 0.05 in all tests.

Results: There were 148 (69%) women and 67 (31%) men in the present study. The mean age was 52.6 ± 12.1 years. Demographic characteristics of participants were not significantly different between the groups. Mean EF levels of groups were 40.8 ± 6.3 in phosphate depleted group and 60.0 ± 9.7 in controls, respectively. The difference between two groups was statistically significant

($P < 0.001$). Mean phosphorus levels were 3.0 ± 1.1 in phosphate depleted groups and 4.2 ± 0.7 mg/dl respectively. There was statistically significant difference ($P = 0.041$) (Table 1).

Conclusions: Phosphorus is a major intracellular constituent. The deficiency of phosphorus can cause a variety of signs and symptoms. Myocardial creatine phosphate, ATP, and ADP levels reduce in case of phosphate deficiency. In addition to these, mitochondrial and myofibrillar creatine phosphokinase activities also reduce. Alterations occur in mitochondrial oxygen consumption, acid-extractable phospholipid precursors, and mitochondrial oxidation of long chain fatty acids due to phosphate depletion. All these effect heart muscles and can cause heart failure. Consequently phosphorus levels should be controlled in patients with acute left heart failure. Phosphorus supplementation may be a supportive Sine Qua Non treatment. And it may save lives.

	Study group (HF +) N=115	Control group (HF -) N=100	P
Phosphorus (2.5-4.6 mg/dl)	3.0 ± 1.1	4.2 ± 0.7	0.041
EF (>50%)	40.8 ± 6.3	60.0 ± 9.7	<0.001

Table 1: phosphorus levels in study and control group. Studygroup (HF +) Control group (HF -)P

Study group

PP.07.12 COMBINED ANTIHYPERTENSIVE THERAPY IN THE RENAL IRRITATION PREVENTION

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Objective: To compare CV outcomes on combination antihypertensive therapy and AU decrease.

Design and method: 59 patients with AH 2–3 degrees were included. Markov model was done on the basis of influence on albuminuria AU and glomerular filtration rate (GFR) and cohort study results, containing the most comprehensive information on the incidence of CV hypertension complications and mortality depending on these parameters. As an alternative to the model were: treatment of free original combination indapamide retard/perindopril (group 1), free generic combination indapamide retard/amlodipine A (2), generic fixed combination lisinopril / A(3), free combination bisoprolol / A (4), original fixed combination valsartan/A (5) and free combination generic losartan/A (6).

Results: For 12 weeks a significant decrease AU excretion in groups: from 20.8 ± 24.9 ml / min / m² to 14.9 ± 14.5 in group 1, 20.2 ± 28.2 to 20.8 ± 37.1 g 2; 20.5 ± 25.6 to 14.2 ± 15.6 (g 3); 19.7 ± 25.9 to 16.7 ± 25.7 g 4; 19.2 ± 22.6 to 7.8 ± 9.9 in g 5, 17.6 ± 19.8 12.7 ± 14.6 in g 6. Were obtained significant group differences in the more pronounced reduction AU under the influence of drugs 5–44,8 ± 44,4 vs. -20,5 ± 31,6 ($p < 0.05$). Significant changes in GFR (increase) in the treatment $74 \pm 16,8$ to $78,8 \pm 16,2$ ($p < 0.05$) in the g 5. In g 6, showed a slight decline in GFR ($74 \pm 19,7$ and $73,2 \pm 16,2$). In the modeling results was obtained, that the death chance of within 5 years in g 1 will be 77 per 1,000 people in the g 2 - 113 in 1000, a g 3 - 97; G 4 - 140; in the g 5- 81 per 1,000 people in the g 6 - 96 by 1000. The probability of stroke - 27, 37, 32, 48, 27 and 32 per 1,000, respectively.

Conclusions: So that more pronounced nephroprotective effect of original fixed combination IR/P and the original fixed combination of V/A can further prevent fatal and non-fatal cardiovascular events.

PP.07.13 NETRIN-1 LEVELS ARE REDUCED IN HEALTHY SUBJECTS IN RESPONSE TO TREATMENT WITH ASPIRIN

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Objective: Pro-inflammatory stimuli and pro-atherogenic factors are known to reduce the level of endothelial-derived netrin-1, a secreted laminin-like protein that attenuates recruitment of circulating monocytes within atherosclerotic plaques. This study investigated the effect of aspirin, routinely used for the prevention of cardiovascular disease, on serum netrin-1 levels in healthy subjects.

Design and method: Serum netrin-1 was measured using an enzyme-linked immunosorbent assay (ELISA) in samples collected from 60 subjects before and after 28 days of treatment with 300 mg aspirin daily. ELISAs were performed to assess serum levels of intercellular adhesion molecule-1 (ICAM-1), E-selectin, and urinary 11-dehydro-thromboxane B2 levels (TXB2). Serum creatinine and salicylate levels were measured using the creatininase enzymatic method on a Roche C8000 analyser and a Cobas Fara automated analyser (Roche) respectively. Crea-

tinine clearance was calculated using the Cockcroft-Gault equation. The Research Ethics Committee approved this study and subjects signed consent forms.

Results: Serum netrin-1 levels were reduced following aspirin treatment (66.06 ± 22.98 pg/ml versus 79.79 ± 34.91 pg/ml at baseline; $p = 0.0022$). There was a linear association between the percentage change in netrin-1 and level of serum salicylate ($r^2 = 0.413$, $p = 0.0013$). TXB2 levels fell in all subjects post-treatment, confirming adherence to treatment (32.99 ± 18.35 ng/mmol creatinine versus 143.7 ± 54.25 ng/mmol creatinine at baseline; $p < 0.0001$). Serum ICAM-1 and E-selectin levels were not modified by treatment. Creatinine clearance decreased following aspirin (103.2 ± 26.13 ml/min versus 110.5 ± 26.95 ml/min at baseline; $p = 0.0011$).

Conclusions: This study demonstrates that serum netrin-1 is reduced following treatment with aspirin. The TXB2 measurements show effective platelet inhibition in the whole population. We observed no change in ICAM-1 or E-selectin levels suggestive of an effect on the vascular endothelial function. Netrin-1 is a known biomarker of renal impairment. We propose that the reduction in netrin-1 is secondary to drug-induced renal dysfunction, as evidenced by a decrease in creatinine clearance.

PP.07.14 EFFECTS OF THE FIXED COMBINATION OF LOSARTAN AND HYDROCHLOROTHIAZIDE ON BLOOD PRESSURE IN HYPERTENSIVE PATIENTS WITH CHRONIC KIDNEY DISEASE GRADE 3 AND ABOVE

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Objective: Hypertensive patients with chronic kidney disease (CKD) usually need multidrug therapy to control blood pressure (BP). For these patients, angiotensin II receptor antagonists (ARB) are effective antihypertensive agents to prevent organ damage but require caution for hyperkalemia, while diuretics may have adverse effects on glucose, lipids and uric acid metabolism. However, the risk of ARB-induced hyperkalemia may be reduced by adding diuretics. Nevertheless, the effect of ARB/diuretics combination on BP regulation in patients with advanced CKD is unclear.

Design and method: The study examined BP and other parameters in hypertensive (>140/90 mmHg) CKD patients treated by a fixed-dose combination product of losartan (50 mg) and hydrochlorothiazide (12.5 mg). Serum potassium and uric acid, BP, and the slope of 1/serum creatinine level (1/SCr; rate of decline of renal function) were measured at 0, 4, 8, 12 and 24 weeks of treatment. Patients were divided by estimated glomerular filtration rate (eGFR) into a CKD1–2 (eGFR > 60 ml/min/1.73 m², 18 men and 11 women, aged 61 ± 9 years) and a CKD > 2 group (eGFR < 60 ml/min/1.73 m², 16 men and 12 women, aged 60 ± 8 years).

Results: The CKD1–2 group showed a significant ($P < 0.01$) decrease in BP (systolic/diastolic) from $153 \pm 12/91 \pm 10$ to $143 \pm 15/75 \pm 5$ mmHg at 4 weeks of treatment and maintained similar levels thereafter. In the CKD > 2 group, BP also decreased significantly ($P < 0.01$) from $151 \pm 14/79 \pm 5$ to $142 \pm 15/86 \pm 4$ mmHg at 8 weeks of treatment and stabilized thereafter. Serum potassium concentrations did not change both in the CKD1–2 (from 4.2 to 4.3 mEq/L at 24 weeks) and CKD > 2 groups (from 4.2 to 4.3 mEq/L). The 1/SCr during the 24-week study period did not differ between the CKD1–2 (0.0062 ± 0.0022 dL/mg/month) and CKD > 2 groups (0.0068 ± 0.0029 dL/mg/month). Serum uric acid levels did not increase both in the CKD1–2 (from 5.2 ± 1.6 to 6.7 ± 2.1 mg/dL at 24 weeks) and CKD > 2 groups (from 7.0 ± 1.8 to 7.6 ± 3.9 mg/dL).

Conclusions: These results suggest that losartan/hydrochlorothiazide fixed combination therapy decreases BP effectively and safely without affecting serum potassium concentrations in hypertensive patients with CKD grade 3 and above. Thus, the fixed combination therapy may confer renoprotection even in advanced CKD.

PP.07.15 EFFECT OF DAYLIGHT HOURS AND OUTDOOR TEMPERATURE ON BLOOD PRESSURE: COMBINATION OF ANTIHYPERTENSIVE THERAPY IN THE ELDERLY, MULTICENTER INVESTIGATION (CAMUI) TRIAL SUBANALYSIS

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Objective: To investigate seasonal blood pressure variability and effect of daylight hours and outdoor temperature on blood pressure with an angiotensin receptor blocker (ARB)-based combination therapy combined with calcium channel blockers (CCBs) or diuretics.

Design and method: Elderly hypertensive outpatients with usual ARB dosages were randomly assigned to switch treatment to losartan/hydrochlorothiazide (ARB+D

group: n = 72) or amlodipine in addition to ARBs (ARB+C group: n = 68). We investigated seasonal BP variation and whether seasonal variation in BP, daylight hours and outdoor temperature were correlated with renal outcome. To investigate the effects of seasonality as a continuous variable, we recorded the outdoor temperature and daylight hours at the municipalities where the patient's data were being collected. Multivariate regression analyses were done to investigate explanatory variables for changes in urinary albumin:creatinine ratio (UACR) and eGFR. Age, sex, body mass index, diabetes mellitus, ischemic heart disease or strokes, eGFR, systolic BP, urinary albumin, log urinary albumin, ARB+D vs. ARB+C, and coefficient of variation for systolic BP were used as covariates in all models, and outdoor temperature and daylight hours were introduced separately into the models.

Results: When each group was subdivided into two seasonal groups, no significant between-group differences in BP were found. (Summer at 12 month: 127/72 mmHg (ARB+C), 128/67 mmHg (ARB+D), Winter at 12 month: 132/76 mmHg (ARB+C), 135/74 mmHg (ARB+D)). Although there were no significant differences between outdoor temperature (for the day of measurement and as the mean for the month in which the measurement was done) at baseline and at 12 months of treatment, there was a tendency toward a negative correlation between outdoor temperature at 12 months and UACR and eGFR at 12 months in the ARB+D group (P = 0.042 and P = 0.067, respectively). There were no significant differences between daylight hours (on the day of measurement) at baseline and at 12 months of treatment, and no correlation was found between daylight hours and renal outcome.

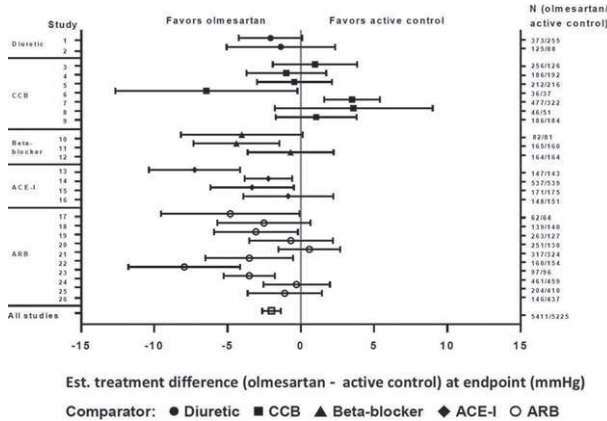
Conclusions: Combination therapy with an ARB plus a CCB or diuretics was effective regardless of season. Seasonal effects on the renal outcome existed, especially with diuretic combination therapy.

PP.07.16 META-ANALYSIS OF BLOOD PRESSURE REDUCTIONS WITH OLMESARTAN MEDOXOMIL IN CLINICAL COMPARISONS WITH ACTIVE CONTROLS IN PATIENTS WITH HYPERTENSION

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Objective: The blood pressure (BP)-lowering efficacy of olmesartan medoxomil (OM) has been assessed in direct comparisons with other agents. Further insights into its efficacy may be obtained by integrating data from individual studies using meta-analysis.

Design and method: A meta-analysis was carried out by combining patient (pt)-level data from 26 studies (first pt in 1998; last pt out 2010) that had compared OM monotherapy against monotherapy with an appropriate active control (AC; ARB = 10 studies; ACE-I = 4; β-blocker = 3; CCB = 7; diuretic = 2). End-points included mean change from baseline (BL) in seated (Se) BP at various time points, including study endpoint (EP), and the proportion of pts achieving SeBP goal < 140/90 mmHg.



Results: The outcomes of exploratory statistical analysis (2-way ANCOVA with study and treatment as factors and baseline SeSBP as covariate) on absolute changes on mean SeSBP from BL to EP (LOCF) are presented as a Forrest plot. The full analysis set (FAS) comprised 10,636 pts (OM = 5411; AC = 5225). At BL, the OM and AC groups contained, respectively, 53.6 and 56.4% of male pts and 77.1 and 73.7% of white pts; and the respective mean (±SD) values for age were 58.4 ± 12.3 and 57.2 ± 12.1 years; for body weight 81.0 ± 17.8 and 82.2 ± 18.0 kg; for BMI 28.6 ± 5.2 and 28.8 ± 5.2 kg/m²; and for SeSBP/DBP 160.3/99.7 and 159.8/100.4 mmHg. At EP, mean SeSBP/DBP for OM and AC treated pts was 142.2/87.5 and 144.2/89.6 mmHg, respectively. The mean change from BL was

-18.1/-12.2 for OM and -15.6/-10.8 mmHg for AC, and the proportion of pts at SeBP goal (<140/90 mmHg) was 42.3 and 32.9%, respectively. ANCOVA analysis (Figure) of absolute changes in mean SeSBP from BL to EP (LOCF) showed an estimated overall treatment difference of -2.00 mmHg (95% CI: -2.64, -1.36) in favor of OM.

Conclusions: Meta-analysis of 26 studies showed that compared with AC, treatment with OM was associated with larger SeBP reductions and enabled more pts to achieve BP control.

PP.07.17 A RANDOMIZED, DOUBLE-BLIND STUDY OF THE EFFICACY AND SAFETY OF NEW FIRST-LINE PERINDOPRIL/AMLODIPINE COMBINATIONS

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Objective: The primary end point is to assess the efficacy of blood pressure control by each dose of a first-line perindopril/amlodipine combination strategy, and to assess its safety.

Design and method: A phase 3, multicenter, international, randomized, double-blind study in two parallel groups over 9 months. The up-titration steps were perindopril/amlodipine 3.5/2.5 mg to 7/5 mg, 14/5 mg, and 14/10 mg for one group. The other arm was treated with an irbesartan ± hydrochlorothiazide strategy (irbesartan 150 mg, to irbesartan ± hydrochlorothiazide 150/12.5 mg, 300/12.5 mg, and 300/25 mg).

Results: The baseline population comprised 3270 hypertensive patients with 37.5% grade I hypertension, 50.8% with grade II, and 11.7% with grade III, and a mean body mass index of 29.5. The proportion of patients with controlled blood pressure increased significantly with the first-line combination strategy over each evaluation period until 6 months (primary end point): 21% at 1 month, 30% at 2 months (P < 0.001), 37% at 3 months (P < 0.001), 42% at 6 months (P = 0.003). However, the perindopril 14 mg/amlodipine 5 mg dose seemed to contribute least to the overall efficacy. The proportion of patients with controlled blood pressure remained stable over the period 6 to 9 months. At the last post-baseline assessment over the period 0 to 6 months, the blood pressure reduction was similar for the two strategies (SBP decrease 22.0 mm Hg for the perindopril/amlodipine group and 22.5 mm Hg for the irbesartan ± hydrochlorothiazide group; P = 0.116). A total of 149 patients (9.2%) had severe emergent adverse events in the perindopril/amlodipine group and 121 patients (7.3%) in the irbesartan ± hydrochlorothiazide group. Emergent clinical events of special interest (composite end point of cardiovascular, diabetes and glucose metabolic impairment, and renal impairment) occurred with a significantly lower incidence in the perindopril/amlodipine group, with a statistically significant hazard ratio of 0.811 (95% CI = [0.666-0.986], P = 0.036).

Conclusions: The primary end point was reached: the proportion of patients with controlled blood pressure increased significantly with each dose of the first-line perindopril/amlodipine combination. In view of the efficacy results, the perindopril 14 mg/amlodipine 5 mg dose has been withdrawn from further development studies.

PP.07.18 EFFECTS OF OLMESARTAN AND CHLORTHALIDONE ON BLOOD PRESSURE, ARTERIAL STIFFNESS. AN OPEN LABEL RANDOMIZED CONTROLLED TRIAL

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Objective: Diuretics are first line drugs for the treatment of hypertension. Due to their low cost there are limited studies on their effect as a monotherapy on vascular properties. They are mostly used in combination therapy, and there is not much data on their effects as monotherapy compared to other drugs.

We aimed to investigate the short term effect of chlorthalidone and olmesartan in arterial stiffness in patients with newly diagnosed essential hypertension.

Design and method: We recruited 28 patients on the olmesartan group and 23 on the chlorthalidone group matched for age, gender, and BMI. The patients were followed for three months. Dose of medication was titrated to achieve blood pressure (BP) goal. PWV was measured by Sphygmocor (Atcor Medical). Central systolic aortic BP (CSBP), Central diastolic BP (CDBP) was assessed by applanation tonometry, 24-hour SBP and 24-hour DBP were also measured (Spacelabs 90216), and clinic SBP and DBP were measured according to international guidelines.

Results: All BP pressure parameters showed no difference at the end of the study with the exception of clinic DBP (δDBP = -11.2 ± 12.4 and -0.56 ± 19.9 mmHg for olmesartan and chlorthalidone, p < 0.05). PWV and AIx were comparable at the end of the study in the two groups (δPWV = -0.2 ± 1.8 vs -0.9 ± 2.7 m/sec for olmesartan and chlorthalidone, p > 0.05).

Conclusions: 24-hour BP parameters and central BP parameters showed a similar reduction at the end of the study for the two drugs. Further, there was no class effect on arterial stiffness parameters between the diuretic and the angiotensin receptor blocker.

PP.07.19 EFFICACY AND SAFETY OF LONG-TERM PAH-SPECIFIC MONO-THERAPY WITH BOSENTAN IN PATIENTS WITH PULMONARY ARTERIAL HYPERTENSION

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Objective: To evaluate the effect of long-term (over 1 year), treatment with bosentan 250 mg / day on central hemodynamics, functional status and tolerability profile in patients with pulmonary arterial hypertension.

Design and method: 10 patients (mean age 38,5{29,75–51,75}; 100% women) with idiopathic pulmonary hypertension (IPAH) (n=8, 80%) and congenital heart disease - Eisenmenger syndrome (CHD) (n=2, 20%), functional class (FC) II-III (WHO) were included in the observational study on bosentan monotherapy in the starting dose of 125 mg (the first 4 weeks) and 250 mg / day for 12+2mes. At baseline and after 1 year of use of bosentan were evaluated: FC (WHO), the test is a 6-minute walk (T6MW) the evaluation of dyspnea on the Borg, a second right heart catheterization (RHC) (30%), traditional echocardiography (echoCG) to the definition of systolic pulmonary artery pressure (SPAP) and the size of the right atrium (RA), chest X-ray with the definition of cardiothoracic index (CTI%), monitoring of transaminases and take tests on a monthly basis.

Results: During therapy with bosentan showed an increase in the distance T6MW from 426{388,5–446} to 486{416–510}. According to echocardiography showed a decrease with SPAP 102,5{74–115} MmHg (average) to 75{61–83} Mm Hg, there was a decrease in the size of the RA from 4{4–7.5} to 4{3.5–4.5}. The results of RHC showed an increase or maintenance of cardiac output, cardiac index, right atrial pressure, pulmonary vascular resistance reduction. During therapy with bosentan 250 mg / day over 1 year showed improvement FC (WHO) to II (40%), to I (40%) and in 20% FC remained unchanged. During the period of observation was carried every month the monitoring of liver transaminases. Neither in 1 patient were noted negative dynamics requiring discontinuation or dose reduction.

Conclusions: Long-term therapy with bosentan 250 mg / day in patients with PAH FC II-III was high, led to an improvement in functional class and central hemodynamic parameters, is well tolerated in patients with pulmonary arterial hypertension of various etiologies.

PP.07.20 STUDY OF INFLUENCE OF BISOPROLOL, NEBIVOLOL AND CARVEDILOL ON THE HEART RATE VARIABILITY IN MEN WITH ARTERIAL HYPERTENSION

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Objective: Decreasing of heart rate variability (HRV) is one of the reasons for autonomic disbalance which is an important mechanism of formation of essential hypertension (ESH). The aim of the work was to study effect of bisoprolol (B), nebivolol (N) and carvedilol (C) on the state of vegetative nervous system (VNS) in men with ESH with regard for index of HRV.

Design and method: Men with 1–2 degree of ESH (n=75; age 35–55 years, mean age 48±3,5 years) received monotherapy with B, N, C for 2 months. After four weeks of placebo period patients were randomized into three groups with 25 men in each. The average dosage of B was 6,1±0,39 mg daily, N – 6,6±0,4 mg daily, C – 22,5±1,02 mg daily. Registration of parameters of HRV was implemented at the end of 4-week placebo period and after 2 months of therapy with a study drug. HRV spectral parameters included low (LF) and high (HF) frequencies waves. The investigation was held with the help of computer cardiography (Cardio - 01).

Results: In placebo period the patients have the increasing power of LF waves and the decreasing power of HF waves. During the therapy of indicated beta-blockers was established normalization of disbalance of VNS with the predomination of parasympathetic component. The monotherapy with B and N resulted the increasing of amplitude of LF waves (acc.: from 241,4±59,4 to 423,8±53,6; p<0,05; from 165,2±32,9 to 400,4±56,8; p<0,001) and increased value of HF waves (acc. from 165,1±32,4 to 423,8±53,6; from 117±12,5 to 279,7±35,8; p<0,001); in the therapy of C improved the power of HF waves (from 159,6±28,02 to 247,6±32;p<0,05) and reduced the power of LF waves (from 229,±37,6 to 130,8±19,9; p<0,05).

Conclusions: The therapy with B, N and C was associated with significant elevation of parasympathetic part of VNS tone. The investigated C exerted correct influence on HRV with reduction of sympathetic hyperactivity and improving of the baroreceptor control of arterial pressure at patients with ESH.

PP.07.21 EFFICACY AND SAFETY OF PERINDOPRIL/INDAPAMIDE/AMLODIPINE (P/I/A) SINGLE PILL VERSUS FREE COMBINATION (P/I + A) AT THE SAME DOSE IN PATIENTS WITH UNCONTROLLED ESSENTIAL HYPERTENSION

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Objective: To assess the effects of perindopril 5 mg/ indapamide 1.25 mg/ amlodipine 5 mg in single pill versus free combination of perindopril 5 mg/ indapamide 1.25 mg + amlodipine 5 mg.

Design and method: International, randomized, open-label, controlled, 12-week phase III study. After one week Perindopril 5 mg/Indapamide 1.25 mg run-in treatment, uncontrolled hypertensive patients having SBP < 160/ DBP < 100 mmHg were randomized and received single pill or free combination at the same dose for 12 weeks.

Evaluation criteria: Supine blood pressure (BP), rate of responders and normalized patients, safety.

Results: 148 randomized patients with similar supine SBP/ DBP at baseline (age 56.4 ± 10.8 years; treatment duration 82.2 ± 13.8 days). After 1 month, BP was well controlled in both treatment groups, however, patients under single pill combination tended to show a better positive response to the treatment than patients under free combination (89.2% versus 82.9%) and higher percentage of controlled patients (87.8% versus 78.6%).

At week 12, office supine SBP (-21.5 ± 11.7 versus -20.0 ± 12.9), and DBP (-15.3 ± 7.8 versus -14.8 ± 9.0) decreases were still in favor of the single pill leading to high levels of response to the treatment (89.2% versus 87.1%) and BP control (81.1% versus 80.0%). Treatment was well tolerated. None of the patients reported any orthostatic hypotension. Treatment-related emergent adverse events were lower in the combination group (4.0% in the P/I/A and 6.8% in the P/I + A groups) and in accordance with events listed in SmPC of each monocomponent.

Conclusions: Perindopril 5 mg, Indapamide 1.25 mg, Amlodipine 5 mg in single pill tend to show better positive response and higher percentage of controlled patients already after one month of treatment compared to a free combination in patients not controlled by previous anti-hypertensive therapy. In both groups, BP was efficiently reduced and controlled at 12 weeks, with a good tolerability and safety profile.

PP.07.22 COMPARISON OF A NEW FIRST-LINE SINGLE-PILL ANTIHYPERTENSIVE STRATEGY WITH A STEPPED-CARE STRATEGY USING THE TIME TO BLOOD PRESSURE CONTROL

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Objective: To compare the time delay to obtain BP control using a new first-line single-pill combination strategy versus a validated classic stepped-care strategy in patients with mild-to-moderate hypertension.

Context: Various studies have shown that a faster blood pressure (BP) control is associated with better cardiovascular protection, therefore it is important to consider this parameter in evaluating the efficacy of antihypertensive strategy and antihypertensive drug.

Design and method: In this post-hoc analysis of an international, double-blind, parallel-group, randomized controlled trial, patients received either, perindopril/amlodipine (881 patients) or valsartan±amlodipine (876 patients). The steps were from perindopril/amlodipine 3.5 mg/2.5 mg to 7/5 mg, 14/10 mg, and 14/10 mg plus indapamide 1.5 mg; or valsartan 80 mg to 160 mg, valsartan/amlodipine 160/5 mg, and valsartan/amlodipine 160/10 mg. At 30, 60, and 90 days, the treatments were uptitrated if office BP ≥ 140/90 mm Hg. The two groups were similar at baseline (55.5 years; 53% male; blood pressure 163.5/100.2 mm Hg). For each treatment strategy, the time delay to obtain BP control was modeled using a mixed generalized linear model (estimating the probability of blood pressure control during the course of the study). The median time to blood pressure control (in half the population, as described by Gradman et al.) was then extracted.

Results: The first-line single-pill combination strategy controlled hypertension in significantly more patients than the stepped-care strategy: 291 (33%), 379 (43%), and 497 (56%), and 755 (86%) patients at 30, 60, 90, and 180 days, compared with 236 (27%), 298 (34%), 429 (49%), and 687 (78%) patients, respectively. The median time to obtain BP control in half of the population was 74 days (20% less) with the first-line single-pill combination strategy, compared with 93 days with the stepped-care strategy.

Conclusions: The new first-line single-pill perindopril/amlodipine combination strategy controlled blood pressure in over 25% more patients at 2 months and 20% faster than the valsartan±amlodipine classic stepped-care strategy. This is expected to be associated with earlier cardiovascular protection, leading to better outcome.

PP.07.23 THE STUDY OF CHRONOTHERAPY IN CHRONIC KIDNEY DISEASE WITH HYPERTENSIVE PATIENTS

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Objective: Our study is designed to identify the effect of evening dosing antihypertensive drugs in CKD with hypertensive patients.

Design and method: In an open-label uncontrolled trial, we assigned 155 CKD with hypertensive patients either to take all prescribed hypertension medications in the morning or to take at least one of them at night. We measured 24-hour ambulatory blood pressure (BP) at baseline and 8 weeks after treatment.

Results: After 8 weeks of treatment, there was no difference between two groups in CKD with hypertensive patients. However, CKD with INH treated with nighttime doses of antihypertensive drug showed a greater reduction in 24 h average systolic BP, 24 h average diastolic BP, daytime average systolic BP, nighttime average systolic BP, nighttime average diastolic BP. After adjusting eGFR, the difference in the reduction of nighttime average diastolic BP between two groups was still statistically significant.

Conclusions: Regimen of taking antihypertensive drugs in the evening should be considered for CKD with hypertension patients to lower the nighttime blood pressure.

PP.07.24 TREATMENT WITH LCZ696 COMPARED TO AT1-RECEPTOR BLOCKADE PROVIDES SUPERIOR BP CONTROL AND RESULTS IN LARGER NT-PROBNP REDUCTIONS IN ASIAN PATIENTS WITH SALT-SENSITIVE HYPERTENSION

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Objective: Salt-sensitivity is associated with exaggerated blood pressure (BP) increase in response to salt load and considered an independent predictor of cardiovascular events in normo- and hypertensive individuals. LCZ696 is an angiotensin receptor neprilysin inhibitor (ARNI) expected to increase ANP levels while simultaneously blocking the AT1-receptor. This study compared the effects of LCZ696 and valsartan on BP and NT-proBNP in Asian patients with salt-sensitive hypertension (SSH).

Design and method: Randomized, double-blind, double-dummy cross-over study in 72 patients with SSH (10% or higher increase in MAP when switching from 50 mmol/day to 320 mmol/day for 7 days each). Patients received LCZ696 400 mg once daily and valsartan 320 mg once daily for 4 weeks each. Office BP, ambulatory blood pressure measurements (ABPM) and NT-proBNP were assessed at baseline and on Day 28.

Results: LCZ696 and valsartan significantly lowered office SBP and office DBP from baseline with larger reductions with LCZ696 compared to valsartan (SBP: -13.3 mmHg vs. -5.9 mmHg; adjusted mean difference between groups: -7.6 mmHg, $p=0.002$; DBP: -6.2 mmHg vs. -4.3 mmHg; adjusted mean difference between groups: -2.0 mmHg, $p=NS$).

LCZ696 and valsartan also significantly lowered ambulatory SBP, DBP, MAP, and pulse pressure from baseline with larger reductions with LCZ696 compared to valsartan for daytime, nighttime, and 24 h intervals. The largest treatment difference between groups was observed at nighttime (adjusted mean difference; SBP: -5.1 mmHg, $p<0.001$; DBP: -2.6 mmHg, $p=0.004$; MAP: -4.0 mmHg, $p<0.001$). Baseline plasma NT-proBNP levels were comparable between groups. On Day 28, NT-proBNP levels were significantly reduced by 41% with LCZ696 and by 28% with valsartan ($p<0.001$ for both). NT-proBNP at week 4 was significantly lower (20%) with LCZ696 compared to valsartan ($p=0.001$).

Conclusions: Treatment with LCZ696 400 mg compared to valsartan 320 mg once daily for 4 weeks provided superior office and ambulatory blood pressure reduction and larger hemodynamic unloading of the heart. These results may suggest an added long-term benefit for LCZ696 related to reduction of end-organ damage and cardiovascular events in patients with SSH.

PP.07.25 EFFECTIVENESS, ADHERENCE AND TOLERABILITY OF PERINDOPRIL/AMLODIPINE FIXED DOSE COMBINATION, IN DAILY CLINICAL PRACTICE. RESULTS FROM THE EMERALD STUDY

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Objective: Increased blood pressure (BP) is a major modifiable risk factor. Despite the overwhelming evidence and the established benefits of antihypertensive treatment, adherence to treatment remains relatively low. Inadequate antihypertensive effect of a drug regimen, as well as poor tolerability, may discourage patient's adherence. Simplifying the drug regimen by using fixed combinations has the potential to achieve effective BP reduction with fewer side effects and thus improve adherence. The purpose of this study was to record BP-lowering effect of Perindopril/Amlodipine fixed dose combination, as well as adherence, safety and tolerability, during a 4-month treatment. Furthermore, we aimed to identify comorbidities and co-existing risk factors, as well as to calculate the total cardiovascular risk of patients.

Design and method: This is a multicenter, non-interventional study that prospectively included 2269 hypertensive patients. The data were recorded from 228 private offices, while the study was coordinated by two Cardiology Departments of University Hospitals. Patients and physicians were dispersed in the entire Greek geographical territory representing epidemiological patterns of Greece. The data were recorded at baseline, 1 and 4 months. Hypertensive patients included were >18 years old, and were under treatment with Perindopril/Amlodipine fixed dose combination.

Table 1: Baseline characteristics, cardiovascular parameters and factors influencing prognosis in hypertension (N=2269).

Parameters	Values		
Gender (male %)	52,4		
Age (years) (Mean SD)	65,3±11,4		
BMI (kg/m ²) (Mean SD)	28,3±4,2		
Waist circumference (cm) (Mean SD)	96,9±13,1		
Smoking (%)	33,9		
Dyslipidemia (%)	44,2		
Increased fasting plasma glucose (%)	24,1		
Abnormal glucose tolerance test (%)	21,2		
Diabetes Mellitus (%)	22,3		
Abdominal obesity (%)	35,8		
Metabolic Syndrome (%)	25,6		
Heart disease : MI, angina, coronary revascularization, HF (%)	9,2		
Renal disease: diabetic nephropathy, renal insufficiency, proteinuria (>300 mg/24h)	3,1		
Cerebrovascular disease (%)	5,2		
Perindopril/Amlodipine fixed combination dosage on each study visit. Base: Patients with recorded dosage. (%)			
	1 st Visit	2 nd Visit	3 rd Visit
10/10mg	15,5%	17,5%	16,9%
10/5mg	21,6%	22,0%	23,2%
5/10mg	7,8%	8,2%	8,7%
5/5 mg	55,1%	52,2%	51,3%

Results: From 2269 hypertensive patients included in the study, 15 patients (0.7% of the sample) prematurely discontinued treatment. 51.2% of the patients

were of "High/Very high added risk". Mean SBP/DBP values decreased from 158.4 ± 13.6/89.9 ± 8.7 mmHg (1st visit), to 136.7 ± 9.9/80.7 ± 6.7 mmHg (2nd visit) and 130.0 ± 7.9/77.7 ± 6.3 mmHg (3rd visit) respectively ($p < 0.001$). The degree of SBP/DBP fluctuation was low and ranged between 2.2 ± 2.3/1.5 ± 1.9, 1.9 ± 2.2/1.3 ± 1.7 and 1.7 ± 2.2/1.3 ± 1.6 during the 4 months of treatment ($p < 0.001$). Adherence was high; 99.6% of the sample was taking their treatment "every day" or "quite often" during the study. Safety and tolerability of the fixed combination was high; only 0.4% of the patients discontinued treatment due to an adverse event.

Conclusions: Perindopril/Amlodipine fixed dose combination decreases BP levels promptly and significantly with low grade of fluctuation. Simplifying drug regimen by using this fixed combination improves adherence, an important requirement for the improvement of prognosis in those patients.

PP.07.26

SEX DIFFERENCE IN RESPONSE TO VALSARTAN/AMLODIPINE SINGLE-PILL COMBINATION IN CHINA STATUS II: AN OBSERVATIONAL STUDY

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Objective: To compare the response to once-daily valsartan/amlodipine (Val/Aml, 80/5 mg) single-pill combination therapy according to sex in CHINA STATUS II.

Design and method: 1,1312 patients (6456 (57%) men and 4856 (43%) women) were analyzed. Patients were treated for 8 weeks. The percentages of not achieving the target systolic blood pressure (SBP \geq 140 mmHg) or diastolic blood pressure (DBP \geq 90 mmHg) were compared in different age groups of men and women, respectively at the baseline, 4 weeks and 8 weeks after Val/Aml treatment. The mixed model hierarchically estimated changes of BP according to different age and gender at 4 weeks and 8 weeks after therapy.

Results: At enrollment, SBP was lower in men (159.30 ± 12.31 mmHg) than in women (160.00 ± 12.71 mmHg, $P = 0.003$), whereas DBP was higher in men (96.40 ± 10.65 mmHg) than in women (94.50 ± 10.72 mmHg, $P < 0.001$). Whether male or female, the percentage of not achieving target SBP was increased with age; however, the percentage of not achieving target DBP was decreased with age. The percentage of not achieving target BP in female were less than those in male (57.41% vs. 59.59%, $P < 0.05$ at 4 weeks and 22.22% vs. 23.78%, $P < 0.05$, OR = 0.95, 95% CI = 0.90, 0.99 at 8 weeks after Val/Aml treatment). Compared with male after Val/Aml treatment, the decrease values of SBP were more in female (20.07 ± 11.97 vs. 19.62 ± 11.07 mmHg, $P < 0.0001$ at 4 weeks and 27.68 ± 12.56 vs. 26.74 ± 11.93 mmHg, $P = 0.0003$ at 8 weeks), while the decrease values of DBP in female were less ($P = 0.0009$ and $P < 0.0001$). The mixed model analysis showed that the difference in SBP was closely related with sex, that lower SBP effect in female was better than it in male after Val/Aml treatment. The difference in DBP was closely related with age.

Conclusions: Gender might be a factor to be taken in the individualized antihypertensive therapy.

Table The changes of BP (mean ± SD) according to different age and gender at 4 weeks and 8 weeks after the therapy.

Item (n)	Age				Unadjusted	P value	
	<35y	35-45y	45-55y	>55y		Model 1	Model 2
SBP(mmHg)	2917(1798)	1641(1331)	1019(1013)	883(602)			
Baseline male	158.20(12.40)	159.30(11.92)	160.60(12.04)	161.30(12.67)	<0.0001		
Baseline female	158.40(12.07)	160.10(12.54)	161.60(13.34)	161.60(13.23)			
P value	0.0322				0.03832	0.7305	0.6889
Difference at 4 weeks							
male	-19.10(11.30)	-19.70(10.94)	-20.20(11.07)	-20.40(11.12)	0.03832		
female	-19.60(11.29)	-21.10(11.28)	-21.60(11.54)	-21.60(11.97)			
P value	Unadjusted	0.0001					
Model 1	<0.0001						
Model 2	<0.0001						
Difference at 8 weeks							
male	-26.10(11.97)	-26.90(11.75)	-27.30(11.86)	-27.90(12.10)	0.0225	0.0858	0.0225
female	-26.60(12.70)	-27.80(12.64)	-28.70(13.19)	-28.60(12.51)			
P value	Unadjusted	0.0026					
Model 1	0.0023						
Model 2	0.0026						
DBP(mmHg)							
Baseline male	98.60(9.97)	96.70(9.78)	94.60(10.53)	91.40(12.27)	<0.0001		
Baseline female	96.70(9.71)	94.60(10.31)	93.00(11.29)	90.40(11.64)			
P value	<0.0001						
Difference at 4 weeks							
male	-12.00(8.54)	-10.70(7.66)	-10.10(8.36)	-8.70(8.13)	0.0219	0.0206	0.0166
female	-10.70(8.01)	-10.80(8.61)	-9.60(8.60)	-8.60(8.90)			
P value	Unadjusted	0.0602					
Model 1	0.0206						
Model 2	0.0403						
Difference at 8 weeks							
male	-17.00(9.37)	-15.50(8.56)	-14.40(8.20)	-12.80(8.22)	0.0057	0.0601	0.0023
female	-15.70(9.03)	-14.90(9.40)	-13.60(9.31)	-12.50(9.87)			
P value	Unadjusted	0.1035					
Model 1	0.8275						
Model 2	0.0771						

Note: Model 1: age and gender as a fixed factors, and adjusted for the baseline of blood pressure, BMI, smoking, drinking, exercise and education level.
Model 2: adjusted for the baseline of blood pressure and statistically significant factors in the model 1.

PP.07.27

LIPID-LOWERING AND ANTI-INFLAMMATORY EFFECTS OF OMEGA 3 ETHYL ESTERS AND KRILL OIL: A RANDOMIZED, CROSS-OVER, CLINICAL TRIAL

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Objective: The aim of our study was to comparatively evaluate the short-term lipid-lowering efficacy of krill oil and purified Omega 3 ethyl esters PUFAs in mildly overweight hypertriglyceridemic subjects.

Design and method: This double blind, randomized clinical trial was carried out in 25 moderately hypertriglyceridemic subjects (TG = 150 - 500 mg/dL). After 4 weeks of diet and physical activity, patients were allocated to treatment with an indistinguishable pill containing Omega 3 ethyl ester PUFAs 2000 mg/die vs. Krill oil 500 mg/die to be assumed once a day. After 4 weeks of treatment, patients were asked to observe a 2-week wash-out period, and they were then assigned to the alternative treatment for a further period of 4 weeks.

Results: Although both PUFA sources were able to improve TG plasma levels, esterified omega 3 PUFAs were more efficacious than Krill oil ($p < 0.05$). Nonetheless, only Krill oil treatment was able to significantly improve HDL-C and apoA1 level, both compared to baseline ($p < 0.05$) and end of treatment with esterified Omega 3 PUFAs ($p < 0.05$) values. Both treatments were able to significantly reduce hsCRP levels from the baseline ($p < 0.05$), but Krill oil improved it more efficaciously than esterified omega 3 PUFAs ($p < 0.05$).

Conclusions: Krill oil has lipid-lowering effects comparable with those obtained through a 4 time higher dose of purified Omega 3 ethyl esters PUFAs in mildly overweight hypertriglyceridemic subjects, while more efficaciously reducing hsCRP.

PP.07.28

COMPARISON OF 12-WEEKS' ANTIHYPERTENSIVE EFFECT OF FIMASARTAN 60 MG OR 120 MG A DAY IN COMPARISON WITH CANDESARTAN 8 MG A DAY IN THE PATIENTS WITH MILD TO MODERATE HYPERTENSION

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Objective: Fimasartan is a new antihypertensive drug which blocks AT-1 receptor selectively. It exhibited a potent antihypertensive effect and quick onset of the effect. We investigated antihypertensive effect of 60 and 120 mg of Fimasartan and its safety in comparison with 8 mg of Candesartan.

Design and method: After 2 weeks' placebo run-in period, 290 patients with mild to moderate hypertension (diastolic blood pressure (DBP), 90 ~ 110 mmHg) aged from 19 to 75 years old were randomly assigned to 60 mg, 120 mg daily of Fimasartan or 8 mg daily of Candesartan. They were administered for 12 weeks without dosage adjustment. Primary endpoint was difference in changes of DBP from baseline at 12 weeks.

Results: After 12 weeks' treatment, DBP and systolic blood pressure (SBP) were decreased significantly in all 3 groups. The decrease of DBP at 12 weeks was larger, but not statistically significant, in Fimasartan 60 mg compared with the Candesartan 8 mg group with the difference of 1.72 ± 8.32 mmHg (95% confidence interval, -0.71 ~ 4.15 mmHg, $p = 0.16$). Lower margin of the confidence interval, -0.71 mmHg, exceeded the pre-defined non-inferiority margin, -3.0 mmHg. DBP lowering effect of Fimasartan 120 mg was also non-significantly larger than the candesartan 8 mg group (difference, 1.58 ± 8.27 mmHg, $p = 0.20$). The decrease of SBP was also non-significantly larger in Fimasartan 60 mg compared with the candesartan 8 mg group (difference, 3.50 ± 12.63 mmHg, $p = 0.06$). However, SBP lowering effect of the Fimasartan 120 mg was statistically larger than the candesartan 8 mg (difference 4.98 ± 13.99 mmHg, $p = 0.02$). Responder rate (DBP < 90 mmHg or DBP lowering > 10 mmHg at 12 weeks) was also non-significantly greater in both Fimasartan groups (Fimasartan 60 mg, 81%; Fimasartan 120 mg, 72%; Candesartan 8 mg, 71%). Safety profile of the Fimasartan 60 mg and 120 mg was similar to candesartan 8 mg, with slightly higher, but statistically not significant, incidence of hepatic enzyme elevation in Fimasartan 120 mg.

Conclusions: Fimasartan, a newly available AT-1 receptor blocker, is an effective antihypertensive agent, comparable to candesartan, with good safety profile.

PP.07.29

PLACEBO-ASSOCIATED BLOOD PRESSURE RESPONSE IN HYPERTENSION

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Objective: In several clinical studies placebo is claimed to have blood pressure lowering effect, but placebo effect by itself is not so well investigated. It is not clear whether it differentiates between young and old population, neither systolic from diastolic blood pressure.

Design and method: 29 healthy volunteers underwent a double-blind crossover placebo controlled study with primary aim to study effects of casein hydrolysate on blood pressure. Duration of the study was 13 weeks with two 6-week intervention periods separated by 1-week wash-out period. Crossover study design allowed us to study individual placebo effect. Detailed clinical examination including office blood pressure measurement (OBPM), ambulatory blood pressure measurements (ABPM), assessment of pulse wave velocity (using applanation tonometry, SphygmoCor) and endothelial dysfunction (using BAUS method) was performed 3 times by one investigator. In this abstract we focus on the effect of placebo on blood pressure, pulse wave velocity and endothelial dysfunction.

Results: 22 subjects were eligible for the analyses, among them 15 (68%) men with mean age 46.4 ± 8.9 y, BMI 29.5 ± 4.5 kg/m², 2 (0.1%) of them were smokers. Office systolic (SBP) and diastolic (DBP) blood pressure averaged 144.2 ± 13.5 mmHg, 91.5 ± 7.2 mmHg respectively, with heart rate 75.4 ± 13.6 bpm.

Detected differences in office blood pressure in sitting position were for SBP -1.3 ± 2.5 mmHg ($p=0.611$), for DBP $+0.73 \pm 1.45$ mmHg ($p=0.621$); in standing position SBP -1.8 ± 3.9 mmHg (0.647) and DBP -1.14 ± 1.81 mmHg ($p=0.537$). In 24-h ABPM the detected changes were for SBP -0.19 ± 1.02 mmHg ($p=0.854$) and for DBP -0.38 ± 0.78 mmHg ($p=0.626$) and were consistent also for day-time and night time 24-h blood pressure. Pulse wave velocity (PWV) decreased for 0.06 ± 0.25 m/s ($p=0.825$) and we detected a statistical significant change in endothelial dysfunction of -0.03 ± 0.02 ($p=0.046$).

Conclusions: In our study mostly younger people were included, predominantly with isolated diastolic hypertension. We could not detect statistically significant placebo effect on blood pressure. We could speculate that placebo effect is less expressed in younger population, or diastolic pressure is less prone to placebo effects. Endothelial dysfunction proved to be statistically significant, but in our opinion this has no clinical relevance.

PP.07.30 PERINDOPRIL AND BETA-BLOCKER FOR THE PREVENTION OF CARDIAC EVENTS AND MORTALITY IN STABLE CAD PATIENTS: A EUROPA SUBANALYSIS

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Objective: Beta-blockers relieve angina/ischemia in stable coronary artery disease (CAD), and angiotensin-converting enzyme (ACE) inhibitors prevent CAD outcomes. In EUROPA, the ACE inhibitor perindopril (8 mg daily) reduced cardiovascular outcomes in low-risk stable CAD patients over 4.2 years. This post hoc analysis examined whether the addition of perindopril to beta-blocker in EUROPA had additional benefits on outcomes compared with standard therapy including beta-blocker.

Design and method: EUROPA was a multicenter, double-blind, placebo-controlled, randomized trial in patients with documented stable CAD. Randomized EUROPA patients who received beta-blocker at baseline were identified, and the effect on cardiovascular outcomes of adding perindopril or placebo was analyzed. Endpoints were the same as those in EUROPA.

Results: At baseline, 62% ($n=7534$ [3789 on perindopril and 3745 on placebo]) received beta-blocker. Treatment with perindopril/beta-blocker reduced the relative risk of the primary endpoint (cardiovascular death, nonfatal myocardial infarction, and resuscitated cardiac arrest) by 24% compared with placebo/beta-blocker (HR, 0.76; 95% CI, 0.64 to 0.91; $P=.002$). Addition of perindopril also reduced fatal or nonfatal myocardial infarction by 28% (HR, 0.72; 95% CI, 0.59 to 0.88; $P=.001$) and hospitalization for heart failure by 45% (HR, 0.55; 95% CI, 0.33 to 0.93; $P=.025$). Serious adverse drug reactions were rare in both groups, and cardiovascular death and hospitalizations occurred less often with perindopril/beta-blocker.

Conclusions: The addition of perindopril to beta-blocker in stable CAD patients was safe and resulted in reductions in cardiovascular outcomes and mortality compared with standard therapy including beta-blocker.

PP.07.31 COMPARISON OF A NEW FIRST-LINE SINGLE-PILL COMBINATION STRATEGY VERSUS A CLASSIC STEPPED-CARE STRATEGY IN HYPERTENSION USING 24-HOUR AMBULATORY BLOOD PRESSURE MONITORING

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Objective: To assess the efficacy and safety of a new first-line single-pill combination strategy versus a validated classic stepped-care strategy in mild-to-moderate hypertension, using ambulatory blood pressure monitoring (ABPM).

Design and method: In an international, double-blind, parallel-group, randomized controlled trial, a subset of patients receiving either perindopril/amlodipine (386 patients at 3 months, 408 patients at 6 months) or valsartan ± amlodipine (356 patients at 3 months, 384 patients at 6 months). The treatment steps were from perindopril/amlodipine 3.5/2.5 mg to 7/5 mg, 14/10 mg, and 14/10 mg plus indapamide 1.5 mg; or valsartan 80 mg to 160 mg, valsartan/amlodipine 160/5 mg, and valsartan/amlodipine 160/10 mg. At 30, 60, and 90 days, the treatments were uptitrated if office blood pressure $\geq 140/90$ mm Hg. The two groups were similar at baseline (55.6 years; 57% male; mean 24-hour SBP/DBP 141.2/87.7 mm Hg).

Results: At 3 months, mean 24-hour systolic BP/diastolic BP was $125.3 \pm 9.8/77.7 \pm 6.9$ and $128.6 \pm 10.5/80.0 \pm 7.8$ mm Hg, respectively, with greater reductions from baseline with the first-line single-pill perindopril/amlodipine combination strategy ($-3.0/-1.8$ mm Hg, $P<0.001$) confirmed over the daytime, nighttime, last 6 hours, and morning periods. At 6 months, mean 24-hour systolic BP/diastolic BP reduction was also significantly greater with the first-line single-pill strategy group ($-2.4/-1.4$ mm Hg, $P<0.001$). No difference in the safety profile of the two strategies was observed.

Conclusions: The new first-line single-pill perindopril/amlodipine combination strategy produces greater clinically relevant reductions in 24-hour systolic BP/diastolic BP than the valsartan ± amlodipine classic stepped-care strategy. ABPM is an important tool for assessing the quality of BP reduction over 24 h, and shows that the new first-line single-pill perindopril/amlodipine combination is adapted to initiate treatment in hypertensive patients.

PP.07.32 AN AMLODIPINE/VALSARTAN SINGLE-PILL COMBINATION IN THE TREATMENT OF TAIWANESE HYPERTENSIVE PATIENTS

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Objective: Hypertension control rate was only less than 30% in Taiwan on early 2000. Two-third of them are prescribed with two or more antihypertensive agents. Improvement of compliance of the medication is expected to raise the hypertension control rate. Amlodipine and valsartan are mostly prescribed blood pressure (BP) lowering agents in Taiwan. Thus we conducted an observational study to evaluate the effectiveness of amlodipine 5 mg/valsartan 80 mg (Aml/Val) combination in Taiwanese hypertensive patients.

Design and method: The patients with essential hypertension (diastolic BP (DBP) between 90mmHg and 110 mmHg and/or systolic BP (SBP) between 140 mmHg and 180 mmHg) whose BP is not adequately controlled with antihypertensive monotherapy were enrolled for the treatment of Aml/Val for 6 weeks.

Results: A significant mean reduction in SBP/DBP from baseline was achieved after 6 weeks of Aml/Val treatment ($-23.2/-12.2$ mmHg; $P<0.001$). Ninety-three percent of patients had their SBP or DBP controlled (less than 140 or 90 mmHg, respectively) at the end of study. For strict BP control (SBP less than 140mmHg and DBP less than 90 mmHg), the achievement rate was 75%. Average SBP and DBP reduction among diabetes patients were -20.3 ± 11.8 mmHg and -8.1 ± 7.8 mmHg, respectively. For those patients with prior antihypertensive treatment for at least 4 weeks, the reduction in SBP and DBP were 19.0mmHg and 11.6mmHg,

respectively. SBP/DBP was greatly reduced by 31.9/15.5 mmHg in those patients without regularly prior treatment. Among them, mean SBP reduction of 34.8 mmHg was presented in subjects who achieved BP goal. Single-pill combination of Aml/Val was well tolerated in the study patients. The adverse events (AEs) were reported in 13.9% of participants. The majority of AEs were reported as mild or moderate in severity.

Conclusions: This study showed that single-pill combination of Aml/Val resulted in clinically and statistically significant additional BP reduction in Taiwanese hypertensive patients inadequately controlled with antihypertensive monotherapy. The safety profile and patient's tolerability is also documented. Moreover, use of Aml/Val has been shown to significantly lower total health care costs compared with free Aml/Val combination therapy.

PP.07.33

COMPARISON OF THE EFFECTIVENESS OF TREATMENT BASED ON SEVERAL COMBINATIONS IN PATIENTS WITH MODERATE TO SEVERE ARTERIAL HYPERTENSION

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Objective: We decided to study the effectiveness of combinations that are included in the list of the most commonly prescribed in Ukraine.

Design and method: We included 58 patients with moderate to severe AH (mean systolic (oSBP)/diastolic (oDBP) BP 173.3 ± 1.7/98.4 ± 1.2 mmHg) - 31 in lisinopril 40 mg + hydrochlorothiazide 25 mg (Liz + HCTZ) and 27 in bisoprolol 10 mg + hydrochlorothiazide 25 mg (B + HCTZ). These measurements were performed at the beginning and during 6 month of follow-up: measuring of oSBP, oDBP and heart rate, ABPM according to a standard protocol with evaluation of 24-h SBP and 24-h DBP, noninvasive central SBP (cSBP) measurement and evaluation of carotid-femoral (cfPWV) and carotid-radial (crPWV) pulse wave velocity, biochemical blood tests with evaluation of creatinine levels. If after 1 month of treatment target BP (<140/90 mmHg) was not achieved, amlodipine 5 mg was added, after second month it was increased to 10 mg if necessary. If after the 3rd month BP remained high doxazosin 2–4 mg was added. We have mainly used not expensive drugs of domestic production.

Results: There was no statistically significant difference between groups neither in the main clinical characteristics nor in the therapies that were added. oSBP/oDBP significantly decreased in Liz + HCTZ and B + HCTZ groups (by 44.5 ± 1.9/19.0 ± 2.1 and 42.2 ± 1.1/16.5 ± 0.8 mmHg respectively). 24-h SBP reduction was a little more pronounced in B + HCTZ (24.1 ± 1.8/16.9 ± 1.2 mmHg) compared with Liz + HCTZ (19.4 ± 2.8/10.3 ± 1.9 mmHg, P = NS for difference). cSBP reduced significantly in both groups. In Liz + HCTZ it decreased better, than in B + HCTZ group (by 25.9 ± 2.9 mmHg vs 15.4 ± 2.9 mmHg, respectively; P < 0.05 for difference). In Liz + HCTZ group of SEVR increased by 22.8 ± 5.6% compared to the baseline (P < 0.05), while in B + HCTZ any dynamics of this index was not observed. cfPWV decreased by 1.2 ± 0.8 m/s in Liz + HCTZ, and by 0.1 ± 0.7 m/s in B + HCTZ (P = NS). Creatinine significant decreased in Liz + HCTZ (by 14.2 ± 5.7 mmol/l; P < 0.05), while in another group this change was less and not significant (5.2 ± 2.4 mmol/l).

Conclusions: Both combinations were almost equally effective in reducing brachial blood pressure, but Liz + HCTZ combination was more effective in reducing cSBP and creatinine.

PP.07.34

EFFECT OF CARDIOLOGICAL THERAPY ON PLASMA HOMEOSTASIS IN ELDERLY WITH ISOLATED AND COMORBID CARDIAC PATHOLOGY

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Objective: To reveal efficacy of two fixed combinations of pharmacological drugs in correction of plasma homeostasis alterations in elderly with isolated and combined cardiac pathology

Design and method: 120 patients were examined according to clinical recommendations. Average age was 68.5 ± 4.9 years, among them males - 56 (66.3 ± 8.1 years), females - 64 (69.8 ± 7.3 years). They were divided into three groups: group 1 (n = 40; patients with coronary artery disease (CAD) + primary arterial hypertension II stage (PAH II); group 2 (n = 40; CAD + PAH III); group 3 (n = 40; CAD). Antihypertensive combination I (AHC I): lisinopril + bisoprolol + aspirin was prescribed to the 60 patients (divided into 20 in each of three abovementioned groups). AHC II: lisinopril + bisoprolol + indapamide + aspirin was given to the other 60 patients. Laser correlation spectroscopy was special research method. Blood sampling was carried out prior and on the 12th day of therapy.

Results: When using AHC I hydrolytic type was distributed in 3 investigated groups in such a way: group 2 > group 1 > group 3 (75% > 40% > 30%). Its contribution decreased in comparison with that one before treatment and looked like

that: group 3 (-40%) > group 1 (-25%) > group 2 (+10%). The distribution of anabolic type: group 1 > group 2 > group 3 (30% > 20% > 15%). Growth of anabolic reactions was presented in group 1, 3 (+15%) and was upsent in group 2. AHC II lead to such distribution of hydrolytic alterations: group 3 > group 1 > group 2 (60% > 45% > 40%). They decreased in comparison with initial data in such a way: group 3 (-20%) > group 2 (-15%) > group 1 (+10%). Anabolic type was distributed like that: group 2 > group 1 > group 3 (40% > 30% > 25%). Growth of anabolic reactions was revealed in all 3 groups and was the highest in the group 2 (+35%), and equal in group 1 and 3 (+25%).

Conclusions: AHC I was the most effective in correction of catabolic and anabolic alterations in group 3 and not effective in group 2. AHC II was effective in groups 2, 3 for catabolic violations normalization and in all the groups for anabolic ones. AHC I is more effective for correction of catabolic dysregulations and AHC II for anabolic ones. Efficacy of treatment in plasma homeostasis normalization is higher in patients with isolated CAD then in those one with CAD combined with PAH.

PP.07.35

EFFECTS OF LISINAPRIL/AMLODIPINE SINGLE PILL COMBINATION ON AMBULATORY BRACHIAL AND CENTRAL BLOOD PRESSURE IN HYPERTENSIVE SUBJECTS WITH NON-ALCOHOLIC FATTY LIVER DISEASE

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Objective: Combination of an ACE-inhibitor and a calcium channel blockers has a favorable metabolic profile and effectively reduces arterial stiffness. The aim of the study was to evaluate effects lisinopril/amlodipine fixed combination (LA) on ambulatory brachial and central BP in hypertensive subjects with non-alcoholic fatty liver disease (NAFLD).

Design and method: The study included 30 untreated non-diabetic hypertensive patients with NAFLD (diagnosed according to ASSLD Practice Guidelines, 2012) and metabolic syndrome (47% men, 51.3 ± 4.2 years, 50% of smokers, BMI 31.3 ± 2.2 kg/m², clinical BP 163.4 ± 12.5/102.6 ± 9.7 mmHg). The treatment was initiated with lisinopril 10 mg/amlodipine 5 mg with doubling of dose after 4 weeks to achieve target office BP < 140/90 mmHg. The effects on 24-h, day- and nighttime brachial and central BP were evaluated with compared oscillometric BPLab VASOTENS system (OOO Petr Telegin, Nizhny Novgorod, Russia). Treatment duration was 12 weeks. The changes were significant if p < 0.05.

Results: The dose of LA was increased in 60%. All patients achieved target BP. After 12 weeks clinic BP was 134.5 ± 8.4/85.6 ± 7.6, 24-h brachial BP was reduced from 143.5 ± 6.2/89.2 ± 5.4 to 132.3 ± 5.8/80.8 ± 4.6, daytime from 144.4 ± 7.0/92.1 ± 5.3 to 134.5 ± 6.6/83.7 ± 6.1, nighttime from 132.3 ± 6.6/79.1 ± 5.9 to 117.6 ± 5.2/69.4 ± 5.0 mmHg (for all p < 0.05). 24-h central SBP decreased from 132.7 ± 7.9 to 120.2 ± 5.3, PP from 44.8 ± 5.2 to 34.6 ± 4.5, daytime, respectively, from 134.2 ± 7.7 to 121.3 ± 7.2, and from 43.1 ± 5.3 to 35.2 ± 5.4, nighttime, respectively, from 121.4 ± 5.3 to 105.4 ± 5.6*, from 45.2 ± 4.1 to 36.1 ± 5.2 mmHg (for all p < 0.05). Difference between brachial and central SBP and PP increased in all time intervals: at baseline it was, respectively, 12.3 ± 2.2 and 12.1 ± 2.0 mmHg at daytime, 10.2 ± 1.2 and 10.1 ± 1.8 mmHg - at nighttime, after 3 months, respectively, 13.2 ± 2.0 and 14.0 ± 2.2 (p < 0.05 vs baseline for both) at daytime, and 12.8 ± 2.1 and 14.7 ± 2.3 at nighttime (p < 0.05 vs baseline for both). AIx@HR75 daytime decreased from 18.7 ± 12.7 to 14.3 ± 11.2, nighttime from 26.2 ± 14.2 to 20.1 ± 11.7%.

Conclusions: The LA fixed combination effectively decreases brachial and central ambulatory BP as well as AIx@HR75. The significant decrease in nighttime brachial and central BP may be clinically beneficial in this particular group of hypertensive subjects.

PP.07.36

TARGET BLOOD PRESSURE LEVELS AT DIFFERENT DOSE COMBINATION LERCANEDIPINE WITH DILTIAZEM IN PATIENTS WITH MILD TO MODERATE ARTERIAL HYPERTENSION

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Objective: The aim was evaluate the target blood pressure at different dose combination lercanidipine with diltiazem in patients with mild to moderate arterial hypertension.

Design and method: 67 patients were included (37-men, 30-women). Systolic (SBP) and diastolic (DBP) blood pressure, heart rate, ambulatory blood pressure monitoring (ABMP) and central blood pressure (cBP), pulse wave velocity (PWV), augmentation index (Aix) baseline and 1 month of treatment were evaluated. It was 4 combination: lercanidipine/diltiazem - 20/240 mg (n = 16), 10/240 mg (n = 15), 10/120 mg (n = 19), 20/120 mg (n = 17) mg daily dose. Mean age of patients was 50.31 ± 0.75 yr., BMI - 29.72 ± 0.35 m², initial SBP - 151.21 ± 1.23 mmHg, DBP - 92.78 ± 0.78 mmHg., heart rate - 68.34 ± 1.22 b.m.

Results: In combination lercanidipine 20 mg with diltiazem 240 mg target office blood pressure was 56,25%, target blood pressure at ABPM was 62,50% patients. In combination lercanidipine 10 mg with diltiazem 240 mg target office blood pressure was 66,67%, target blood pressure at ABPM was 73,34% patients. In combination lercanidipine 10 mg with diltiazem 120 mg target office blood pressure was 52,63%, target blood pressure at ABPM was 78,95% patients. In combination lercanidipine 20 mg with diltiazem 120 mg target office blood pressure was 82,35%, target blood pressure at ABPM was 52,94% patients. We did not note any negative changes in biochemical and clinical laboratory data.

Conclusions: the highest percentage achieving target blood pressure on office was the combination lercanidipine 20 mg with diltiazem 120 mg therapy – 82,35% but the highest percentage achieving target blood pressure at ABPM was in combination lercanidipine 10 mg with diltiazem 120 mg therapy – 78,95%.

PP.07.37 INITIAL COMBINATION ANTIHYPERTENSIVE THERAPY IN BULGARIA. A NATIONAL, PROSPECTIVE, OBSERVATIONAL STUDY (BP-INITIAL THERAPY-BG STUDY)

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Objective: Results of the real-world studies suggest early vs delayed combination treatment (CT) is advantageous in decreasing the risk of cardiovascular events. The aim of study was to examine the type of initial combination antihypertensive therapy(AHT) - fixed dose (FDC)/free combinations (FC) and individual drug modalities in Bulgaria.

Design and method: Prospective, observational, noninterventional design. Data were obtained from 770 geographically diverse primary care sites (77% GPs, 23% cardiologists). All patients didn't receive any antihypertensive drugs at least 3 months before inclusion in the observation.

Results: 5878 hypertensives were included (53% females) - mean age 57.2 ± 12.1yrs, BP= 146.4 ± 9.7/90 ± 9.6 mmHg. 2060 (35%) patients had high/very high risk (SCORE) and 3818 (65%) were at low/moderate risk. Monotherapy was started in 1550(26.4%) and CT was initiated in 4328 (73.6%) patients. Two AH classes (FDC or FC) were initiated in 38% (n=2237), 3 classes in 25% (n=1446) and >3 classes in 11%(n=645) of patients. 1003 (17.1%) patients were on FDC alone, and 3325 (56.6%) on FC. The most frequent 2 drugs combinations (n=2237) were ARB + D (28%), ACEI + D (15%), ACEi + BB (14%), ACEI + CCB (10%), ARB + BB (10%), and triple combinations – ARB + D + CCB (39%), ACEi + D + CCB (14%), ACEI + D + BB (13%). The most frequent FDC were ARB + D (54%), ACEI + D (21%), ACEI + CCB (12%), BB + D (6%), ARB + CCB (6%). As initial therapy diuretics (D) were used in 99 %, beta-blockers (BB) in 68%, ARB in 50%, ACEi in 46% and calcium channel blockers (CCB) in 45% of 3325 patients on FC. In 1972 patients on FC without participation of any FDC, BB (61% nonvasodilated) were used in 68%, ACEi in 50%, D (80% thiazides) in 46%, CCB (80% dihydropiridines) in 38% and ARB in 34% of patients, and the most frequently used combinations were ACEI + BB (36%), BB + D (32%), BB + CCB (31%), ACEI + D (26%), ARB + BB (24%), ACEI + CCB (19%), CCB + D (18%), ARB + D (17%), ARB + CCB (15%).

Conclusions: The FC of 2 AH classes (ARB + D) were the preferred initial treatment in Bulgaria. The most frequently used of FDC were ARB + BB, but FDC were underused as initial CT. BB were participated in initial FC unjustified frequently. Too many less effective instead preferred combinations were used as FC.

PP.07.38 EVALUATION OF INFLUENCE OF FIXED DOSE COMBINATION PERINDOPRIL/AMLODIPIN ON TARGET ORGAN DAMAGE IN PATIENTS WITH ARTERIAL HYPERTENSION

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Objective: To evaluate the antihypertensive effectiveness and changes of target organ damage in patients with arterial hypertension (AH) on fixed dose combination (FDC) (perindopril(P)|amlodipin(A)) treatment.

Patterns	Baseline	12 months	Patterns	Baseline	12 months
Aorta PWV, m/s	11.9±0.7	9.4±0.8 ^Δ	E/A	0.93±0.06	1.3±0.08 ^Δ
ABI	1.00±0.05	1.1±0.08	E/E'	9.9±0.2	7.6±0.5 ^Δ
Albuminuria, mg/24-h	53.3±5.6	15.8±3.2 ^Δ	Cornel index, mm x ms	2440.1±67.9	1987.2±66.8 ^Δ
DMT, mm	1.1±0.03	1.0±0.04	Aix75, %	26.8±1.9	11.2±1.7 ^Δ
LVMi, g/m2	108.8±5.5	88.3±5.3 ^Δ	Left atrium, mm	41.1±0.2	38.1±0.3 ^Δ

Design and method: There were included 30 patients (age > 30 yrs, untreated hypertensives with BP > 160/100 and < 200/120 mmHg or who were on monotherapy (except P), but their office BP was > 140/90 and < 200/120 mmHg), whom were evaluated office systolic (SBP) and diastolic (DBP) blood pressure (BP), 24-h SBP and 24-h DBP, central SBP (cSBP) and aorta pulse wave velocity (PWV) by Sphygmocor, EchoCG with Tissue Doppler, albuminuria, intima-media thickness (IMT), ankle-brachial index (ABI), biochemical blood analysis. Follow-up period was 12 months. After wash-out period P/A administered in dose 5/5 mg with up-titration to 10/10 mg every 2 weeks. Indapamid was added as the third drug. Beta-blockers or alpha-blockers were allowed for better BP control. Primary end-points were BP lowering (office, systolic, central), significant (>SD) dynamic of target organ damage signs, tolerance of FDC.

Results: Baseline FDC were administered to 34 pts, but 4 were excluded due to intolerance (n=1) or their personal reasons. Office SBP/DBP decreased from 156.4 ± 3.8/96.3 ± 2.2 till 135.3 ± 1.3/76.2 ± 1.1 mmHg (p < 0.001/0.001), 24-hSBP/DBP from 140.2 ± 1.9/86.6 ± 2.2 till 117.8 ± 1.4/74.2 ± 1.1 mmHg (p < 0.001/0.001), cSBP from 142.8 ± 2.5 till 118.3 ± 2.7 mmHg (p < 0.001). Target BP was achieved in all patients. Effective BP control followed by positive target organ changes (tab: p < 0.05). The changes of E/E', E/A and albuminuria did not correlate with office BP lowering, but with aorta PWV and Aix75 decreasing. We did not note any significant changes of biochemical patterns.

Conclusions: The treatment based on FDC (P/A) was effective not only in decreasing of office and ambulatory BP, but central SBP too. It led to decreasing of target organ damage. Diastolic left ventricular function and renal damage improving were connected with much decreasing arterial stiffness and aorta augmentation.

PP.07.39 THE ARTERIAL STIFFNESS AND ENDOTHELIAL FUNCTION DYNAMICS UNDER THE EFFECT OF SPIRONOLACTONE ADDED TO A STANDARD ANTIHYPERTENSIVE THERAPY

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Objective: We studied the influence of spironolactone added to a standard therapy on peripheral and central BP, pulse wave velocity (PWV) and endothelial dependent vasodilatation (EDVD) in patients with uncontrolled hypertension.

Design and method: 42 patients (20 men and 22 women aged 53.49.8) with uncontrolled hypertension were randomized into two groups. Group 1 included 27 patients who received a fixed combination of 10 mg/day lisinopril and 5 mg/day amlodipine. Group 2 consisted of 15 patients who followed the same regimen of therapy with addition of 25 mg/day spironolactone. The office and central (aortic) BP, augmentation index (Aix), carotid-femoral and carotid-radial PWV as well as EDVD by cuff occlusion test were evaluated before and after a 24-week follow-up period.

Results: The office BP decreased in both groups from 169.623.7/104.113.3 to 135.39.5/87.39.0 mmHg (p < 0.001) in the 1st group and from 177.416.9/105.112.2 to 129.917.6/82.110.7 mmHg (p < 0.001) in the 2nd one. The degree of BP reduction was more pronounced in the 2nd group (-34.3/16.7 vs -47.4/23.1 mmHg, p=0.05 for systolic and p=0.03 for diastolic BP reduction). Central BP also decreased in both groups from 151.221.4/99.312.8 to 117.69.6/82.18.6 mmHg (p < 0.001) in the 1st group and from 156.719.7/99.411.3 to 118.612.0/81.58.4 mmHg (p < 0.001) in the 2nd one. The extent of central BP decline did not differ. Aix decreased from 30.913.6 to 26.115.3% (p=0.05) in the 1st group and from 30.116.7% to 18.620.9% in the 2nd group (p < 0.01) with more prominent Aix decrease in the latter (-4.7% and -11.6% respectively, p=0.04). Mean carotid-femoral PWV decreased statistically in the 1st group from 9.01.9 to 8.11.28 m/s and from 10.12.3 to 8.61.7 m/s in the second (p < 0.02). The carotid-radial PWV did not change in both groups. The level of EDVD equally increased under the two treatment regimens from -0.324.4% to +3.84.9% (p < 0.05) and from -1.15.1% to 4.95.4% (p < 0.05).

Conclusions: Addition of mineralocorticoid receptors antagonist spironolactone to a fixed lisinopril/amlodipine combination in treatment of patients with uncontrolled hypertension resulted in further decline of office BP and augmentation index, but was beneficial neither for decrease of central BP and carotid-femoral pulse wave velocity nor endothelial dependent vasodilatation increase.

POSTERS' SESSION

POSTERS' SESSION PS08

HEART AND HAEMODYNAMICS

PP.08.01 AORTIC STENOSIS INFLUENCES THE RELATIONSHIP BETWEEN HYPERTENSION AND CHRONIC RENAL FAILURE

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Objective: It is well recognized that hypertension is a major risk factor for chronic renal disease (CKD). However, whether hypertension maintains its pathogenetic role in the development of CKD in elderly patients with aortic stenosis remains circumstantial. The aim of this study was to evaluate the impact of hypertension in the development of CKD in presence of aortic stenosis.

Design and method: This is a prospective study on patients older than 65 years, hospitalized in the Department of Internal Medicine in 2013. Pre-specified exclusion criteria were: acute renal failure, pulmonary embolism, recent stroke and previous procedures for aortic valvular disease. Laboratory and clinical parameters were recorded. All patients underwent a transthoracic 2D-echocardiography. Renal function was assessed using CKD-EPI formula and classified according the National Kidney Foundation criteria. Statistical analysis was performed by SPSS software (version 13.0).

Results: A total of 346 patients were included in the study (age 79.5 ± 7.4 yrs): 104/346 were diabetics, 298 had mild to moderate hypertension; 59/346 showed aortic stenosis (moderate: 52; severe: 7, respectively). In absence of aortic stenosis ($n=287$), eGFR resulted <60 ml/min in 250 patients and hypertension was significantly associated with a eGFR <60 ml/min (hypertensives: 123/250, 49%; normotensives: 13/37, 35%, $P<0.05$). In patients with aortic stenosis ($n=59$) eGFR resulted <60 ml/min in 40 patients. In these patients the association with eGFR <60 ml/min resulted similar in hypertensives (33/48, 69%) and normotensives (7/11, 64%, NS).

Conclusions: Our results show that in elderly patients aortic stenosis influences the association between hypertension and CKD.

PP.08.02 HEMODYNAMIC PROFILE OF HYPERTENSIVE PATIENTS WITH LABILE BLOOD PRESSURE

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Objective: The aim of study was to investigate clinical characteristics of hypertensive patients with labile blood pressure (BP) in comparison with patients having stable elevation of BP.

Design and method: 92 patients with arterial hypertension (AH) were enrolled in the study. There were 55 females and 37 males. Mean age of the examined patients was 51.2 ± 9.1 years. The fasting plasma concentration of lipids was determined by immunoassay. Cardiac remodeling and peculiarities of hemodynamics were assessed by echocardiography and 24-hours BP monitoring (withdrawal of antihypertensive medications was made at the day of investigation). The detection of hypotensive episodes during 24-hours BP monitoring were used as criterion of labile arterial hypertension (LAH). Data are presented as mean \pm standard deviation.

Results: There were 26 patients with LAH and 66 patients with stable arterial hypertension (SAH). The daily systolic blood pressure (SBP), daily diastolic blood pressure (DBP) were lower in patients with LAH than with SAH (125.9 ± 12.5 vs. 137.2 ± 14.2 mm Hg, $p<0.001$; 77.8 ± 8.3 vs. 86.3 ± 8.6 mm Hg; $p<0.001$). Daily

variability of SBP and DBP in contrast was higher in patients with LAH than with SAH (17.1 ± 3.9 vs. 14.4 ± 3.2 , $p<0.001$; 12.9 ± 2.7 vs. 11.1 ± 1.8 , $p<0.001$). Daily variability of heart rate was also higher in patients with LAH (13.0 ± 3.6 vs. 10.9 ± 3.0 , $p=0.005$). Myocardial mass index by Penn Convention formula was less in patients with LAH than with SAH (124.0 ± 19.9 vs. 140.3 ± 30.8 g/m², $p=0.014$). The plasma level of triglycerides was higher in patients with LAH than with SAH (2.56 ± 1.74 vs. 1.76 ± 1.01 mmol/l, $p=0.007$).

Conclusions: Labile arterial hypertension is associated with mild elevation of blood pressure, mild increase of myocardial mass, high variability of blood pressure and heart rate. Hypertriglyceridemia found in patients with labile blood pressure may indicate early metabolic abnormality, which are common in arterial hypertension.

PP.08.03 EMERGENCY CHRONIC HEART FAILURE

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Objective: The aim of the present study is to evaluate the clinical utility of pro-B-type natriuretic peptides (proBNP) in patients admitted with acute heart failure.

Design and method: We conducted a analysis of levels liver enzymes (Alanine aminotransferase [ALT] and Aspartate aminotransferase [AST]), and we used highly sensitive cardiac troponin T (TnT) and n-terminal pro-Brain natriuretic peptide (NT-proBNP) as biomarkers of myocardial damage and function.

Results: Pro-B-type natriuretic peptides demonstrated a high degree of correlation with NT-proBNP ($R=0.802$, $p<0.001$) at admission. Further characterization of proBNP demonstrated little variation with changes in age, body mass index and creatinine. All 3 plasma natriuretic peptides were significantly elevated at admission in patients suffering a cardiac death or all-cause mortality ($p<0.05$). Receiver-operating characteristic curves demonstrated that admission and discharge NT-proBNP had superior prognostic power for all-cause mortality when compared with proBNP and TnT. In this population-based study (mean age 44 years), higher levels of ALT, AST and LDH, even within the normal range, were significantly and independently associated with detectable and elevated concentrations of TnT. Furthermore, there was evidence for inverse associations of ALT and AST with NT-proBNP. The TnT and NT-proBNP showed subtle differences in their relation to clinical characteristics and prognostic performance in a large population of patients with chronic and stable chronic heart failure.

Conclusions: Our results suggest that elevated liver enzymes may be associated with subclinical myocardial injury, they were the most powerful independent markers of outcome in chronic heart failure.

PP.08.04 SISTOLIC BLOOD PRESSURE AND THE EJECTION FRACTION: KEY ELEMENTS OF PREDICTION OF THE DEATH RISK IN PATIENTS WITH ACUTE CARDIAC FAILURE

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Objective: Systolic blood pressure (SBP) and ejection fraction measured at hospital admission are important in predicting the risk of death during hospitalisation, and after discharge in patients with acute heart failure.

Design and method: We conducted a prospective study on a sample of 101 patients hospitalized from January 2005 to April 2008, with the diagnosis of heart failure; they were followed up until 30.06.2010.

The studied variables were: demographic data, data about heart failure etiology, comorbidity, smoker status, clinical factors (SBP, pulse rate, NYHA class at admission, systemic or pulmonary congestion, atrial fibrillation, BMI), echocardiographic data, electrocardiograms, laboratory and therapeutic factors.

Results: The probability of survival over $t=$ five years for a person with heart failure, selected by chance from the studied population, is $S(t=5 \text{ years})=0.4231$. It should be noted that 49.8% of patients survive more than 44 months. Note that 50,32% of the men with heart failure survive more than 42 months and 50% of the female patients survive more than 48 months.

It is also confirmed for patients with acute heart failure included in the study that even a slight increase in ejection fraction can improve the prognosis. The intensity of the risk falls with 4.6% with every increasing unit of the ejection fraction.

SBP measured at admission is a key element in predicting the risk of death during hospitalization and after discharge, in patients with preserved left ventricular function and those with systolic dysfunction. The intensity of the risk decreases with 2.03% for every increasing unit (1 mmHg) of SBP.

Conclusions: Systolic blood pressure and the ejection fraction determined at hospital admission are strong predicting markers on short-term mortality, medium or long-term in patients with acute heart failure.

2. The prognostic value of these parameters is maintained 5 years after hospital discharge, mortality being directly proportional with the decrease of systolic blood pressure or of the ejection fraction, regardless of the therapy followed.

PP.08.05 CLINICAL AND HEMODYNAMIC PROFILE OF PATIENTS WITH IDIOPATHIC ARTERIAL PULMONARY HYPERTENSION DEPENDING ON PULMONARY ARTERY VASODILATOR REACTIVITY

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Objective: To compare the clinical and hemodynamic status of idiopathic arterial pulmonary hypertension (IPAH) patients with positive and negative results of acute vasodilator testing with nitric oxide (iNO).

Design and method: In the study we included 131 pts with IPAH (mean age 32.4 ± 3.2 years). All pts were underwent clinical examination, Echo, 6-min walking test, routine lab tests, acute testing (AT) with iNO 20 ppm at RHC with the guidelines criteria of positive AT. According to acute vasodilator testing the pts were divided into two groups depending on iNO response ($n=51$) or nonresponse ($n=80$).

Results: % of iNO responders among IPAH group was 31%. The IPAH responder group (AT+) was characterized by highest % of pts with functional class (FC) II (71.4%) with the lowest proportion of patients with FC III (17.9%). In 6MWT IPAH responders had significantly greater distance: 433.94 ± 77.89 as compared to AT- group (320.04 ± 108.19 m), which was accompanied by a less severe dyspnea index (2.59 ± 1.46 vs. 4.25 ± 1.86). AT- group was characterized by significantly greater systolic pressure pulmonary (SPAP) increase, more pronounced dilatation and hypertrophy of RV, the smaller size of LV. At right heart catheterization we found significant differences of almost all measured and calculated parameters between the groups with AT- and AT+: SPAP- 101.41 ± 24.88 vs 80.14 ± 15.53 mmHg ($p < 0.000001$), PAPm- 66.2 ± 17.99 vs 51.22 ± 9.05 mmHg ($p = 0.0000008$), SV- 3.11 ± 0.86 vs 4.13 ± 1.05 l/min ($p < 0.0000005$), PVR- 1439.94 ± 667.16 vs 935.51 ± 479.55 dxnscm⁵ ($p = 0.000008$).

Conclusions: At the time of initial diagnosis of IPAH the pts with preserved pulmonary artery vasodilator reactivity to iNO were characterized by favorable functional/hemodynamic profile and less pronounced heart remodeling.

PP.08.06 FIRST DATE OF RUSSIAN NATIONAL REGISTRY OF PULMONARY ARTERIAL HYPERTENSION

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Objective: To assess demographic characteristics of patients with pulmonary arterial hypertension (PAH) in the National multicenter, open prospective Registry.

Design and method: 14 reference centers of Russia participated in the study from 01.01.2012 to 25.12.2014. The Register included patients aged >18 years having PAH. Online Version of the Registry is submitted on the site www.pulhyp.medibase.ru

Results: In total in Registry included 296 patients (235 women / 61 men) from 44 regions of the Russian Federation; mean age at the time of including in the Register was 42.4 ± 15.4 of year, age at the time of an onset was 31.3 ± 18.8 years. Among 42.2% - Idiopathic PAH, 30.4% - PAH associated with Congenital Heart Disease (Eisenmenger syndrome), 23.6% - PAH associated with Connective Tissue Diseases, 0.7% - inherited PAH, 0.3% PAH associated with HIV, 1.7% PAH associated with a portal hypertension, 0.7% drugs and toxin induced PAH and 0.3% had pulmonary veno-occlusive disease. The mean distance in 6MWT was 380.4 ± 117.9 meters with Borg index 3 (3–4). 10.2% had WHO-FC I, 38.5% of WHO-FC II, 39.4% of WHO-FC III, 11.9% of WHO-FC IV.

Conclusions: The Russian National Registry revealed that among PAH pts the majority have IPAH. In comparison with other European Registries Russian patients have confirmed diagnosis at the early stages of the disease that might influence the prognosis.

PP.08.07 EFFECT OF GENDER ON TREATMENT AND OUTCOMES CHRONIC HEART FAILURE IN AZERBAIJAN

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Objective: The study assessed gender differences in therapy, procedure use, and outcomes in patients with chronic heart failure (CHF)

Design and method: There were investigated 150 men and 160 women.

Results: Women who had CHF were older (79 ± 10 vs 74 ± 11 years, $p < 0.001$), had more hypertension (42% vs 30%, $p < 0.001$) and hyperlipidemia (19% vs 15%, $p < 0.001$) but less frequent myocardial infarction (20% vs 27%, $p < 0.001$). Women were less likely to see a cardiologist (29% vs 35%, $p < 0.001$) and required a longer hospital stay (11.5 ± 14.9 vs 11.4 ± 12.6 days, $p < 0.001$). During the first year after a first CHF hospitalization, women were less likely to have an assessment of left ventricular function (62% vs 66%, $p < 0.001$), diagnostic cardiac catheterization (11% vs 16%, $p < 0.001$), and revascularization procedure (3% vs 6%, $p < 0.001$). Women were less likely to be prescribed an angiotensin-converting enzyme inhibitor (60% vs 67%) and more likely to be prescribed a beta-blocker (37% vs 31%). Women and men had similar yearly numbers of rehospitalizations for CHF (1.5 ± 1.1 vs 1.3 ± 1.0) and emergency room visits (1.8 ± 1.1 vs 1.7 ± 1.4). The adjusted risk of death was minimally higher in men than in women (hazard ratio 1.07, 95% confidence interval 1.03 to 1.1, $p < 0.01$).

Conclusions: Thus, despite less frequent cardiologist assessment, fewer cardiac-related procedures, and less frequent use of standard medical therapy, clinical outcomes in women and men who had CHF were similar.

PP.08.08 HEMODYNAMIC AND METABOLIC FACTORS IN THE PREDICTION OF DIASTOLIC DYSFUNCTION

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Objective: To explore possible hemodynamic and metabolic determinants of diastolic dysfunction in a random population sample.

Design and method: We examined associations between hemodynamic factors (systolic blood pressure (SBP), heart rate (HR)), metabolic factors (fasting insulin, fasting plasma glucose, 2-hour glucose during oral glucose tolerance test (OGTT), oral disposition index (DI_o), and Homeostatic Model Assessment (HOMA) derived indices of beta-cell function (HOMA-2B), insulin sensitivity (HOMA-2S), and insulin resistance (HOMA-2IR)), other traditional cardiovascular risk factors, and later detection of grade 2 or 3 diastolic dysfunction (DD) in 243 men and 22 women aged 28 to 57 years at the time of inclusion, using binary logistic regression analysis. Study subjects came from a random population based sample and were included 1974–1992, whilst the echocardiography was performed 2002–2006.

Results: After a mean follow-up time of 27 years, grade 2 or 3 diastolic dysfunction was detected in 34% ($n=89$) of subjects. In univariate analyses (significance level 0.05), diastolic dysfunction was associated with age, sex, heart rate, systolic blood pressure, fasting insulin levels, 2-hour glucose levels, HOMA-2B, HOMA-2S, HOMA-2IR, and the time elapsed between inclusion and echocardiography. In multivariable analysis (significance level 0.20), sex (odds ratio (OR)=6.08 (95% confidence interval (CI), 1.26–29.25); $p=0.02$), heart rate (OR=1.02 (95% CI, 0.996–1.05); $p=0.1$), HOMA-2B (OR=1.01 (95% CI, 1.00–1.01); $p=0.051$), and time span (OR=1.84 (95% CI, 1.73–1.96); $p=0.01$), remained significantly associated with diastolic dysfunction, whereas age was forced into the model (OR=1.03 (95% CI, 0.96–1.11); $p=0.41$). We did not detect any significant interactions between HOMA-2B and other variables in the prediction of diastolic dysfunction.

Conclusions: In a binary logistic regression model adjusted for age, sex, and time, HOMA-2B was significantly associated with the development of grade 2 or 3 diastolic dysfunction. It is suggested that subjects with increased HOMA-2B values may be at greater cardiovascular risk.

PP.08.09 PULMONARY ARTERIAL HYPERTENSION IN INTERNAL MEDICINE DEPARTMENT: PROGNOSIS AND TREATMENT

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Objective: Despite progresses in the knowledge of pulmonary arterial hypertension (PAH) pathophysiology, it is still a devastating disease needing an aggressive

approach of therapy to improve long-term outcomes. The purpose of our study is to describe prognostic and therapeutic characteristics of PAH in internal medicine department

Design and method: A retrospective study over a period of 14 years (2000–2014) concerning patients admitted in internal Medicine department for PAH. Pulmonary arterial pressure (PAP) was estimated from the data of cardiac ultrasound Doppler. A PAH was retained in front of PAH superior to 30 mmHg.

Results: Forty-six patients were retained. Middle age of patients was of 60,6 years (24–48 years). Middle age of diagnosis of PAH was of 48,3 years. Main causes of PAH were connective tissue diseases (CTD) in 24 patients (52,1 %). PAH was secondary to thrombo-embolic disease at 9 patients (19,5%), to left heart disorders at 6 patients (13%). PAH was associated to hypoxemic respiratory affection in a case, to a hyperthyroidism in a case and to acute myeloid leukemia in another case. An idiopathic PAH was retained at 9%. All patients received symptomatic treatment (anticoagulants). Calcic inhibitors were prescribed in 25 patients (54%). Among them, twenty four patients had CTD. Specific treatment was prescribed using prostacycline at 2 patients and an antagonist of the receptors of the endotheline in 3 other patients with ScS. An etiological treatment using corticosteroids and cyclophosphamide boluses, was instaurated in 8 cases with SLE or SLE ScS overlap syndrome. In all patients receiving cyclophosphamide boluses or specific treatment (Benzylthiouracile, anticoagulants), we noted an improvement of PAP. A worsening was noted in 8 cases (17%), in a patient with hypoxemic respiratory disease, two with left heart disorders and five with ScS or ScS-SLE overlap syndrome. Average duration of follow-up was of 47 months. A single death was noted due to global cardiac insufficiency in a patient with ScS. Another death was noted in patient with acute myeloid leukemia.

Conclusions: The prognosis of PAH is better when using specific treatments. Immunosuppressive treatment could be useful in mild to moderate PAH associated to systemic lupus and mixed connective tissue disease.

PP.08.10 AN INVESTIGATION ON THE RELATIONSHIP BETWEEN LEFT VENTRICULAR MYOCARDIAL COLLAGEN AND SYSTOLIC DEFORMATION IN SPONTANEOUSLY HYPERTENSIVE RATS

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Objective: This study aimed to observed the relationships of myocardial collagen with myocardial deformation and left ventricular global function in SHR, to investigate the role of collagen accumulation in the development of cardiac dysfunction in hypertension.

Design and method: SHR were randomly divided into 9 groups and studied at different weeks (from 12 to 84wks, and WKY rats at the similar weeks of age as control. Conventional parameters and 2DSE measurements including LV longitudinal, radial and circumferential strain (SL, SR, SC) were acquired echocardiographically, and invasive LVEDP and $LV \pm dp/dt_{max}$ were detected within 24hrs after echo exam, and collagen volume fraction (CVF) in subendocardial and subepicardial myocardium were observed histologically.

Results: (1) RWT and LVMI increased with age in SHR, and reached the peak at 75–84 wks ($p < 0.05$), and the difference from WKY found after 75 wks ($p < 0.05$); (2) 2DSE driven SL, SC and SR in SHR increased progressively from 12 to 28 wks ($p < 0.05$), and SL declined at 45 wks ($p < 0.05$), while SC, SR decreased at 75wks ($p < 0.05$), all reached to the minimum at 84wks ($p < 0.05$), and the difference between SHR and WKY occurred after 66wks; (3) CVF in SHR increased with age, with the subendocardial exceeding the epicardial myocardium from 66wks, especially after 75 wks ($p < 0.05$), and higher than WKY after 66wks; (4) $LV \pm dp/dt_{max}$ increased from 12 to 28 wks and decreased from 36 to 82wks in SHR ($p < 0.05$), whereas LVEDP increased from 36 to 82wk, different from those in WKY. (5) Subendocardial CVF correlates negatively with SL ($r = -0.47$, $p = 0.002$) and SR, SC ($-0.37 \sim -0.41$, $p < 0.05$), LVEDP correlated with CVF ($r = 0.57$, $p < 0.01$).

Conclusions: Pathological myocardial fibrosis concerned with hypertension begins at 66 weeks of age in SHR, with interstitial collagen developing from inner to out layer of myocardium; and the development of fibrosis might contribute to the progression of damaged multi-dimensional systolic strain, where longitudinal strain involved firstly and LVEF declines when all directions of systolic strain reduced, which might provide a mechanical and pathological basis for the investigation of the development in hypertensive cardiac dysfunction.

PP.08.11 RIGHT VENTRICULAR DYSFUNCTION IS ACCOMPANIED BY HSP90 AND CAV-1 CHANGES IN MONOCROTALINE INDUCED PULMONARY HYPERTENSION

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Objective: Monocrotaline induced pulmonary arterial hypertension is well known experimental model in rats. Undergoing processes in failing right ventricle are still not completely known. Heat shock protein 90 (Hsp90) seems to play a role in compensating mechanism alongside with caveolin-1 (CAV-1) and its phosphorylated isoform (pTyr14CAV-1). Therefore we hypothesized that levels of these proteins might be changed in right ventricle in experimentally induced pulmonary hypertension.

Design and method: Group of 13 male Wistar rats was injected with monocrotaline (MON; 60 mg/kg) and 7 control rats (CON) received vehicle. Separate group of 20 (MON) and 10 (CON) rats was used for hemodynamic measurements. Animals were weighted frequently and vital functions were measured using MouseOx meter. Rats were sacrificed after 4 weeks or immediately if showing dyspnea, lethargy and significant weight loss.

Results: MON-treated rats exhibited decrease in body weight when compared to controls (MON: 294 ± 9 g vs. CON: 328 ± 6 , $P < 0.01$). There was a significant increase in the right ventricular systolic pressure (MON: 50.65 ± 6.28 vs. CON: 21.52 ± 2.49 , $P < 0.01$). Right ventricular weight was significantly increased (MON: 0.29 ± 0.02 vs. CON: 0.17 ± 0.01 , $P < 0.05$), whereas left ventricular weight was not significantly changed (MON: 0.69 ± 0.03 vs. CON: 0.70 ± 0.05). Expression of Hsp90 in the right ventricle of monocrotaline treated rats was significantly increased (MON: 234 ± 44 vs. CON: 100 ± 7 , $P < 0.05$), while in left ventricle remained stable (MON: 126 ± 14 vs. CON: 100 ± 3). Caveolin-1 expression in the right ventricle of MON group was decreased (MON: 66 ± 14 vs. CON: 100 ± 9), as well as in the left ventricle (67 ± 11 vs. CON: 100 ± 23). Expression of pTyr14CAV-1 was significantly decreased in the right ventricle (MON: 48 ± 13 vs. CON: 100 ± 14 , $P < 0.05$), while in the left ventricle was unchanged (80 ± 24 vs. CON: 100 ± 22).

Conclusions: Increased level of Hsp90 along with lowered expression of CAV-1 isomers might play an important role in hypertrophied and dysfunctional right ventricle in monocrotaline induced pulmonary hypertension model.

PP.08.12 ADIPOSITAS CORDIS SUDDEN DEATH: A POORLY DESCRIBED CLINICAL ENTITY

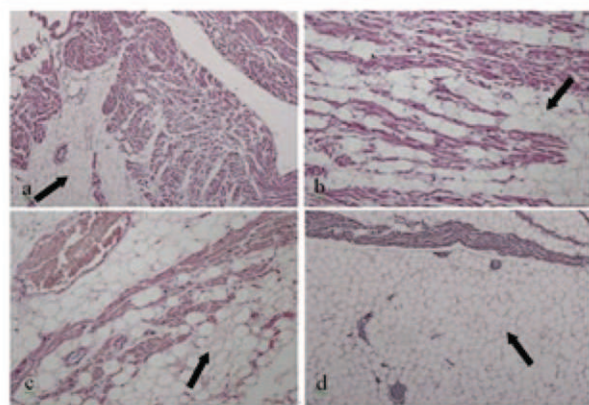
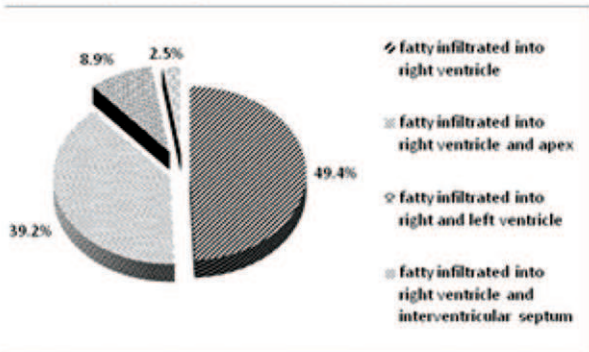
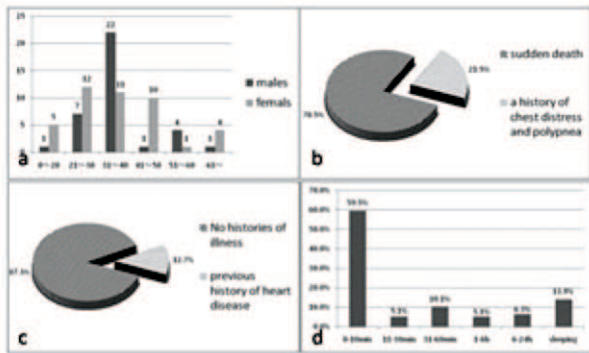
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Objective: The aim of this report is to describe the clinical and pathologic features for a sample of adipositas cordis sudden death.

Design and method: From 1975 to 2010, we conducted postmortem studies of 79 Chinese patients who died suddenly. Data were extracted from China National Knowledge Infrastructure and Wan Fang Database and searched for 31 reported post-mortem data of all the cases with adipositas cordis.

Results: The 79 cases included 36 males and 43 females ranging in age from 13 to 68 years (mean age: 36.6 ± 1.4 years). Sixty-five cases (82.3%) were between 20 and 50 years of age (Fig. 1a on the following page). This disorder was not diagnosed or suspected before the subjects died. Sudden death was the first symptom in 62 (78.5%) of the cases. Only 17 (21.5%) had a history of chest distress or dyspnea (Fig. 1b). More than 4/5 (87.3%) of the cases had no past medical history, and only 12.7% had a history of previous cardiac disease (Fig. 1c). Forty-seven (59.6%) of the patients died within 10 minutes and 42 (90%) did not have any preceding signs or symptoms (Fig. 1d). The average time to death after the first symptoms in 79 cases was 1.4 ± 0.6 hours. There was a significant regional difference in the prevalence of the disease, with 80% of cases occurring in patients living north of the Yangzi River and only 20% occurring in patients living south of the Yangzi River (Fig. 2). Heart weight was mild or moderately increased at autopsy. The most pronounced change seen was fatty infiltration involving the right ventricle (Fig. 3). A large amount of fatty or fibrofatty tissues were found underneath the epicardium, infiltrating toward the right ventricle wall and into all layers of the heart (Fig. 4).

Conclusions: Our findings indicate that, at least in China, the cause of adipositas cordis is still unknown, and more frequent than previous thoughts. It needs special attention as the vast majority of cases do not have any symptom before a sudden death.



PP.08.13 WAVE INTENSITY IN NEWLY DIAGNOSED NEVER TREATED HYPERTENSIVE PATIENTS

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Objective: Increased left ventricular (LV) contractility is described in hypertensive patients. We assessed the LV contractility using the traditional echocardiographic indexes and wave intensity (WI) parameters, that evaluate the working condition of

the heart interacting with the arterial system in newly diagnosed and never treated hypertensive subjects. WI has two peaks, the first (W1) reflects LV contractile performance, the second (W2) is related to the ability of the LV to actively stop aortic blood flow.

Design and method: Participants were 145 normotensives and 145 age- and sex-match hypertensives (mean age 50 ± 10 vs 51.9 ± 12 years). Anthropometric, office blood pressure (BP) measurements and echocardiography were performed. LV mass index, relative wall thickness, LV stress, LV ejection fraction (LVEF), midwall fractional shortening (MWFS), circumferential end systolic stress (cESS) and the E/A ratio and E/Em as a measure of diastolic function were calculated. WI analysis was performed at the level of the common carotid artery using a high definition echo-tracking system implemented in the echo-machine (Aloka).

Results: Hypertensive patients, after adjustment for weight and physical activity, had similar heart rate but significantly higher LVEF ($p = 0.016$), cEES ($p = 0.006$), LV stress ($p = 0.048$), one-point PWV ($p < 0.0001$) and WI (W1 $p = 0.001$; W2 $p = 0.001$) compared with normotensive subjects. The hypertensive group was then divided in tertiles according to LVEF: systolic, diastolic BP and heart rate were similar among the 3 groups but relative wall thickness was positively related with LVEF ($p = 0.05$) and negatively with LV internal diameter in diastole ($p = 0.003$). MWFS ($p = 0.01$), fractional shortening ($p = 0.007$) significantly increased according to LVEF while the opposite was observed for cESS ($p = 0.004$) and LV stress ($p = 0.003$). Among the WI parameters W1 was significantly higher in the group with higher LVEF ($p < 0.0001$).

Conclusions: In patients with new onset of hypertension LV structure was similar to normal subjects but they had higher LV performance represented by LVEF and higher WI. Moreover, hypertensive patients with higher LVEF had the tendency of concentric LV remodeling, lower LV stress and higher LV performance combined with higher W1 parameter that mainly represents the inotropic capacity of the LV.

PP.08.14 ASSESSMENT OF REMODELING, SYSTOLIC AND DIASTOLIC FUNCTION OF RIGHT VENTRICLE IN PATIENTS WITH IDIOPATHIC PULMONARY HYPERTENSION

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Objective: to assess data of echocardiography (ECHO) initially and their dynamics during acute pharmacological testing (aPhT) with nitric oxide (iNO) in patients with idiopathic pulmonary hypertension.

Design and method: 42 pts (39 woman and 4 men, II-IV FC) with a verified diagnosis of idiopathic pulmonary hypertension. All patients underwent an aPhT with iNO (20 ppm for 10 min) under the control of echocardiography, two hours before the right heart catheterization (RHC) with aPhT. All patients were divided into 2 groups according to the international standards of positive response to aPhT during RHC: 1st group - patients with (+)aPhT ($n = 20$); 2nd gr. - patients with (-)aPhT ($n = 22$). Analysis of echocardiography included: assessment of remodeling, systolic and diastolic function of the right ventricle before and after aPhT.

Results: The mPAP according to RHC decreased from the initial value $48,8 \pm 7,9$ mmHg to $30,5 \pm 7,9$ mmHg ($p < 0.05$) after iNO in the first group. There was no significant dynamics of mPAP (with $69,6 \pm 20,8$ mm Hg to $67,9 \pm 20,3$ mm Hg ($p > 0.05$) in the second group. Patients in 2nd group had more pronounced signs of remodeling in comparison to the 1st gr.: anteroposterior size of the right ventricle (RV) $4,0 \pm 0,8$ vs $3,2 \pm 0,7$ cm. ($p < 0.05$), basal size of RV $4,4 \pm 0,6$ vs $3,7 \pm 0,5$ cm. ($p < 0.05$), the area of the right atrium $25,3 \pm 6,7$ vs $16,8 \pm 3,0$ cm² ($p < 0.05$). Standard data of echocardiography did not change during the aPhT with iNO. Systolic and diastolic RV function was worse in 2nd group than in the first: S'tv(tricuspid valve) $4,3 \pm 1,3$ vs $5,9 \pm 1,3$ sm /sec ($p < 0.05$); E'tv $2,4 \pm 1,1$ vs $4,8 \pm 1,4$ sm /sec ($p < 0.05$). There were significant improvement of TVI data in the first group and no changes in the second group during iNO. Peak S' at the ring of TV of RV before/after test in the 1st gr.: $5,9/7,1$ sm/sec ($p < 0.05$). Peak E' at the ring of TV of RV before/after test: $4,8/6,5$ sm/sec ($p < 0.05$).

Conclusions: Dilatation of the right ventricle was more pronounced in the 2nd group with (-)aPhT in compared with first group. Global systolic and diastolic RV function improved according to the TVI data during test with iNO in patients with (+)aPhT.

PP.08.15 THE RELATIONSHIP BETWEEN LEFT VENTRICULAR DEFORMATION AND DIFFERENT GEOMETRIC PATTERNS ACCORDING IN HYPERTENSIVE POPULATION

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Objective: We sought to investigate left ventricular (LV) mechanics in hypertensive patients with different geometric patterns by using two-dimensional (2DE) strain analysis.

Design and method: This cross-sectional study included 187 hypertensive subjects. All subjects underwent complete 2DE examination. We applied the new Dallas classification of LV geometry that considers LV mass index, LV end-diastolic diameter and relative wall thickness. According to this classification all subjects were divided into the six different groups: normal LV geometry, concentric remodeling, eccentric non-dilated LVH, concentric LVH, eccentric LVH and dilated LVH.

Results: LV mass index gradually increased from hypertensive patients with normal LV geometry; across the subjects with LV concentric remodeling, eccentric non-dilated LVH, concentric LVH to the patients with dilated LVH. Two-dimensional multidirectional LV strain (longitudinal, circumferential and radial) decreased in the same direction, whereas LV twist increased from the subjects with normal LV geometry to the patients with dilated LVH. There is no statistically important difference in LV mechanics between the subjects with normal LV geometry and concentric remodeling, or between individuals with eccentric and concentric non-dilated LVH. However, all other groups differ from each other. Two-dimensional LV strain and twist were most deteriorated in hypertensive patients with concentric and eccentric LVH. All results are presented in the table.

	Normal geometry (n=84)	Concentric remodeling (n=27)	Eccentric non-dilated LVH (n=53)	Concentric LVH (n=17)	Dilated LVH (n=10)	p value for trend
LV mass index (g/m ²)	47.7 ± 4.8	43.2 ± 5	52.3 ± 6.5	56.8 ± 7.2	73.1 ± 13.2	<0.001
LV global longitudinal strain (%)	-20.8 ± 2.1	-20.1 ± 1.9	-18.8 ± 1.7	-17.9 ± 1.8	-14.4 ± 2	<0.001
LV global circumferential strain (%)	-21.5 ± 2.7	-20.8 ± 2.4	-18.3 ± 2	-17.4 ± 1.9	-14.9 ± 2.1	<0.001
LV global radial strain (%)	46.5 ± 13	46.3 ± 13.7	42.7 ± 14.2	40.3 ± 14.8	37.3 ± 14.4	<0.001
Twist (°)	16.9 ± 5.2	17.3 ± 5.5	19.3 ± 6.4	20.8 ± 6.2	22.4 ± 7.1	<0.001

Conclusions: LV deformation in hypertensive patients is significantly impacted by LV geometry. Concentric and eccentric LVH patterns have the greatest unfavorable effect on LV mechanics. The new classification of LV geometry provides valuable and comprehensive information about mechanics and structure in hypertensive population.

PP.08.16 LEFT ATRIAL REMODELING IN PATIENTS WITH ESSENTIAL HYPERTENSION

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Objective: Hypertension (HTN) has severe consequences to the heart, leading to morphological and functional remodeling of left atrium. We sought to assess left atrial (LA) mechanical function in a group of hypertensives, matching it with healthy controls.

Design and method: We prospectively enrolled 35 consecutive hypertensive patients (mild, moderate and severe HTN but pharmacological treated subjects). The secondary causes of hypertension, as well as significant valvular disease, thyroid dysfunctions, diabetes mellitus or any other important organ abnormality were excluded. LA diameters (antero-posterior, transverse and longitudinal) LA volumes were measured by echocardiography, using the modified biplane Simpson method: maximal LA (LAV max), preatrial contraction LA (LAV preA) and minimal LA volume (LAV min). LA emptying functions were calculated: LA total EF (LAV max-LAV min)/LAV max, LA passive EF = (LAV max-LAV preA)/LAV max and LA active EF (LAV preA-LAV min)/LAV preA. Peak longitudinal strain of LA walls were analysed using 2D speckle-tracking echocardiography. The results were compared with a group of 37 age-matched healthy controls.

Results: In the HTN group the mean time of arterial hypertension diagnosis was 33 months and the mean blood pressure (24 hour ambulatory blood pressure monitoring) was 139/74 mmHg. LA antero-posterior diameter and all the volumes (LAV max, LAV min and LAV preA) were significantly greater in hypertensives compared to controls (p < 0.0001), while the transversal and longitudinal diameters were similar. LA active EF was similar between the two groups, but we found significantly lower LA passive and total EF in hypertensives than in the control group (p < 0.0001). The peak strain values were also significantly lower in HTN group compared to control (22.7 versus 35.1, p < 0.0001).

Conclusions: In our study, arterial hypertension was associated with increased LA size (anteroposterior diameter and volumes), a decrease in LA passive EF and in LA total EF, with preserved atrial pump function. LA dysfunction was also demonstrated through low peak strain values.

PP.08.17 LEFT VENTRICLE SYSTOLIC LONGITUDINAL DYSFUNCTION AND DIASTOLIC DYSFUNCTION IN HYPERTENSIVE PATIENTS. TWO SIDES OF THE SAME COIN?

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Objective: Hypertension (HT) is a multifactorial disease with high incidence and prevalence, strongly associated with cardiovascular mortality and morbidity. The left ventricle (LV) is a major target organ of HT. To evaluate cardiac structural changes arising from HT, with particular emphasis on the relationship between the longitudinal systolic and diastolic dysfunction of the LV.

Design and method: We conducted a cross-sectional study, enrolling 30 hypertensive (HG) patients and a group of 30 normotensive and healthy subjects, matched for age and gender (control group- CG). Inclusion criteria for the HG was taking at least one antihypertensive drug and the absence of comorbidities. All patients underwent transthoracic echocardiography, complemented with Tissue Doppler analysis (TDI), by the same operator.

Results: The A wave and the septal and lateral E/E' ratios, were significantly higher (p < 0.005), and the E/A ratio significantly lower (p < 0.001), in the HG compared to the CG. The Vp had a significantly lower mean value in hypertensive patients (p = 0.001). The mean S-wave velocity was significantly lower, and the mean A'-wave velocity significantly higher, in the HG compared to the CG (p < 0.05 for both comparisons). A positive linear relationship between Sm and E'm was also depicted (p < 0.001).

Conclusions: The results indicate that the contraction and relaxation of the longitudinal fibers of the LV are interdependent processes, revealing subtle functional changes in hypertensive patients with preserved ejection fraction and with slight or no increase in ventricular mass.

PP.08.18 EFFECTS OF DOBUTAMINE AND GLYCERYL TRINITRATE THERAPY ON CORONARY BLOOD FLOW, THE CORONARY WAVE INTENSITY PROFILE AND CENTRAL AORTIC PRESSURE WAVEFORM

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Objective: Central aortic blood pressure (CBP) is proposed as a predictor of cardiovascular events. Central Augmentation Index (AIx) and pulse pressure are thought to relate to coronary blood flow (CBF) but the underlying mechanisms are poorly understood. Coronary wave intensity analysis (CWI) enables quantification of the forces acting on CBF with two principal waves accelerating CBF – the systolic forward travelling compression wave (W1) generated by rising aortic pressure in systole and the diastolic backward travelling suction wave (W2) attributed to microvascular recoil in diastole. We sought to clarify the effects of dobutamine and glyceryl trinitrate (GTN) on CBP waveform, CBF and CWI.

Design and method: We prospectively recruited 20 patients undergoing left heart catheterization. Simultaneous intracoronary pressure and CBF velocity waveforms were acquired with a dual-transducer tipped guidewire in the left anterior descending coronary artery at baseline and during administration of dobutamine (10 µg/kg/min) and following sublingual GTN (400mcg). CBP waveforms were simultaneously acquired in the ascending aorta. Cumulative intensities of W1 and W2 were determined. Pulse pressure, pressure augmentation and AIx were determined from the CBP waveform.

	Baseline Mean (SEM)	Post GTN Mean (SEM)	P-Value
Systolic Blood Pressure (mmHg)	135.7 (7.9)	118.6 (5.4)	0.01
Diastolic Blood Pressure (mmHg)	72.3 (3.1)	70.8 (2.4)	0.73
Heart Rate (bpm)	66.1 (3.5)	65.7 (3.0)	0.91
AIx (%)	26.2 (4.8)	16.3 (4.5)	0.01
Sub-Endocardial Viability Ratio	1.28 (0.1)	1.45 (0.1)	0.21
W1 cumulative intensity (10 ³ m ⁻² s ⁻²)	6.1 (1.5)	3.5 (0.6)	0.01
W2 cumulative intensity (10 ³ m ⁻² s ⁻²)	9.3 (1.1)	7.7 (0.8)	0.07
Mean Systolic Flow velocity (cm/s)	16.9 (2.5)	11.5 (1.4)	0.01
Mean Diastolic Flow velocity (cm/s)	28.2 (3.1)	22.2 (2.3)	0.01
Total Systolic flow velocity integral (cm)	5.7 (0.9)	3.7 (0.5)	0.01
Total Diastolic flow velocity integral (cm)	15.8 (1.6)	13.0 (1.5)	0.01
Peak Systolic velocity (cm/s)	15.3 (2.1)	15.9 (2.2)	0.82
Peak Diastolic velocity (cm/s)	40.4 (4.2)	31.3 (2.8)	0.01

	Baseline Mean (SEM)	Post Dobutamine Mean (SEM)	P-Value
Systolic Blood Pressure (mmHg)	137.9 (4.5)	132.9 (6.2)	0.41
Diastolic Blood Pressure (mmHg)	76.3 (3.2)	66.2 (4.1)	0.003
Heart Rate (bpm)	66.9 (4.1)	86.0 (6.4)	0.001
AIx (%)	29.9 (4.6)	3.8 (8.4)	0.001
Sub-Endocardial Viability Ratio	1.3 (0.1)	1.43 (0.1)	0.15
W1 cumulative intensity (10 ³ m ⁻² s ⁻²)	3.8 (0.8)	10.1 (2.4)	0.001
W2 cumulative intensity (10 ³ m ⁻² s ⁻²)	9.5 (1.1)	14.3 (2.0)	0.003
Mean Systolic Flow velocity (cm/s)	11.3 (0.9)	16.6 (2.5)	0.002
Mean Diastolic Flow velocity (cm/s)	22.5 (3.5)	32.5 (5.3)	0.001
Total Systolic flow velocity integral (cm)	3.7 (0.2)	3.8 (0.4)	0.76
Total Diastolic flow velocity integral (cm)	11.9 (1.0)	14.7 (1.5)	0.03
Peak Systolic velocity (cm/s)	13.9 (1.5)	25.1 (3.8)	0.002
Peak Diastolic velocity (cm/s)	31.9 (4.3)	45.4 (6.5)	0.002

Results: Hemodynamic parameters are shown in Figure 1. AIx decreased with Dobutamine and GTN despite opposite effects on systemic and coronary hemodynamics. SBP decreased with GTN but was unchanged with dobutamine, the converse was observed with DBP. Heart rate increased with dobutamine but not GTN. Mean systolic and diastolic CBF increased with dobutamine whereas both decreased following GTN. W1 cumulative intensity decreased following GTN, with a trend to decrease seen in W2 cumulative intensity. The intensity of both coronary waves increased with dobutamine. AIx was not correlated with CBF, CWI or pressure parameters at baseline or post-intervention.

Conclusions: In this novel analysis of CWI following pharmacological intervention, decreased CBF following GTN was accompanied by diminished accelerative coronary wave intensity. Conversely, accelerative wave intensity was enhanced with dobutamine in concert with augmented inotropy and lusitropy. Despite opposite changes in coronary and systemic hemodynamics, AIx decreased by a similar extent following both interventions. These findings provide important insights into mechanisms of CBF in response to changes in cardiovascular hemodynamics.

PP.08.19 NON-INVASIVE HAEMODYNAMIC PROFILE OF DIFFICULT TO TREAT HYPERTENSIVE PATIENTS: IMPACT OF BODY POSITION

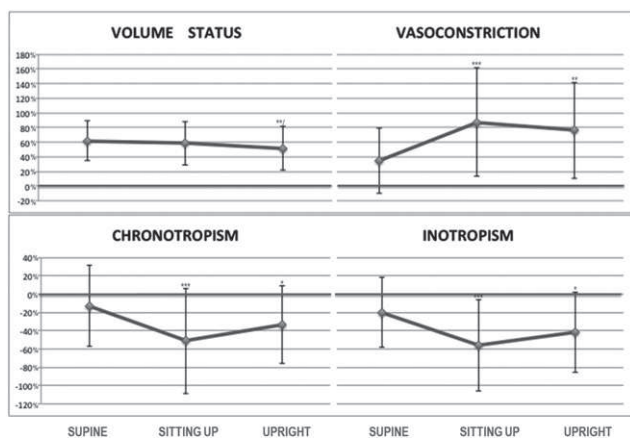
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Objective: The haemodynamic profile (HP) can be determined non-invasively by means of thoracic electric bio-impedance (TEB):

- (1) Characterize the HP of resistant or difficult to treat hypertensive patients.
- (2) Analyse the changes in HP with switching positions.
- (3) Correlate changes in HP with BP changes after including eplerenone (E) to the treatment.

Design and method: Sample: 27 patients with uncontrolled hypertension (UH) (mean age 57.7y; 6 female; BMI 30.8 kg/m², average of antihypertensive drugs: 4); 16 patients with TEB study repeated after E treatment. TEB was assessed with HOTMAN® system. Changes in hemodynamic modulators are expressed as the percentage of deviation from normal (0 ± 20%). The paired ttest was used to compare changes in HP with switching positions and before and after the introduction of E.

Results: The average of the main haemodynamic modulators in supine were: 61% hypervolemia; 12.9% hypochronotropism; 20.1% hypoinotropism and 34.6% vasoconstriction. When switching position from supine to sitting up, there were highly significant decreases in chronotropism (C) and inotropismo (I), highly significant increase in vasoconstriction (VC) whereas there were not significant changes in volume status (VS). From supine to upright position, there were significant decreases especially in VS but also for C and I. There was a significant increase in VC. From sitting up to upright position, there was a significant decrease in VS. There was a trend to increase the C and I but no significant changes were seen in VC.



After the addition of eplerenone, there was a significant decrease in office BP, especially for SBP (167.1 to 148.9 mmHg, p-value = 0.008) but also for DBP (96.2 to 87.7 mmHg, p-value = 0.032). There were not any significant changes in haemodynamic parameters although there was trend to decrease in VS.

There were significant positive correlations among changes in SBP with VS and with VC.

Conclusions: According to our results, UH is characterized mainly by hypervolemia and VC. With the BP reduction during the follow-up, there was a trend to a reduction in volume status and in the left stroke work index. The changes in BP seem to act mainly through changes in VS or VC.

PP.08.20 DIASTOLIC BLOOD PRESSURE IS THE PREDICTORS OF LEFT VENTRICULAR MYOCARDIAL RELAXATION IN HEALTHY POSTMENOPAUSAL WOMEN

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Objective: Previous studies that indicate metabolic syndrome (MetS) might be at risk for left ventricular (LV) diastolic dysfunction. However, little is known about which metabolic factors contribute to the development of LV dysfunction in postmenopausal women without obesity or overweight, diabetes mellitus, and/or cardiovascular disease.

Design and method: Participants aged over 60 years old without diabetes mellitus, systolic dysfunction, or other heart diseases underwent a thorough physical examination including tissue Doppler echocardiography. A peak early mitral annular velocity (e-prime) of <5.0 was designated as indicating abnormal LV myocardial relaxation (LVMR). We performed single and multiple logistic regression analyses of e-prime and cardiovascular risk factors, including MetS factors and indicators of major organ dysfunction. Normal-weight subjects (body mass index < 25 kg/m²) were also analyzed.

Results: A total of 269 postmenopausal women (mean age, 70 ± 7 years) participated, of which 29 (10.8%) had MetS and 67 (23.8%) had abnormal LVMR. Multiple logistic regression analysis revealed high diastolic blood pressure: DBP (odds ratio [OR] 5.3, 95% confidential interval [CI] 1.89 – 15.0, P < 0.01), abnormal waist circumference (OR 2.4, CI 1.15 – 5.01, P < 0.01) and age (OR 1.1, CI 1.05 – 1.16, P < 0.01) to be predictors of abnormal LVMR. In normal-weight subjects (n = 232), high DBP (OR 5.1, CI 1.65 – 15.89, P < 0.01), and aging (OR 1.1, CI 1.06 – 1.17, P < 0.01) were predictors of abnormal LVMR.

Conclusions: In postmenopausal women, only diastolic blood pressure was the independent risk factors for abnormal LVMR in both normal-weight and overweight individuals, and therefore might be useful for predicting diastolic heart failure during routine physical checkups.

PP.08.21 CORRELATION BETWEEN DIFFUSE MYOCARDIAL FIBROSIS AND CHANGES IN SYSTOLIC STRAIN IN HYPERTENSIVES. A PILOT STUDY WITH CARDIOVASCULAR MAGNETIC RESONANCE

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Objective: The new cardiovascular magnetic resonance (CMR) T1 mapping sequences can be applied to quantify diffuse myocardial fibrosis. Also, new CMR analysis softwares allow for the accurate and reproducible measurement of myocardial strain. We aimed to use these two new developments in a pilot study in order to assess the association between presence of diffuse fibrosis and changes in myocardial strain.

Design and method: 12 hypertensive patients (HT, 52 ± 7yrs, 10 males) with preserved ejection fraction and 12 controls (NT, 44 ± 10yrs, 8 males) underwent a CMR protocol at 3T that included black blood morphological sequences, cine sequences in the 2,3 and 4-chamber views as well as short axis series with typically 40 phases for each image acquisition, T1-mapping with two MOLLI acquisitions (3–3–5), before and 15 min after administration of a bolus of gadolinium-DTPA (0.1 mM/kg), and late gadolinium sequences in the same views as the cine sequences. All the scans were eventually analysed by two experienced observers with a dedicated software to obtain left ventricular volumes, ejection fraction and mass, precontrast myocardial T1 values, gadolinium partition coefficient (GPC) and extracellular volume fraction (ECV), a measure of diffuse myocardial fibrosis. Also, global longitudinal and radial myocardial strain and strain rate, as well as epicardium-endocardium strain gradient were measured.

Results: All subjects had preserved systolic function and results are shown on the table. There was a trend towards increased ECV in HT though it did not reach statistical significance. Global longitudinal and radial strain (GLS, GRS), longitudinal strain rate (GLSR) and precontrast T1 were all lower in HT, while radial strain gradient between subendocardium and subepicardium (GRS endo-epi) was increased in HT. There was a significant inverse correlation of GLS and GRS with ECV, and of radial strain rate with ECV (all p < 0.05).

	GLS	GLSR	GRS	GRSendo-epi	Precontrast T1	ECV
NT	-16.8%	109%/s	32.2%	1,9%	1095ms	24%
HT	-14.2%	80%/s	24.6%	4,6%	968ms	27%
P	0.05	0.02	0.02	0.03	0.04	0.08

Conclusions: In this pilot study we have found that there is an inverse correlation between global strain, a sensitive indicator of regional contractility, and myocardial extracellular volume fraction, a marker of diffuse fibrosis. This finding may have implications for early diagnosis of target organ damage in hypertensive patients.

PP.08.22 **IN YOUNG AND MIDDLE-AGED HYPERTENSIVES THE AUGMENTATION INDEX DEPENDS MORE ON LEFT VENTRICULAR PERFORMANCE THAN REFLECTED WAVE**

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Objective: Augmentation index (AI) is a well recognized marker of arterial stiffness related to cardiovascular morbidity and mortality. The arterial pulse waveform is the sum of the forward wave generated by left ventricle (LV) and a backward wave reflected from the periphery. The aim of this study was to estimate the relation of AI with hemodynamic indices of LV performance and afterload assessed by impedance cardiography (ICG) in young and middle-aged patients with arterial hypertension (AH).

Design and method: This study involved 144 patients (mean age: 45.2 years) with untreated AH. Augmentation index was evaluated by applanation tonometry (SphygmoCor® system) and systolic blood pressure (SBP), diastolic blood pressure (DBP), heart rate (HR), stroke index (SI), cardiac index (CI), Heather index (HI), left ventricular ejection time (LVET), systemic vascular resistance index (SVRI), total artery compliance (TAC) by ICG (Niccom™ device). The analysis included: interquartile comparison in subgroups of AI < 15% (Q1), 15–22% (Q2), 23–29% (Q3), equal or higher than 30% (Q4) and the assessment of correlation between AI and the above ICG variables.

Results: The mean AI in the study group was $21.8 \pm 13.3\%$. Gender distribution among quartiles was disproportionate: lower quartile was dominated by men (97.2%) and upper (Q4) - by women (77.6%; $p < 0.00001$). The subjects in Q4, in comparison with Q1, were older (41.8 vs 39.8 years; $p < 0.00001$) and characterized with lower height (166.5 vs 180.8 cm; $p < 0.00001$), HR (68.1 vs 78.8 bpm; $p < 0.00001$), longer LVET (330.8 vs 287.7 ms; $p < 0.00001$), higher SI (52.3 vs 45.5 ml/m²; $p < 0.05$) and HI (14.8 vs 12.1 Ohm*s²; $p < 0.05$). No significant differences in DBP, CI, SVRI and TAC were identified. Correlation analysis revealed significant associations of AI with age ($r = 0.45$; $p < 0.00001$), height ($r = -0.53$; $p < 0.00001$); HR ($r = -0.37$; $p < 0.00001$); SI ($r = 0.28$; $p < 0.05$), LVET (0.43, $p < 0.00001$) and HI ($r = 0.25$; $p < 0.001$). However, in multivariate linear regression analysis the only independent determinants of AI (as dependent variable) were age, height and HR ($R^2 = 0.57$).

Conclusions: Our results suggest that the strongest determinants of AI in young and middle-aged hypertensives are age, gender, height and hemodynamic indices of LV performance but not those characterised afterload.

PP.08.23 **LEFT VENTRICULAR HEMODYNAMIC FUNCTION IS ASSOCIATED WITH ABDOMINAL OBESITY IN PATIENTS WITH ARTERIAL HYPERTENSION**

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Objective: Abdominal obesity is associated with increased cardiovascular risk in hypertensives. The aim of this study was to estimate the relation between abdominal obesity and hemodynamic profile evaluated with the use of echocardiography, applanation tonometry (AT) and impedance cardiography (ICG).

Design and method: This study involved 144 patients (mean age: 45.2 years) with untreated AH, recruited to the clinical trial NCT01996085. Abdominal obesity was defined when waist circumference (WC) was equal or higher than 88/102 cm (women/men). The clinical evaluation included i.e.: 1/ echocardiographic assessment (VIVID S6, GE Medical System) of left ventricular (LV) ejection fraction (LVEF), indices of LV diastolic function (E/A - mitral flow early (E) and late (A) phase ratio; e' - mitral septal annulus early diastolic velocity, E/e' ratio) and global longitudinal systolic strain (GLSS, reversed to positive values), 2/ AT (SphygmoCor® system): central pulse pressure (CPP) and augmentation index (AI) and 3/ ICG (Niccom™ device): systemic vascular resistance index (SVRI); car-

diac index (CI), acceleration index (ACI); velocity index (VI), thoracic fluid content (TFC) and total artery compliance (TAC). The comparison between obese and not obese subjects was supplemented with the assessment of correlation between WC and the above mentioned hemodynamic variables.

Results: Obese hypertensives characterized with: worse diastolic function (e': 9.08 ± 2.69 vs 10.39 ± 2.34 cm/s. $p = 0.003$; E/e': 7.54 ± 1.81 vs 6.74 ± 1.40 . $p = 0.007$; E/A: 1.02 ± 0.34 vs 1.15 ± 0.33 ; $p = 0.008$) and lower echocardiographic (GLSS: 17.2 ± 2.5 vs $19.0 \pm 2.8\%$, $p = 0.0002$) and impedance indices of LV performance (VI: 44.8 ± 12.4 vs 51.6 ± 14.2 1000*Ohm/s; $p = 0.006$; ACI: 66.7 ± 27.8 vs 79.1 ± 31.2 100*Ohm/s²; $p = 0.003$). LV diastolic function was impaired in 35.4% obese subjects compared to 10.8% of the non-obese ($p = 0.0006$). No relevant differences in gender, age, blood pressure, heart rate, LVEF, E/A, SVRI, TFC, TAC, CPP and AI were identified. Correlation analysis revealed significant associations between WC and e' (-0.22 ; $p = 0.010$); E/A (-0.26 ; $p = 0.002$); VI (-0.47 ; $p < 0.000001$) and ACI (-0.41 ; $p < 0.000001$).

Conclusions: Obese patients characterized with slightly impaired LV diastolic and systolic function and no significant alterations in afterload and fluid balance. In young and middle aged obese hypertensives asymptomatic depression of cardiac function can be the earliest clinical feature of impaired ventricular-vascular interactions.

PP.08.24 **RENIN-MEDIATED ARTERIAL HYPERTENSION IS ASSOCIATED WITH LONGITUDINAL GLOBAL SYSTOLIC DYSFUNCTION**

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Objective: Arterial hypertension phenotyping by plasma renin activity (PRA) may be a useful approach to improve BP control. Thus target organ damage evaluation is important in different types of arterial hypertension determined by PRA measurement. The aim of study was to compare left ventricular systolic function with speckle tracking technique in subjects with low-renin and renin-mediated hypertension

Design and method: PRA (radioimmune assay) was measured in 72 hypertensive subjects (age 61.1 ± 7.6 years, 30 male). PRA < 0.65 ng/ml/h was classified as volume (V)-type hypertension, PRA > 0.65 ng/ml/h - as renin (R)-type. Longitudinal global systolic deformation (LGSD) was evaluated by 2-D echocardiography (normal $< -18.6\%$) and compared in subjects with two types of hypertension. Multivariate regression analysis was applied to define determinants of LGSD. $p < 0.05$ was considered significant.

Results: 42 (58%) subjects had V-type hypertension, 30 (42%) - R-type. Despite patients with V-type hypertension were older (respectively, 63.1 ± 9.1 vs 60.3 ± 6.4 years, $p < 0.05$) and had higher systolic and diastolic BP ($162.6 \pm 14.1/103.7 \pm 11.5$ vs $157.9 \pm 17.1/95.0 \pm 7.8$ mmHg), respectively, $p < 0.05$). Left ventricular ejection fraction was similar in the two subgroups: $64.8 \pm 5.9\%$ in V-type, and $68.5 \pm 7.0\%$ in R-type. Despite of normal EF impairment of LGSD was found in 75% among all patients and was significantly higher in subjects with R-type hypertension than in V-type, respectively, 97% vs 40% ($\chi^2 = 75.3$; $p < 0.001$). Absolute LGSD values were, respectively, -16.6 ± 3.3 vs $-17.9 \pm 3.4\%$ ($p < 0.05$). Multivariate regression analysis revealed independent association of PRA and LGSD ($\beta = 1.94$, $p < 0.001$).

Conclusions: Evaluation of longitudinal global systolic deformation reveals systolic dysfunction in 75% hypertensive patients. Systolic function impairment is associated with renin-mediated arterial hypertension.

PP.08.25 **SEVERITY OF LEFT VENTRICULAR REMODELLING IS ASSOCIATED WITH RENIN-MEDIATED ARTERIAL HYPERTENSION**

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Objective: Plasma renin activity (PRA) measurement is an approach to guide antihypertensive treatment. RAAS blockers are effective in renin-mediated hypertension, whereas anti-volume drugs (e.g. diuretics or calcium channel blockers) - in low-renin hypertension. RAAS-blockers have proven their ability to regress left ventricular hypertrophy (LVH). The aim of study was to compare LV characteristics in subjects with low-renin and renin-mediated hypertension to confirm potential benefits of this treatment approach.

Design and method: PRA (radioimmune assay) was measured in 72 hypertensive subjects (age 61.1 ± 7.6 years, 30 male). PRA < 0.65 ng/ml/h was classified as volume (V)-type hypertension, PRA > 0.65 ng/ml/h - as renin (R)-type. Echocardiographic parameters of LV remodelling and its function were compared in subjects with two types of hypertension. LVH criteria were: LV mass index (LVMI) > 125 g/m² in males and > 110 g/m² in females. $p < 0.05$ was considered significant.

Results: 42 (58%) subjects had V-type hypertension, 30 (42%) - R-type. Despite patients with V-type hypertension were older (respectively, $63,1 \pm 9,1$ vs $60,3 \pm 6,4$ years, $p < 0,05$) and had higher systolic and diastolic BP ($162,6 \pm 14,1/103,7 \pm 11,5$ vs $157,9 \pm 17,1/95,0 \pm 7,8$ mmHg), respectively, $p < 0,05$). Patients with R-type hypertension vs those with V-type had significantly ($p < 0,05$) larger left atrium diameter ($3,9 \pm 0,4$ vs $3,7 \pm 0,5$ cm) and its volume index ($39,1 \pm 7,3$ vs $36,2 \pm 7,4$ ml/m²), relative wall thickness ($0,63 \pm 0,12$ vs $0,57 \pm 0,11$), LVMI ($145,9 \pm 35,6$ vs $134,3 \pm 38,4$ g/m²), deceleration time ($256,3 \pm 55,8$ vs $179,4 \pm 40,3$ ms), E/Ė ($12,4 \pm 5,8$ vs $10,9 \pm 4,0$) and LVH prevalence (93% vs

62%). Multivariate logistic analysis revealed independent association between PRA and LVMI ($\beta=0,78$, $p < 0,001$) and diastolic function characteristics E/A ($\beta = -0,49$, $p < 0,001$), isovolumic relaxation time ($\beta = 0,34$, $p < 0,001$), deceleration time ($\beta = 0,74$, $p < 0,001$), E/Ė ($\beta=0,68$, $p < 0,001$).

Conclusions: Renin-mediated arterial hypertension is associated with adverse LV remodelling and diastolic dysfunction in hypertensive subjects. The finding confirms choice of RAAS-blockers as a beneficial therapeutic approach in those subjects to decrease BP and achieve LVH regression

POSTERS' SESSION

POSTERS' SESSION PS09

ENDOCRINE ASPECTS AND PEPTIDES

PP.09.01 BRADYKININ-INDUCED VASORELAXATION: THE ROLE OF AGE, MAS-RECEPTORS AND BRADYKININ RECEPTORS TYPE 1 AND 2

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Objective: Milk casein-derived tripeptides (Ile-Pro-Pro, Val-Pro-Pro and Leu-Pro-Pro) and functional food products containing them lower blood pressure in experimental models of hypertension (spontaneously hypertensive rats (SHR), salt-loaded Goto-Kakizaki rats, double transgenic rats harboring human renin and angiotensinogen genes (dTGR)) and in mildly hypertensive subjects. These tripeptides also improve vascular relaxation ex vivo in the rat and decrease arterial stiffness in man. The antihypertensive and vasodilatory mechanism has been suggested to be related to ACE1-inhibition and thus to reduced formation of the potent vasoconstrictor, angiotensin II and to reduced degradation of vasodilatory bradykinin into inactive fragments.

Design and method: However, ACE1 inhibition and lowering of blood pressure do not explain – at least alone – the improved endothelial function. We present here data from ex vivo experiments which show that Ile-Pro-Pro pretreatment augments bradykinin-induced vasorelaxation of mesenteric arteries in young and especially in old rats.

Results: We have evidence that Mas-receptors and their physiological agonist angiotensin(1–7) can play an important role in the beneficial vascular effects of the tripeptides. We present here further support for these data using Mas-receptor and bradykinin receptor type 1 and 2 inhibition on bradykinin-induced vasorelaxation after pre-incubation with Ile-Pro-Pro. Mas-receptor is a receptor for a vasodilatory component angiotensin(1–7) in renin-angiotensin system (RAS). qPCR measurements of the receptor mRNA levels in the aortas from young and old rats give further evidence on the role of Mas-receptors in synergistic effect of Ile-Pro-Pro on bradykinin induced vasorelaxation.

Conclusions: Bradykinin and its receptors have a role in vascular dysfunction in aging. Bioactive tripeptides of dietary origin might be beneficial in restoring the defect.

PP.09.02 ATHEROGENIC POTENTIAL OF SUBCLINICAL HYPOTHYROIDISM AND METHODS OF ITS CORRECTION

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Objective: The presence of a subclinical hypothyroidism (SH) repeatedly strengthens processes of formation of atherosclerosis. At the same time, therapy of statin with levothyroxine replacement therapy (LRT) has antiatherogenic and additional antiinflammatory effects at patients with hypertension (H),SH.

Design and method: 50 patients with MS,SH and Peripheral Arterial Disease are surveyed which have made 2 groups: 1 gr.-27 pts with H and SH with undergoing LRT.; 2 gr. - 23 pts with H, SH without LRT. Waist circumference, blood pressure monitoring, ankle-brachial index (ABI), echocardiography, fast levels of lipids, glucose, insulin, lipids levels were performed. During 16 weeks all pts received atorvastatin at the same dose - 10 mg. Patients of 1 gr. additionally received LRT – 50–75 mkg/daily.

Results: The levels of ABI in 1 gr. increased from $0,8 \pm 0,02$ to $1,1 \pm 0,03$ after 16 weeks of combination therapy (atorvastatin and LRT) and reduction of the index Homa from $3,9 \pm 0,1$ to $2,3 \pm 0,1$. Authentic changes in body weight and level of leptin it not been received, but after 16 weeks of treatment has been marked. Increase of adiponectin levels to a comparable degree in patients with MS through mechanisms related to decreases in triglyceride levels and increases in HDL cholesterol

levels. We have demonstrated with the purpose of definition of possible influence of atorvastatin with levothyroxine replacement therapy (LRT) on a level of hormones of a fatty fabric: adiponectin and leptin in a combination to its influence on insulin sensitivity it is surveyed 50 patients with a H and SH.

Conclusions: The increase of adiponectin levels and reduction of the insulin resistance may be an additional mechanism for the beneficial effects of combination therapy (atorvastatin and LRT) at the patients with H, SH

PP.09.03 FEATURES OF HEART REMODELING AT WOMEN WITH ARTERIAL HYPERTENSION AND PRIMARY HYPOTHYROIDISM

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Objective: To study features of heart remodeling at women with the arterial hypertension (AH) and primary hypothyroidism (PHT).

Design and method: Research included 95 patients with AH of 1–2 degrees and PHT, from them 31 women with PHT in decompensation stages (the main group) and 64 women with PHT in a stage of medicamentous compensation. The first group of comparison included patients with AH without pathology of the thyroid gland (TG), into the second group of the woman with PHT in a decompensation stage without AH. There were included women without AH in group of control, cardiovascular diseases and impairment of the function of the thyroid gland. To all patients conducted echocardiographic research on the device Sonos-7500.

Results: In the analysis of research results it was revealed that women with PHT in a decompensation stage without AH in comparison with patients of control group had higher values of the left ventricular mass index (LVMI), smaller values of the stroke volume index (SVI). At women with AH and PHT in a decompensation stage in comparative aspect with indicators at patients with AH without pathology of TG essential changes of structurally functional indicators of LV were observed: authentically higher values of LVMI, authentically lower values of SVI, in 71% of cases remodeling of LV was determined by concentric type by volume. Against hormone replacement therapy at women with AH and primary hypothyroidism in a stage of medicamentous compensation authentically lower indicators of LVMI and higher values of the relation of peak speeds on the mitralny valve in comparison with indicators at patients with AH and PHT in a decompensation stage are noted.

Conclusions: Thus, there are noted at women with PHT without AH initial signs of remodeling of heart. At patients with AH and PHT in a stage of a decompensation authentically more expressed signs of a hypertrophy of a myocardium of LV, diastolic dysfunction LV, prevalence of remodeling of LV on concentric type that allows to judge pronounced remodeling of the heart as a result of deficiency of thyroid hormones, and existing AH.

PP.09.04 HYPERTENSION IN WOMEN WITH HYPOTHYROIDISM

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Objective: Influence expression hypothyroidism on feature of development metabolic syndrome at the patients with hypertension remains not up to the end investigated. Hypothyroidism progressively increases risk development of cardiovascular diseases.

Design and method: 220 women who have made 2 clinical groups are surveyed: 1group 108 patients($53,6 \pm 1,6$ years) with hypertension, abdominal obesity and hypothyroidism(TSH $15,4 \pm 2,3$ IU/ml); 2group 112 patients ($55,3 \pm 2,5$ years) with hypertension, abdominal obesity and medicament compensated hypothyroidism function levothyroxinum natricum in the dose of 50 mg per day- at the 3months of treatment (TSH $3,1 \pm 0,4$ IU/ml)-pathogenetically therapy. All researched carried out measurement waist circumference, blood pressure and the 24-hour BP monitoring, echocardiography, fast levels of glucose, insulin and lipids levels. Insulin sensitivity was estimated homeostasis model assessment (HOMA) method. Identical antihypertension and statin therapy was appointed in both groups.

Results: It is marked, that patients of 1 group had authentically significantly more pronounced displays of abdominal obesity ($112,4 \pm 2,8$ sm) in comparison with group ($92,3 \pm 2,1$ sm) and parameters of body mass index differ ($35,7 \pm 1,2$ and $30,20 \pm 1,1$ accordingly). In 1 group was fixed diastolic hypertension ($153/111$ mm Hg). In 2 group was fixed hypertension ($142/81$ mm Hg). In 1 group it has not been revealed changes of fast levels of glucose ($5,5 \pm 0,2$ mmol/l) and attributes of the insulin resistance (HOMA $3,4 \pm 0,3$), that distinguished them from patients of 2 groups (HOMA $2,3 \pm 0,2$). Distinctive feature of 1 group was authentic higher in comparison to 2 group a parameter of the triglycerides levels ($2,5 \pm 0,4$ mmol/l). The given echocardiographies in 1 group have shown the tendency to increase in the size of the left atrium and increase of the left ventricular mass index ($124,1 \pm 3,2$ g/m²) in comparison to the 2 group.

Conclusions: It is established, that manifestation of hypothyroidism in patients with abdominal obesity it is accompanied with diastolic hypertension, by more expressed lipids disorders and changes of hemodynamic parameters of the left atrium and ventricle, not favorable type of HOMA-index. In patients of medicament compensated hypothyroidism function levotiroksinom all indexes were better, due to the combined therapy: antihypertension, statin + pathogenetically therapy.

PP.09.05 THE IMPACT OF THYROID HORMONE REPLACEMENT THERAPY ON CARDIO-ANKLE INDEX IN PATIENTS WITH SUBCLINICAL HYPOTHYROIDISM

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Objective: Subclinical hypothyroidism is associated with an increased risk of cardiovascular morbidity and mortality among older adults. The cardio-ankle vascular index (CAVI) is a sensitive non-invasive marker of arterial stiffness and atherosclerosis. Objective of our prospective study was to assess the impact of thyroid hormone replacement therapy with low doses of L-thyroxine ($6.25-25$ µg/day) on CAVI index in patients with subclinical hypothyroidism.

Design and method: The study involved 232 patients with subclinical hypothyroidism (73 males, 159 females, mean age 52.34 ± 3.67 years) and 207 healthy controls (79 males, 128 females, mean age 49.93 ± 4.32 years). CAVI was measured in all participants using the system VaSera® 1500, adopting the oscillometric method for blood pressure measurement. Blood pressure, ECG and phonocardiography were monitored during the measurement. All patients with subclinical hypothyroidism received thyroxine replacement therapy (mean doses 21.75 ± 3.43 µg) during 12 months in order to establish euthyroid state. After this period, all patients from studied group underwent CAVI measurement.

Results: CAVI was significantly higher in patients with hypothyroidism (8.75, 95% CI 6.13–10.52) than in controls (7.03, 95% CI 5.73–9.03; $p < 0.01$). After 12 months of L-thyroxine substitution, patients with subclinical hypothyroidism had significantly lower CAVI than at baseline (8.75, 95% CI 6.13–10.52 vs 7.10, 95% CI 6.05–9.37; $p < 0.01$).

Conclusions: Hormone replacement therapy with low dosed L-thyroxine may improve vascular function in patients with subclinical hypothyroidism. Patients with cardiovascular risk factors as well as elderly should be closely monitored for the symptoms of iatrogenic hyperthyroidism during the dose titration process.

PP.09.06 THE INTERRELATION BETWEEN RESISTIN LEVEL AND HEMODYNAMIC INDEXES IN PATIENTS WITH TYPE 2 DIABETES MELLITUS WITH ARTERIAL HYPERTENSION

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Objective: Different reports have been prove the fact that even insignificant increase of blood pressure may favor the development of cardiovascular pathology in patients with diabetes mellitus type 2 (T2DM). The influence of increased level of proinflammatory adipokin resistin to development arterial hypertension (AH) in patients with T2DM remains understudied.

The aim of the research was to evaluate the relationship between the state of resistin activity and hemodynamic indexes in patients with T2DM associated with AH.

Design and method: 76 patients with T2DM were randomized into 2 groups: 1st group (34 patients) – T2DM with AH, 2nd group (42 patients) – T2DM without AH. The following data were analyzed: systolic blood pressure (SBP), diastolic blood pressure (DBP), average hemodynamic blood pressure (AHBP). The level of resistin determined by immune-enzyme assay.

Results: The level of SBP was 164.86 ± 2.17 mmHg, DBP – 99.78 ± 1.54 mmHg, AHBP – 108.61 ± 1.07 mmHg in 1st group. The level of SBP was 122.27 ± 1.17 mmHg, DBP – 78.46 ± 0.82 mmHg, AHBP – 93.61 ± 0.74 mmHg in 2nd group. The levels of resistin were 18.26 ± 0.19 ng/ml in 1st group and 10.42 ± 0.27 ng/ml in 2nd group. We have identified a correlation between AHBP and the resistin activity in 1st group ($R = 0.42$ ($p < 0.05$)). Such association was not revealed in the 2nd group. We have not identified other correlations between the studied parameters.

Conclusions: Revealed a significant relationship between the expression of resistin and increased AHBP indicates important pathogenetic role of resistin activity in the development of AH in patients with T2DM. Widespread AH, its frequent combination with T2DM and severe incapacitating consequences of such a tandem point to further explore the relevance of this issue.

PP.09.07 THE NECESSITY OF ADRENAL VENOUS SAMPLING IN ALDOSTERONISM PATIENTS YOUNGER THAN AGE 45

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Objective: Background: Adrenal venous sampling (AVS) is an invasive and cost procedure, not all the medical centers can perform it. Considering the prevalence of incidentalomas increases with age, current primary aldosteronism (PA) diagnosis and treatment guideline and the AVS expert consensus both recommended that PA patients younger than age 40 are not necessary to have AVS before adrenalectomy if they have a typical PA profile and a clear unilateral adrenal adenoma on CT scan. To study the necessity of AVS in PA patients younger than age 45.

Design and method: This is a retrospective study. 106 patients younger than age 45 who were diagnosed PA in the Department of Hypertension in Ruijin Hospital between 2006 and 2014 were analyzed. PA was confirmed either by fludrocortisone test or saline infusion test. Patients received unilateral adrenalectomy guided by AVS result or by the typical adenoma appearance on adrenal CT image. They were followed after surgery. Group 1 included 39 patients who received successful lateralized AVS. Group 2 had 67 patients including 53 without AVS, 10 with nonlateralized AVS and 4 with unsuccessful AVS.

Results: The baseline clinical characters, including age, gender, hypertension duration, 24 hour systolic and diastolic blood pressure, hypokalemia history, the number of antihypertensive medications and the length of follow-up after surgery were not different, respectively, between two groups. Group 2 had significantly higher standing plasma aldosterone and urinary aldosterone level than that of group 1 (298.71 ± 153.71 vs 399.67 ± 269.06 (pg/ml), 23.45 ± 14.61 vs 31.52 ± 21.16 µg/24hour, respectively, all $P < 0.05$), but there were no difference considering plasma renin activity and renin to aldosterone ratio. The adenoma diameter measured from adrenal CT image was different between two groups (1.2 ± 0.72 cm vs 1.5 ± 0.74 cm, $P < 0.05$). 59% patients in group 1 and 62.7% patients in group 2 had PA cured respectively after surgery ($P > 0.05$).

Conclusions: In this small retrospective study, PA patients younger than age 45 had similar adrenalectomy outcome no matter they received AVS or not. It is suggested therefore that AVS might not be necessary in typical PA patients younger than 45.

PP.09.08 EARLY POSTOPERATIVE TESTING IN PHEOCHROMOCYTOMA. IS IT FEASIBLE?

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Objective: Pheochromocytoma and functional paraganglioma (PHEO) are catecholamine-producing tumors with typical clinical presentation. Tumor resection is considered as an appropriate treatment strategy. Due to its unpredictable clinical behavior, biochemical testing is mandatory to confirm successful tumor removal after the operation. Until now, no exact recommendation about the timing of postoperative examination exists. Recently published Guideline about PHEO recommends performing biochemical tests in 2–4 weeks after the operation. In some cases, this period may be too long and shorter period may be more suitable for the patient. The aim of the study was to investigate if shorter period of postoperative testing is feasible.

Design and method: We investigated 82 patients with PHEO before and after the operation. Postoperative examination was performed in stable subjects immediately after their transport from the surgical to the internal ward. For the PHEO diagnosis and confirmation of the successful tumor removal, plasma metanephrines and serum chromogranin were used.

Results: All subjects with PHEO had elevated plasma metanephrines before the operation. Postoperative testing was performed on day 8.3 ± 7.5 . Two subjects examined on day 7 presented with mild elevation of plasma metanephrine and 6 subjects investigated on days 6–11 showed mild increase of plasma normetanephrine. Only one subject showed tumor recurrence in the later course. No difference was found between subjects examined early after the operation (40 patients investigated

during the first 6 days after the operation (the earliest time was day 3 in 2 subjects) and subjects tested later was noted (2 vs. 5 subjects; one subject presented with elevation of both metanephrines). Serum chromogranin was measured in 74 patients before the operation and 7 patients presented with negative serum chromogranin values (this was significantly lower sensitivity compared to plasma metanephrines; $P=0.005$). Eight subjects showed increased serum chromogranin after the operation. These subjects were treated with proton pump inhibitors at the department of surgery.

Conclusions: In this retrospective study, we have shown that early postoperative diagnostic workup of subjects with PHEO is feasible and may so simplify early postoperative management in this clinical condition.

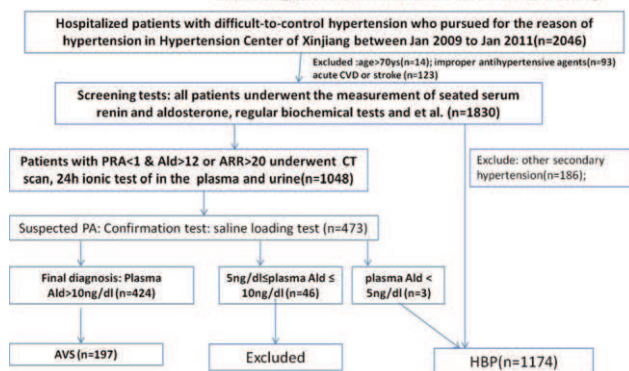
PP.09.09 PREVALENCE AND ITS CARDIOMETABOLIC FACTORS OF PRIMARY ALDOSTERONISM IN CHINESE PATIENTS WITH HYPERTENSION FROM XINJIANG OF CHINA

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Objective: To investigate the prevalence and its cardiometabolic pattern of PA in hospitalized patients with hypertension in People's Hospital of Xinjiang, considering the prevalence of PA in Chinese population is not widely evaluated and few reports concerned the cardio-metabolic pattern of PA in a large scale population of China.

Design and method: Consecutive hypertensive patients referred to Hypertension Center of Xinjiang from 2009 to 2011 underwent a diagnostic protocol composed of measurement of Na⁺ and K⁺ in serum and urine, seated plasma renin activity, and aldosterone at baseline and after saline loading test. The patients with an aldosterone/renin ratio >20 at baseline, and/or >5 after saline loading test, and/or a probability of PA (by a logistic discriminant function) > or =50% underwent imaging tests and adrenal vein sampling (AVS). Patients were evaluated for glucose, lipid profile, smoking and alcoholism and the clinical profiles were compared between PA and HBP group. The related factors with PA were discussed by multivariate logistic regression.

The diagnostic flowchart of PA of the study



Results: (1) 424(20.7%) out of 2046 hypertensive patients with age<70yr were diagnosed PA. The patients with PA had younger diagnosis age but longer hypertension duration. (2) 25.4% females with hypertension were identified as PA, the detection rate of PA was around 30% in OSAS, obese, age<45 yr and hyperglycemia population, respectively. (3) The patients of PA showed worse blood control, and greater mean BMI, compared to patients with HBP. But the fasting glucose, TC and LDL-C showed higher levels in patients with HBP. (4) Logistic regression analysis using PA status as the dependent variable showed that the severity of OSAS were included, the severe OSAS may increase 1.08-fold risk of PA with non-OSAS individuals as reference regardless of age, sex and obese status.

Conclusions: A markedly prevalence of PA(20.7%) was detected in Chinese hypertensive population of Xinjiang, the greater detection rate of PA in males and patients with severe OSAS, obesity, abnormal presence of adrenal CT, hypokalemia history leading to a concept that PA identification should extend to such individuals.

PP.09.10 ECHOCARDIOGRAPHIC COMPARISON OF LEFT VENTRICULAR STRUCTURE AND FUNCTION IN PATIENTS WITH PRIMARY ALDOSTERONISM AND ESSENTIAL HYPERTENSION

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Objective: Primary aldosteronism (PA) has been the most common secondary cause of hypertension. The present study investigated the difference of left ventricular

Structure and function in hypertensive patients with primary aldosteronism and essential hypertension.

Design and method: Hypertensive patients from the hypertension department or clinic in Ruijin hospital were studied. The sample included 100 patients with primary aldosteronism and 100 controls with essential hypertension matched for age, gender, and 24-hour ambulatory monitoring BP. Left ventricular mass index (LVMI), LA volume index (LAVI), Ejection fraction were calculated. LV diastolic function was estimated by the ratio of early diastolic velocities (E) from transmittal inflow to early diastolic velocities (E') of tissue Doppler at mitral annulus.

Results: Primary aldosteronism and essential hypertension patients had similar LV dimensions, LV wall thickness, LVMI and LV systolic function. PA patients were associated with greater impairment in diastolic function as reflected by E' (5.8 ± 1.9 cm/s vs. 6.6 ± 2.1 cm/s, respectively; $p=0.004$), E/E' ratio (13.5 ± 4.3 vs. 11.9 ± 3.3 , respectively; $p=0.005$) and higher left atrial volume index (23.0 ± 5.8 ml/m² vs. 21.1 ± 5.5 ml/m², respectively; $p=0.02$). Multivariate analysis showed that E/E' ratio independently correlated with age ($\beta=0.457$, $p<0.001$) and serum potassium ($\beta=-0.230$, $p=0.018$). The left ventricular geometric, systolic functional parameters and patterns of LV-hypertrophy were similar in male patients between PA and EHT groups. While in female patients, PA was correlated with higher LVMI (103 ± 24 g/m² vs. 93 ± 18 g/m², respectively; $p=0.04$) and lower RWT (0.38 ± 0.05 vs. 0.42 ± 0.04 , respectively; $p=0.001$).

Conclusions: The increase in aldosterone levels could contribute to the impairment of LV diastolic function in both sexes and higher prevalence of eccentric hypertrophy in women than in men. LV diastolic function independently correlated with age and serum potassium in PA.

PP.09.11 ASSOCIATION OF PLASMA ALDOSTERONE CONCENTRATION WITH PREVALENCE OF DIABETES MELLITUS IN SUSPECTED PRIMARY ALDOSTERONISM

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Objective: Hypertension is a common feature of both type 1 and type 2 diabetes. Marked hypertension is not infrequent, and individuals with these coexisting conditions are at increased risk of cardiovascular events and stroke. However, the association between plasma aldosterone and the prevalence of DM remains controversial. This study aimed to investigate the association between plasma aldosterone concentration (PAC) and the prevalence of DM in hypertensive patients with suspected primary aldosteronism(PA).

Design and method: 790 subjects with hypertension were evaluated history of DM, fasting blood glucose, PAC, primary renin activity and other biochemical parameters. The identification of DM was defined as known or newly-diagnosed diabetes according to the criteria set by the American Diabetes Association. Primary aldosteronism was determined as following: subjects with plasma aldosterone/renin activity (ARR) >20 ng/dL per ng/mL/h, who were defined as suspected PA, and performed saline infusion test as a confirmatory test, after which aldosterone concentration >10ng/dL was a sign of primary aldosteronism.

Results: No correlation PAC with DM prevalence was found in total($r=0.042$, $P=0.239$). Among 340 patients with ARR >20ng/dL per ng/mL/h, the prevalence of DM was correlated with sex($r=0.180$, $P<0.01$), age($r=0.217$, $P<0.01$), body mass index ($r=0.129$, $P<0.05$), systolic blood pressure ($r=0.124$, $P<0.05$), triglycerides ($r=0.147$, $P<0.01$), urinary K+($r=0.212$, $P<0.01$) and PAC($r=0.124$, $P<0.05$). Factors associated with DM prevalence in patients with ARR >20 ng/dL per ng/mL/h included sex (odds ratio (OR) 3.89, 95% confidence interval (CI) 1.79–8.42), age (OR2.62, 95%CI 1.62–4.24) and PAC (OR1.83, 95%CI 1.17–2.86). Comparing 86 age- and sex-matched patients with and without PA, the prevalence of DM was significantly higher in patients with PA compared with those without PA (29.1 vs. 9.3%, $P<0.05$).

Conclusions: The association of PAC with the prevalence of DM should be considered in hypertensive patients with suspected PA.

PP.09.12 SIGNIFICANCE OF PLASMA NORMETANEPHRINE AND METANEPHRINE IN DIAGNOSIS OF PHEOCHROMOCYTOMA

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Objective: To evaluate the significance of plasma free normetanephrine(NMN) and metanephrine(MN) in diagnosis of pheochromocytoma.

Design and method: From March 2005 to June 2012, patients with pheochromocytoma screening indications were selected from hypertension departments

of people's hospital of Henan province. Plasma NMN and MN levels, detected by enzyme immunoassay, of pheochromocytoma patients (n=67) and non-pheochromocytoma patients (n=101) were compared as well as those of pheochromocytoma patients before and after the operation. Receiver operating characteristic (ROC) curves were employed to determine the sensitivity and specificity of plasma NMN and MN in the diagnosis of pheochromocytoma.

Results: The area under ROC curve of NMN was (0.999 ± 0.001), and that of MN was (0.789 ± 0.073). The NMN and MN levels of pheochromocytoma patients [NMN: (2331.546 ± 1475.966) vs (49.796 ± 35.701) ng/L, MN: (521.504 ± 813.693) vs (36.784 ± 24.063) ng/L, respectively, P < 0.01] were higher than those of non-pheochromocytoma patients. The sensitivity and specificity of plasma NMN at the level of 234.460 ng/L in diagnosis were 98.5% and 100%, and those of plasma MN at the level of 93.705 ng/L were 50.7% and 100% respectively. The NMN and MN levels of 29 pheochromocytoma patients decreased after the operation [NMN: (2790.001 ± 1451.237) vs (81.780 ± 53.087) ng/L, P = 0.001; MN: (496.810 ± 764.574) vs (35.986 ± 23.344) ng/L, P = 0.025].

Conclusions: Determinations of plasma NMN and MN levels can be adopted as optimal parameters in pheochromocytoma screening. EIA is an effective method for plasma NMN and MN detection.

PP.09.13 COMPLIANCE WITH ANTIHYPERTENSIVE TREATMENT IN PRIMARY ALDOSTERONISM

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Objective: Primary aldosteronism is the most frequent cause of secondary endocrine hypertension. Primary aldosteronism has two main subtypes – unilateral caused by cortical adrenal adenoma, treated by surgery (approx. 1/3 of cases) and bilateral form with overproduction of aldosterone most frequently caused by bilateral adrenal hyperplasia (not always visible on CT). This form and patients who deny surgical treatment of unilateral forms (in all approx. 2/3 of patients of primary aldosteronism) are treated by aldosterone receptor blockers (usually by spironolactone or newer more selective eplerenone). The treatment with spironolactone is, however often accompanied by side effects (mainly gynecomastia in males). Therefore the compliance with spironolactone is usually lower than with other drugs. Therefore we decided to perform a study to assess the compliance with antihypertensive treatment in out-patients with primary aldosteronism treated with spironolactone and followed in our Hypertension unit.

Design and method: Altogether, to the study were included 37 patients (25 males), the unplanned blood sampling was done during an outpatient visit. The qualitative (presence of canrenoate) assessment of other antihypertensive drugs in serum was done by means of liquid chromatography tandem mass spectrometry (LC-MS/MS).

Results: Mean number of antihypertensive drugs was 3.1 ± 0.5, including spironolactone in all of them. Other antihypertensive drugs - verapamil, doxazosin, thiazide diuretic, amlodipin, less frequently beta-blockers were also used in combination treatment. The mean office blood pressure at the time of sampling was 154 ± 28 mmHg/92 ± 17 mmHg. Full compliance was noted in 87%, partial non-compliance in 10% a total noncompliance in 3% (1 patient). Compliance with spironolactone was confirmed in 92%.

Conclusions: In conclusion, the compliance with treatment in patients with primary aldosteronism is according to the results of this study much better than in patients with essential hypertension. It may be caused by specific treatment of a secondary form in a Hypertension unit, in well-educated patients and also because only cooperative patients are visiting us regularly during the follow-up. Males intolerant to spironolactone (not included in this study), were previously switched to eplerenone.

PP.09.14 ADRENAL VENOUS SAMPLING: A SINGLE CENTRE EXPERIENCE

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Objective: Primary aldosteronism (PA) is a potentially curable form of secondary arterial hypertension provided there is unilateral aldosterone overproduction. Adrenal venous sampling (AVS) enables to identify the PA patients who can profit from unilateral adrenalectomy. The aim of the study was to analyse the AVS experience in our centre.

Design and method: The data of the patients who were referred for AVS were enrolled in the study. All AVS procedures were performed according to the routine standardised protocol used in our centre. An infusion of cosyntrophin was adminis-

tered 30 minutes before and during the procedure. Samples were taken step by step from both adrenal veins, and the inferior vena cava. Adrenal samples were considered adequate if the cortisol concentration was at least 5-fold greater than that of the inferior vena cava. The lateralization of aldosterone secretion was confirmed when cortisol-corrected aldosterone concentration from the affected gland was at least 4-fold higher than that of the contralateral side. The procedural success, the frequency of lateralisation of aldosterone secretion, and the complication rate were the main analysed parameters.

Results: In the period 2005–2014, the AVS was performed in 184 patients. After repeating the procedure in 17 (9.2%), the adequate adrenal samples were obtained in 170 (92.4%) of patients. The lateralization of aldosterone secretion was identified in 72 (42.3%) cases where the AVS was successful. One periprocedural complication was noted. An adrenal hematoma developed as a consequence of adrenal vein injury. This adverse event resolved without a negative sequel.

Conclusions: Provided the procedure is initially unsuccessful, repeating the AVS increases the success rate not augmenting the risk of complications. The rather high number of cases with proven lateralization of aldosterone secretion could be attributed to the selection of patients who have a high probability of surgically correctable form of PA when initiating the PA screening.

PP.09.15 PECULIARITIES OF ARTERIAL HYPERTENSION IN RECURRENT PHEOCHROMOCYTOMA

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Objective: To recognize peculiarities of arterial hypertension (H) in recurrent (R) pheochromocytoma (pheo).

Design and method: Retrospective analysis of 178 operated pheo pts (74 males and 104 females, average age 37.7 years) was done. 34 out of 178 pts had Rpheo. Pheo was verified by histology. Clinical course of H was compared in 34 Rpheo pts and in 144 pts without R.

Results: 34 Rpheo pts (13 males and 21 females, average age 29.4 y, paroxysmal H – 33, sustain – 1, malignant – 2) were operated for the first time (adrenals pheo – 31, extraadrenal – 3, multiple – 8, malignant – 22, benign – 12). In 5.7 ± 1.9 years all 34 pts (paroxysmal H – 27, normal BP – 7) had surgery for their first R (R1) in adrenals (n = 27) or extraadrenal (n = 7), multiple (n = 14), malignant (n = 31) or benign (n = 3), average tumor's weight 52.0 (median 31.8). Then 9 out of 34 R1pheo pts (paroxysmal H – 6, normal BP – 3) had second R (R2) in 8.7 ± 5.4 y in adrenals (n = 5) or extraadrenal (n = 4). After one year, 2 of 9 R2pheo pts had a third (R3) and a fourth R (R4); one of the latter 2 pts had a fifth R within a year after his last operation (R5). Mean pts follow up was 8.5 y. Before and after the first operation, Rpheo (n = 34) and pheo pts without R (n = 144) showed no significant difference in H and in BP levels. Malignant H was observed in 2 out of 34 (5%) R1pheo pts and in 23 out of 144 pts (16%) without R. In 20.5% of R1pheo pts and in 33.3% of R2pheo pts BP was normal.

Conclusions: Normal blood pressure in patients after removal of pheo does not preclude recurrence of the disease. Malignant hypertension in Rpheo pts observed significantly less (5%) than in patients with primary pheo (16%). Most patients with Rpheo noted a milder course of hypertension than in primary tumors.

PP.09.16 24-HOUR CENTRAL SYSTOLIC AORTIC BLOOD PRESSURE IN ALDOSTERONISM, ESSENTIAL HYPERTENSION AND NORMOTENSION

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Objective: Primary aldosteronism is the most common cause of secondary hypertension. It accounts for approximately 10% of cases of hypertension and is caused either by bilateral adrenal hyperplasia or aldosterone-producing adenomas. The aim of the present study was to compare 24-hour central aortic systolic blood pressure (SBPao) levels in aldosteronism, essential hypertension and normotensive subjects. In conclusion, differential diagnosis between aldosteronism and essential hypertension should not be based on hypertension levels, but rather in other clinical characteristics such as low serum potassium.

Design and method: We recruited fifteen patients with aldosteronism and age, gender and body mass index (BMI)-matched hypertensive and normotensive subjects. Measurement of SBPao was done by the Arteriograph device (TensionMed, Ltd, Budapest, Hungary). Comparison of the means was conducted by the analysis of covariance (ANOVA). P < 0.05 was considered statistically significant.

Results: Mean SBPao was significantly lower between aldosteronism and controls (mean difference 41.0 ± 15.5 mmHg, p < 0.05) and essential hypertension and controls (mean difference 42.6, p < 0.05). SBPao however was comparable between

age, gender and BMI-matched subjects with aldosteronism and essential hypertension. Serum potassium levels were significantly lower in aldosteronism compared to the other two study groups.

Conclusions: In conclusion, differential diagnosis between aldosteronism and essential hypertension should not be based on hypertension levels, but rather in other clinical characteristics such as low serum potassium.

PP.09.17 PRE AND POST-TREATMENT BLOOD PRESSURE LEVELS IN PATIENTS WITH GRAVES DISEASE. A CASE-CONTROL PROSPECTIVE STUDY

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Objective: Thyroid hormone has important effects on cardiac muscle, the peripheral circulation, and the sympathetic nervous system that alter cardiovascular hemodynamics. There are data describing high systolic blood pressure (SBP) and low diastolic blood pressure (DBP) in subjects with hyperthyroidism. However the effects of anti-thyroid treatment on BP levels has not been investigated to an adequate extent. Therefore, we aimed to investigate the effects of anti-thyroid treatment on BP.

Design and method: We recruited 44 patients with Grave's disease and 43 controls matched for age and gender.

Patients with Grave's disease were treated with anti-thyroid medication to achieve an euthyroid status. Office BP levels were measured after 6 and 12 months in patients and controls according to international guidelines.

Results: Systolic BP (SBP) was significantly higher in patients with Graves disease compared to controls (141.9 ± 15.1 vs 135.9 ± 16.6mmHg, p < 0.05 respectively). There was no difference in BP levels at 6 months follow up. At the end of the 12 months SBP was reduced significantly from baseline in the patient group (135.7 ± 13.9mmHg) and the control group (127.5 ± 10.8mmHg). However differences in SBP in the two groups from baseline to the end of the study were comparable (ΔSBP = -0.5 (105)mmHg, median(range) for patients and -5 (98) mmHg, for controls).

Conclusions: Subjects with clinical hyperthyroidism have higher SBP than normal subjects. Anti-thyroid treatment reduced SBP levels in patients with Graves disease but it was comparable to the reduction observed in the control group.

PP.09.18 CHANGES IN THYROID HORMONE LEVELS AFTER TREATMENT IN GRAVE'S DISEASE CORRELATE WITH CHANGES IN BLOOD PRESSURE LEVELS

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Objective: Hyperthyroidism has been described as a secondary cause of hypertension that causes hyperdynamic circulation. We aimed to investigate the correlations of the circulating thyroid hormones change on blood pressure (BP) levels change in patients with newly diagnosed Grave's disease.

Design and method: We recruited 44 patients with Grave's disease and 43 controls matched for age and gender.

Patients with Grave's disease were treated with anti-thyroid medication to achieve an euthyroid status. Office BP levels were measured after 6 and 12 months in patients and controls according to international guidelines. Free T3 and Free T4 were measured

We used Spearman test for the analyses and a p < 0.05 was considered statistically significant.

Results: Change in SBP between baseline 6 and 12 months of follow up after treatment (ΔSBP) significantly correlated with changes in free T3 (ΔfT3). Change in fT4 (ΔfT4) showed a significant correlation with ΔSBP only at the end of the first semester.

Correlation coefficients r(ΔfT3) = -0.37, p < 0.05, and r(ΔfT4) = -0.32, p < 0.05 after 6 months of treatment were significant, accordingly r(ΔfT3) = -0.35, p < 0.05, was significant but r(ΔfT4) = -0.23, p > 0.05 was not after 12 months of treatment.

Conclusions: Thyroid hormone levels in Grave's disease significantly affect SBP. Normalization of thyroid function leads to reduction of BP levels.

PP.09.19 ACTIVE RENIN CONCENTRATION IS USEFUL FOR DETECTING ALDOSTERONE PRODUCING ADENOMA

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Objective: The plasma aldosterone-to-renin ratio (ARR) for the clinical diagnosis of primary aldosteronism (PA) is usually calculated with plasma renin activity (PRA) as denominator. However, in the Endocrine Society Clinical Practice Guideline for PA, they also recommended the use of active renin concentration (ARC) for diagnosing PA. Moreover, the rapid assay of ARC was recently developed.

Design and method: We surveyed the correlation of PRA and ARC in hypertensive patients, including PA. Then, we investigated whether the calculation of ARR with ARC (ARR-Ac, ng/dl per pg/ml) instead of PRA (ARR-Pa, ng/dl per ng/ml/h) affects the diagnosing of the patients with aldosterone producing adenoma (APA). PRA, ARC, and PAC were measured in 350 patients with hypertension, including the patients with APA (n = 129), bilateral hyperaldosteronism (BHA, n = 93), essential hypertension (EH, n = 46), cushing syndrome (CS, n = 30), subclinical cushing syndrome (SCS, n = 23), paraganglioma (PGL, n = 29). The ARR-Ac and ARR-Pa were calculated, and the receiver operating characteristic (ROC) curve analyses were performed.

Results: ARC were significantly correlated with PRA (r = 0.902, p < 0.0001). ARR-Pa and ARR-Ac of APA patients were 107.2 ± 4.5 and 8.8 ± 0.3 (Mean ± SEM), respectively. Those of BHA were 43.4 ± 2.0 and 4.3 ± 0.1, EH 18.5 ± 1.4 and 2.1 ± 0.1, CS 8.4 ± 1.2 and 1.2 ± 0.1, SCS 11.6 ± 1.3 and 1.5 ± 0.9, and PGL 16.4 ± 1.6 and 1.8 ± 0.1, respectively. The ROC curve analyses confirmed the cut-off value of ARR-Pa of detecting APA was 33.7 (sensitivity: 69.1% and specificity: 74.8%) and that of ARR-Ac was 4.85 (sensitivity: 66.4% and specificity: 84.4%), respectively.

Conclusions: ARC was significantly correlated with PRA. ARC is effective for detecting APA almost equally to PRA.

PP.09.20 THE RELATIONSHIP BETWEEN DAY AND NIGHT URINARY CORTISOL METABOLITES AND VASCULAR RESPONSE IN PARTICIPANTS WITH OR AT RISK OF TYPE 2 DIABETES

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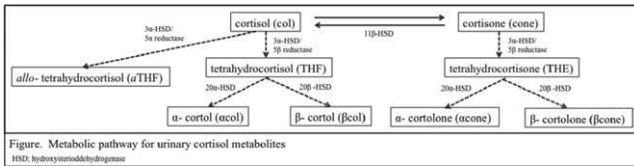
Objective: To assess if 24 h urinary steroid metabolite profiles are related to vascular parameters such as arterial stiffness and blood pressure (BP)

Design and method: 43 eligible participants, 25–81 years, with eGFR > 45 mL/min and no serious illness. Urine was collected over 24 h (12 h day and night samples). Peripheral BP, central pulse wave velocity (aPWV) (by Arteriograph) and cardio ankle vascular index (CAVI) (by VaSera) measures were performed on the collection day. Steroids were extracted from urine aliquots and conjugates hydrolysed by Helix pomatia digestive juice. Free steroids were re-extracted and methyl oxime-trimethylsilyl ether derivatives prepared for GC-MS analysis. Pearson correlation and multiple regression analysis were performed.

Results: The urinary steroid metabolites detailed in the figure (on the following page) were quantified. Systolic BP and aPWV correlated positively with the ratio of cortisol to cortisone metabolites [αTHF, THF, αcol and βcol: THE, αcone and βcone, (colmets: conemets)]; r = 0.32, 0.37 respectively, p < 0.05 for day samples and r = 0.33, 0.34 respectively, p < 0.05 for night samples. Both BP and aPWV also correlated negatively in the day samples with the ratio αcol, βcol, αcone and βcone: αTHF, THF and THE (20OH: 20oxo); r = -0.33, -0.32 respectively, p < 0.05. Night samples only showed this correlation with diastolic BP r = 0.31, p < 0.05. No correlations were seen with CAVI.

Regression analysis with these metabolite ratios (including age and body mass index) did not show they were associated with BP or CAVI (including BP). While aPWV was borderline associated with colmets: conemets, p = 0.077, 20OH: 20oxo was significantly associated (p = 0.026). BP and BMI remained independent predictors.

Conclusions: 24 h urinary 20OH:20oxo ratio was independently related to aPWV in those with or at risk of T2D and colmets:conemets had borderline associations with aPWV. There were no associations with the urinary steroids and BP.



PP.09.21 ENDOGENOUS OUABAIN AND ALDOSTERONE LEVELS: A NEW ADRENAL-VASCULAR AXIS IN NAÏVE HYPERTENSIVE PATIENTS

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Objective: Several studies indicate inappropriately elevated aldosterone (Aldo) secretion in ~30% of newly discovered hypertensive patients. In primary aldosteronism homeostatic feedback loops between sodium balance and Aldo levels are disturbed and cardiovascular/renal damage is assumed to be secondary to high Aldo. However, other adrenocortical steroids including endogenous ouabain (EO) may be important. EO is elevated in sodium-loaded states, is a vasoconstrictor, raises blood pressure (BP), and promotes cardiovascular/renal damage.

Design and method: Here, we investigated the relationship between circulating Aldo and EO and BP changes following an acute salt load in naïve hypertensive patients (NHP). Aldo cross-reactivity was <1% in the EO assay.

Results: NHP (488) were enrolled and grouped in tertiles by circulating Aldo (mean 1st 87 ± 2.18, 2nd 164 ± 1.83, and 3rd 332.3 ± 10.3 ng/dL). Baseline systolic and diastolic BPs were higher in the 3rd versus the 1st Aldo tertile (149.2 ± 1.17 vs 145.6 ± 1.11 and 98.4 ± 0.78 vs 92.5 ± 0.74 mmHg, p < 0.001, respectively). Circulating EO was higher in the 3rd Aldo tertile (285.7 ± 14.9 pmol/L) versus the 1st (239.0 ± 13.6 pM) and 2nd (211.4 ± 12.1 pM) tertiles (p < 0.01). Following an acute Na load, NHE in the 3rd Aldo tertile showed heightened salt-sensitivity of the pressure-natriuresis relationship (slope 0.013 ± 0.002 vs 0.004 μEq/mmHg/min, p = 0.008 after adjustment for sex, BMI, and age). In all subgroups circulating Aldo and PRA are suppressed after Na load. Plasma EO is not affected by Na load. Plasma K⁺ (4.07 ± 0.028 vs 3.93 ± 0.07 mEq/L) was higher (p = 0.002) in the 3rd Aldo tertile. Importantly, a direct (β = 0.116, p < 0.001) linear relationship was found between circulating Aldo and EO following adjustment for baseline BP, age, sex and BMI. β

Conclusions: Among NHP, a large portion of patients have co-elevated circulating levels of EO and Aldo, and their BP is highly salt-sensitive. We suggest that EO and its target, the vascular myocyte α2 isoform of the Na-K ATPase, may contribute significantly to adverse cardiovascular and renal events in high aldosterone states.

PP.09.22 POTENTIAL EFFECTS OF AGE ON SCREENING FOR PRIMARY ALDOSTERONISM

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Objective: Screening test is the first and crucial step of case detection for primary aldosteronism (PA), aldosterone/renin ratio (ARR) is currently regarded as the most reliable and available screening test for PA, however, the falling accuracy of ARR with increasing age has posed crucial challenge for PA screening among older-aged population.

Age (years)	ARR						
	AUC	95%CI	Cutoff value	Sensitivity (%)	Specificity (%)	YI	LR
≤ 39	0.979	0.965-0.994	20.4	100	90.3	0.903	10.3
40-49	0.952	0.934-0.971	20.4	100	81.4	0.814	5.4
50-59	0.912	0.873-0.951	28.0	98.0	76.3	0.743	4.1
≥ 60	0.863	0.775-0.950	25.0	95.2	69.0	0.643	3.1

Design and method: To clarify potential effects of age on screening for PA, 216 subjects with PA and 657 subjects with non-PA were recruited and subdivided into four age groups (less than or equal to 39, 40–49, 50–59 and greater than or equal to 60 years). we respectively compared the level and tendency of PRA, PAC and ARR between different age groups and examined the accuracy as well as the best cutoff value of ARR as screening test for PA in each age group.

Results: As expected, plasma renin activity (PRA) lowered more than plasma aldosterone concentration (PAC) and led to gradually elevated ARR with increasing age

in the non-PA group (P < 0.001), whereas this phenomenon was unobscure in PA group. The best cutoff values of ARR for PA screening were elevated in subjects aged 50–59 years (28.0) and over 60 years (25.0) compared to subjects under 50 years (20.4), while the area under the receiver operating characteristic curves (AUCs), sensitivity, specificity, Youden’s index (YI) and positive likelihood ratio (LR) of ARR were declined with increasing age, especially in patients over 60 years (AUC = 0.863, sensitivity = 95.2%, specificity = 69.0%, YI = 0.643 and LR = 3.1). The AUCs of PAC increased with increasing age and even slightly surpassed that of ARR in patients over 60 years (AUCPAC = 0.884).

Conclusions: Our data suggest that the criteria of ARR for PA screening in patients over 50 years may need setting higher than in patients under 50 years; the falling accuracy of ARR with increasing age, especially in patients over 60 years, could be improved by taking into account the absolute value of the PAC when applicable by the center.

PP.09.23 ADRENAL PHEOCHROMOCYTOMA INCIDENTALLY DISCOVERED IN A PATIENT WITH PARKINSON’S DISEASE

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Objective: Pheochromocytoma (PHEO) and paragangliomas (PGLs) are neuroendocrine tumors arising from chromaffin cells, primarily found in the adrenal gland with an incidence of 1 to 6 per million and a prevalence in hypertension populations varies between 0.1 % and 0.6%. Approximately 4–15 % of PHEO are found as incidentalomas and later coherently diagnosed as PHEO.

Design and method: The coexistence of PHEO and Parkinson’s disease is very rare, with only three cases reported in English literature. Here, we report a case of 67-year-old male with Parkinson’s disease under treatment of dopaminergic drugs, presented for evaluation of poorly controlled hypertension and right adrenal mass incidentally discovered.

Results: The working included an endocrinological examination, which revealed higher 24h-urine metanephrines levels suggesting the possibility of a PHEO. Subsequently, scintiscan with I-123 – MIBG was performed confirming raised activity within the right adrenal gland concordant with the mass. An elective laparoscopic right adrenalectomy was performed and pathological examination confirmed the diagnosis of PHEO.

Conclusions: We empathized the relevance of an accurate diagnosis especially in rare disease, and I-123- MIBG scintigraphy is diagnostic value for confirming PHEO in patient with Parkinson’s disease while receiving dopaminergic therapy.

PP.09.24 A META ANALYSIS OF 1504 PRIMARY ALDOSTERONISM PATIENTS WITH ALDOSTERONE PRODUCING ADENOMA GENOTYPED FOR KCNJ5 MUTATIONS

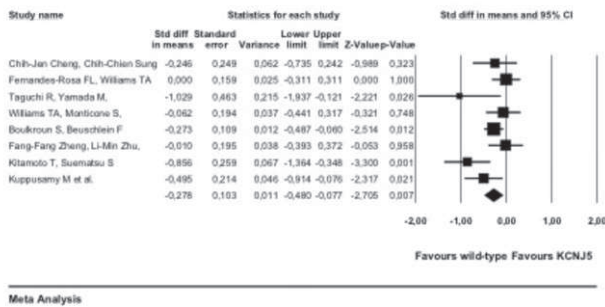
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Objective: The meta-analysis of multiple studies can provide relevant data of outcome when individual studies failed to do so. We therefore meta-analyzed all the available studies reporting on KCNJ5 mutations in PA caused by Aldosterone Producing Adenoma (APA) to determine the clinical features of the KCNJ5 mutated tumors.

Design and method: To identify relevant studies we applied the PICO strategy to search the PubMed database using predefined terms (Population: primary aldosteronism patients with aldosterone producing adenoma; Intervention: adrenalectomy, sequencing for KCNJ5 mutations; Control: APA without KCNJ5 mutations; Outcome: clinical pathological correlates of KCNJ5 mutations). Relevant data were extracted from the eligible studies and used to construct a database. To allow for independent replication of the results we elected to use the commercially available Comprehensive Meta-Analysis™ software. For continuous variables, the standard difference in mean (SDM) and corresponding 95 % confidence interval were computed using random-effects modeling.

Results: By this PICO strategy we identified 11 studies published from 2011 to 2014, which recruited a total of 1504 patients (age 49 years ± 5; 754 males/750 females). The overall prevalence of KCNJ5 mutations was 48%. The meta-analysis showed that compared to wild-type patients (52 ± 5 yrs), those with the KCNJ5 mutations were younger (45 ± 3 yrs) and had higher plasma aldosterone levels (43 ng/dl ± 8 vs 34 ± 8) (Figure 1 on the following page). At variance, we could find no significant effect of systolic and diastolic blood pressure, serum potassium and of gender.

Plasma Aldosterone: standardized differences of means



Conclusions: In conclusion, the meta-analysis of a large dataset comprising all studies available thus far showed that young age and prominent hyperaldosteronism are features associated with the presence of KCNJ5 mutations in PA due to APA

PP.09.25 ASSESSMENT OF URINARY POTASSIUM TO URINARY SODIUM DIVIDED BY SERUM POTASSIUM TO SERUM SODIUM (UPUSPS) AS A SCREENING TOOL FOR PRIMARY ALDOSTERONISM

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Objective: To assess the clinical validity of using UPUSPS [(urinary potassium / urinary sodium) / (serum potassium / serum sodium)] as an index to screen for primary aldosteronism (PA) in patients with high blood pressure.

Figure 1. ROC curves for UPUSPS, UPUS and ARR applied in screening for PA in hypertension patients.

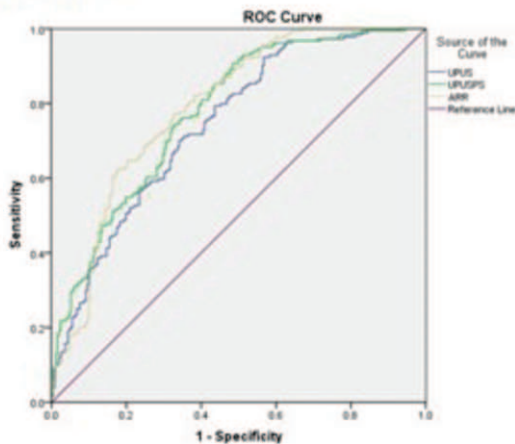


Table 2. Clinical validity data for using UPUSPS, UPUS and ARR to screen for PA in hypertension patients.

Index	Cut off value	AUC	SE	95%CI	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
UPUSPS	3.9	0.778	0.02	0.735-0.820	98.9	81	61	90.7
UPUS	0.11	0.744	0.02	0.699-0.789	98.4	81.3	45.7	94.7
ARR	17.2	0.796	0.02	0.756-0.836	100	80.9	88.6	100

Cut off value: the optimal cut off value; AUC: Area under curve; SE: standard error; CI: confidence interval; PPV: positive predictive value; NPV: negative predictive value.

Design and method: Measurement of the plasma aldosterone concentration (PAC) and plasma renin activity (PRA) was performed in 952 hypertension patients. Of the screened patients, 204 patients were diagnosed with PA and 261 patients were diagnosed with essential hypertension (EH) without PA. Three indexes, including UPUSPS, UPUS (urinary potassium to urinary sodium ratio), and ARR (PAC to

PRA ratio), were calculated for both the PA group and EH group and were used to plot receiver operating characteristic (ROC) curves.

Results: Area under the curve for UPUSPS, UPUS and ARR were 0.778, 0.774 and 0.796, respectively. At an optimal cut off point of 3.9, the sensitivity and specificity of UPUSPS was 98.1% and 81%, respectively, which were comparable to those of ARR. The Bland-Altman plot showed mean bias but no obvious heteroscedasticity between the ARR and UPUSPS.

Conclusions: UPUSPS, which is simple, low-cost, and has a comparable sensitivity and specificity to ARR, could be used as PA screening index in hypertensive patients, especially when PAC and PRC testing is unavailable.

PP.09.26 AMBULATORY BLOOD PRESSURE MONITORING-DERIVED SHORT-TERM BLOOD PRESSURE VARIABILITY IN PRIMARY ALDOSTERONISM

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Objective: The aim of our study was to investigate the ambulatory blood pressure monitoring (ABPM)-derived short-term BP variability (BPV) in patients with primary aldosteronism (PA), either idiopathic hyperaldosteronism (IHA) or aldosterone-producing adenoma (APA), in comparison with patients with essential hypertension (EH) and normotensive (NT) controls.

Design and method: Thirty PA patients (16 IHA, 14 APA), 30 EH patients and 30 NT, matched for sex, age, BMI and antihypertensive therapy, were studied. Short-term BPV was derived from ABPM and calculated as the following: (1) standard deviation (SD) of 24-h, daytime, and nighttime BP; (2) 24-h weighted SD of BP; and (3) average real variability (ARV), i.e., the average of the absolute differences between consecutive BP measurements over 24h.

Results: Standard Deviation (SD) of 24-h, daytime and nighttime BP, 24-h weighted SD of BP, and 24-h BP ARV were not different between PA and EH patients (P ns). All BPV indices were higher in PA, either IHA or APA subtypes, and EH patients, compared to NT (P < 0.001 to P < 0.05).

Conclusions: ABPM-derived short-term BPV is increased in PA patients, and it may represent an additional cardiovascular risk factor in this disease. The role of aldosterone excess in BPV has to be clarified.

PP.09.27 GENETIC ABNORMALITIES IN LATERALIZED MULTINODULAR PRIMARY ALDOSTERONISM

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Objective: Primary aldosteronism (PA) is the most common form of secondary hypertension. Somatic mutations in the KCNJ5, ATP1A1, ATP2B3 and CACNA1D genes have recently been described in aldosterone-producing adenoma (APA). In addition, adrenals with APA show increased nodulation and cortical remodeling with zona glomerulosa hyperplasia. Although the functional link between somatic mutations and aldosterone production is clearly established, it is still not clear whether and how mutations lead to increased proliferation and nodulation. To verify if the somatic mutations are responsible for the entire adrenal phenotype (nodulation and aldosterone production) or isolated events occurring in a previously altered adrenal gland, the aim of this study was to investigate the presence of somatic KCNJ5, ATP1A1, ATP2B3 and CACNA1D mutations in secondary functional nodules of adrenals with APA.

Design and method: We performed aldosterone synthase immunohistochemistry in multinodular adrenals to assess the functional characteristics of the secondary nodules for aldosterone secretion, followed by DNA extraction from functional secondary nodules from FFPE.

Results: KCNJ5, ATP1A1, ATP2B3 and CACNA1D sequencing was performed on 33 functional secondary nodules from 26 multinodular adrenals of PA patients, collected through the COMETE network. In 12 adrenals, 4 harboring a somatic mutation in the APA and 8 without mutation in known genes, we identified the same mutation status between the APA and the secondary nodule. In 10 adrenals with the APA harboring a mutation, no mutations were identified in the secondary nodule. In 2 adrenals without mutation in APA, we identified a KCNJ5 muta-

tion in the secondary nodule. In 1 adrenal harboring a KCNJ5 mutation in the APA, we identified the same mutation in two secondary nodules but no mutation was identified in a third secondary nodule. Finally, in 1 adrenal a CACNA1D mutation was identified in the APA and a KCNJ5 mutation in the secondary nodule.

Conclusions: The identification of a different mutation status between APA and secondary nodules in the same adrenal suggests that somatic mutations found in APA are independent events leading to increased aldosterone production. The sequence of events underlying formation of aldosterone producing nodules remains to be elucidated.

PP.09.28 INCREASED URINARY RELEASE OF ENAC-ACTIVATING PROSTASIN IN PATIENTS AFFECTED BY PRIMARY ALDOSTERONISM

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Objective: Prostin is a GPI-anchored serine protease involved in Epithelium Na Channel (ENaC) activation and released in urine. A direct association between urinary prostin concentration and the activation of the aldosterone-driven pathway has been suggested. Purpose are: verify i) if urinary prostin concentrations are higher in patients with primary aldosteronism (PA) than in patients with essential hypertension (EH), ii) to investigate the relation between prostin and natriuresis in hypertensive patients with or without PA.

Design and method: We enrolled 106 patients (65 M, 41F) who were investigated for possible secondary causes of hypertension and underwent aldosterone to renin ratio (ARR) screening at the Hypertension Unit of the University Hospital of Verona. Prostin concentration was measured by an ELISA assay, based on the antibody sandwich principle utilizing a "capture" antibody and a "detection" antibody, both antibodies commercially available.

Results: Prostin was higher in urine of PA than EH patients. Prostin was positively correlated with aldosterone to renin ratio (ARR), inversely with plasma potassium and urinary sodium. The u-prostin/Na ratio in the highest quartile is associated with a 15 fold probability of PA diagnosis in hypertensive patients

Conclusions: Unlike normotensive subjects in whom prostin and natriuresis are directly correlated, in PA patients prostin increases as u-Na decreases, suggesting a disproportional ENaC activation in spite of the hypertensive state and expanded volume. PA patients are thus characterized by a specific urinary pattern of high prostin and low sodium suggesting that urinary prostin grossly reflects the extent of aldosterone-dependent ENaC over-activation.

PP.09.29 AORTIC DILATATION IN PATIENTS WITH PRIMARY ALDOSTERONISM AFTER THERAPY WITH MINERALOCORTICOID RECEPTORS ANTAGONISTS

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Objective: To evaluate aortic disease in patients with primary aldosteronism (PA) treated with spironolactone in comparison with PA patients treated with surrenectomy.

Design and method: In 22 patients with idiopathic PA treated with spironolactone or canrenoate we evaluate aortic root (AR) and ascending aorta (AA) diameter, indexed for body surface area, LV mass indexed (LVMI) and plasma aldosterone levels. These patients were compared to 23 patients with PA due to adrenal adenoma after surgical treatment, matched for age, BMI, time after beginning of treatment and use of other anti-hypertensive drug classes.

Results: PA patients treated with spironolactone had a greater AR dimension (16.7 ± 1.8 vs 15.6 ± 1.8 mm/m², $P = 0.025$) and a higher prevalence of AR dilatation (64% vs 26%, $P = 0.025$) than patients surgically treated. Moreover, PA patients in spironolactone had a greater AA diameter (19.3 ± 2.3 vs 16.9 ± 2.4 mm/m², $P = 0.003$) and higher prevalence of AA dilatation (45% vs 17%, $P = 0.037$) than PA patients surgically treated. Furthermore, patients treated with spironolactone had a slightly higher plasma aldosterone levels (183 ± 116 vs 108 ± 88 pg/mL, $P = 0.059$) than the control group. At multivariate analysis including age and LVMI as potential confounders, AR and AA diameters were independently associated with use of spironolactone ($B = 0.266$, $P = 0.039$ and $B = 0.392$, $P = 0.002$, respectively), but these associations lost independence including also plasma aldosterone levels into the analysis.

Conclusions: In patients with PA treatment with mineralocorticoid receptors antagonists is associated with a more evident aortic disease than in patients surgically treated. This association could be mediated by non-genomic effects of MRA on arterial wall.

PP.09.30 DIETARY SALT INTAKE AND RENAL DAMAGE IN PRIMARY ALDOSTERONISM

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Objective: Primary aldosteronism is associated with renal changes that include glomerular hyperfiltration and increased urinary protein excretion that recede after treatment. Although animal studies indicate that dietary salt content is critical for occurrence of aldosterone-related renal damage, there is no evidence of this interaction in patients with primary aldosteronism. The aim of this study was to examine the relevance of dietary salt intake, as assessed by measurement of 24-hour urinary sodium excretion (UNaE), and renal damage in primary aldosteronism before and 1 year after surgical or medical treatment.

Design and method: In 46 patients with primary aldosteronism (age 53 ± 12 yr; 32 males) we measured glomerular filtration rate (GFR) by 24-hour creatinine clearance, and 24-hour urinary sodium (UNaE) and albumin excretion (UAE). Diagnosis of primary aldosteronism was established after screening with the aldosterone-to-renin ratio and subsequent confirmation by a saline load test. Twenty-two patients had bilateral adrenal hyperplasia and 24 adrenal adenoma and were treated with mineralocorticoid receptor antagonists or unilateral adrenalectomy, respectively. Measurements were repeated in all patients one year after treatment.

Results: Before treatment, UAE was significantly related with UNaE ($r = 0.388$; $P < 0.01$) both in patients with unilateral and bilateral disease. However, when GFR was included in a multivariate regression analysis the relationship between UAE and UNaE was lost. At follow-up and as expected, GFR and UAE declined significantly both in patients treated with mineralocorticoid receptor antagonists and adrenalectomy, whereas UNaE did differ significantly from baseline. Univariate analysis of correlation did not show any relationship of UNaE with UAE in patients treated medically or surgically.

Conclusions: In conclusion, dietary salt intake is associated with the extent of subclinical renal damage in primary aldosteronism, but this association is explained by glomerular hyperfiltration and therefore could be attributed to the functional changes occurring in the kidney of these patients.

PP.09.31 DEVELOPMENT OF A NEW KIT FOR FREE PLASMA METANEPHRINES

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Objective: Determination of metanephrines from blood plasma plays an important role in the diagnosis of chromaffin cell tumors pheochromocytoma (PHEO) and paraganglioma (PGL). It is highly preferable to use this method for the diagnosis as it is more sensitive than the other methods.

This study aims to develop a new kit for the determination of metanephrine (MN), normetanephrine (NMN) and 3-methoxytyramine (3-MT).

In order to simplify the pre-treatment of the samples and the chromatographic analysis, the solid face extraction (SPE) and all measurement conditions have been thoroughly optimized.

Design and method: We tested patients with and without diagnosis of PHEO and/or PGL. All selected patients were fasting overnight and on a special diet before blood taking. Heparin was used as an anticoagulant. The blood corpuscles were separated by centrifugation. Metanephrines from plasma matrix were extracted by SPE and subsequently determined by high performance liquid chromatography with electrochemical detection.

Results: To optimize the SPE method, eight of the commercially available SPE ion-exchange sorbents were tested. We found a mixture of Discovery DSC-SCX and Discovery DSC-SAX (m/m 4:1) as the most suitable sorbent for metanephrines. As for the HPLC separation, six analytical columns were tested. According to our results, Kinetex XB-C18 100×4.6 mm (5 μ m) is the most convenient solution to perform a short and sensitive analysis.

For the cell potentials optimization, the current-voltage curves of MN, NMN, 3-MT and internal standard have been measured. As the result, +100 mV (1st cell), -350 mV (2nd cell) and +400 mV (conditioning cell) have been determined for further measurements.

Conclusions: The new kit for free plasma metanephrines has been developed. We found the suitable SPE sorbent for the sample preparation and the analytical column for HPLC analysis. The conditions of the measurement have been successfully optimized.

PP.09.32 ALDOSTERONE-RENIN RATIO IN HYPERTENSIVE PATIENTS: IF GENDER AND AGE MATTERS?

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Objective: Primary aldosteronism (PA) is one of the most frequent causes of secondary hypertension and resistance to antihypertensive therapy. Aldosterone-renin ratio (ARR) is considered to be the "gold standard" for PA screening, however the results are often difficult to interpret. We hypothesized that gender and age may have an impact on the aldosterone, renin levels and ARR in patients with uncontrolled hypertension (UCHTN).

Design and method: We examined 314 ambulatory patients [161 males (51.3%) and 153 females (48.7%)], mean age 52.8 ± 17.6 years, referred to Hypertension Excellence Center due to UCHTN. Ambulatory blood pressure monitoring (Space-Labs 90207, USA), renal ultrasound with Doppler were performed as well as blood testing for creatinine level with calculation of GFR by MDRD formula, potassium, glucose, cortisol, metanephrines, plasma aldosterone, renin concentrations with calculation of ARR. In case of elevated ARR the patients proceeded to confirmatory saline infusion test.

Results: ARR was high in 141 (52.2%) patients with UCHTN (n=314), which may be explained by a high proportion of severe and resistant hypertension, obesity, obstructive sleep apnea (63.1%). The diagnosis of PA was confirmed in 27 patients (8.6% of all hypertensive patients, 19.2% of patients with elevated ARR). There were no differences in renin, aldosterone levels and ARR in gender subgroups. But in age group older than 60 years the renin level was significantly lower in male patients (17.6 ± 10.9 and 9.8 ± 6.4 pg/ml; $p=0.02$) and the higher frequency of false-positive ARR results ($\chi^2 = 2.18$; $p=0.05$). And only in male subgroup ARR increased with aging ($r = 0.250$; $p=0.003$) and there was an inverse relationship of renin level with age ($r = -0.386$; $p=0.0001$).

Conclusions: Male hypertensive patients older than 60 are characterized by higher incidence of false-positive ARR results associated with lower renin concentrations.

PP.09.33

ADRENAL VEIN CATHETERISATION GUIDED BY FAST CORTISOL ANALYSIS, AND WITH CONTINUOUS SAMPLING DURING 30 MINUTES FROM THE LEFT ADRENAL VEIN

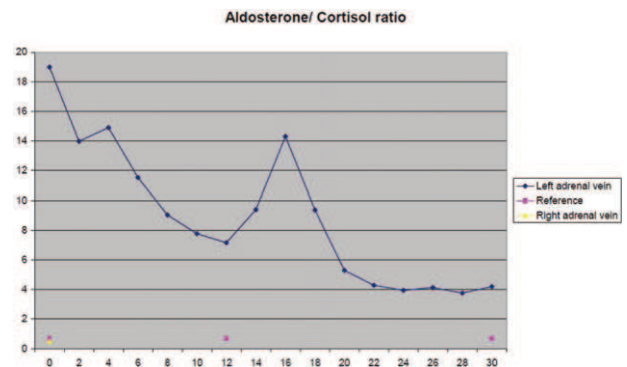
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Objective: To report the results of 11 adrenal vein catheterisations made in 2013 after introducing a bedside analysis of cortisol with response after 12 minutes. Furthermore, to report the results of 30 minutes continuous sampling from the left adrenal vein.

Design and method: 11 consecutive patients with primary hyperaldosteronism and hypokalemia, referred for adrenal vein catheterisation. Catheters were placed under fluoroscopic guidance. Contrast injection was used as necessary to confirm correct placement. Fast cortisol analysis with response time 12 minutes confirmed that samples were representative of adrenal vein blood. In 10 patients, blood samples were drawn every second minute during 30 minutes.

Results: Successful sampling from both adrenals was obtained in 9 of 11 patients (82%). 7 patients had unilateral hypersecretion with suppression of the contralateral secretion, while 2 had bilateral secretion. Sampling with analysis of aldosterone and cortisol showed great variations over time of the key parameter aldosterone/cortisol ratio in blood from hypersecreting adrenals (with ratios between highest and lowest values ranging from 3,3 to 8,9) but also from suppressed adrenals (with ratios between 1,6 and 4). The main reason for the variations were aldosterone secretory peaks.

Conclusions: The rate of successful bilateral sampling from adrenal veins has improved from approximately 60% to 82% after introducing a method for fast cortisol analysis. There are great variations in aldosterone/ cortisol ratio over time. Multiple sampling with intervals of several minutes are recommended.



POSTERS' SESSION

POSTERS' SESSION PS10

AGEING

PP.10.01 FACTORS ASSOCIATED WITH ARTERIAL HYPERTENSION ON ELDERLY

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Objective: Characterize elderly population attending an hypertension clinic and comparing them with non elderly.

Design and method: Observational study using a sample of all patients followed by one physician at an hypertension clinic of a public university hospital till December 2014. Demographic variables, comorbidities, hypertension control (on Ambulatory Blood Pressure Monitor (ABPM), home blood pressure measurement (HBPM) and at physician office), target organ damage and salt consumption were registered. Beyond the age of 65, patients were considered elderly. SPSS was used for statistical analysis: Student t test for continuous variables, and chi-square for categorical ones.

Results: From our sample of 102 patients, 47 were elderly (46.1%) and 53 were women (52%), with similar proportion of females on both groups. Elderly patients had more frequently dyslipidemia (54.9% Vs. 45.1%, $p = .009$), cerebrovascular disease (80% Vs. 20%, $p = .001$) and carotid disease (21.3% Vs. 0%, $p = .005$). They also have more coronary (70% Vs. 30%) and renal disease (60% Vs. 40%), but these without statistical significance. Concerning other target organ damage, there were no differences on left ventricular hypertrophy ($N = 58$) and albuminuria ($N = 85$) between the two groups. Elders were more frequently medicated with acetylsalicylic acid (67.7% Vs. 32.3%, $p = .005$) and statin (60.6% Vs. 39.4%, $p = .005$) and had more frequently resistant hypertension (59.3% Vs. 40.7%, $P = .006$). Prevalence of non controlled hypertension did not differ between two groups neither at physician office, nor on diurnal ABPM ($N = 66$), or on HBPM ($N = 82$). The average 24 hour urinary sodium was lower in elderly both at the beginning (146 Vs. 207mEq/L, $N = 70$) and at the end of follow-up (132 Vs 146mEq/L, $N = 64$), but without statistical significance.

Conclusions: Elderly attending our hypertension clinic had more frequently resistant hypertension, as would be expected. However, we couldn't show more target organ damage on elderly, maybe due to good adherence to treatment and good pressure control. We couldn't also find a difference between blood pressure control on elderly and non elderly, in contrast to previous studies which reported poorer hypertension control on the first group, favoring an early referral of elderly to specialized hypertension clinics.

PP.10.02 A STUDY OF COMORBIDITIES AND HIGH BLOOD PRESSURE IN THE ELDERLY

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Objective: This poster aims to present a relationship between various diseases ubiquitous in the elderly population and the high blood pressure (HBP) incidence.

Design and method: Longitudinal study with duration of 24 months, at the same location, University Hospital CF Timisoara.

Study lot: 312 elderly patients (age >65 years old) out of which 257 with HBP.

Investigations: clinical and para-clinical (cardiac ultrasound, abdominal ultrasound, EKG, complete blood works, thoracic Rx), as well as various geriatric assessments (MMSE, IADL, ADL)

Results: Out of 257 patients presenting HBP, 93 were male (36,19%), 164 female (63,81%). The HBP was found at the 2nd degree in 154 patients (59,92%), while 103 presented HBP with 3rd degree (40,07%).

Significant comorbidities found included primary generalized osteoarthritis in 237 persons, COPD in 198, chronic renal disease in 125, obesity in 122, anaemia in 82, hyperthyroidism in 41 as well malignant diseases in 49 patients.

The geriatric assessments showed a MMSE score over 25 points in 95 patients, between 20–24 in 81 patients, between 15–19 in 38 patients and under 15 points, 33 patients.

ADL and IADL presented significant prejudicial scores in 105 persons

The treatment compliance was highly unsatisfactory in patients due to the presence of depression for 73 of them, due to senile dementia with/ without delirium or acute confusional state for 59 persons. A mild case of unacceptable treatment compliance was correlated with reduced mobility in 148 patients.

Conclusions: The comorbidity presence has an impact on the severity degree of HBP. In the elderly patients, geriatric specific comorbidities influence the ability to treat HBP, consequently making those patients prone to complications like cardiac insufficiency, stroke and/or myocardial infarction. Permanent control is required in elderly with HBP.

PP.10.03 PSYCHOLOGICAL DISORDERS AND CONTROL OF HYPERTENSION IN ELDERLY

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Objective: Epidemiological evidence suggests increasing proportion of elderly people. One half/two thirds of old population have hypertension. The aim of the present study was to evaluate the coexistence of psychological disorders in elderly subjects with hypertension with poor therapeutic control.

Design and method: 68 elderly patients (30 Males, 38 Females; mean age 72 ± 6 years) with uncontrolled hypertension were included in the study. They all went through psychiatric evaluation, using anxiety and depression scales. Benzodiazepines, Selective serotonin reuptake inhibitors and supporting psychotherapy were provided to the patients with psychological disorders during 3 months. Hypertensives at first place diagnosed with psychological disorders were re-evaluated after 3 months of psychiatric therapy.

Results: 42 elderly hypertensives (61.76%) suffered from psychological disorders. 11 patients (16.17%) suffered from generalized anxiety disorder with frequent anxiety attacks, phobias and visits to the emergency room. 17 elderly hypertensives (25.01%) had anxiety depression. 9 patients (13.23%) were diagnosed with simple anxiety disorder, and 5 patients (7.35%) with intense somatization disorder. After 3 months of psychiatric therapy blood pressure was controlled in 25 patients (42.64%). In the rest of elderly hypertensives there was a reduction in systolic and diastolic blood pressure (15 and 5 mmHg, respectively).

Conclusions: Psychological evaluation in elderly uncontrolled hypertensives must be considered and treatment must be provided when necessary in order to achieve better blood pressure control.

PP.10.04 DETERMINANTS OF AORTIC STIFFNESS IN A LONG-LIVING POPULATION: THE IKARIA STUDY

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Objective: Ikaria, the Greek island of the East Aegean, is among the five places in the world with the highest rates of octagenarians. Aortic stiffness, assessed by aortic pulse wave velocity (PWV), is an independent prognostic factor of cardiovascular and all-cause mortality. However, data on the assessment of aortic stiffness in long-living populations are lacking. The aim of the present study was to evaluate aortic stiffness in the inhabitants of Ikaria island, across a broad spectrum of age.

Design and method: We studied a sample of the Ikaria island's inhabitants ($N = 153$). We divided the population into 4 age groups, each per decade: 1. 40–49 years old ($N = 30$), 2. 50–59 years old ($N = 40$), 3. 60–69 years old ($N = 35$) and 4. over 70 years of age ($N = 48$). Aortic stiffness was assessed by the measurement

of carotid-femoral PWV using the Complior device. Laboratory evaluation was performed in all participants.

Results: Systolic blood pressure (SBP) showed a gradual increase proportional to the advanced age group (from 131.1 ± 11.5 to 136.5 ± 15.1 to 143.6 ± 16.4 to 152.4 ± 21.7 mmHg, $p < 0.01$). On the contrary, no difference was observed in the levels of diastolic BP among groups (from 81.7 ± 6.4 to 83.5 ± 10.1 to 80.8 ± 7.3 to 81.6 ± 11.1 mmHg, $p = \text{NS}$).

Pulse wave velocity increased gradually across the 4 groups of age (from 7.96 ± 0.95 to 8.76 ± 1.25 to 9.89 ± 1.19 to 12.05 ± 2.62 m/s, respectively, $p < 0.001$). In linear regression analysis, PWV was independently related to age group ($b = 0.62$, $p < 0.001$), heart rate ($b = 0.24$, $p < 0.001$), mean BP ($b = 0.20$, $p < 0.01$), creatinine ($b = 0.15$, $p = 0.02$) and, inversely, to BMI ($b = -0.13$, $p = 0.03$).

Conclusions: Age is a powerful determinant of aortic stiffness in the population of Ikaria island. Moreover, haemodynamic parameters, such as arterial pressure and heart rate, as well as kidney function are independently associated with aortic stiffness. Interestingly, obesity is inversely related to PWV, a finding suggesting a possible 'obesity paradox' effect. Future studies in other long-living populations need to confirm the present findings and shed light into the relationship of arterial stiffness with longevity.

PP.10.05 PREVALENCE OF TARGET ORGAN DAMAGE IN THE ELDERLY IN A GENERAL POPULATION IN NORTHERN ITALY: THE VOBARNO STUDY

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Objective: Current hypertension guidelines recommend evaluation of preclinical organ damage (OD) for cardiovascular risk assessment. Previous studies have indicated that in elderly subjects the prevalence of OD is high, but few data are available on the prevalence of various forms of OD in elderly subjects (E) as compared to non-elderly (NE) in a general population.

Design and method: A total of 478 subjects (mean age 58 ± 10 , range 43–74 yrs), 44% males, 69% hypertensives (37% treated), 17% obese, underwent clinical examination with blood pressure (BP) measurement (clinic and 24 hours), standard laboratory examinations, echocardiography, measurement of carotid femoral pulse wave velocity (PWV) and carotid intima media thickness (IMT). OD was defined, according to ESH ESC 2013 Guidelines.

Results: 40% of patients were classified as E (> 64 years). SBP values were greater in E (clinic: 148 ± 15 vs 133 ± 13 mmHg, 24h: 125 ± 13 vs 119 ± 11 mmHg, all $p < 0.01$). The prevalence of hypertension was greater in E as compared to NE (86% vs 53%, chi square $p < 0.001$). The prevalence of LVH was 31% in E as compared to 8.1% in NE (Chi square $p < 0.001$). Also vascular damage was significantly more frequent in E: increased PWV was observed in 69% of E and in 21% of NE (chi square $p < 0.001$) and carotid structural damage (increased IMT or presence of a plaque) was observed in 96% of E and 64% of NE (chi square $p < 0.001$). The overall prevalence of OD was greater in E (98.4 vs 67.7%, chi square $p < 0.001$); The simultaneous presence of 2 forms of OD was observed in 59% of E and in 17% of NE and the simultaneous presence of 3 forms of OD was observed in 14% of E and in 3% of NE.

Conclusions: In a general population the prevalence of OD is particularly high in elderly patients as compared to middle age subjects. The coexistence of more than one form of OD is common in elderly patients and might contribute to the increased CV risk in these subjects.

PP.10.06 EARLY VASCULAR AGEING IN NORMOTENSIVE SUBJECTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS. COMPARISON WITH YOUNG HYPERTENSIVE PATIENTS

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Objective: Aortic pulse wave velocity (aPWV), is one of the most important markers of vascular aging.

It is well known that connective tissue diseases are associated with accelerated atherosclerosis, but only a few data are available about aPWV in patients with systemic lupus erythematosus (SLE).

The aim of this study was to evaluate early vascular aging, assessed by measuring aPWV, in a group of normotensive patients with SLE and to compare these subjects with a group of young essential hypertensive (EH) individuals

Design and method: Cross-sectional study. We have enrolled 39 normotensive SLE subjects (mean age: 38.7 ± 8.3 years) matched for age with a group of essential hypertensive patients (mean age 38.7 ± 9.8 years). Each patient has been underwent aPWV measurement through an oscillometric device (Arteriograph).

Results: As for selection, systolic and diastolic blood pressure values were significantly lower ($121/71 \pm 14/9$ mmHg) in the SLE patients when compared to those of the hypertensive subjects ($151/98 \pm 14/8$ mmHg; $p < 0.001$). Despite this difference regarding BP, aPWV was similar in the two groups, being 9.1 ± 2.9 m/sec in SLE subjects and 9.05 ± 2 m/sec in the group of young essential hypertensive patients ($p = \text{ns}$). In both groups aPWV was greater than that of the normal population in the same age category (6.5 m/s).

Conclusions: Our results seem to suggest that SLE has the same deleterious impact on vascular aging as well as high blood pressure. It is very likely that this unfavourable effect of SLE is mediated by chronic inflammation.

PP.10.07 ORTHOSTATIC HYPOTENSION IN LATINO ELDERLY: FINDINGS FROM THE MARACAIBO AGEING STUDY

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Objective: Orthostatic hypotension (OH) is a debilitating condition that is associated with decreased quality of life and increase all-cause mortality. There is insufficient information about OH in elderly Latinos. The aim of the present study was to determine the prevalence and risk factors for OH in community-dwelling elders from the Maracaibo Aging Study (MAS), Venezuela.

Design and method: The MAS is a population-based study of community-dwelling individuals aged 55 years or older. The MAS included 2437 participants who underwent standardized assessments. Randomly selected, 887 subjects completed the OH protocol. OH was defined as a drop in systolic blood pressure (BP) of 20 mm Hg or more or a drop in diastolic BP of 10 mmHg after standing for 1, 3, or 5 minutes. Pulse pressure (PP) was the difference between systolic and diastolic BP. One-way ANOVA and χ^2 tests were used for data analysis. Multivariate logistic regression model, adjusting for age, sex, smoking, obesity, hyperhomocysteinemia, heart rate (HR) and PP was performed to determine risk factors for OH.

Results: The mean age of subjects was 66.6 yrs, and 62% were women. Hypertension was highly prevalent (80.3%), and one-third of the participants were obese. Prevalence of OH was 45% and doubled from 33% in the younger (55–64 y) group to 68.5% in the older (>75 y) group. The most common type was systolic OH (43%) compared with diastolic OH (26.5%) or combined systolic and diastolic (30.5%). All subjects with OH were hypertensive, 32% received treatment, and none of those treated had their BP controlled. Multivariate analysis revealed that, in the younger group, high HR (OR = 7.58 95% CI = 1.97 – 29.09) and PP (OR = 1.21, 95% CI = 1.16 – 1.26) were significantly associated with high risk of OH. Other confounders contributed to risk, including sex (OR = 0.20, 95% CI = 0.09 – 0.42) and smoking (OR = 0.44, 95% CI = 0.20 – 0.96). In the old group, only PP was associated with OH.

Conclusions: Elderly participants of the MAS have a high prevalence of hypertension, and high rates OH. Male sex, high HR and high PP were risk factors for OH, while smoking was protective.

PP.10.08 TRAJECTORY OF BLOOD PRESSURE IN SERIAL MEASUREMENTS IN AN AGEING POPULATION

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Objective: The change of blood pressure (BP) with age is well established. The trajectory of BP with ageing using repeated data is less studied, and difference in longitudinal BP curves could contribute the population specific rates of age-dependent outcomes. We investigated the trajectory of BP in serial measurements in ageing population sample in Russia.

Design and method: The representative population samples of men and women aged 45–69 years at baseline were examined in 2003/05 in Novosibirsk (Russia) and re-examined 3 years later (aged 48–72 years, response rate = 77%) as part of the HAPIEE Project. Two types of analyses were made: (i) cross-sectional analyses of BP vs. age, and (ii) longitudinal analyses of repeated measurements of BP in 5564 persons with two repeated measurements over a mean 3.1 (SD 0.7) year follow-up. The difference (DIFF) in BP values between two examinations was calculated.

Results: In cross-sectional analyses of re-examination data, both SBP and DBP increased with age ($b = 0.882$ and $b = 0.093$, respectively, both p -values < 0.001). In longitudinal analyses over the follow up, the mean systolic (SBP) and diastolic blood pressure (DBP) increased by 5.3 and 1.5 mm Hg, respectively. The

increases in SBP were similar in men and women but changes of DBP in men were not statistically significant. After restricting analysis to those not receiving antihypertensive treatment, SBP trajectory remained consistently upward and DBP trajectory became insignificantly downward. The curves of both SBP DIFF and DBP DIFF were decreasing ($b = -0.191$, $p < 0.001$ and $b = -0.053$, $p = 0.021$, respectively).

Conclusions: In this Russian population sample of middle aged and older persons, SBP increased with age in both cross-sectional and longitudinal analyses. However, association of longitudinal DBP with age was not statistically significant. These findings reflect the limitations of BP control, and may suggest the peculiarities of BP gradient with ageing in the Siberian population; this might contribute the high rates of age-dependent outcomes.

PP.10.09 ARTERIAL STIFFNESS AND AGE IN NORMOTENSIVE PATIENTS

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Objective: We exam 58 patients older 60 years (30 female, mean age 78 ± 0.4). We subdivided this patients in two groups: younger and older 80 years ($n = 18$). As a control group was patients younger 40 (third group) and patients in age 40–60 (4-th group).

Design and method: For all patients we performed of estimation of lipid and glucose levels, echocardiography, 24-hour monitoring of blood pressure (BPLab device, «Petr Telegin», Russia). We estimated pulse wave velocity (PWV), augmentation index (Aix), index of arterial stiffness (ASI), ambulatory index rigidity (AASI). Statistic analyze we performed by «Biostat».

Results: PWV in first group was in mean 9.3 ± 0.6 m/s, in second group 10.4 ± 0.5 m/s, in 3-d group 6.97 ± 0.04 , in 4-th 8.2 ± 0.4 m/s; $p_{3-1} < 0.05$; $p_{3-2} < 0.05$. In first group PWV was more in male (10.75 ± 0.3 m/s; in female 8.71 ± 0.38 , $p < 0.05$). In 2-d group PWV was in male 10.1 ± 0.4 m/s, in female 11.5 ± 0.2 . In 31% of male and 65% of female older 80 years PWV was than 10 m/s. In patients in 4-th group we obtained more stronger increase PWV in male (8.7 ± 1.3 m/s in contrast in female 7.1 ± 1.3 m/s, $p < 0.05$). In patients younger 40 we do not obtained statistic differences between male and female.

Progression of Aix in patients according to age was more stronger in female. Before 40 Aix in female was $-26 \pm 0.3\%$ (in male -53.4 ± 0.7). In female in age 40–60 it was $-21.3 \pm 1.1\%$ (in male $-44.2 \pm 0.1\%$). This tendency is preserved in 60–80 years in female $-13.7 \pm 1.4\%$, in male -22 ± 0.03 , $p < 0.05$. In female older 80 it was $6.1 \pm 0.8\%$, in male $-5 \pm 0.02\%$. According to age of patients we obtained tendency to impair of ASI, AASI. In patients younger 80 alteration of arteries were more stronger in male, after 80- in female.

Conclusions: progression of increasing artery stiffness in patients older 60 inhomogeneous. In age 60–80 more strong progression was obtained in male: increasing of PWV, ASI, AASI. In female in this age Aix impair progression was more stronger. In patients older 80 years the most impaired of arterial stiffness was obtained in female. In this process was involved as direct as reflect pulse wave.

PP.10.10 INTERACTIVE EFFECTS OF AGE AND 24-HOUR BLOOD PRESSURE VARIABILITY ON LEFT VENTRICULAR HYPERTROPHY. DATA FROM THE KOREAN AMBULATORY BLOOD PRESSURE (KOR-ABP) REGISTRY

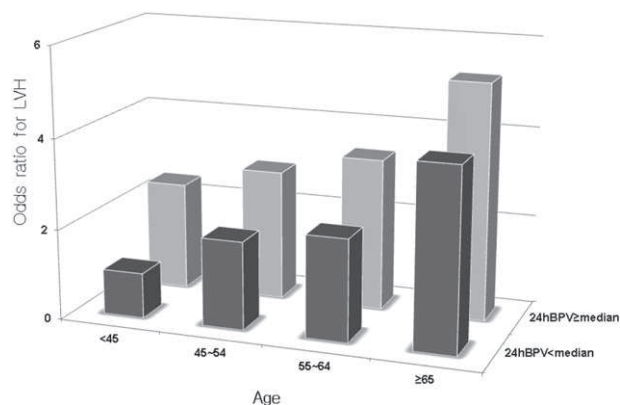
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Objective: Increased short-term blood pressure variability (BPV) has been known to be related with target organ damages independent of blood pressure (BP) level. However, the effect of age on the relationship between BPV and left ventricular hypertrophy (LVH) has not been evaluated. We aimed to investigate the relationships between age, BPV, and LVH in a cross sectional study.

Design and method: Among the 3,762 participants of the Korean ambulatory BP (KOR-ABP) registry, we assessed the data of 1,606 (42.7%) participants who had the record of echocardiography. As an index for 24-hour BPV, the average real variability (ARV) of systolic and diastolic BP was analyzed. We used left ventricular mass index (LVMI, LV mass divided by body surface area) as an index for LVH (LVH; > 95 g/m² in women, > 115 g/m² in men).

Results: Mean age was 57.2 (SD 14.2) years, 857 (53.4%) were men, and 953 (59.3%) had hypertension (BP $> 140/90$ mmHg or taking antihypertensive medications). Age was not associated with 24-hour average systolic BP ($B = 0.037$, $P = 0.211$), but associated with 24-hour average diastolic BP ($B = -0.18$, $P < 0.001$) by linear regression analysis. However, age was associated with both 24-hour ARV

of systolic ($B = 0.06$, $P < 0.001$) and diastolic ($B = 0.03$, $P = 0.014$) BP. There were significant relationships of age and BPV on the presence of LVH, thus the older participants with increased BPV showed higher risk of having LVH.



Conclusions: In KOR-ABP registry, age was associated with short-term BPV. Furthermore, there exist significant interactive effects of age and BPV on left ventricular hypertrophy.

PP.10.11 BLOOD PRESSURE VALUES AND MORTALITY AMONG DISABLED ELDERLY RESIDENTS OF LONG TERM CARE FACILITIES

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Objective: Estimation the relationship between mortality and blood pressure values and functional status among elderly residents of long-term care (LTC) facilities.

Design and method: Medical documentation of elderly residents of 3 LTC facilities (two residential homes and one nursing home) were analyzed. Blood pressure (BP) measurements, Mini Nutritional Assessment (MNA), Abbreviated Mental Test Score (AMTS) and Barthel's Index were performed in all study participants at the beginning of the study. Mortality during one year follow-up was analyzed. Results obtained among residents with initial systolic BP values below 140 mmHg [group I] and equal or above 140 mmHg [group II] were compared using U Mann-Whitney or Chi square tests.

Results: The sample consisted of 168 residents, 78.7 ± 8.5 years old, 52.56% men. Group I ($n = 122$) and group II ($n = 46$) had similar age (78.7 ± 8.7 vs 78.7 ± 7.9), number of diagnosed diseases (4.2 ± 1.8 vs 4.3 ± 1.6) number of used drugs (6.6 ± 3.6 vs 6.3 ± 3.6), and AMTS score (6.3 ± 3.2 vs 7.3 ± 2.4). However group I showed significantly lower BP values ($119.2 \pm 11.7/69.0 \pm 9.9$ vs $151.6 \pm 12.1/79.2 \pm 10.3$ mmHg), MNA score (9.8 ± 3.1 vs 12.3 ± 1.9) and Barthel Index (36.2 ± 34.4 vs 77.3 ± 30.4). Moreover, frequency of deaths was higher in group I than II (15.6% vs 4.4%).

Conclusions: Elderly residents of LTC facilities with lower BP values, functional status and higher risk of malnutrition revealed higher probability of death during one year follow-up.

PP.10.12 ARTERIAL STIFFNESS IS ASSOCIATED WITH TELOMERE LENGTH IN HYPERTENSIVE PATIENTS

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Objective: Peripheral blood leukocyte telomere length (TL) is a systemic aging biomarker and has been proposed as an independent predictor of cardiovascular diseases. Telomerase activity (TA) may be regarded as a potential target for vascular rejuvenation. Nevertheless the origin of the association between telomere biology and cardiovascular diseases is still unknown.

The aim of the study was to estimate the role of TL and TA in the development of age-associated arterial changes.

Design and method: TL and TA were assessed by quantitative polymerase chain reaction in 127 patients with essential hypertension, mean age 51.5 ± 0.8 years, 94 males.

Intima-media thickness (IMT) and plaque presence (PP) were determined by ultrasonography in both left and right carotid arteries. Aortic pulse wave velocity (PWV) was measured with the help of SphygmoCor (AtCor Medical). Results are summarized in the table (on the following page).

Results:

Association between telomere biology and vascular aging.			
	PWV (m/s)	IMT (mm)	PP (number)
Age (yrs)	r=0,4082 p=0,0021	r=0,5834 p=0,0001	r=0,3414 p=0,0091
TL	r=-0,2867 p=0,0374	r=-0,0607 p=0,6597	r=-0,0965 p=0,4832
TA	r=-0,1367 p=0,3242	r=-0,0170 p=0,9013	r=-0,0623 p=0,6482

Conclusions: Conclusions: The effect of TL on arterial aging may be mediated by the predisposition to arterial stiffness, but not atherosclerosis. Further studies are needed to investigate the potential mechanisms of telomerase activity in vascular aging.

PP.10.13 **LOW DIASTOLIC BLOOD PRESSURE AS A CARDIOVASCULAR RISK FACTOR IN ELDERLY HYPERTENSIVE SUBJECTS**

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Objective: The aim of this study was to identify cardiovascular risk factors in a cohort of hypertensive subjects over 70 years.

Design and method: We designed a retrospective cohort study. The study population included 72 hypertensive patients over 70 years and they all underwent a complete annual medical examination from January 2011 to December 2014, including 48-hours blood pressure monitoring (ABPM) in order to exclude those with "white-coat" hypertension. They also underwent applanation tonometry to estimate central aortic blood pressure and carotid-femoral pulse wave velocity (PWV). Primary endpoint was the combination of fatal/non-fatal coronary heart disease or fatal/non-fatal stroke, or peripheral revascularization. All events were confirmed on the basis of medical records.

Results: A total of 14 cardiovascular events were identified (6 fatal CV events, 3 acute coronary events, 3 acute congestive heart failure episodes and 2 ischemic strokes). There were not any differences between those subjects with or without any CV event regarding age, gender, body mass index, waist perimeter, office systolic/pulse pressure, central systolic BP or PWV.

Both office and central diastolic BP were lower in those elderly hypertensive subjects with CV events (71.5 Vs 79.7 mmHg; $p=0.02$ and 72.2 Vs 81.8 mmHg; $p=0.01$, respectively). When taking into account 48-hour ABPM, we only found significant differences on pulse pressure, higher on those with CV events (67.4 Vs 59.6 mmHg).

A multivariate analysis demonstrated that office diastolic BP under 70 mmHg or central DBP under 75 mmHg were risk factor for the occurrence of fatal/non fatal CV events (RR: 1.78; 95%CI: 1.08–2.93 and RR: 1.57; 95%CI: 1.061–2.53, respectively).

Conclusions: We conclude that those hypertensive subjects over 70 years with low office or central diastolic BP had worse cardiovascular prognosis. We suggest 70 mmHg as a valid diastolic BP threshold that below which survival is impaired.

PP.10.14 **DETERMINANTS OF CENTRAL SYSTOLIC BLOOD PRESSURE IN THE VERY ELDERLY WITH ACUTE CORONARY SYNDROME**

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Objective: The systolic blood pressure (SBP) and age are the main factors which influence arterial stiffness. Data on the interrelation of arterial stiffness with other cardiovascular risk factors is controversial. The aim of this study was to evaluate relationship of arterial stiffness, SBP and cardiovascular risk factors in very elderly subjects.

Design and method: Routine investigations, aortic pulse wave velocity (PWV) measurement and central pulse wave analysis (PWA) was done in 64 subjects older than 80 years (mean age 83.4 ± 0.8 years, 34.4% male, mean brachial SBP 132.6 ± 6.96 mm Hg) with BPLab Vasotens system («Petr Telegin», Russia). The subjects were admitted due to acute coronary syndrome. Patients with ejection fraction (EF) < 40%, atrial fibrillation, aortic stenosis and severe comorbidities were not included. Kruskal-Wallis test was used for comparison PWV and PWA results in subgroups by brachial SBP tertiles (I from 94 to 127,3 mmHg, II from 127,4 to 140 mmHg and III from 140,1 to 174 mmHg). Pearson test was used for correlation analysis.

Results: By brachial SBP tertiles central SBP was $102,3 \pm 5,7$, $124,5 \pm 3,2$, $138,8 \pm 8,5$ mm Hg ($p < 0,0001$), respectively. There was no significant increase of augmentation index (AI) from I to III tertiles of brachial SBP: $34,6 \pm 8,3$, $40,9 \pm 7,1$, $40,1 \pm 7,4\%$ ($p = 0,43$), respectively. No significant difference in PWV was observed also: $12,0 \pm 0,89$, $11,1 \pm 0,78$, $11,1 \pm 1,3$ m/s ($p = 0,27$), respectively.

Central SBP was associated with body mass index (BMI) ($r = 0,42$, $p < 0,05$), waist circumference ($r = 0,52$, $p < 0,005$), triglycerides level ($r = 0,45$, $p < 0,05$). Paradoxical negative correlation between central SBP and PWV $r = -0,33$ ($p < 0,001$) was observed. Significant correlation between central SBP and EF was found ($r = 0,59$, $p < 0,0001$).

Conclusions: In the very elderly central SBP is not determined by arterial stiffness (PWV) but is associated with LV contractility (ejection fraction).

PP.10.15 **RISK OF EARLY VASCULAR AGEING IN NORMOTENSIVE SUBJECTS**

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Objective: Early vascular aging (EVA) is closely related with a worse cardiovascular outcome. Although hypertension is clearly associated with EVA, there is a cluster of normotensive patients with EVA. In these subjects there is not well known the role of different biomarkers and risk factors as mechanism of the increased arterial stiffness.

a-To evaluate the prevalence of abnormal PWV in normotensives. b-To determine independent predictors of increased vascular stiffness in normotensive,

Design and method: We evaluated 136 subjects in a primary cardiovascular prevention program, without any pharmacological treatment. After applying exclusion criteria (hypertension, diabetes, kidney disease) a final sample of 85 were included ($45,5,6 \pm 11,7$ years, $119,8 \pm 8,42/75,4 \pm 8,08$ mm Hg, 49% female). We performed the following determinations in all population: PWV (Mobil-O-Graph®), waist circumference, BMI, total cholesterol, LDLc, HDLc, triglycerides, glucose, A1C Hb, and information about first degree family history of hypertension and cardiovascular disease. Abnormal PWV was defined as those values above 90 th percentile (ESH). Univariate correlations between PWV and all the metabolic determinants (Pearson) were performed. Multivariate analysis to identify abnormal PWV predictors were done with logistic regression by considering: a) PWV as a dependant variable, and b) metabolic markers that showed $p < 0,1$ in univariate analysis.

Results: The prevalence of abnormal PWV was 11,76%. In univariate analysis, in normotensive subjects we observed that abnormal PWV was associated with age, waist circumference, SBP, LDLc, and glucose levels. In the logistic regression, only SBP ($p = 0,02$), and glucose levels ($p = 0,05$) showed an independent and predictive value to determine abnormal PWV ($p = 0,0026$).

	Coefficient	Std. Error	P
Gender	0,160	1,203	0,893
Waist circ.	-0,054	0,056	0,333
LDLc	-0,028	0,017	0,107
Glucose	-0,210	0,109	0,050
SBP	0,200	0,086	0,020
Family Hist. CV dis.	0,461	1,398	0,741
Family Hist. HBP	1,278	1,085	0,239
Constant	-0,520		
Significance level			0,0026

Conclusions: We found that systolic blood pressure and glycemic values are closely related with early vascular aging among normotensive young and healthy subjects, independently of hypertension and cardiovascular history. We consider that larger studies could evaluate if the increased glucose values, in normotensive and non diabetic subjects, may play a role in vascular stiffness and may be a therapeutic target.

PP.10.16 **ARE WE DOING WELL WITH OUR ELDERLY PATIENTS? AN OBSERVATIONAL STUDY IN AN URBAN PRIMARY ATTENTION CENTER**

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Objective: To assess the control of blood pressure (BP) in hypertensive patients (HP) older than 80 regarding two different treatment targets (more intensive vs. less intensive BP lowering). To know the antihypertensive drug classes, combinations employed and the prevalence of the main cardiovascular risk factors.

Design and method: A descriptive observational study based in the review of electronic health record of patients treated from November 2013 to October 2014, choosing patients with at least three BP measurements in the study period who are over 80 years of age. Those who do not meet these criteria are excluded from the study.

We calculated the mean BP from the last three measures and contrast the percentage controlled considering the more intensive BP lowering (139/89 mmHg) and the less intensive BP lowering (149/89 mmHg).

Results: 472 (28.68%) of 1646 HP are older than 80. There are 291 (61.65%) with at least three BP measurements. Considering the more intensive BP lowering target,

193(66.32%) HP are controlled, but if we consider the less intensive BP lowering target, 264(90.72%) are. 92(31.61%) are in the one-drug treatment group [Angiotensin receptor blockers(ARB) in 11(3.78%); calcium antagonist(CA) in 7(2.4%); angiotensin converting enzyme inhibitors(ACEI) in 28(9.62%) and diuretics(D) 46(15.8%)]. 92 patients are in the two-drugs therapy group 92(31.61%) [ARB+CA 6(2.1%); ARB+D 33(11.34%); ACEI+CA 5(1.72%), ACEI+D 36(12.37%), CA+D 12(4.1%)]. In the three-drugs therapy group there are 51(17.52%) [ARB+CA+D 24 (8.25%); ACEI+CA+D 27 (9.28%)] and 56(19.24%) are following another treatments. CVRF found: Heart Failure 3(1.03%); peripheral artery disease 3(1.03%); Atrial Fibrillation 13(4.47%), stroke 1(0.34%), DM 29(9.97%), smoking 1(0.34%), dyslipidaemia 68(23.37%).

Conclusions: Most of the elderly patients are treated with one or two antihypertensive drugs, being the most used D in monotherapy and angiotensin inhibitors plus diuretics in combined therapy. The prevalent CVRF are the lipids disorders, DM and AF. The population's progressive aging makes hypertension be a great impact problem. Almost three out of ten hypertensive patients are older than 80. Whereas strict control of hypertension 65.8% of patients would be controlled, this figure rises to 90,72% for wider range. We agree to take into account individual factors to decide a control target.

PP.10.17 DO BLOOD PRESSURE, NUTRITIONAL STATUS AND PHYSICAL ACTIVITY HAVE IMPACT ON QUALITY OF LIFE OF THE OLDEST OLD PATIENTS?

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Objective: Analyse the influence of blood pressure control, nutritional status and level of physical activity in the quality of life of very elderly hypertensive patients.

Design and method: Cross-sectional study with forty-one oldest old patients (over 80 years), both males and females, followed at a reference center for hypertension treatment in a midwest Brazilian City. A survey questionnaire about sociodemographic and lifestyle variables was applied. The International Physical Activity Questionnaire (IPAQ) and the Medical Outcomes Study SF-36 item Short Form Health Survey (SF 36) were also used to evaluate the Quality of Life. Blood pressure and anthropometric variables were measured. Fisher test, t test, chi-square and Mann-Whitney-U test were performed. The significance level was 5% and confidence interval was 95% for all tests. The study was approved by the Ethics Committee of the institution.

Results: Low educational levels and low income were found in the sample. Only 7.3% of the patients referred alcohol consumption and no one was a smoker. Smoking and alcohol intake showed differences between gender and was higher among men ($p=0.002$, $p<0.001$). Almost half of participants (46.3%) were overweight according to body mass index. Controlled blood pressure were verified in 73.2% of the sample. Moderate and intense physical activity levels were observed on 46.3% of the participants. Nutritional status and physical activity level did not influence blood pressure control. Physically active oldest old had better score for functional capacity in the SF 36 ($p=0.011$). Social, emotional and mental health domains obtained the highest scores for quality of life. Blood pressure control and nutritional status did not affect quality of life.

Conclusions: The rates of blood pressure control was higher than in general Brazilian population. Physically active elderly have better quality of life associated with functional capacity.

PP.10.18 AMBULATORY BLOOD PRESSURE PROFILES IN ELDERLY

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Objective: Ambulatory blood pressure monitoring (ABPM) is being increasingly used in the assessment of hypertension in all age groups, confirming the continuous relationship between blood pressure (BP) and cardiovascular risk amongst older people. Moreover, ABPM seems to be a more accurate predictor of cardiovascular morbidity and mortality than isolated clinic measurements, providing a better estimate of BP load and the identification of white-coat hypertension, a known common phenomenon in the elderly.

The present analysis was undertaken to evaluate blood pressure profiles in subjects over 80 years old referred to our institution for ABPM. In view of the lack of data regarding ABPM in elderly people, the objective was to better understand possible additional value of ABPM over office BP measuring and its reflections on patients' treatment and follow-up.

Design and method: 429 ABPMs of subjects aged 80 and over, referred at our Institution in the period 2000- 2014 were analyzed; all the recordings were performed using the same oscillometric device (TM 2430), in order to avoid confounding fac-

tors; all ABPMs fulfilled both the following criteria: > 23 hours recording and at least 2 valid measurements/hour (>70 % of total measures).

Results: We identified hypertensive and normotensive subjects; hypertensives were furtherly subdivided in white coat, masked, isolated systolic, systo-diastolic and diastolic isolated hypertensives.

Moreover dipper and non dipper status (difference day- night > 10%) and post prandial fall (difference between the mean values measured from 10 to 12am and from 2 to 4 pm) were also calculated for all the pressures. Morning surge phenomenon was also taken into account.

Conclusions: Twenty-four-hour ABPM provides many measurements for better analysis and is likely to eliminate the stress of office visits and observer bias and proves to be a more accurate predictor of target organ damage and cardiovascular risk than routine office BP measurements. This tool seems to be of a certain importance even in the better evaluation of elderly subjects and in their possible therapeutic approach.

PP.10.19 AMBULATORY BLOOD PRESSURE PROFILES IN VERY ELDERLY SUBJECTS IN COMPARISON WITH YOUNG ONES

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Objective: Ambulatory blood pressure monitoring (ABPM) is being increasingly used in the assessment of hypertension in all age groups, confirming the continuous relationship between blood pressure (BP) and cardiovascular risk amongst older people. Moreover, ABPM seems to be a more accurate predictor of cardiovascular morbidity and mortality than clinic measurements, providing a better estimate of BP load and identification of white-coat hypertension, a known common phenomenon in the elderly.

The present analysis was undertaken to evaluate blood pressure profiles in subjects over 80 years old referred to our institution for ABPM in comparison with young subjects (18-30 years old). In view of the lack of data regarding ABPM in elderly people, we tried to better understand additional value of ABPM over office BP measuring and its reflections on patients' treatment and follow-up.

Design and method: 429 ABPMs of subjects aged 80 and over compared with 210 ABPMs of subjects between 18 and 30 years, referred at our Institution in the period 2000- 2014 were analyzed; all the recordings were performed using the same oscillometric device (TM 2430), in order to avoid confounding factors; all ABPMs fulfilled both the following criteria: > 23 hours recording and at least 2 valid measurements/hour (>70 % of total measures).

Results: We identified hypertensive and normotensive subjects; hypertensives were furtherly subdivided in white coat, masked, isolated systolic, systo-diastolic and diastolic isolated hypertensives.

Dipper and non dipper status (difference day- night > 10%) and post prandial fall were also calculated. Morning surge phenomenon and hypotension were also considered.

Conclusions: Twenty-four-hour ABPM provides many measurements for better analysis and is likely to eliminate the stress of office visits and observer bias and proves to be a more accurate predictor of target organ damage and cardiovascular risk than routine office BP measurements. This tool seems to be of a certain importance even in the better evaluation of elderly subjects and in their possible therapeutic approach.

White coat phenomenon seems to be a crucial parameter to be taken into account not only in younger subjects but also in elderly.

PP.10.20 UNTARGETED METABOLOMICS WITH LC-TOF/MS IN STUDIES ON MECHANISMS UNDERLYING EARLY VASCULAR AGEING

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Objective: Early vascular ageing (EVA), reflected by increased pulse wave velocity, has been associated with premature CV diseases manifestation including coronary heart disease and stroke. Potential mechanisms underlying EVA process include arterial stiffening and impaired endothelial function. Small-molecule metabolites may reflect pathological state and serve as novel markers of EVA state. The aim of this study was to assess if there are any metabolite alterations related to EVA.

Design and method: The subject groups consisted of 60 patients with EVA and 60 without EVA. EVA was defined as increased arterial stiffness (pulse wave velocity >12 m/s). The patient groups were matched for age (mean \pm standard deviation,

57.8 ± 8.1 vs. 59.7 ± 7.4) and body mass index (BMI) (31.4 ± 4.9 vs. 30.7 ± 4.9) and did not differ in the distribution of sex. Plasma metabolic fingerprints were obtained with LC-TOF-MS (positive and negative ionization modes). Subsequently, univariate (t test or U Mann-Whitney test) and multivariate statistical analyses (Principal Component Analysis-PCA and Partial Least Squares- Discriminant Analysis PLS-DA) were performed to select metabolites that showed the highest contribution into the group classification.

Results: The PLS-DA model showed clear separation of the compared groups and provided selection of the potential markers of EVA state. Among metabolites, which were found to significantly differentiate patients with EVA status from patients without EVA process, oxo-proline (p = 0.05), hydroxyecosatetraenoic acid (HETE) (p = 0.04), tryptophan (p = 0.02), phenylalanine (p = 0.03), arachidonic acid (p = 0.02), linoleic acid (p = 0.02), carnitine (p = 0.02), and palmitoylcarnitine (p = 0.03) were identified in available databases (METLIN, HMDB, LIPIDMAPS, KEGG and CEU Mass Mediator). These metabolite changes involved in inflammation, oxidative stress and endothelium dysfunction could play crucial role in EVA pathogenesis.

Conclusions: Our results indicate that EVA process may be associated with specific metabolite changes. Therefore, untargeted metabolomics and particularly plasma metabolic fingerprinting can be a powerful tool for identification of pathological hallmarks involved in EVA development.

PP.10.21 ANTIHYPERTENSIVE CARE IN THE OLDEST OLD AGED 90 YEARS AND OVER: LESSONS FROM A PROSPECTIVE SURVEY IN A PRIMARY CARE HOSPITAL

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Objective: The prevalence of hypertension increases dramatically with age but reliable data on blood pressure and its treatment in the oldest old aged >89 years are lacking. To gain insight into and improve the quality of hypertension care in these patients we analysed the characteristics, blood pressure (BP) and antihypertensive treatment of those admitted to a primary care hospital in Germany.

Design and method: All patients admitted to the medical ward aged >89 years were prospectively included over a 12 months period ending 2010. Within an extended cardiovascular risk profiling offered to those >59 years, patients had sitting BP taken at hospital admission with an ECG and blood tests; fasting serum lipid measurements were >2 days thereafter. Antihypertensive treatment followed German guidelines. Follow-up sitting BP was obtained in the morning before drug intake. Patients with septic or circulatory shock and re-admissions were excluded.

Results: N = 58 patients aged 92 ± 3 years (mean ± SD; 90–101) with in average 11 (median; 4–32) hospital days were included (77.6% female, 34.5% diabetics, 24.1% atrial fibrillation, 41.4% coronary heart disease). Main diagnoses were diabetes, non-septic infections, heart insufficiency, orthopedic pain and neuro-cognitive impairment. Admission systolic BP was 149 ± 29 mmHg (n = 16 >159 mmHg), diastolic BP 88 ± 31 mmHg, heart rate (HR) 87 ± 15/min, weight 62.1 ± 11.6 kg, serum creatinine 112 ± 48 micromol/l, total cholesterol 4.9 ± 1.2 mmol/l, blood hemoglobin 7.8 ± 1.2 mmol/l. Mid-term BP was 128 ± 22/72 ± 9 mmHg (HR 76 ± 9/min). Discharge BP was 128 ± 17/72 ± 9 mmHg (none >159 mmHg) and HR 73 ± 6/min (BP 21 ± 43/17 ± 35 mmHg and HR 16 ± 22/min lower vs. admission, p < 0.01). Mean antihypertensives/patient (admission vs. discharge) excluding diuretics was 1.0 ± 0.9 vs. 1.1 ± 0.9 (p = NS), including diuretics 1.5 ± 1.2 vs. 1.7 ± 1.1 (p < 0.05); blockers of B-adrenoceptors 22.4% vs. 25.9%, Ca-channels 8.6% vs. 12.1%, the renin-angiotensin system (RAS) 63.8% vs. 63.8%; spironolactone 5.2% vs. 5.2%, others 1.7% vs. 3.4% (p = NS); diuretics 48.3% vs. 67.2% (p < 0.05); treated patients excluding diuretics 67.2% vs. 70.7% (any change 43.1%), including diuretics 75.9% vs. 86.2%. There were no sex differences (p = NS).

Conclusions: Ambulatory BP treatment was usually by <3 drugs, mainly adrenoceptor- and RAS-blockers or diuretics. Hospitalisation increased the use of diuretics while hospital discharge BP was well controlled.

PP.10.22 HEART FAILURE AND HYPERTENSION: WHAT DO WE KNOW ABOUT THE VERY ELDERLY?

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Objective: The very elderly represent a growing proportion of patients admitted to the hospital with heart failure (HF) and this is one of the leading causes of morbidity and mortality in this age group. Elderly patients with HF and hypertension (HTN) differ from younger individuals with the same diagnosis therefore we aimed at comparing biological characteristics between these two age groups.

Design and method: We retrospectively analyzed 148 consecutive hypertensive pts admitted for HF between January and June 2013 in an Internal Medicine Department. We retrieved demographic, clinical and paraclinical characteristics from the patients admission charts. We compared different characteristics between patients under 80 years of age (young HF/HTN group (YNG)) and the very elderly (ELD) (patients above 80 years of age). LV (left ventricular) hypertrophy was defined on echocardiographic studies using LV mass index calculated with the Devereaux formula and LV ejection fraction > 45% was considered preserved LV systolic function, glomerular filtration rate (eGFR) was estimated using CKD-EPI study equation and chronic kidney disease (CKD) stage >3 was considered at eGFR <60 ml/min/1.73m².

Results: We studied 148 pts, 47.5% women, mean age 72.55 ± 11.21 years. The ELD included 45 pts (30.4%) with significantly more women than in the YNG group. ELD population had less overweight and dyslipidemic pts with no difference in the proportion of diabetes mellitus. In term of target organ damage, about half of the patients in both groups had LV hypertrophy and preserved LVEF. Moreover, half of the pts in both groups had atrial fibrillation and one fifth of them had an ischemic stroke. ELD had a significantly higher number of stage 3 CKD. A higher proportion of YNG pts were receiving more than 3 antihypertensive drugs. See table.

Characteristic	ELD	YNG	P	Odds ratio
Age	85.1 ± 3.6	68.4 ± 9.0	-	-
Female, %	66.6	44.7	0.01	0.4
Overweight (BMI > 30 kg/m ²), %	17.7	42.8	0.005	3.4
Dyslipidemia, %	42.2	60	0.04	4.1
Diabetes mellitus, %	24.4	29.5	0.82	0.9
CKD (eGFR < 60 mL/min/1.73 m ²), %	68.8	39.0	0.00	0.28
HF preserved LVEF, %	62.2	52.3	0.26	0.66
LV hypertrophy, %	57.7	63.8	1	1.01
Atrial fibrillation, %	53.3	51.4	0.79	0.9
Stroke, %	20.0	16.1	0.57	0.77
≥ 3 BP lowering drugs, %	28.8	46.6	0.04	2.15
In hospital mortality, %	8.5	1.9	0.03	0.19

Conclusions: The very elderly patients represent a significant proportion of the HTN pts admitted for HF. They are more frequently women with a high burden of target organ damage such as LVH, CKD and stroke. With the increasing life expectancy, this population is becoming an important patient prototype.

POSTERS' SESSION

POSTERS' SESSION PS11

KIDNEY AND RENIN-ANGIOTENSIN SYSTEM

PP.11.01 WHITE-COAT HYPERTENSION AND MASKED HYPERTENSION IN CHRONIC KIDNEY DISEASE AT THE POPULATION LEVEL IN URUGUAY

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Objective: We aim to study the prevalence of white-coat hypertension (WCHT) and masked hypertension (MHT) in chronic kidney disease (CKD) patients from a Uruguayan population. We also studied white-coat resistant hypertension (WCRHT) and masked resistant hypertension (MRHT) in treated participants.

Design and method: The GEFA-HT-UY is a population study running in Uruguay. Office blood pressure (OBP) was the average of five consecutive readings at doctor's office and ambulatory blood pressure (ABP) was the average of 24-h readings. Categories of hypertension were based on systolic and diastolic blood pressure, (ESH-guidelines). OBP and 24-h ABP thresholds were 140/90 mmHg and 130/80 mmHg for systolic and diastolic blood pressure, respectively. We estimate the Glomerular Filtration Rate from cystatin-C (eGFR_{cys}) using CKD-EPI equation. We defined CKD as eGFR_{cys} lower than 60 mL/min/1.73m².

Results: 142 participants [89 (62.7%) women, mean age 56.3 ± 17.0] completed studies on blood pressure and renal function. The average (±SD) of OBP was 129.4 ± 22.7 mmHg systolic and 81.7 ± 12.3 mmHg diastolic. The corresponding 24-h ABP levels were 117.9 ± 10.5 and 74.1 ± 8.8 mmHg, respectively. Serum cystatin-C was 1.02 ± 0.25 mg/L, and the average for eGFR_{cys} was 77.9 ± 24.3 mL/min/1.73m².

In untreated participants [94 (66.2%)], the prevalence of CKD was 21.3%. The prevalence of sustained normotension (SNT), sustained hypertension (SHT), WCHT, MHT were 69.2%, 13.8%, 8.5%, 8.5%, respectively. The prevalence of SNT, SHT and MHT was similar in patients with and without CKD (P > 0.05). However, the prevalence of WCHT was higher (P = 0.038) in CKD (20.0%) versus non-CKD (5.4%).

Among 48 (33.8%) patients under hypertensive treatment, the prevalence of CKD was 45.8%. In that group the prevalence of SNT, SHT, WCRHT, MRHT were 35.4%, 25.0%, 29.2%, 10.4%, respectively. The prevalence of SNT, SHT and MRHT was similar in patients with and without CKD (P > 0.05). Similarly to untreated participants, the prevalence of WCRHT was higher (P = 0.020) in patients with CKD (45.5%) versus non-CKD (15.4%).

Conclusions: Even in a small population sample, the prevalence of WCHT and WCRHT was higher among CKD patients. In this group of patients, ABPM contributes to refine diagnosis and cardiovascular risk stratification. Should CKD be included among indications for ABPM?

PP.11.02 ASSOCIATION OF AUTOMATED OFFICE BLOOD PRESSURE READINGS WITH ANKLE BRACHIAL INDEX IN HYPERTENSIVES WITH CHRONIC KIDNEY DISEASE

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Objective: To evaluate whether automated office blood pressure (AOBP) measurements are associated with peripheral arterial disease (PAD) and this association is comparable to that of ambulatory blood pressure (ABP) measurements

Design and method: Subjects with chronic kidney disease (CKD) stage III to V and office hypertension were included in the study. Three types of readings were obtained: office blood pressure (OBP), 24-hour ABP monitoring and AOBP. Individuals were subsequently monitored by ABP and AOBP techniques over 2 consecutive days. The patients were fitted with a 24-hour ABP device (Microlife WatchBP O3). The following day the ABP monitoring device was removed and measurements to obtain AOBP readings were performed using a Microlife WatchBP Office device. The device was set to record BP at 1 min intervals and all six readings were used to determine the mean AOBP. WatchBP Office was used in order to determine ankle brachial index (ABI). Automated dual-arm measurements were performed and the average value of the right and left ABI index was used in the analysis. Independent sample t-test analysis was implicated in order to detect statistical correlations between BP measurements with ABI.

Results: A total of 80 hypertensive patients with chronic kidney disease stage III to V, 56 males, 24 females, with mean age 66.05 ± 11.51 years, mean eGFR 32.8 ± 13.5 mL/min/1.73 m², a mean number of antihypertensive drugs 2.4 ± 1.2, 35% diabetics and 11% current smokers were analyzed; 12 subjects had ABI < 0.9. Mean awake diastolic ABP and mean diastolic AOBP readings were closely (p = NS). There was a strong correlation between diastolic AOBP readings and low ABI < 0.9 (p = 0.01), whereas diastolic OBP readings had not impact on low ABI (p < 0.5). Systolic readings with all 3 techniques did not show any correlation with low ABI. Current smoking and diabetes were also strongly associated with low ABI (p = 0.018 and 0.035, respectively).

Conclusions: High quality AOBP readings and ABP diastolic readings correlate equally with low ABI in hypertensive patients with CKD, further supporting the use of AOBP in the clinical setting.

PP.11.03 EFFECT OF DIFFERENT DIALYSATE SODIUM CONCENTRATION ON BLOOD PRESSURE IN HEMODIALYSIS PATIENTS: A RANDOMIZED STUDY

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Objective: Various dialysate sodium concentrations have been favored throughout the history of dialysis, but the optimal concentration remains unclear. Optimization of the dialysate sodium prescription is important in improving blood pressure (BP) control in chronic hemodialysis patients. The aim of this study was to examine the effects of different dialysate sodium concentration on BP in patients on chronic hemodiafiltration (HDF).

Design and method: Forty-five patients with end-stage renal disease on HDF (24 men, mean age 64.31 ± 14.25 years) were included in the study. The patients were randomly assigned into three groups, each with 15 patients and with dialysate sodium concentration of 138 mEq/L, 140 mEq/L or 142 mmol/L. Values of systolic and diastolic BP before and after HDF were collected at the start (2-monthly average values before the beginning of the study) and after 2 months of HDF treatment with different dialysate sodium concentrations. Fixed doses of antihypertensive drugs were kept during the study.

Results: Using one-way ANOVA we did not find any statistical difference at the beginning of the study between groups in age, dialysis vintage, plasma sodium, and systolic or diastolic BP values. All data are presented in Table 1 (on the following page). Using paired sampled T-test we found statistically significant difference in systolic BP before HDF (P = 0.002) between the start and end of the study only in patients with a dialysate sodium concentration of 138 mEq/L.

	Sodium dialysate 138 mEq/L	Sodium dialysate 140 mEq/L	Sodium dialysate 142 mEq/L	P
Age (years)	62±14.57	66±13.13	64.93±15.64	0.737
Dialysis vintage (months)	90.67±88.61	81.53±83.08	83.07±73.19	0.948
Systolic BP before HDF at the start of the study (mmHg)	151.67±17.36	149.8±21.11	146.93±19.9	0.800
Diastolic BP before HDF at the start of the study (mmHg)	73.8±10.99	75.87±13.05	70.67±7.94	0.426
Systolic BP after HDF at the start of the study (mmHg)	149.87±22.76	151.53±22.24	147.47±25.88	0.895
Diastolic BP after HDF at the start of the study (mmHg)	75.93±8.87	80.67±11.11	74.67±10.44	0.247
Plasma sodium at the start of the study (mmol/L)	135.27±3.97	135.33±3.37	135.33±3.13	0.998
Plasma sodium at the end of the study (mmol/L)	133.33±3.31	135±2.14	135.07±2.74	0.164
Systolic BP before HDF at the end of the study (mmHg)	146.07±16.58	146.13±23.65	144.87±20.31	0.982
Diastolic BP before HDF at the end of the study (mmHg)	72.40±9.43	75.13±13.55	71.6±6.77	0.619
Systolic BP after HDF at the end of the study (mmHg)	147.87±22.00	149.07±25.37	148.8±22.7	0.989
Diastolic BP after HDF at the end of the study (mmHg)	74.67±8.71	80.93±12.99	74.8±9.31	0.188

Table 1. Data of 45 patients on chronic HDF divided into three groups according to the sodium dialysate concentration

Conclusions: Dialysate sodium concentration of 138 mEq/L in patients on HDF resulted in a statistically significant reduction in systolic BP before HDF.

PP.11.04 IMPACT OF PULSE PRESSURE IN CARDIAC REMODELLING AND LEFT VENTRICULAR FILLING PRESSURE IN END-STAGE RENAL FAILURE PATIENTS UNDERGOING PERITONEAL DIALYSIS AND HEMODIALYSIS

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Objective: It is well known that both pressure and volume overloads contribute to left ventricular hypertrophy (LVH) and left ventricular dilatation in patients with chronic kidney disease (CKD). The aim of this study was to evaluate the impact of pulse pressure as an indirect assessment of arterial stiffness on ventricular geometry and left ventricular filling pressure in patients with end stage renal disease on peritoneal and hemodialysis treatment.

Design and method: A case control study was conducted, enrolling all patients on chronic dialysis (HD and PD) who had more than 3 months in therapy. Two-dimensional echocardiography was performed 2–24h after the dialysis session according to AEE recommendation. The ratio of early transmitral flow velocity (E) to early diastolic mitral annular velocity (Em) (E/Em ratio) assessed using tissue Doppler imaging was used for estimating LV filling pressure.

Results: Our dialysis population studied consisted in 122 pts, 78 pts (61%) on hemodialysis, mean age 53.4 ± 14.5 years and mean time on therapy was of 40.4 ± 14.4 months. We didn't found difference in PP between 2 groups (PD vs HD). Concentric hypertrophy was found in 42.3% of the pts in HD and 61.4% of pts in PD (p=0.058) and eccentric hypertrophy in 43% of HD pts and in 29.5% of PD pts (p>0.07). When the patients with LVH were stratified into tertiles based on their LVM-i there were found significantly increasing pulse pressure, across the three groups with increasing LVM-i (p=0.036). Pulse pressure was found the only independent risk factor associated with LVM-i [1.04 (0.99–1.09) p<0.05. Six % of patients on PD vs 16.8% on HD had E/Em Ratio>14 (p=0.101). Patients with E/Em Ratio>14 have significantly higher PP value p=0.039.

Conclusions: These results suggest that severity of arterial stiffness have impact not only to cardiac remodelling but also to higher left ventricular filling pressure. The recognition of pulse pressure underline once again that more in focus needs to be the risk of vascular calcifications in ESRD patients.

PP.11.05 ROLE OF PLASMA RENIN ACTIVITY IN THE OCCURRENCE OF LEFT VENTRICULAR HYPERTROPHY IN ESSENTIAL HYPERTENSIVE PATIENTS

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Objective: Plasma renin activity (PRA) is accepted as a marker for increased risk of cardiovascular diseases. We examined whether PRA is a risk factor left ventricular structure abnormal in hypertension patients of Han Chinese.

Table 1 the baseline characteristics of different renin levels essential hypertension patients

	All N=879	Low renin N=194	Medium renin N=580	High renin N=105	P value
Male (%)	803(91.5%)	122(62.9%)	402(69.3%)	79(76.2%)	0.103
Age (yr)	44.42±7.22	45.61±7.08	44.35±7.018	40.91±7.284	<0.001**
Smoking (%)	26.47±3.365	25.99±3.323	26.53±3.258	27.03±3.314	0.929
Drinking (%)	39.4(4.4%)	74(38.1%)	26(50%)	5(4.8%)	0.107
Family history of hypertension (%)	375(42.7%)	81(41.8%)	243(41.9%)	51(48.57%)	0.556
Family history of CHD (%)	74(8.4%)	15(7.7%)	43(7.4%)	17(16.2%)	0.014*
Stroke (%)	80(9.1%)	14(7.2%)	39(6.7%)	8(7.6%)	0.039*
Mean 24-h SBP (mmHg)	135.42±16.119	133.76±13.901	134.77±15.545	141.42±20.549	0.007
Mean 24-h DBP (mmHg)	88.81±10.535	88.78±9.249	89.27±10.180	94.44±12.963	<0.001**
Mean 24-h MAP (mmHg)	104.50±11.052	103.57±9.848	103.89±11.336	109.06±14.733	0.003*
Mean 24-h heart rate	76.29±8.723	74.23±8.633	76.28±8.602	79.87±9.928	0.002*
Daytime 24-h SBP (mmHg)	138.46±16.238	136.36±13.655	137.83±15.719	145.18±20.669	<0.001**
Daytime 24-h DBP (mmHg)	82.26±10.856	80.69±9.448	81.76±10.496	87.51±13.160	<0.001**
Mean 24-h MAP (mmHg)	106.93±11.413	105.60±9.793	106.37±10.895	111.97±14.033	<0.001**
Light-time 24-h SBP (mmHg)	126.00±24.299	127.50±23.792	127.61±22.772	136.83±31.057	0.136
Light-time 24-h DBP (mmHg)	84.42±15.287	84.01±15.938	84.14±13.778	86.55±20.594	0.032*
Light-time 24-h MAP (mmHg)	98.93±17.381	98.57±17.737	98.64±15.721	100.98±23.715	0.096
PRA (ng/ml/h)	2.144±2.117	0.2788±0.161	1.976±1.000	6.487±2.390	<0.001**
PAC (ng/ml)	14.97±8.453	12.795±8.798	14.533±7.096	21.381±11.542	<0.001**
ARR	27.939±78.425	34.641±145.878	9.267±6.381	3.424±1.598	<0.001**
Serum potassium (mmol/L)	3.840±0.556	3.821±0.589	3.848±0.519	3.841±0.519	0.977
BUN (mmol/L)	5.300±2.998	5.297±4.207	5.278±2.589	6.419±1.487	0.006
Serum creatinine (μmol/L)	327.22±95.649	356.13±90.809	359.99±106.678	348.26±92.251	0.03*
Fasting blood glucose	5.116±2.109	4.968±1.158	5.186±2.645	5.114±1.413	0.554
HDL (mmol/L)	2.178±1.599	2.323±1.581	2.191±1.642	1.854±1.357	0.103
TC (mmol/L)	3.657±3.908	3.738±7.464	3.548±1.731	4.098±1.592	0.336
LDL (mmol/L)	2.480±0.795	2.429±0.735	2.497±0.756	2.463±0.895	0.401
TG	2.134±1.556	1.921±1.089	2.188±1.477	2.491±2.273	<0.001**
High-sensitivity C-reactive protein (mg/L)	1.97±2.547	1.727±2.256	1.951±2.403	2.534±2.500	0.030*
24-hour proteinuria	0.152±0.263	0.187±0.402	0.132±0.319	0.195±0.238	<0.001**

Abbreviations: BUN=body mass index; DBP=diastolic blood pressure; CHD=Coronary Heart Disease; PRA=plasma renin activity; PAC=plasma aldosterone concentration; BUN=Blood urea nitrogen; HDL=high density lipoprotein cholesterol; TC=total cholesterol; LDL=C-low density lipoprotein cholesterol; TG=triglyceride. *P<0.05 **P<0.001

Table 2 the echocardiography parameters characteristics of different renin levels essential hypertension patients

	All N=879	Low renin N=194	Medium renin N=580	High renin N=105	P value	P value (adjusted)	LR vs MR	LR vs HR	MRS vs HR
IVSd (mm)	10.25±1.150	10.42±1.059	10.57±1.125	10.16±1.352	<0.001**	<0.001**	0.911	<0.001**	
LVEDD (mm)	47.57±4.203	47.80±5.189	47.41±3.830	47.84±4.054	0.241	0.308	0.821	0.33	0.2
PW (mm)	10.10±0.942	9.94±0.887	10.07±0.934	10.48±0.990	<0.001**	<0.001**	0.900*	0.987	<0.001**
LVFI (%)	60.02±5.021	60.07±3.923	60.04±5.239	59.79±5.645	0.915	0.781	0.643	0.936	0.647
EDV	74.12±17.628	73.86±18.224	74.05±17.767	74.94±17.430	0.843	0.874	0.916	0.896	0.639
LVMIg	208.07±55.295	206.05±58.192	205.93±58.888	223.19±59.869	<0.001**	<0.001**	0.911	0.977	<0.001**
LVMIcm ²	111.47±23.391	111.83±26.696	110.98±19.987	118.3±28.108	0.028*	<0.001**	0.909	0.343	<0.001**
RWT	0.046±0.002	0.047±0.003	0.046±0.002	0.047±0.004	<0.001**	<0.001**	<0.001**	0.034	<0.001**

Adjusted age, sex, BMI, mean 24 hours MAP. Abbreviations: IVS=interventricular septum thickness diastolic; LVEDD=left ventricular end-diastolic diameter; PW=septum wall thickness diastolic; EDV=End-diastolic volume; LVMI=left ventricular mass; LVMI=left ventricular mass index; RWT=relative wall thickness *P<0.05 **P<0.001

Table 3 LVH and LV geometry of different renin levels essential hypertension patients

	Low renin N=194	Medium renin N=580	High renin N=105	P value
LVH	Yes 31(24.29%)	158(27.24%)	41(64.6%)	0.016*
LV geometry	85.4(43.5%)	215(37.3%)	35(11.3%)	
High renin	47(24.2%)	183(31.6%)	33(31.4%)	
CCR	40(21.1%)	105(18.1%)	15(14.3%)	
ECH	4(2.1%)	26(4.5%)	26(25.7%)	0.022*

Abbreviations: LVH=normal geometry; CCR=concentric remodeling; CCH=concentric hypertrophy; ECH=eccentric hypertrophy. *P<0.05 **P<0.001

Table 4 multivariate-adjusted relationships between plasma renin activity and LV structure parameters

	Partial r	P value
IVSd	0.12*	<0.001**
PWd	0.17*	<0.001**
LVM	0.106	0.003*
LVMI	0.138	<0.001**
RWT	0.135	<0.001**
LVH	0.118	<0.001**
LV geometry	0.122	0.003**

Adjusted age, sex, BMI, mean 24 hours MAP. Abbreviations: IVS=interventricular septum thickness diastolic; LVEDD=left ventricular end-diastolic diameter; PW=septum wall thickness diastolic; EDV=End-diastolic volume; LVMI=left ventricular mass; LVMI=left ventricular mass index; RWT=relative wall thickness *P<0.05 **P<0.001

Table 5 logistic Regression Analysis of PRA and LVH

variables	B	SE	Wald	OR	95%CI	P
Sex(male)	1.06*	0.185	3.23*	2.907	2.02-4.178	0.000
Age	0.054	0.003	165.9*	1.055	1.029-1.082	0.000
Low renin	0.412	0.221	3.486*	1.509	0.995-2.375	0.078
Medium renin	1.026	0.225	19.81*	2.833	1.82-4.706	0.000
High renin	-0.007	0.021	39.310	0.993	0.948-1.042	0.000
Mean 24h MAP	0.021	0.001	9.74	1.022	1.019-1.025	0.000
duration	0.001	0.001	0.974	1.001	0.994-1.008	0.002

LVH status in LVMI<112g/m² in men and >110 g/m² in women as dependent variables, logistic regression model: backward+ward with indicator variables for age, body mass index, serum creatinine, high-sensitivity C-reactive protein, triglyceride, duration.

Design and method: This cross-sectional study included a total of 879 consecutive Han patients diagnosed essential hypertension who were hospitalized at Department of Hypertension in People's Hospital of Xinjiang Uygur Autonomous Region in China between 2009 and 2013, subjects aged from 30 years to 60 years. All participants who had not taken antihypertensive drugs at least four weeks, or stopped the drug to effect hormone, such as contraception pills, diuretic dihydropyridines calcium antagonist, beta blockers, angiotensin converting enzyme inhibitors and angiotensin II receptor inhibitor. 24-h ambulatory blood pressure monitoring, echocardiography, plasma renin activity and plasma aldosterone were also performed. LV mass index (LVMI) was calculated according to the method of Devereux and Reichek. LV hypertrophy (LVH) was defined as LVMI>125 g/m² in men and >=110 g/m² in women. According to LVMI and RWT, concentric remodeling (CCR), a normal LVMI and RWT>=0.45; concentric hypertrophy (CCH), RWT<0.45 and LVH; eccentric hypertrophy (ECH) RWT>=0.45 and LVH. According to the plasma renin activity lever, participants were classified three renin categories, as follows: low renin, <0.56ng/ml/h (30% of the sample); medium renin, 0.56 to 4.24ng/ml/h (60% of the sample); or high renin, >4.24ng/ml/h (10% of the sample)

Results: As compared with low-renin and medium-renin groups, high-renin group had high mean 24-h mean arterial pressure. High-renin group show a high prevalence of LVMI and concentric hypertrophy, eccentric hypertrophy than low and medium renin groups adjusting for sex, age, BMI, and mean 24 hours MAP. Regression models showed that high-renin group showed significantly increased 3.033 fold risk of left ventricular hypertrophy (p<0.001), compared to low-renin group, as potential confounders for age, gender, BMI, serum creatinine, high-sensitivity C-reactive protein, triglyceride, duration.

Conclusions: These results raise the hypothesis that high plasma renin activity may have a deleterious effort on the development of LV structure in essential hypertension.

PP.11.06 HYPONATREMIC VERSUS ISONATREMIC DIALYSATE IN PATIENTS WITH INTRADIALYTIC HYPERTENSION. A RANDOMIZED CONTROLLED TRIAL

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Objective: Intradialytic hypertension (IDH) is a commonly, but poorly understood and studied phenomenon in hemodialysis (HD) patients. To determine the prevalence of IDH in a prevalent HD population and their characteristics. To evaluate the effect of individually adjusted iso- and hyponatremic dialysate on IDH, intra- and interdialytic blood pressure (BP), weight gain and side effects in patients with IDH.

Design and method: Cross-sectional study, followed by a prospective, randomized, cross-over study with 4 consecutive 4-week periods with different dialysate sodium concentrations in patients with IDH. During run-in and wash-out standard dialysate (140 mmol/l) was prescribed. Office BP was measured standardized with an automated device during dialysis; home BP was evaluated by 24 h ambulatory BP measurement and by self-measurement using a BP telemonitoring system.

Results: Prevalence of IDH was 11.9% (n=13/109). Subjects with IDH were older, had lower dry weight, lower interdialytic weight gain and were taking more antihypertensive drugs. During iso- and hyponatremic treatment, resp. 42% and 40% of dialysis sessions were complicated by IDH compared to 51% during run-in (NS). During standard dialysate office post-HD BP, 24 h ambulatory BP and tele-HBP were resp. 159 ± 22/80 ± 12 mm Hg, 144 ± 21/75 ± 11 mm Hg and 156 ± 25/84 ± 16 mmHg. Compared to standard dialysate, both hypo- and isonatremic dialysate significantly decreased post-HD BP (p<0.005). Office post-HD BP and 24 h ambulatory BP were lower during hyponatremic dialysis compared to isonatremic dialysate, but without reaching significance (resp. 142 ± 21/73 ± 13 vs 154 ± 25/77 ± 14 mmHg and 134 ± 33/71 ± 15 vs 144 ± 28/74 ± 12 mmHg). Tele-HBP revealed only minimal changes in BP. Interdialytic weight gain did not differ significantly between hypo- and isonatremic dialysis (1.464 ± 0.818 kg vs 1.609 ± 0.978 kg), the prevalence of side effects was similar too (resp. 8 and 9%).

Conclusions: Individualized lowering of dialysate sodium did not result in a significant reduction of IDH episodes. However, both iso- and hyponatremic dialysate significantly lowered office BP compared to standard dialysate, interdialytic BP tended to decrease. Lowering dialysate sodium did not increase intradialytic side-effects.

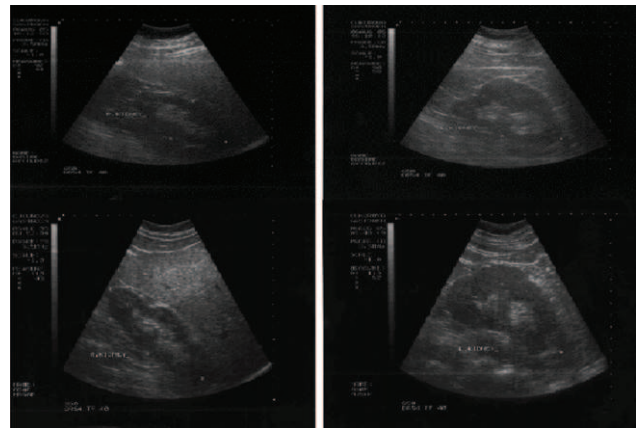
PP.11.07 PRIMARY HYPERTENSION AND NEPHROSCLEROSIS. NEPHROSCLEROSIS BEGINS FIRST WITHIN THE LEFT KIDNEY AND THIS SIGN COULD BE CALLED AS ERGUN SIGN

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Objective: Since 1995 a sign noticed by Ergün in which echo pattern of some patients showing differences and left kidney echo pattern was hyperechogenic as compared to right side. Changes were hyperechogenic, somewhat like thick corn or large sand particles and kidney had some pathological changes on parenchima pyelon ratios and borders.

Design and method: Baselines performed in Nephrology Clinics then patients seen for abdominal ultrasonography and color doppler ultrasonography performed by radiologists blindly without being informed. Angles of both renal arteries arising from abdominal aorta., lumen diameters of renal arteries and blood flows and outputs performed. 51 patients enrolled to study.

Results: Totally 51 patients, 28 were females, mean average of ages were 53.6 years, 23 males with the average of age 54.5. Hypertension classifications were class II and III according to ISH. The small kidney was present in 11 rights and 15 left kidneys. Parenchima/pyelon border irregularities were present in 12 right and 42 left kidneys. Pathological abnormalities were in 22 right and 29 left kidneys. Renal arteries diameters were similar (5 mm). The flow in right renal arteries were 434 ml/min., but 393 ml/min. in lefts. Narrow angle was 13 in right side and 24 in left kidneys. The increase in ecogenity was 14 in right but was 45 in left kidneys. Nephrosclerosis was 27.45% in right kidney but 88.23 in lefts. VMA values were normal in patients.

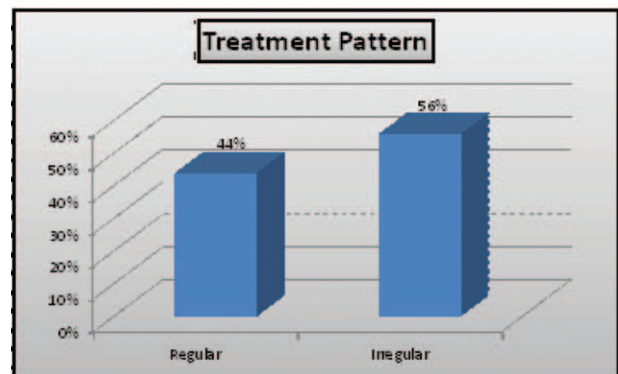
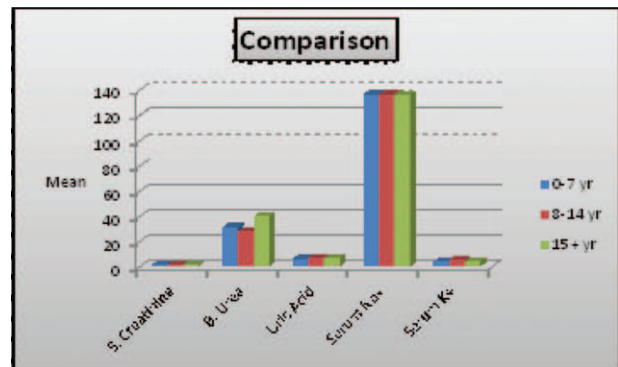


Conclusions: Results emphasized nephrosclerosis in primary hypertension start initially in left kidney and nephrosclerosis level is one or two points greater than right kidney. This sign in primary hypertension could be named Ergun Sign.

PP.11.08 RENAL FUNCTION IN SUDANESE PATIENTS WITH ESSENTIAL HYPERTENSION

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Objective: To study the effect of the duration of essential hypertension on renal function, detect the effect of irregular control of hypertension on renal function and identify the most affected parameters of renal function in hypertensive patients



Design and method: This is a case-control and cross-sectional study conducted to assess renal function in Sudanese patients, with essential hypertension recruited from governmental clinics. Hypertensive 81 and normotensive 24 subjects were randomly selected. Blood samples and 24-hour urine collection were performed. Jaffe's reaction for creatinine, colorimetric methods for urea and uric acid, flame photometer for electrolytes were used. Creatinine clearance was calculated.

Results: Mean creatinine clearance was 57.8 ± 33.9 ml/min in hypertensive group. Serum creatinine, in 35.4% of the hypertensive group, was > 1.5 mg/dl, in 9.2% was 1.5-1.7 mg/dl and in 26.2% was > 1.7 mg/dl. Blood urea was significantly high in 25.8% of hypertensive almost coinciding those with serum creatinine > 1.7 mg/dl. Mean uric acid 7.71 mg/dl and 6.03 mg/dl were for hypertensive and normotensive respectively, significant and in more cases. Serum sodium increased in hypertensive insignificantly; potassium elevated in 21.2% hypertensive significantly higher

than in 4.2% of normotensive group. Serum creatinine increased with duration of hypertension significantly. Albuminuria was in 12.2%, granular casts in 12.2% and RBCS (> 5 erythrocytes/HEP) in 8.6% of hypertensive patients.

Conclusions: The results indicated a high interaction between essential hypertension and renal function in Sudanese patients with essential hypertension. The most affected parameters of renal function were serum uric acid, serum creatinine, blood urea, serum potassium and albuminuria consecutively. This effect was associated with diastolic blood pressure, duration and control of hypertension.

PP.11.09 PLASMA RENIN ACTIVITY AND RESTING HEART RATE IN A POPULATION OF COMMUNITY-DWELLING JAPANESE: THE TANUSHIMARU STUDY

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Objective: Heart rate is a strong predictor of mortality and development of obesity and diabetes. The renin-angiotensin-aldosterone system plays an important role in blood pressure control and volume homeostasis. Although many studies have indicated the association between aldosterone and hypertension or insulin resistance, epidemiological evidence of the association of heart rate with plasma renin activity (PRA) remains scant. Therefore, this study aimed to clarify the relation between PRA and higher heart rate in a population of community-dwelling Japanese.

Design and method: This study was approved by the Tanushimaru branch of the Japan Medical Association and by the local mayor, as well as by the ethics committee of Kurume University School of Medicine. All of the participants gave informed consent. A total of 1,943 subjects over the age of 40 years (774 males and 1,169 females) were enrolled, who underwent a health examination in Tanushimaru in 2009. Plasma renin and aldosterone concentrations were measured by RIA assay. PRA and the homeostasis model assessment (HOMA) were used by natural-log transformed. Resting heart rate was measured using electrocardiography.

Results: We divided the subjects into four groups by heart rate (<60/min, 60–69/min, 70–79/min, >80/min), and analyzed an association between PRA and heart rate by analysis of co-variance after adjustments for age and sex. The adjusted mean PRA and HOMA index showed a significant trend ($p < 0.01$) as higher heart rate, although there was no significant trend between aldosterone and heart rate ($p = 0.26$). In multiple linear regression analysis adjusted for age, sex, systolic blood pressure, HOMA index and hypertensive medication, PRA was positively and strongly associated with elevated heart rate ($p < 0.01$).

Conclusions: This epidemiological study demonstrated that PRA, but not aldosterone, is significantly and positively associated with higher resting heart rate in a general population. Hypertension, insulin resistance, elevated PRA, and taking anti-hypertensive medication were significantly correlated to higher heart rate. Among them, this is the first evidence to demonstrate that the elevated PRA was independently and strongly associated with heart rate in both genders over 40 years in a Japanese cohort.

PP.11.10 LONGITUDINAL PATTERN OF LIPID PROFILE BEFORE AND AFTER HEMODIALYSIS IN END STAGE RENAL DISEASE PATIENTS

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Objective: Lipid abnormalities are still insuperable complications for maintenance hemodialysis(HD) patients. This retrospective longitudinal observational study was performed to determine the pattern of lipid profile for each two years before and after hemodialysis in patients on maintenance HD.

Design and method: We observed the serum lipid profile of sixty two maintenance HD patients for each two years before and after hemodialysis(Male: Female; 43: 19, age; 65.97 + 12.00 years old, hemodialysis duration; 46.95 + 49.16 months, body weight; 22.98 + 3.46 kg/m²). After fasting for at least 8 hours, blood samples were drawn from the arterio-venous fistula before starting dialysis. Dyslipidemia is defined according to the National Cholesterol Education Program-Adult Treatment Panel III. Descriptive and inferential statistical analysis were performed using SPSS version 16.0.

Results: The prevalence of hypercholesterolemia, hyper-LDL-cholesterolemia, hypertriglycemia and hypo-HDL-cholesterolemia were 28.85%, 28.85%, 19.61% and 62.75% at the time of starting HD. The prevalence of hypercholesterolemia and hyper-LDL-cholesterolemia decreased from 51.85% and 51.85% at 2 year before HD to 18.18% and 12.15% at 2 year after HD($P < 0.05$ for each). The prevalence of

hypertriglycemia and hypo-HDL-cholesterolemia were not significantly different in the before and after HD.

Conclusions: Our study suggests that abnormalities of lipid metabolism like hypercholesterolemia, hyper-LDL-cholesterolemia, hypertriglycemia and hypo-HDL-cholesterolemia of ESRD patients are improved after HD.

PP.11.11 CHRONIC KIDNEY DISEASE IS CLOSELY RELATED TO CARDIOVASCULAR RISK FACTORS. A POPULATION-BASED STUDY FROM SPAIN

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Objective: Chronic kidney disease (CKD) is a public health problem worldwide. Our aim was to estimate the prevalence of CKD in Spain and to assess associated risk factors.

Design and method: We studied 11,505 individuals representative of the Spanish population aged >18 years. Information was collected through standardized questionnaires, physical examination, and 12-h fasting of blood and urine samples. Creatinine was determined by Jaffé, alcalin picrate by kinetic reaction, and microalbumin by polyethylene glycol-enhanced immunoturbidimetry. The laboratory tests were performed centrally using standard procedures and appropriate quality controls. Kidney function was graded according current KDIGO definitions for CKD staging. Estimated glomerular filtration rate was calculated by the CKD-EPI equation. The prevalence of CKD, stratified by sex, age, and presence/absence of established cardiovascular disease (CVD) was estimated. Relationship between CKD and a total of 12 CVD risk factors (CVRF), following ESH/ESC guidelines definitions, was assessed in subjects with no CVD. Analyzed CVRF were age, hypertension, general obesity, abdominal obesity, smoking, diagnosed hypercholesterolemia, high total cholesterol, high LDL-cholesterol, low HDL-cholesterol, high triglycerides, diabetes, and sedentary habit.

Results: Mean age of study participants was 47.0 ± 17.0 years (49.3% males). Prevalence of CKD was 15.1% (95% CI, 14.3–16.0). CKD was more frequent in men than women (23.1% vs 7.3%, $p < 0.001$), and increased with age (4.8% in 18- to 44-years' subjects, 17.4% in 45-to-64-years' subjects, and 37.3% in individuals aged 65 or more; p -trend <0.001). CKD prevalence within subjects with no CVD was 14.6% whereas it was 39.8% in subjects with CVD ($p < 0.001$). CKD affected <4% of subjects with 0–1 CVRF, and then to 8.5%, 12.4%, 16.2%, 23.3%, 25.5%, 27.9%, 33.7%, 35.4%, 41.7%, 70.0%, and 100% in subjects with 2 to 12 CVRF respectively (p -trend <0.001).

Conclusions: The prevalence of CKD in Spain was around 15%. CKD was particularly prevalent in men, older subjects, and individuals with CVD. There was a continuously increasing prevalence of CKD with the clustering of CVRF. We suggest that CKD could be interpreted as a cardiovascular condition in the population.

PP.11.12 HYPERTENSION IN LUPUS NEPHRITIS

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Objective: Evaluate hypertension (HT) in a cohort with lupus nephritis (LN) and study its epidemiologic, clinical, histological and therapeutic characteristics.

Design and method: The patients included in this study met the criteria fixed by the ARA for the diagnosis of systemic lupus erythematosus. The LN was selected based on the criteria of the International Society of Nephrology (ISN) and the Renal Pathology Society. We reviewed 120 cases of LES hospitalized in the Internal Medicine Department of the Military Hospital of Tunis during 13-year period from 1999 to 2012 and were selected 41 cases of LN.

Results: Hypertension was found in 10 patients among the 41 cases studied (25%). There were 2 men and 8 women. The average age of our patients was 34 years. Threatening HT with hypertensive encephalopathy was observed in one patient. HT was associated with diffuse proliferative glomerulonephritis (Class IV) in 6 cases, associated with membranous glomerulopathy (IV + V) in a case. Four patients had clinical and biological signs of thrombotic microangiopathy. In one case, diagnosis of thrombotic microangiopathy was histologically confirmed. The others patients (4 cases) had HT secondary to corticosteroids treatment. The therapeutic strategies consisted of a low salt diet associated with antihypertensive medications in all cases. The angiotensin converting enzyme inhibitors were used in all cases, loop diuretic in 2 cases, beta blockers and calcium channel blockers in 2 others patients. After etiopathogenic treatment, evolution was marked by persistent HT in 4 cases.

Conclusions: HT in NL is a poor prognostic factor. It is multifactorial, treatment based on angiotensin converting enzyme inhibitors and its evolution is often favorable.

PP.11.13 HYPERTENSION AND END STAGE RENAL DISEASE REQUIRING HEMODIALYSIS

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Objective: The prevalence of hypertension (HT) remains high in hemodialysis patients ranging from 55% to 85%. Its origins are in the extracellular volume overload associated to the increased arterial resistance. The aim of our study was to describe the epidemiological, clinical and therapeutic characteristics in our hypertensive hemodialysis population.

Design and method: This was a cross-sectional descriptive study about 61 hemodialysis patients between May and August 2014. The collected data were age, type of initial renal disease, hemodialysis duration and treatment of HT.

Results: Of these 61 patients undergoing hemodialysis, 58 were hypertensive when hemodialysis was started, 49 were hypertensive since the discovery of the initial renal disease, and 45 patients required antihypertensive treatment after at least 6 months of hemodialysis at the end of the study. The average age of hypertensive patients was 56 years (22–88 years). Thirty six patients were males. The mean duration of renal replacement therapy was 7.9 years (1–31 years). In patients who started hemodialysis with HT, the initial nephropathy was a glomerulopathy in 23 cases, including 15 cases of diabetic nephropathy, vascular nephropathy in 13 cases, tubulointerstitial in 10 cases (including 2 cases of polycystic kidney disease) and in 10 cases renal disease was indeterminate. Sixty patients used at least one antihypertensive treatment during their followed in renal replacement. Seventeen hemodialysis patients had left ventricular hypertrophy and 4 had presented an ischemic stroke.

Conclusions: HT in chronic hemodialysis patients is common. It is a risk factor for cardiovascular disease which is the main cause of morbidity and mortality in the dialysis population. The extra-cellular volume expansion is the main pathophysiological determinant of HT in dialysis patients. To manage HT, limiting dietary intake, and individualizing dialysate sodium delivery would be the first steps. Anti-hypertensive drug therapies can effectively reduce blood pressure and are needed by the vast majority of hemodialysis patients.

PP.11.14 THE MECHANISMS OF SUSCEPTIBILITY OF DAHL STRAIN TO HYPERTENSIVE KIDNEY DAMAGE

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Objective: Dahl salt sensitive rats (DS) exhibit salt-dependent hypertension with severe organ damage including renal failure, stroke and heart failure. However, the mechanisms for their susceptibility remain to be elucidated. In this study, we examined whether angiotensin II (AII) and its intracellular signaling are responsible for the susceptibility of DS to hypertensive kidney injury.

Design and method: Pressor dose of AII (200ng/min/kg BW) was continuously infused for 4 weeks to normotensive DS and Dahl salt resistant rats (DR) fed a low-salt diet (0.3%NaCl). After AII-induced hypertension in DS and DR, we investigated renal damage including urinary protein excretions (U-TP), plasma creatinine (PCr), morphological glomerular sclerosis (GS), and measured with Real-Time PCR mRNA levels of the regulator of Gq-protein signaling 2, RGS2, in the kidney and aorta, which inhibits AII-dependent G-protein signaling.

Results: 4-weeks AII infusion similarly developed hypertension in DS and DR fed a low-salt diet (35 ± 6mmHg SBP for DS-AII vs. 35 ± 8mmHg for DR-AII, p = ns). In DS, however, the SBP rising was associated with functional and morphological kidney damage including proteinuria (178 ± 51 mg/day for DS-AII vs. 35 ± 6 mg/day for DR-AII, p < 0.001), PCr (0.28 ± 0.01 mg/dl for DS-AII vs. 0.23 ± 0.01 mg/dl for DR-AII, p < 0.001), and glomerular sclerosis (175 ± 13 for DS-AII vs. 166 ± 31 for DR-AII, p = ns). Moreover, RGS2mRNA expression was lower in DS-AII than DR-AII (1.28 ± 0.13 vs. 1.51 ± 0.16, p < 0.05). Interestingly, AII infusion tended to decrease RGS2mRNA in DS and, conversely tended to increase RGS2mRNA in DR. The difference was significant. Multiple regression analysis revealed that RGS2mRNA was an independent, negative determinant of U-TP (beta = -0.5, p < 0.05).

Conclusions: There was no difference in SBP response to AII between DS and DR; however, DS is more susceptible to AII-induced kidney damage through up-regulation of AII-receptor mediated G-protein signaling by decreased RGS2 expression.

PP.11.15 IMPACT OF NEONATAL LEPTIN ON RENAL STRUCTURE AND FUNCTION IN THE PRESENCE AND ABSENCE OF HYPERTENSION: EVIDENCE FROM MELANOCORTIN-4 RECEPTOR DEFICIENT MICE

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Objective: Maternal obesity in rodents leads to sympathetic mediated hypertension in the juvenile offspring prior to obesity. This is associated with an exaggerated leptin surge in early postnatal life. The aim of this study was to determine the impact of this exaggerated neonatal leptin surge on the long-term renal structure and function, independent of the presence of hypertension, using a normotensive melanocortin-4 receptor deficient (MC4R^{-/-}) mice model.

Design and method: Neonatal mice were treated with leptin (L-Tx; 3 mg/kg IP) or saline (S-Tx), postnatal day 9–14. Mean arterial pressure (MAP) and glomerular filtration rate (GFR) were measured at 6 month old wild-type (WT) and MC4R^{-/-} mice using radiotelemetry and creatinine clearance test respectively. After hypertension had been established in WT, markers of renal injury, intrarenal renin-angiotensin system and sodium transporters were assessed and compared with normotensive MC4R^{-/-} mice.

Results: At 6 months of age, obese MC4R^{-/-} mice were hyperphagic and hyperleptinaemic compared with WT. Neonatal leptin (L-Tx) induced body weight, food intake and fat mass in WT with no influence in the MC4R^{-/-} mice. L-Tx-WT mice showed also 30% less glomerular area and reduced creatinine clearance [GFR, ml/min gKW, L-Tx, 0.46 ± 0.06 vs. S-Tx, 1.34 ± 0.32, n = 6, p < 0.01] with no additive effect in the MC4R^{-/-} mice. Renal injury was increased in L-Tx mice with higher urinary albumin excretion (UAE) and ratio UAE/creatinine in MC4R^{-/-} compared with WT. The L-Tx WT mice showed greater expression of renal tyrosine hydroxylase (TH), angiotensin II receptor (AT1a) and renin with marked down-regulated angiotensin II 2 (AT2R). These alterations were associated with elevated proximal tubule Na-H exchanger 3 transporter. Interestingly L-Tx mice also demonstrated increased renal NADPH oxidase 4 (NOX-4) and cyclooxygenase 2 (COX-2) expression [COX-2, L-Tx, 458 ± 92 vs. S-Tx, 162 ± 37, n = 6, p < 0.01]. COX has been associated with angiotensin II induced hypertension and reactive oxygen species (ROS).

Conclusions: Thus, alterations in MAP, Ang II pathways and ROS handling in the kidney, may reset the tubular functions in neonatal leptin mice and underpin the development of hypertension and renal dysfunction.

PP.11.16 RENAL DENERVATION REVERSES THE DEVELOPMENT OF JUVENILE HYPERTENSION, RENAL DYSFUNCTION AND GLOMEROSCLEROSIS SECONDARY TO NEONATAL HYPERLEPTINAEMIA

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Objective: To determine the effects of bilateral renal denervation (DNX) and unilateral renal denervation (UNX) on renal function and structure in young male and female hypertensive rats, secondary to neonatal hyperleptinaemia.

Design and method: Neonatal rats were treated with leptin (L-Tx; 3 mg/kg IP) or saline (S-Tx), postnatal day 9–14. Bilateral renal denervation (DNX) or sham-operation (SHAM) was performed at day 22. At 30 days of age, rats were allocated to one of two procedures designed to examine renal structure and function. A further group underwent unilateral renal denervation (UNX). In UNX and SHAM group, either the kidneys were perfusion-fixed for stereological estimates of glomerular dimensions and glomerulosclerosis, or the kidneys were frozen and used for qPCR and immunohistochemistry.

Results: Bilateral renal denervation recovered the juvenile hypertension in L-Tx rats. Mean arterial pressure was approximately 20 mmHg lower in the L-Tx DNX versus L-Tx SHAM rats. Unilateral renal denervation showed no effect on blood pressure, but resulted in decreased oxidative stress (Nox-4, Nitrotyrosine) and injury (NGAL, Kim-1 and caspase-3) and improved glomerulosclerosis. Glomerular filtration rate (GFR) was rescued in L-TX-DNX (male, 1.4 ± 0.1, female, 0.9 ± 0.1 ml/min) compared with L-Tx-SHAM (male, 1.0 ± 0.1, female, 0.5 ± 0.1 ml/min; P < 0.05). L-Tx rats also showed altered sodium retention, ENAC (epithelial sodium channel) activity, and urinary renin and angiotensinogen concentrations which all became normalised after DNX surgery.

Conclusions: This study provides incontrovertible evidence that renal nerve activation (RSNA) is the primary mechanism instigating juvenile hypertension and renal fibrogenesis, secondary to neonatal hyperleptinaemia. Our data implicates that increased RSNA mediate changes in intrarenal RAS and oxidative stress which initiate the renal dysfunction and structural malformations as tubular damage and fibrogenesis. Renal denervation may therefore be a putative therapeutic strategy for preventing, reversing or limiting primary hypertension and early kidney dysfunction. Furthermore, understanding the mechanisms by which renal denervation improves oxidative stress and renal injury will further the possibility to target new therapeutically strategies for the early prevention of hypertension.

PP.11.17 ANGIOTENSIN AT2 RECEPTOR AGONIST PREVENTS SALT-SENSITIVE HYPERTENSION IN OBESE ZUCKER RATS

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Objective: High sodium intake is a risk factor for the pathogenesis of hypertension, especially in obesity. The present study is designed to investigate whether angiotensin type-2 receptor (AT2R) activation with selective agonist C21 prevents high-sodium diet (HSD)-induced hypertension in obese animals.

Design and method: Male obese rats were treated with AT2R agonist C21 (1 mg/kg/day, oral) while maintained on either normal-sodium diet (NSD, 0.4%) or HSD (4%) for 2-weeks. Radio-telemetric recording of blood pressure was performed during 2-weeks of treatment followed by measuring renal urinary sodium and biochemical measurements in the isolated kidney.

Results: Radio-telemetric recording showed a time dependent increase in systolic blood pressure in HSD-fed obese rats, being maximal increase (~27 mmHg) at day 12 of the HSD regimen. C21 treatment completely prevented the increase in blood pressure of HSD-fed rats. Compared to NSD controls, HSD-fed obese rats had greater natriuresis/diuresis and urinary levels of nitrates, and these parameters were further increased by C21 treatment. HSD-fed rats expressed higher level of cortical AngII, which was reduced to 50% by C21 treatment. HSD feeding and/or C21 treatment had no effects on cortical renin activity and the expression of angiotensin converting enzyme and chymase, which are AngII producing enzymes. However, Ang(1-7) concentration and ACE2 activity in the renal cortex were reduced by HSD feeding, and C21 treatment rescued both the parameters. Also, C21 treatment reduced the cortical expression of AT1R in HSD-fed rats, but had no effect of AT2R expression.

Conclusions: We conclude that chronic treatment with the AT2R agonist C21 prevents salt-sensitive hypertension in obese rats, and a reduction in the renal AngII/AT1R and enhanced ACE2/Ang(1-7) levels may play a potential role in this phenomenon.

PP.11.18 ALTERED WATER BALANCE IN PREHYPERTENSIVE SPONTANEOUSLY HYPERTENSIVE RATS

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Objective: Evidences indicate that in addition to long term regulation of blood pressure, in the kidney resides the initial trigger for the development of hypertension. Altered capacity of the kidney to excrete sodium and water in relation to intake has been proposed as a basic mechanism of initiating hypertension. Betaine is one of the major organic osmolytes and the upregulation of its betaine/gamma-aminobutyric acid transporter (BGT1) in the renal medulla is related to high extracellular tonicity and urinary osmolality.

Design and method: The present study investigated the abnormalities in water and sodium balance and osmoregulation in a model of polygenic multifactorial arterial hypertension, the spontaneously hypertensive rats (SHR, n = 58) and compared with their normotensive controls Wistar Kyoto (WKY, n = 46 from their prehypertensive phase (4 weeks of age) until the development hypertension and of organ damage (28-30 weeks of age). Rats were housed in metabolic cages to monitor water and salt balance parameters at the age of 4-5, 14-16 and 28-30 weeks of age.

Results: No difference of blood pressure (both indirectly tail cuff method and invasively, as well heart rate, body weight, serum sodium, potassium and creatinine levels) was measured at the age of 5 weeks of age between SHR and WKY. Daily urinary volume was reduced in prehypertensive SHR as compared to WKY (-36%, p<0.01) with an increased urinary osmolality (p<0.01); a trend toward reduced urinary sodium excretion (p=0.079) in prehypertensive SHR was observed as compared with WKY. A marked accumulation of BGT1 is observed in outer medulla of SHR (mTHAL) as compared to WKY and its expression is directly correlated with urinary osmolality. Arginin vasopressin circulating levels were not different between prehypertensive SHR and WKY whereas urinary aqua-

porin 2/creatinine ratio excretion was higher in prehypertensive SHR vs WKY. At the age of 28-30 weeks, hypertensive SHR with moderate renal failure did not show any difference in urinary osmolality, renal expression of BGT1 as compared with WKY.

Conclusions: All these results suggest in prehypertensive SHR an early positive balance of water before sodium balance alteration.

PP.11.19 WARFARIN NEPHROPATHY: ANOTHER CONCERNING BUT FREQUENTLY OVERLOOKED SIDE EFFECT

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Objective: Warfarin nephropathy is often unrecognized cause of kidney injury, most common in high-risk patients where worsening of renal function is attributed to various comorbidities and risk factors (chronic kidney disease, diabetes, hypertension, congestive heart disease). In those patients increase in serum creatinine with elevated INR should bring up suspicion of a possible anticoagulant-induced-nephropathy.

Design and method: 77yrs female patient with history of diabetes, hypertension and permanent atrial fibrillation was admitted in a dermatology clinic due to suspected leucocytoclastic vasculitis. Oral corticosteroid therapy was initiated, followed by the regression of skin lesions. Because of deterioration in renal function, proteinuria of 1.5 g/dU, microhaematuria with a episodes of macrohematuria, patient was transferred to the nephrology department. Immunological, laboratory tests, chest X-ray and kidney ultrasound were unremarkable. Therapy with warfarin was stopped and after normalization of INR values (on arrival was >4) kidney biopsy was performed.

Results: Patohistological findings were characteristic for nodular diabetic glomerulosclerosis, but also revealed dilated atrophic tubules with damaged epithelium and large clusters of red blood cells in the lumen, which is also consistent with warfarin nephropathy. Interruption of anticoagulant therapy and normalization of INR was accompanied with a decline in serum creatinine. Considering the need for anticoagulant therapy (atrial fibrillation) dabigatran was started. Follow-up of more than two years showed no further episode of kidney impairment

Conclusions: Warfarin nephropathy is often an unrecognized cause of kidney injury in patients treated with warfarin. Our patient, the first case of warfarin nephropathy described in Croatia, had a number of predisposing risk factors. In addition to clinical elements (deterioration of renal function, INR > 3, kidney function improvement after omission of warfarin, leucocytoclastic vasculitis) diagnosis was confirmed by kidney biopsy which is the 'gold standard' for diagnosis. However, in clinical practice it is not performed frequently mainly because of the risk of bleeding. By presenting this patient, we wanted to draw attention to another possible complication of warfarin therapy and to remind on another possible cause of acute worsening of renal function in chronic patients which often goes unrecognized.

PP.11.20 PREVALENCE OF HYPERTENSION AND POORLY CONTROLLED HYPERTENSION 6 AND 12 MONTH AFTER SOLID ORGAN TRANSPLANTATION IN THE SWISS TRANSPLANT COHORT STUDY

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Objective: Prevalence of hypertension (HTN) is high after solid organ transplantation (SOT) and has been associated to graft failure, death-censored graft failure and death. The Swiss Transplant Cohort Study has enrolled SOT participants prospectively since 2008. No data on the prevalence of HTN and poorly controlled HTN has been reported from this cohort so far. The objective was therefore to determine the prevalence of HTN and poorly controlled HRN

Design and method: Patients' characteristics including Blood pressure (BP) data were recorded at 6 and 12 months. HTN was defined as BP > 140/90 mmHg or the use of antihypertensive drugs. Uncontrolled HTN was defined as BP > 140/90 mmHg despite the use of antihypertensive drugs. Data from 1236 participants were available at baseline (time of SOT).

Results: 64.8% of the participants were male, mean age was 52.0 ± 13.1 years (mean ± standard deviation), mean body mass index was 25.0 ± 13.1 Kg/m².

Table 1. Prevalence of HTN and poorly controlled HTN 6 and 12 month after SOT.

Organ transplanted		6M FUP	12M FUP
Kidney	n	801	651
	HTN	94.5%	96.2%
	pcHTN	40.7%	42.1%
Liver	n	190	154
	HTN	70.5%	74.0%
	pcHTN	25.8%	33.3%
Lung	n	112	80
	HTN	82.1%	83.8%
	pcHTN	34.3%	45.6%
Heart	n	65	54
	HTN	95.4%	100%
	pcHTN	35.5%	28.0%

HTN: hypertension, pcHTN: poorly controlled hypertension, 6MFUP: 6 months follow-up, 12 FUP: 12 months follow-up.

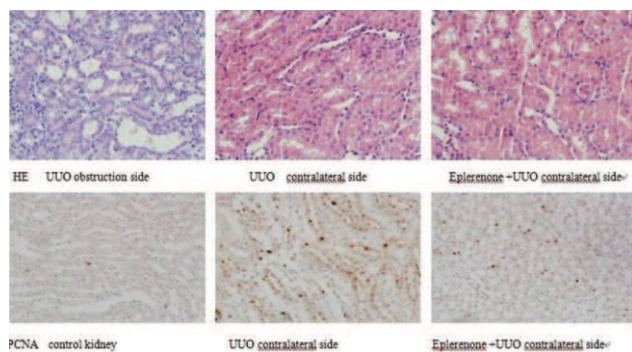
At 6 and 12 months, the prevalence of HTN was different among the different organs ($p < 0.001$). The prevalence of uncontrolled HTN among the different organs was different at 6 months ($p = 0.013$) but not at 12 months ($p = 0.080$). In multivariate analysis age was associated with an increased risk of uncontrolled HTN at 6 and 12 months. Sex (male) and the number of antihypertensive drug used were associated with HTN at 6 months.

Conclusions: The prevalence of HTN after SOT is high but dependent of the organ transplanted. Despite the use of antihypertensive drugs in most SOT patients, uncontrolled HTN is frequent, particularly in kidney transplants.

PP.11.21 THE EFFECT OF ALDOSTERONE ON CELL PROLIFERATION IN CONTRALATERAL KIDNEY OF RATS WITH UNILATERAL URETERAL OBSTRUCTION

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Objective: UUO model not only induces renal interstitial fibrosis (RIF) in obstructed kidney, but also induces injury in contralateral kidney. The precise mechanisms to induce RIF in the contralateral kidney are not well revealed. Inflammation and cell proliferation plays an important role in the process of RIF. Proliferation appears early, even prior to the abnormal deposition of extracellular matrix, and continued throughout the whole process of fibrosis. We hypothesized that aldosterone may induce inflammation and cell proliferation by SGK-1/ NF- κ B pathway.



Design and method: 36 female Wistar rats weight 200 ± 10 g were used in this study. After 7 days to adapt, rats are randomly divided into 3 groups: Control group, UUO group, and UUO and Eplerenone group. The rats in UUO and Eplerenone group had the UUO operation and treated with Eplerenone of 100 mg/Kg/d. At the tenth day, the serum aldosterone, MCP-1 and TNF- α were evaluated by radioimmunoassay or ELISA method. The kidneys were harvested for histopathological and biomolecular study.

Results: 1 In UUO group, the level of serum aldosterone, MCP-1 and TNF- α were increased significantly than sham group and they are lowered by Eplerenone.
 2 Pathologic changes: in UUO group, severe inflammation can be observed in the contralateral kidneys. Eplerenone treatment decreased the degree of inflammation and interstitial fibrosis in both obstructed and contralateral kidneys.
 3 Cell proliferation was examined by PCNA staining and PCNA positive cells increased markedly together with increased collagens in UUO group than control group in contralateral kidney and those changes are attenuated by Eplerenone.
 4 The expression of SGK-1 protein were upregulated in contralateral kidney in UUO group, which is suppressed by Eplerenone treatment.
 5 NF- κ B, ERK1/2 and P-ERK1/2 were also increased markedly in contralateral kidney of UUO than Sham group and downregulated after Eplerenone treatment.

Conclusions: 1 Cell proliferation in contralateral kidney of UUO may play an important role in the process of RIF.

2 Aldosterone and its receptor (MR) activity are increased in contralateral kidney in obstructive nephropathy and they induce inflammation to stimulate cell proliferation

3 Effect of MR on cell proliferation maybe associated with SGK-1/ NF- κ B pathway.

PP.11.22 RATE OF GFR FALL OVER TIME, 24H AMBULATORY BP MONITORING AND OFFICE BP IN TRANSPLANT PATIENTS

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Objective: Current guidelines recommend 24hABPM as a priority for the diagnosis of hypertension and for treatment monitoring in pts likely to have a blunted nighttime BP decline and elevated CV risk, like renal transplant pts. Blunted nocturnal decline in BP is common in CKD and it is considered as the BP component with the strongest association with renal function loss over time in these pts. The relationship between 24 h ABPM components and the rate of GFR loss has never been investigated in these pts.

Design and method: The rate of GFR loss was measured by fitting the slope of the GFR over time in series of at least 20 GFR measurements extended over 12 to 123 months. In 274 renal transplant pts with pre-planned, systematic 24hABPM measurement. 139 pts were excluded because they had insufficient repeated measurements of GFR over time. Thus, 135 pts were available for this analysis.

Results: Baseline eGFR was 56 ± 21 ml/min/1.73 m². The eGFR slope had a median value of 0.6 ml/min/year. On univariate analyses, eGFR slope was inversely related to office systolic BP (SBP), 24hSBP, night-time SBP and 24 h pulse pressure (PP) (all $\rho = -0.19, P = 0.03$). eGFR slope was also inversely related to day-time PP ($\rho = -0.18, P = 0.04$) and tended to correlate with day-time SBP ($\rho = -0.15, P = 0.08$) and night-time PP ($\rho = -0.16, P = 0.07$). The eGFR slope-BP components link become even stronger after adjustment for age, gender, smoking, diabetes, cholesterol and baseline eGFR: eGFR slope versus office SBP: $\beta = -0.25, P = 0.005$; versus 24 h SBP: $\beta = -0.22, P = 0.01$; versus night-time SBP: $\beta = -0.24, P = 0.007$; versus 24 h PP: $\beta = -0.23, P = 0.01$; versus day-time PP: $\beta = -0.21, P = 0.02$; versus day-time SBP: $\beta = -0.18, P = 0.047$; versus night-time PP: $\beta = -0.20, P = 0.03$.

Conclusions: When measured intensively and over extended time periods the rate of GFR loss in renal transplant pts associates with the BP burden. Even though measured at a single time point, office SBP associates with the GFR slope as strongly as 24 h SBP, day and night time SBP. These findings confirm the role of BP burden on long term evolution of renal function in renal transplant and indicates that it is unlikely that 24hABPM holds superior prognostic power for this outcome in this population.

PP.11.23 ASSOCIATION BETWEEN SALT INTAKE AND INDICES OF MICRO- AND MACROVASCULAR FUNCTION

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Objective: Multiple studies have linked sodium intake with office blood pressure (BP) levels and increased cardiovascular mortality and morbidity. However, the association between increased salt consumption and 24-hour ambulatory BP monitoring (ABPM) parameters remains underinvestigated. Moreover, it still remains ambiguous whether it promotes subclinical micro- and macrovascular damage independent of BP levels and simultaneously in different target organs.

Design and method: Consecutive newly diagnosed, otherwise healthy, never-treated hypertensive patients and healthy volunteers underwent ABPM and blood sampling. Sodium intake was estimated in 24-hour urine samples. Structural alterations of dermal capillaries (capillary density per visual field) were evaluated using special software analysis of nailfold capillaroscopy images. Functional microvascular alterations of the kidney were assessed by estimation of microalbuminuria. The Sphygmocor device was used to assess arterial stiffness by measurement of pulse wave velocity (PWV), and Aortic augmentation Index (AIx).

Results: The study included 193 participants. Sodium excretion was significantly associated with ABPM ($r = 0.216, p < 0.01$), day-time systolic blood pressure (SBP) ($r = 0.207, p < 0.05$), and night-time SBP ($r = 0.213, p < 0.01$). The association

between sodium excretion and 24-hour SBP ($r=0.170$, $p<0.05$), as well as night-time SBP ($r=0.173$, $p<0.05$) remained significant even after adjustment for other parameters. Although sodium excretion was not associated with PWV or capillary density, a significant correlation was found between sodium excretion and Alx, as well as microalbuminuria. In the multiple linear regression model, 24-hour SBP ($p=0.008$), albuminuria ($p=0.019$) and Alx ($p=0.042$) remained significant predictors of sodium excretion, even after adjustment for age, BMI, office BP, smoking, glomerular filtration rate (GFR), capillary rarefaction and aldosterone levels.

Conclusions: This is the first study demonstrating a significant association between salt intake and indices of functional microvascular (microalbuminuria) and macrovascular (Alx) involvement in a population free from the long-standing effects of essential hypertension and after accounting for several factors including aldosterone. In addition, it was shown that of all 24-hour ABPM parameters, 24-hour and night-time SBP exhibit the most powerful association with salt consumption. Our findings highlight the detrimental effects of excessive dietary salt intake and should serve as a reminder to promote lifestyle changes in hypertensive patients.

PP.11.24 A COMPARISON OF GLOMERULAR FILTRATION RATE ESTIMATING FORMULAS IN A POPULATION OF HEALTHY AND HYPERTENSIVE INDIVIDUALS

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Objective: Estimation of the glomerular filtration rate (GFR) represents the most significant index of renal function and an indispensable clinical tool. Various non-invasive calculation formulas have been invented and used. However, studies that focus on the correlation between their outcomes or the direct comparison of their effectiveness are remarkably few, especially in healthy as well as hypertensive populations. The aim of the present study was to compare various types used for the calculation of GFR with creatinine clearance in a population of newly diagnosed, never-treated, otherwise healthy hypertensive patients and healthy, normotensive individuals.

Design and method: Blood sampling and 24-hour urine collection from all participants was used to evaluate serum and urine creatinine levels, respectively. The adjusted for body surface formulas Cockcroft-Gault (CG), Modification of Diet in Renal Disease (MDRD) and Chronic Kidney Disease-Epidemiology (CKD-EPI) were used to estimate GFR values using 24-hour urine creatinine. Statistical analysis included Cronbach alpha and chi square tests.

Results: A total of 205 individuals with a mean age of 43.5 ± 11.7 years participated in the study. Of them, 159 were hypertensives and 46 healthy normotensives. Using urine creatinine clearance, only 3.4% of the total population were classified to GFR < 90 ml/min. Of note, when the MDRD calculation formula was applied, this classification reached 40% of the study population. Although the CG equation had the greatest agreement with baseline GFR regarding classification, Cronbach alpha did not present a powerful correlation and was significantly underestimated by the rest equations (Table 1).

Table 1. Classification of the population to the first stage of renal disease according to the applied GFR calculation type and control of the agreement between various formulas.

	<90ml/min	≥90ml/min	Cronbach a	CG	MDRD	CKD-EPI
CrCl	3,4%	96,6%	CrCl	0,277	0,265	0,120
CG	4,4%	95,6%	CG	-	0,717	0,827
MDRD	40%	60%	MDRD	-	-	0,921
CKD-EPI	24,4%	75,6%				

GFR=glomerular filtration rate, CrCl=Urine Creatinine Clearance, CG=Cockcroft-Gault, MDRD=Modification of Diet in Renal Disease, CKD-EPI=Chronic Kidney Disease-Epidemiology

Conclusions: The present study demonstrates a large variation between estimated values of GFR using the most widely used GFR calculating formulas. Further studies are warranted to decide which types are the most appropriate for use among healthy and hypertensive individuals.

PP.11.25

RELATIONSHIP BETWEEN LEPTIN AND TRADITIONAL CARDIOVASCULAR RISK FACTORS IN HEMODIALYSIS PATIENTS AT DIFFERENT LENGTH OF DIALYSIS THERAPY

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Objective: Despite advances in the technology of dialysis, cardiovascular morbidity and mortality in patients with end-stage renal disease (ESRD) who are on hemodialysis therapy are still very high. Recent clinical studies have demonstrated a significant correlation between leptin levels and hypertension, hyperlipidemia, perturbed fibrinolysis and chronic inflammation. The aim of this study was to investigate the significance of changes in serum leptin concentrations and relationship of leptin and traditional cardiovascular risk factors in patients with varying duration of hemodialysis therapy.

Design and method: The cross sectional study included 60 patients with end stage renal disease, of both sexes, divided into two equal groups ($n=30$) based on the duration of hemodialysis treatment: A group of subjects who are on hemodialysis therapy between three months and five years, and group of subjects who are on hemodialysis therapy five and more than five years. The control group ($n=30$) consisted of apparently healthy subjects, with no subjective and objective indicators of chronic renal disease. The serum leptin concentration was determined by enzyme-linked immunosorbent assay (ELISA).

Results: Serum leptin levels in patients in Group under 5 years was significantly higher from leptin concentrations in serum of patients in Group equally and more then 5 years and of serum leptin concentrations in the control group. Statistically significant positive correlation was found between serum leptin levels and body mass index (BMI) in subjects of Group equally and more then 5 years and in the control group. There was no significant correlation between serum leptin levels and C – reactive protein (CRP) in any of the groups of patients. Results showed that the serum leptin value had a poor diagnostic accuracy in distinguish hemodialysis patients from healthy control, as well as, hemodialysis patients at different length of dialysis therapy.

Conclusions: In this population of stable HD patients, obtained results do not support the hypothesis that serum leptin and relationship between leptin and traditional cardiovascular risk factors can be used as an independent marker to distinguish between hemodialysis patients than healthy subjects, nor in differentiating hemodialysis patients at different length of dialysis therapy.

PP.11.26

IMPACT OF BLOOD PRESSURE AND HYDRATATION ON LEFT VENTRICULAR GEOMETRY AND FUNCTION IN CHRONIC HEMODIALYSIS PATIENTS DETERMINED BY BIOIMPEDANCE SPECTROSCOPY

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Objective: Single center retrospective study focused on blood pressure (BP) and fluid overhydration (OH) impact on the left ventricular (LV) geometry and function in hemodialysis (HD) patients, using bioimpedance spectroscopy (BIS)

Design and method: 45 HD patients (male / female: 30/15) were included. The hydration parameters and BP data were collected on a monthly basis during one year, namely extracellular fluid (ECW), intracellular fluid (ICW), total body water (TBW), ratio of ECW / ICW, ECW / TBW and OH / ECW and BP values (BPsystolic, BPd-diastolic, BPmap -mean arterial, BPPp -pulse). Furthermore, we determined LV ejection fraction (LVEF), LV mass (LVM), LV mass index (LVMI), left atrium size (LA), interventricular septum thickness (IVS), LV end-diastolic diameter (LVEDD), LV relative wall thickness (LVRWT), maximum speed of the phase of rapid (E) and late (A) filling, E/A ratio, deceleration time (DCT) and isovolumic time (IVRT).

Results: Normal LV geometry was found in 11 patients (25%), concentric remodeling in 5 patients (11%), concentric hypertrophy in 25 patients (55%) and eccentric hypertrophy in 4 (9%) patients.

BP values (median, interquartile range) were as follows: BPs 138 (127–148) mmHg, BPd 78 (73–80) mmHg, BPmap 98 (92–103) mmHg and BPpp 60 (52–68) mmHg. Significant impact of BPs, BPd, BPmap and BPpp to the LVM, LVMI, IVS, LVRWT ($p < 0.001$, $r = 0.4$) was confirmed, but not on the LVEF, LVEDD, LA. A causal relationship was found between OH and LVM ($p < 0.01$, $r = 0.3$) and LA ($p < 0.01$, $r = 0.3$).

LVM and LA were correlated with ECW ($p < 0.01$, $r = 0.3$), ICW ($p < 0.01$, $r = 0.4$) and TBW ($p < 0.01$, $r = 0.4$).

No other causal relationship between hydration parameters and LVEF, LVMI, LVEDD, IVS, LVRWT, E, A, E/A, DCT, IVRT was found.

Conclusions: BIS provides detailed information on the hydration status in HD patients and can – by influencing BP - increase quality of complex treatment of arterial hypertension.

POSTERS' SESSION

POSTERS' SESSION PS12

NEURAL AND REFLEX MECHANISMS

PP.12.01 INFLUENCES OF AGE ON THE RESULTS OF BLOOD PRESSURE-REDUCTION AND AUTONOMIC NERVOUS FUNCTION IN ORTHOSTATIC CHANGES

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Objective: We evaluated orthostatic upright postural blood pressure (BP) changes and autonomic nervous function during simple standing-up test in community-based subjects. The present study was conducted to evaluate the influences of age on the results of BP changes and autonomic nervous function in orthostatic changes.

Design and method: A total of 1915 subjects ranging from 15 to 80 years of age (mean age = 54.0 y.o.; 795 males and 1120 females) were selected from the participants in a Wakayama population-based health study. They underwent a simple standing-up test, and during the test brachial BP was measured every min and the R-R intervals of ECG were continuously evaluated. To evaluate autonomic fluctuations, we calculated the coefficient of variation of the R-R interval (CVRR), the ratio of low to high frequency heart rate variability (LF/HF), and the coefficient of component variance of high frequency (CCVHF). The results of BP and autonomic function at standing were analyzed chronologically in 10-year age intervals.

Results: SBP ($R^2 = 0.987$) and pulse pressure significantly increased and heart rate (HR), log LF/HF, CCVHF and CVRR significantly decreased substantially with age at baseline. When changing positions from sitting to standing, SBP, HR, log LF/HF, CVRR significantly decreased and CCVHF significantly increased chronologically. Systolic BP when changing positions from sitting to standing was defined δ SBP, δ SBP was higher in males than in females (5.90 vs 4.43 mmHg, $p = 0.008$). δ SBP significantly correlate with CVRR, CCVHF both baseline and at standing, age and gender. In multiple regression analysis, SBP changes after standing resulted to be significantly associated to CVRR at standing ($\beta = 0.122$, $p = 0.0001$), age and gender.

Conclusions: At the orthostatic position, the differences of SBP, HR, log LF/HF, CVRR significantly decreased and CCVHF significantly increased substantially with age. SBP changes after standing resulted to be significantly associated to CVRR at standing, age and gender. These results demonstrate that aging clearly influences autonomic nervous function and blood pressure-changes at standing may relate to parasympathetic nervous activity.

PP.12.02 NEUROHORMONAL RESPONSES TO MILD COLD EXPOSURE IN HEALTHY SUBJECTS: A RANDOMIZED CROSS-OVER STUDY

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Objective: Exposure to very low temperature induces a cascade of biochemical and hormonal responses to increase heat production and maintain the body temperature constant. Our objective was to analyze the neurohormonal adaptation to a mild acute cold exposure in humans using a surgeon's cooling vest.

Design and method: In an open randomized cross-over study with blind end-point evaluation, 10 healthy normotensive men aged 25 ± 5 yrs were randomly exposed at 48-hours interval to an acute cold temperature test (CTT) or room temperature test (RTT), by wearing a surgeon's cooling vest filled with either circulating water set at 14°C or at room temperature for 2 hours, respectively. Blood pressure (BP) and heart rate (HR), skin and central temperature were monitored. Blood samples for hormones were drawn before and at 2 hours.

Results: Skin temperature decreased significantly from $36.3 \pm 0.3^\circ\text{C}$ to $30.4 \pm 1.7^\circ\text{C}$ ($P < 0.0001$) during CTT whereas it remained constant during RTT. Central temperature, HR and BP remained constant and similar during RTT and CTT. Plasma norepinephrine concentration increased significantly from 1.6 ± 0.6 to 2.8 ± 1.2 ng/l during CTT ($P = 0.0007$), whereas it remained stable during RTT, from 1.4 ± 0.7 to 1.5 ± 0.6 ng/l ($P = 0.763$).

No significant change in plasma epinephrine concentration was observed. Plasma copeptin concentration, a surrogate marker of AVP release, decreased significantly from 5.0 ± 2.0 to 3.8 ± 2.7 pmol/l during CTT ($P = 0.0015$), whereas it remained stable during RTT, from 4.8 ± 2.1 to 4.3 ± 1.5 pmol/l ($P = 0.258$).

Plasma renin concentration remained constant, whereas plasma aldosterone, ACTH and cortisol concentrations followed their circadian rhythm during both the CTT and RTT.

No significant changes in the concentrations of free fractions of thyroid hormones, glycaemia and insulin were detected.

Conclusions: In conclusion, the mild acute cold temperature test described here triggers catecholamine release of neuronal origin (norepinephrine) and central inhibition of copeptin release, without significant hemodynamic changes.

Further studies are required to determine whether this test could be of interest to select patients for interventions targeting the autonomous nervous system such as renal denervation or baroreceptor stimulation.

PP.12.03 THE HEART RATE VARIABILITY AMONG COMORBID HYPERTENSIVE PATIENTS WITH ACUTE CORONARY SYNDROME AND ANXIETY AND DEPRESSIVE DISORDERS

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Objective: To study the heart rate variability (HRV) of patients with arterial hypertension (AH) associated with ACS with anxiety and depressive disorders.

Design and method: 54 patients with hypertension associated with ACS and anxiety and depressive disorders were included in open, comparative, prospective research. The first group (27 patients) was treated by conventional therapy and received additional Agomelatine (Valdoxane, SERVIER), 25 mg/day. Patients in the second group (27 patients) were given placebo. Holter ECG monitoring was conducted for 47 patients before discharge and after 6 months, using the recording system Schiller MT-200 Holter-ECG.

Results: Both treatment groups were comparable in terms of clinical and demographic characteristics, as well as the basic treatment of hypertension and ACS. Analysis of the Holter ECG monitoring data revealed a low level of all HRV parameters in both groups. That showed the change in the sympathetic and parasympathetic tone of nervous system. HRV reducing is a predictor of death and arrhythmias among patients after ACS. All patients were mentioned heart rate rigidity. Valdoxane group had showed improvement in mental status after 6 months of the treatment. After 6 months the second Holter ECG monitoring had showed a positive trend in the Valdoxane group as reducing the activity of the sympathetic as enhancing the activity of the parasympathetic nervous system. Patients had not been revealed of sinus rhythm rigidity. SDNN index increased from 88 [73; 101] ms to 124 [104; 135] ms; SDANN from 85 ms \pm 14.8 to 106.6 \pm 18.9 ms; pNN50% from 2.9 [1.5, 4.0] to 7.0 [4.6, 12.6]), $p < 0.005$. In the placebo group dynamics of HRV had not been revealed.

Conclusions: Valdoxane increases HRV among patients with hypertension associated with ACS and anxiety and depressive disorder, thus reducing the mortality and the incidence of ventricular arrhythmias among hypertensive patients after ACS.

PP.12.04 CIRCADIAN VARIATION OF HEART RATE IN NORMOTENSIVE AND HYPERTENSIVE PATIENTS

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Objective: To evaluate by performing 24-h ambulatory blood pressure monitoring (ABPM) circadian variation of heart rate (HR) with the purpose of establish a classification of the variation of HR according to the frequency and magnitude of its decrease or increase in normotensive and untreated hypertensive patients.

Design and method: 561 patients who underwent 24-h ABPM. After performing ABPM the total sample was classified in 02 groups: Normotensive patients (NP): (n = 302, 63.4% female, 49.59 ± 14.84 years, BMI: 28.03 ± 4.93 Kg/m²) and hypertensive patients (HP): (n = 259, 58.6% male, 48.94 ± 14.06 years, BMI: 29.72 ± 6.24 Kg/m²). The circadian variation of HR was calculated as the difference percentage between the average of HR during the day and night. The development of a scale of variation of HR by absolute and percentage frequencies has been the method used to classify the variation of the same.

Results: In this study it was found a decrease of average heart rate during the day to night of 10 to 19% was the most frequent circadian variation in normotensive and hypertensive patients (55% and 56%, respectively), (Table 1, 2).

Variable	N ° of Patients	%
Heart Rate Variation, (%)		
< 0	8	3.1
0 – 10	57	22
10 – 19	145	56
20 – 29	45	17.4
30 or more	4	1.5
Total	259	100

Variable	N ° of Patients	%
Heart Rate Variation, (%)		
< 0	8	2.6
0 – 10	74	24.5
10 – 19	166	55.0
20 – 29	50	16.6
30 or more	4	1.3
Total	302	100

Conclusions: Our results suggest that the circadian variation of the mean of HR between 10 to 19% represent the cutoff to establish normal range of this variable in normotensive and hypertensive patients.

PP.12.05 EFFECT OF UNILATERAL FIELD STIMULATION OF CAROTID BARORECEPTORS ON VASCULAR IMPEDANCE AND WAVE REFLECTION IN THE RAT AORTA AND RENAL ARTERY

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Objective: Carotid baroreceptor stimulation is used for treatment of resistant hypertension, with possible additional effect on the vasculature beyond the associated decrease in arterial pressure. This study aims to quantify the effect of acute baroreceptor stimulation on renal and aortic impedance and wave reflection in rats.

Design and method: Male Wistar-Kyoto (n=9, age 12–56 weeks) were anaesthetised (urethane, 1.3 g/kg) and implanted with a field stimulation electrode (100 Hz, pulse width 0.53 ms) surrounding the left common carotid artery, immediately proximal to the carotid bifurcation. Mean arterial pressure (MAP), heart rate (HR), lower thoracic aorta and renal flow were measured simultaneously. Aortic and renal resistance was calculated using measured pressure (P) and flow (Q) waveforms. For aortic and renal sites, impedance modulus (Zm) and phase (Zph) were calculated as the ratio of Fourier components of P and Q waveforms. Characteristic impedance (Zc) (impedance in the absence of the wave reflection) was determined from the average of harmonics 3 to 10 from the impedance frequency spectrum. Forward (Pf) and backward (Pb-) pressure waveforms were computed as Pf = (P + Zc × Q)/2 and Pb = (P - Zc × Q)/2. Reflection magnitude (Rm) was quantified as the ratio of the amplitude of Pb (aPb) and Pf (aPf). Phase zero crossing frequency (fz) and frequency of minimum modulus (fZmin) was determined for aortic and renal impedance spectra.

Results: Stimulation caused substantial reduction in MAP and HR accompanied by a tendency for reduction in aortic and renal mean flow (Qm) but no significant change in aortic or renal resistance (Res) (Table, means ± SD). However, there was a significant reduction in aortic but not renal Rm. There was no change in aortic or renal Zc but a general leftward shift of the impedance spectrum as suggested by lower fz and fZmin with stimulation.

	AORTA			RENAL ARTERY		
	Control	Stimulation	p	Control	Stimulation	p
MAP (mm Hg)	80.7 ± 13.0	56.6 ± 5.8	<0.001	80.7 ± 13.0	56.6 ± 5.8	<0.001
HR (b/min)	369 ± 47	347 ± 53	0.004	369 ± 47	347 ± 53	0.004
Qm (ml/min)	57.4 ± 21.0	39.3 ± 18.3	0.256	3.4 ± 1.7	2.0 ± 0.9	0.002
Res (mmHg/ml/min)	1.51 ± 0.40	1.61 ± 0.46	0.516	30.3 ± 17.6	36.4 ± 22.4	0.099
aPf (mm Hg)	35.9 ± 5.6	31.65 ± 7.7	0.049	38.6 ± 6.5	32.7 ± 7.6	0.011
aPb (mm Hg)	14.3 ± 3.0	10.4 ± 1.6	<0.001	9.5 ± 2.9	8.4 ± 2.3	0.374
Rm	0.41 ± 0.09	0.35 ± 0.09	0.007	0.26 ± 0.08	0.27 ± 0.08	0.208
Zc (mmHg/ml/min)	0.15 ± 0.05	0.20 ± 0.09	0.301	7.7 ± 4.3	7.7 ± 5.6	0.103
fz (hz)	27.2 ± 4.3	24.8 ± 4.2	0.969	31.5 ± 4.9	26.4 ± 4.7	0.024
fZmin (hz)	23.6 ± 4.7	20.6 ± 4.7	0.743	27.6 ± 8.5	22.8 ± 3.7	0.400

Conclusions: Acute field stimulation of the carotid baroreceptors in the rat reduces arterial pressure and with associate changes in vascular impedance in both the aorta and renal artery. However, the effects on peripheral wave reflection are variable in both locations.

PP.12.06 DIFFERENT PATTERNS OF BEAT TO BEAT VENTRICULAR-ARTERIAL INTERACTIONS IN YOUNG MEN: ROLE OF AUTONOMIC MODULATION

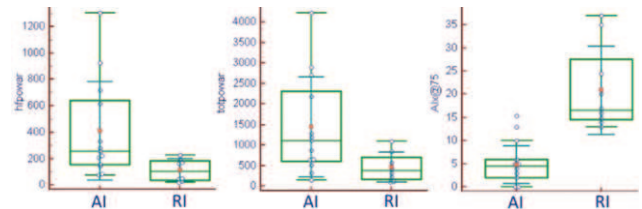
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Objective: Recently anterograde influences of left ventricular contractility over arterial stiffness have been evidenced in young men in population studies. However, is possible that different patterns of cardiovascular adjustment could be recognized through beat-to-beat measurements.

a-To describe beat-to-beat relationships between left ventricular function and aortic stiffness (anterograde (AI) and retrograde (RI) interactions), in normotensive and hypertensive patients. b- Correlate these profiles with the autonomic modulation.

Design and method: Of 130 patients evaluated, and after exclusion criteria (female, age < 18 > 60 years, secondary hypertension, diabetes, kidney disease, cardiovascular event, and sympatholytics) 22 males were included: 11 normotensives (40.8 ± 9.8 years, 126.1 ± 8.6/81.1 ± 8.0 mm Hg) and 11 mild hypertensive patients (42.1 ± 10.2 years, 137.2 ± 15.1/89.3 ± 9.0 mm Hg) treated with RAAS-blockers. BP (ESH), HR, ejection time (ET) and dZ/dT (a dV/dT estimator) were determined by impedance cardiography, together with tonometric carotid-femoral PWV; all the measurements were performed beat-to-beat, for 3 minutes at rest. Both sets of determinations were coordinated through R-R intervals. Spectral analysis of parasympathetic (HF, ms²)/sympathetic (LF/HF) and overall autonomic modulation (total power, TP, ms²) were performed through heart rate variability during 3 minutes/lying. Aortic augmentation index at 75bpm (AIX75) was measured. Beat-to-beat correlations between dZ/dT and ET with PWV were performed, identifying positive/negative signs of the interactions (AI/RI, respectively), (Pearson). We assessed differences between autonomic modulation and AIX75 according to AI/RI (T-test).

Results: Significant beat-to-beat correlations between dZ/dT and PWV were evident: Type-AI in 59% (n = 13; r = from 0.22 to 0.71, p < 0.05) and Type-RI in the remaining 41% (n = 9; r = -0.22 to -0.72, p < 0.05). ET was not significantly associated with PWV (p > 0.05). AI/RI prevalence were similar between normotensive and hypertensive patients (chi², p = 0.96). LF/HF was similar between AI/RI (p = 0.87). HF and TP were higher in AI subjects (409 vs. 112 ms² and 1007 vs. 418 ms², respectively; p < 0.05). AIX75 was higher in RI subjects (20.8 vs. 7.3%, p < 0.002).

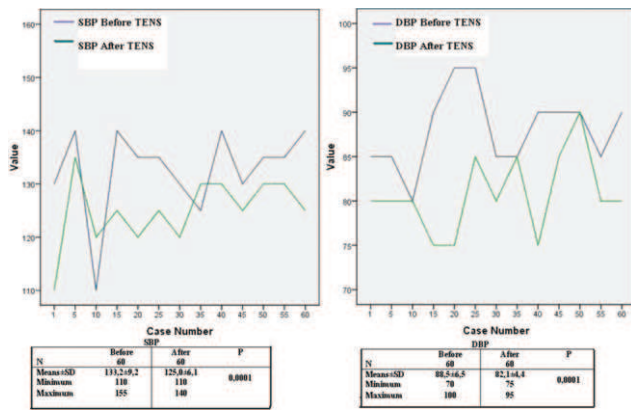


Conclusions: Two beat-to-beat ventricular-arterial interaction types in young men were noted. The anterograde interaction pattern appears to be more physiological, presenting greater parasympathetic and overall autonomic modulations, and less aortic reflections, which could have a lesser impact on target organ damage development.

PP.12.07 STRIKING EFFICACY OF TRANSCUTANEOUS ELECTRICAL NERVE STIMULATIONS IN PERIPHERAL POLYNEUROPATHIES IN CHRONIC KIDNEY DISEASE, DIABETES MELLITUS AND PRIMARY HYPERTENSION

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Objective: The polyneuropathies associated with diabetes mellitus type 2 and chronic renal disease are referred by long term complications. Especially, painful polyneuropathy situations decrease the quality of the patient's lives severely. Transcutaneous Electrical Nerve Stimulation (TENS) is a method which is used in painful polyneuropathy treatment. In our study, we tried to evaluate the analgesic efficiency of Transcutaneous Electrical Nerve Stimulation (TENS) in uremic & diabetic polyneuropathy patients' life quality and recovery of symptoms.



Design and method: 60 patients admitted to the Cukurova University Faculty of Medicine, Nephrology and Endocrinology Outpatient Clinics between 2010 - 2012 who had been diagnosed peripheral polyneuropathy associated with Diabetes Mellitus and Stage 4 or 5 Chronic Renal Disease were included in this study. In Patients with diabetes mellitus type 2 and chronic renal disease. Disease related symptoms, medication usings, disease and neuropathy duration time were recorded. General physical examination was performed and routine laboratory tests, vitamin B12 and folate levels were asked in all patients. Before and after the treatment of Transcutaneous Electrical Nerve Stimulation (TENS) therapy international scalas such as VAS (visual analog scala), LANNS (Leeds assesment of neuropathic symptoms and signs pain scale) and NHP (Nottingham health protocol) were performed and recorded. Transcutaneous Electrical Nerve Stimulation (TENS) therapy was applied to thepatients 30 minutes daily for 3 weeks by physiotherapists in Department of Physical Therapy of Cukurova University.

Results: Significant recovery were assessed with in symptoms, in patients life quality plus some decriments in systolic and diastolic blood pressures before and after therapy by using continuously blood pressure recorders and using parameters includings VAS, LANNS and NHP scalas.

Conclusions: In our study, the symptoms of painfull polyneuropathy patients are improved withTranscutaneous Electrical Nerve Stimulation (TENS) therapy. Besides, there were significant improvement in life quality of patients. Transcutaneous Electrical Nerve Stimulation (TENS) therapy is a valuable alternative therapy to drug therapy in patients. We believe every such patients must have the right to use this very advanced technologically developed treatment modality. This is a sine qua non medical approac modality.

PP.12.08 THE EFFECT OF HEAD AND NECK RADIOTHERAPY ON BLOOD PRESSURE AND ORTHOSTATIC HYPOTENSION IN PATIENTS WITH HEAD AND NECK TUMORS

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Objective: Head and neck cancer (HNC) is the sixth most common cancer worldwide. Radiotherapy (RT) plays a key role in the management of HNCs, especially in locally advanced disease. There is a notion that patients undergoing head and neck RT, especially elderly ones, are suffering from low and labile blood pressure (BP) during the treatment. They complain of weakness and fatigue and are prone to recurrent falls. The aim of this study was to characterized BP changes during RT period.

Design and method: Patients with HNC, recieving radiation to the neck for a total dose of 45-70 Gy, with Performance status (Karnofsky) 0-2 were recruited from the Chaim Sheba Medical Center RT unit. Office BP, including orthostatic measurements and 24H ambulatory BP (ABPM) were measured at baseline and after 30 days of therapy.

Results: 15 patients (13 males), 68±11 years old were recruited between May 2013 and November 2014. 7 hypertensive patients continued their antihypertensive treatment during the study. Office systolic BP (SBP) but not diastolic BP (DPB) decreased significantly after 30 days (SBP: 133±5 to 126±4 mm Hg; p<0.05, DBP: 79±4 to 76±4 mm Hg; P=NS) without a significant change of heart rate. Analysis of 24H ABPM confirmed the decrease in SBP and showed a significant decrease also in DBP. Average 24H BP levels decreased from 134±4/78±2 to

126±4/72±3 mm Hg; P<0.01. A similar trend was observed for day and night BP levels. During the first month of treatment 2 patients fall. No orthostasis was observed after 30 days of treatment.

Conclusions: There is a significant BP reduction after 30 days of head and neck RT, without orthostatic changes. More studies should be done to evaluate the mechanism of this BP reduction and the association with patients' complains.

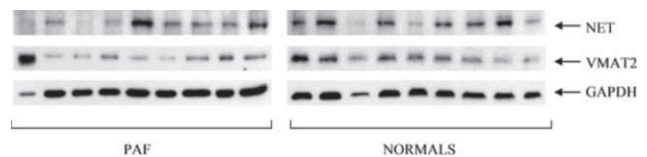
PP.12.09 NEURAL BIOLOGY OF PURE AUTONOMIC FAILURE

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Objective: Patients with autonomic insufficiency syndromes accompanied by postural hypotension are commonly referred to hypertension experts, who are often expected to be skilled in low BP disorders also. One phenotype, pure autonomic failure (PAF), remains enigmatic. PAF is usually attributed to isolated degeneration of postganglionic sympathetic nerves, without CNS disease, as is conveyed in the name. Our results reported here suggest otherwise.

Design and method: Nine patients with PAF and a reference group of 9 older healthy people aged 50-80 years were studied using novel molecular methods for studying sympathetic nerve proteins. As expected, the PAF patients had intractable postural hypotension without CNS disease, with diagnosis confirmed by presence of markedly reduced release of noradrenaline from sympathetic nerves, measured by isotope dilution (total noradrenaline spillover < 150 ng/min compared with 300-900 ng/min in health) and near-absence of sympathetic nerve firing recorded with microneurography.

Results: When we tested for anticipated absence of specific sympathetic nerve proteins in biopsied subcutaneous forearm vein samples in PAF patients, veins being a rich source of sympathetic nerves, unexpectedly we found normal abundance of the noradrenaline transporter, NET and the vesicular transporter, VMAT2 (figure), unequivocal evidence that sympathetic nerves were present.



Western blot analysis of sympathetic nerve proteins, accessed by forearm vein biopsy. The abundance of NET and VMAT2 was not reduced in PAF (P>0.1 compared with normals). GAPDH served as a marker protein for protein loading of the gel.

Conclusions: These results suggest that the abnormality in PAF, rather than being neurodegenerative, may be a sympathetic nerve membrane fault causing electrical silence so that, as we find here, microneurography registers no sympathetic nerve firing, electro-coupled noradrenaline release is nearly absent and neural postural circulatory homeostasis is severely compromised. The fault may be epigenetic, as PAF has onset in later life.

PP.12.10 BARORECEPTOR STIMULATION ENHANCED VESSELS SENSITIVITY TO NITRIC OXIDE, A NEW ASPECT OF CARDIOVASCULAR PHYSIOLOGY

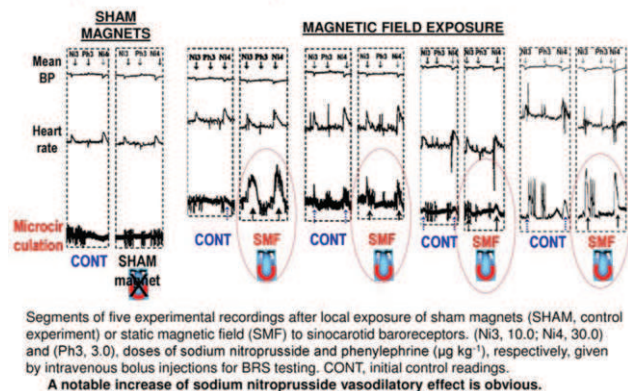
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Objective: Increasing evidence suggests nitric oxide (NO) deficit and baroreflex dysfunction to be characteristic for a wide variety of cardiovascular conditions even in preclinical stages of the disease. Sodium nitroprusside (SNP), a spontaneous NO-donor, vasodilatory effect was studied in conjunction with sinocarotid baroreceptor magnetic stimulation and potential implementation in NO deficiency states.

Design and method: Mean femoral artery blood pressure (MAP), heart rate (HR) and ear lobe skin microcirculatory blood flow, measured by microphotoelectric plethysmogram (MPPG), were simultaneously recorded in conscious rabbits before and after 40-min sinocarotid baroreceptors exposure to 350 mT static magnetic field (SMF), generated by Nd-Fe-B alloy (n=8) or sham magnets (n=8, controls). Arterial baroreflex sensitivity (BRS) was measured by changes in HR and MAP after intravenous bolus injections of SNP and phenylephrine.

Results: The vasodilatory effect of SNP significantly increased after SMF exposure (MPPGbeforeSMF: 2.57 ± 0.81 V vs. MPPGafterSMF: 7.82 ± 1.61 V, $p < 0.0001$) and positively correlated with significant increase in BRS ($r = 0.51$, $p = 0.01$).

BARORECEPTOR STIMULATION ENHANCED SODIUM NITROPRUSSIDE (NITRIC OXIDE - DONOR) VASODILATOR RESPONSIVENESS



Conclusions: Presented findings support the concept that the entire arterial system is under baroreflex control and that it is NO-dependent. The amplification of vascular smooth muscle cells sensitivity to NO suggested to be a new mechanism in baroreflex physiology, which can promote interactions between sympathetic nervous system and NO function, regenerating reduced NO bioavailability, a crucial mechanism of microvascular and endothelial dysfunction. These may generate important etiopathogenetic significance and potential therapeutic implementation in a spectrum of cardiovascular conditions, such as arterial hypertension, coronary heart disease, insulin resistance and diabetes, where sympathovagal imbalance exacerbated by derangements of NO signaling increases cardiovascular risk substantially.

PP.12.11 DIFFERENCES OF SYMPATHO-VAGAL BALANCE IN RELATION TO DIURNAL/NOCTURNAL BLOOD PRESSURE RATIO IN ESSENTIAL HYPERTENSIVES

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Objective: The extent of the physiological nocturnal dip of blood pressure (BP) and its variation seems to be correlated with autonomic nervous system's (ANS) activity. This relationship is not completely clear, however, especially with regard to the role of the two different components of the ANS and their balance. For example, patients with primary autonomic failure and very low sympathetic and parasympathetic activities also have a high incidence of nondipping, suggesting that it is not the inability to inhibit sympathetic activity during the night, but the inability to modulate autonomic tone that is responsible for the nondipping phenomenon. In order to assess the relationship between ANS's activity and dipping pattern observed by ABPM, we investigated the time domain HRV indexes obtained from 24-hours-Holter ECG monitoring in a group of hypertensive subjects.

Design and method: Were enrolled 132 patients with hypertension who have been subjected to an ABPM and to a 24-hours-Holter ECG monitoring to not more than 30 days apart. Time-domain HRV parameters evaluated were the standard deviation of all normal RR intervals (SDNN), the standard deviation of the averaged normal RR intervals for all 5-min segments (SDANN), the root mean square of differences between adjacent R-R intervals (rMSSD) and the percentage of adjacent R-R intervals that varied by more than 50 ms (pNN50). SDNN and SDANN measures estimates sympathetic nervous system (SNS) activity, whereas rMSSD and pNN50 measures estimates parasympathetic nervous system (PNS) activity.

Results: We observed a progressive reduction of SDNN and SDANN values from extreme dippers to dippers to nondippers to reverse dippers although the only statistical significance was obtained comparing extreme vs reverse dipper ($p: 0.14$). We did not observe differences regarding to the PNS activity HRV markers.

Conclusions: In our sample non dippers and reverse dippers patients seems to be marked by a change of the sympatho-vagal balance due to increase of SNS activity as assessed by the reduction of SDNN and SDANN parameters.

PP.12.12 ELECTRICAL FIELD STIMULATION OF PERIVASCULAR ADIPOSE TISSUE ELICITS A FREQUENCY-DEPENDENT EFFECT ON VESSEL CONTRACTILITY VIA SYMPATHETIC NERVES

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Objective: There is considerable evidence to implicate over-activity of the sympathetic nervous system during obesity and the subsequent development of metabolic syndrome and type 2 diabetes. It has been suggested that these conditions are dependent upon changes in small artery function and type II diabetes. Healthy perivascular fat exerts an anti-contractile effect on circulation which is lost in obesity. Therefore it was decided to examine the effects of sympathetic nerve (SN) stimulation on perivascular adipose tissue (PVAT) function. The hypothesis to be tested was that an anti-contractile factor is released from PVAT as a result of SN stimulation.

Design and method: The frequency-stimulation profiles (0.1–30 Hz) of murine mesenteric arteries ($<200 \mu\text{M}$), +/-PVAT, were characterised using wire myography at various voltages (5–30 V). The accepted test for neural stimulation using $1 \mu\text{M}$ tetrodotoxin (TTX) was performed, and $1.46 \mu\text{M}$ 6-hydroxydopamine (6-OHDA) used to sympathetically denervate vessels +/-PVAT. Exogenous PVAT was incubated with TTX and 6-OHDA for 30 minutes before re-suspending in the bath. Specific adrenoceptor stimulation of PVAT function was investigated using noradrenaline, phenylephrine (both 1×10^{-9} – 1×10^{-5} M), and CL-316,243 ($10 \mu\text{M}$).

Results: At 20&30 V PVAT elicited an anti-contractile effect ($P < 0.01$); reproducible at 20 V after a 15 minute rest period. Sympathetic denervation of whole vessels with 6-OHDA abolished all significant contractile activity, confirming that EFS at 20 V innervates SNs ($P < 0.0001$). PVAT incubated with TTX, demonstrated a reduced anti-contractile effect, confirming this effect to be neural and therefore physiologically relevant ($P < 0.05$). Exogenous PVAT pre-incubated with 6-OHDA also induced a diminished PVAT anti-contractile effect, implicating the role of SNs in PVAT ($P < 0.0001$). In the noradrenaline but not phenylephrine concentration-response curve, PVAT elicits an anti-contractile response. The addition of CL-316,243 to phenylephrine-constricted +PVAT vessels induced a relaxation ($P < 0.05$), indicating the role of beta-3 adrenoceptors.

Conclusions: These results clearly demonstrate SN stimulation can provoke the release of vasodilators from PVAT. The mechanism appears to be via activation of the adipocyte membrane located beta-3 adrenoceptor. Further studies will be carried out in an obese model to understand how over-stimulation leads to a down-regulation and a loss of anti-contractility possibly via beta-3 receptor desensitisation.

PP.12.13 THE VENTROMEDIAL HYPOTHALAMUS AS THE ORIGIN OF ABERRANT BLOOD PRESSURE AND SYMPATHETIC REGULATION IN DIET INDUCED OBESITY

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Objective: High fat diet (HFD) induced hypertension in rabbits is neurogenic and due to the central action of leptin. This action is dependent on secondary neuronal activation in alpha-melanocortin stimulating hormone (alpha-MSH) and neuropeptide Y (NPY) positive cells. Neurons in the ventromedial hypothalamus (VMH) and Dorsomedial hypothalamus (DMH) are innervated by both neuronal populations and transduce leptin signaling from the Arcuate to other hypothalamic and hindbrain nuclei. The VMH and DMH are also capable of responding to leptin signals directly, independent of NPY or alpha-MSH neurons. In the present study we assessed the contribution of leptin, alpha-MSH and NPY neurons in the VMH and DMH on development of diet-induced neurogenic hypertension.

Design and method: Male New Zealand White rabbits were instrumented with a VMH or DMH cannula and a renal sympathetic nerve electrode. Blood pressure was measured by means of an intra-arterial catheter. Following 3 weeks of a HFD (13.5 % fat, $n = 10$) conscious rabbits had higher renal sympathetic nerve activity (RSNA), blood pressure and heart rate compared with control diet-fed animals (3.5 % fat, $n = 10$).

Results: Rabbits exhibited higher blood pressure, heart rate and renal sympathetic nerve activity when fed a high fat diet compared to controls ($n = 6-10$). Alpha-melanocyte-stimulating hormone injection into the ventromedial hypothalamus increased blood pressure and renal sympathetic nerve activity ($P < 0.05$) in high fat diet rabbits. By contrast, no changes were observed in blood pressure or renal sympathetic nerve activity following alpha-melanocyte-stimulating hormone injections into the dorsomedial hypothalamus. Leptin antagonist injection into ventromedial

and dorsomedial hypothalamus decreased blood pressure ($P < 0.05$) when given to high fat diet rabbits. Neuropeptide Y injection had no effect on blood pressure or renal sympathetic nerve activity in either nuclei.

Conclusions: We conclude that the VMH is the likely origin of leptin-mediated sympathoexcitation, alpha-MSH hypersensitivity and altered central responsiveness to NPY.

PP.12.14

EFFECT OF NEUROVASCULAR DECOMPRESSION IN RESISTANT HYPERTENSION ON BAROREFLEX-SENSITIVITY, TOTAL PERIPHERAL RESISTANCE, CARDIAC AUTONOMIC NEUROPATHY AND PLASMA NOREPINEPHRINE

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Objective: In severe resistant hypertension (RHT) not responding to a multiple combination of conventional drug therapy, the neurovascular pulsatile compression (NVPC) of the rostral ventrolateral medulla on the left side may be considered as an etiological factor for the hypertension. In such cases neurovascular decompression (NVD) can lead to blood pressure (BP) reduction and the conventional medication may become more effective.

Design and method: A magnetic resonance investigation combined with angiography of the brain stem was performed of a 57-year-old white woman with severe RHT treated with 10 different antihypertensive drugs. It showed a NVPC on the left side. The duration of her HT was 36 years. She had impaired glucose tolerance, her BMI was 26.3 kg/m² and her GFR was 79.5 ml/min/1.73m². Before and after the operation the next parameters were assessed: the cardiac autonomic neuropathy (CAN) by means of five standard cardiovascular reflex-tests, the spontaneous baroreflex sensitivity (BRS) via a sequence method calculating from ECG and BP data recorded by a Finometer device and the total peripheral resistance (TPR) by the modelflow technique in a 10-minute-long supine and a 10-minute-long standing position, and the plasma norepinephrine (NE) level.

Results: After the NVD, both the systolic and diastolic BP decreased significantly likewise the number of antihypertensive medication. Only a 5-fold combination needed after the NVD to maintain the decreased BP. In the supine position, the BRS was 5.62 ms/mmHg before and 7.51 ms/mmHg after NVD. In the standing position, the BRS was 3.29 ms/mmHg before and 5.57 ms/mmHg after NVD. The sum of the CAN scores did not change; it remained 3. The plasma NE level decreased from 421 pg/ml to 282 pg/ml.

Conclusions: In conclusion, the NVD of the brain stem on the left side in severe RHT that does not respond to conventional drug therapy can guarantee a significant BP reduction and a better response to antihypertensive medication. The sympathetic activity may decrease and so perhaps the cardiovascular risk also after an NVD.

POSTERS' SESSION

POSTERS' SESSION PS13

ATHEROSCLEROSIS AND MICROCIRCULATION

PP.13.01 EFFECTS OF DIET RICH IN TOMATO ON ENDOTHELIAL FUNCTION AFTER A FAT MEAL IN HEALTHY VOLUNTEERS: A SINGLE BLIND CROSS OVER STUDY

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Objective: The Mediterranean diet (MD), rich in vegetables and fruits, reduces cardiovascular disease (CVD) via antioxidant, hypocholesterolaemic and anti-inflammatory mechanisms. Tomato, one of the main component of the MD, is rich in antioxidants suggesting that its assumption can have beneficial effects. The aim of this study was to test whether a 7-day period of tomato paste supplementation can improve endothelial function and/or other haemodynamic parameters in healthy volunteers (HV) before and after a standardized fat meal.

Design and method: We enrolled 17 male HV in a randomized, single-blind (operator), crossover design. HV maintained a diet poor in vegetables during the study periods. They were randomized either to a supplementation arm (70 g tomato paste per day) for 7 days or to a control arm (no added tomato paste) with a two-week washout periods between the different periods. Flow-Mediated Dilatation (FMD), Carotid Distendibility (CD), Intima Media Thickness (IMT) by ultrasounds, Stiffness Index (AIx), Reflection Index (RI) by photoplethysmography and blood pressure (BP), were measured as an estimate of vascular function before and after (2 and 3.5 hours) the fat meal.

Results: In the direct comparison between the 2 arms, at different time-points, no significant differences was present. After the fat meal, HV showed a consistent reduction in RI (mean \pm SD $60.67 \pm 10.53\%$ vs $71.35 \pm 11.32\%$ with tomato paste; $61.86 \pm 11.75\%$ vs $69.05 \pm 10.34\%$ without tomato paste; $P < 0.01$). Only in the tomato arm, haemodynamic changes were detectable with respect to baseline: in particular an increase in brachial artery diameter (4.23 ± 0.42 mm vs 4.03 ± 0.36 mm, $P < 0.01$), a reduction in diastolic BP (70.56 ± 7.14 mmHg vs 72.97 ± 6.39 mmHg, $P < 0.05$) and an increase in heart rate (67.26 ± 8.94 bpm vs 63.40 ± 9.73 bpm, $P < 0.01$). In the without-tomato arm, an increase in SI (6.65 ± 0.85 m/sec vs 6.30 ± 0.50 m/sec, $P < 0.05$) was viewable.

Conclusions: Tomato supplementation modifies some haemodynamic parameters triggered by a high fat diet suggesting a possible beneficial effect in people assuming a diet rich in tomato.

PP.13.02 THE PROGNOSTIC VALUE OF ENDOTHELIAL DYSFUNCTION AT HYPERTENSIVE PATIENTS WITH OR WITHOUT DIABETES MELLITUS

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Objective: The objective of the study was to estimate how the endothelial dysfunction (ED) correlates with cardiovascular and renal events at hypertensive patients (pts) with or without diabetes mellitus (DM).

Design and method: 30 hypertensive pts (mean age = 58.2 ± 7.6 years, 53.3% males)-group 1 and 30 hypertensive pts with DM, matched for age and sex (mean age = 59.8 ± 7.3 years, 56.6% males)-group 2. ED was evaluated using ultrasound assessment of flow-mediated vasodilatation (FMD) of the brachial artery. FMD smaller than 10% was considered abnormal. All pts were evaluated during one year, in order to detect the following complications: unstable angina (UA), non-ST-segment elevation myocardial infarction (NSTEMI), ischemic stroke (IS), renal dysfunction (RD): microalbuminuria, proteinuria, chronic kidney disease.

Results: In group 1, 13 pts (43.3%) had reduced FMD: $7.6 \pm 1.5\%$. In group 2, 16 patients (53.3%) had reduced FMD: $6.3 \pm 2.1\%$. The difference is not signifi-

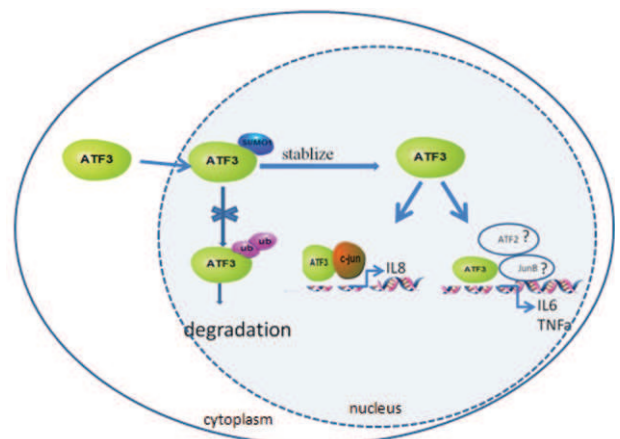
cantly statistic between the two groups ($p = 0.07$). In group 1, UA was significantly associated with reduced FMD ($7.1 \pm 1.5\%$ vs $11.3 \pm 2.2\%$, $p = 0.03$). In the same group, RD was found in a significantly higher proportion at patients with reduced FMD ($7.8 \pm 1.8\%$ vs $12.1 \pm 2.3\%$, $p = 0.02$). In group 2, UA was also significantly associated with reduced FMD ($6.8 \pm 2.1\%$ vs $10.9 \pm 2.8\%$, $p = 0.01$). NSTEMI was significantly more frequent at pts with reduced FMD ($6.3 \pm 1.7\%$ vs $11.4 \pm 3.1\%$, $p = 0.01$). In the same group, RD was found in a significantly higher proportion at pts with reduced FMD ($6.9 \pm 2.7\%$ vs $10.5 \pm 2.6\%$, $p = 0.02$).

Conclusions: Hypertensive pts with DM have ED in a greater, but not significant proportion than hypertensive pts without DM. ED seems to predict a worse mid term outcome (one year) concerning cardiovascular and renal events at hypertensive pts, especially with DM. Moreover, ED appears to have more powerful mid term prognostic value for incidence of acute coronary syndromes without ST-segment elevation at hypertensive pts with DM.

PP.13.03 INDUCTION OF ACTIVATING TRANSCRIPTION FACTOR 3 (ATF3) SUMOYLATION BY ANGIOTENSIN 2 (ANG2) STABILIZE ITSELF AND INCREASES ENDOTHELIAL INFLAMMATION

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Objective: Angiotensin 2-induced endothelial inflammation is a big risk for vascular diseases. Our work found that both ATF3 expression and SUMOylation were induced by Angiotensin 2 in endothelia cells, so we aimed to explore how ATF3 and its SUMOylation participated in endothelial inflammation caused by Angiotensin 2.



Design and method: Mice were sacrificed after infusion of Angiotensin 2 (Ang2) for 14 days, thoracic aorta immunofluorescence showed that both ATF3 and SUMO1 expressions increased, and merge analysis exhibited ATF3 was SUMOylated. Human Umbilical Vein Endothelial Cells (HUVECs) in culture were exposed to Ang2, western blot and co-immunoprecipitation (co-IP) exhibited both ATF3 expression and ATF3 SUMOylation were up-regulated. When Anacardic acid, an inhibitor of SUMOylation and SUMO1 siRNA were introduced to HUVECs, Ang2 failed to increase ATF3 protein level. Co-IP experiment demonstrated that when SUMO1 and ubiquitin were overexpressed at the same time, ATF3 combined SUMO1 rather than ubiquitin, means that ATF3 SUMOylation avoided its ubiquitination. Real-time PCR and Elisa confirmed that both ATF3 siRNA and SUMO1 siRNA blocked Ang2-induced transcriptions and expressions of IL6, TNF- α and IL-8. As a member of AP-1 complex, overexpressed ATF3 plasmid alone failed to increase inflammation cytokines. But inflammation responses were triggered when ATF3 and AP-1 members plasmids demonstrated to HUVEC together.

Results: Ang2 induce ATF3 expression and ATF3 sumoylation in vascular endothelium.

ATF3 sumoylation stabilize itself by keep it from ubiquitination.

ATF3 contributed to inflammation induced by Ang2 and regulated by ATF3 sumoylation

ATF3 activates inflammatory gene transcription dimerise with AP-1 members.

Conclusions: Angiotensin 2 induced ATF3 SUMOylation protected ATF3 from ubiquitination. ATF3 heterodimer with AP-1 members increases endothelial inflammation. SUMOylation may be a potential therapeutic target for the treatment of vascular diseases caused by endothelial inflammation.

PP.13.04 REFERENCE VALUES OF ENDOTHELIAL GLYCOCALYX IN RECENTLY DIAGNOSED AND UNTREATED PATIENTS WITH ESSENTIAL HYPERTENSION. A PILOT STUDY

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Objective: Target organ damage evaluation in patients with arterial hypertension is necessary in order to estimate cardiovascular risk (CVR) and plan treatment. The integrity of endothelial glycocalyx (EG) plays a vital role in vascular permeability, inflammation and elasticity and finally to cardiovascular disease. Sideview Darkfield imaging allows for non-invasive automated estimation of EG dimensions based on the erythrocyte column distribution. We aimed to estimate reference values of EG in untreated patients with untreated essential hypertension.

Design and method: We studied 90 patients with newly diagnosed and never treated essential hypertension (mean age 48 ± 10 years, 62 males). Increased perfusion boundary region (PBR) of the sublingual arterial microvessels (ranged from 5–25 micrometers) using Sideview Darkfield imaging (Microscan, Glycocheck) was measured as a non-invasive accurate index of reduced EG thickness.

Results: Regarding total population, mean office BP was 149 ± 17/93 ± 11 mmHg, mean ABPM 138 ± 11/86 ± 9 mmHg, mean PBR 5–25 was 2.0 ± 0.3, mean PBR 5–9 was 1.1 ± 0.2, mean PBR 10–19 was 2.2 ± 0.3, mean PBR 20–25 was 2.5 ± 0.4. In male patients with mean office BP 139 ± 11/92 ± 10 mmHg and mean ABPM 139 ± 11/89 ± 8 mmHg, we found that mean PBR 5–25 was 2.0 ± 0.3, mean PBR 5–9 was 1.1 ± 0.2, mean PBR 10–19 was 2.2 ± 0.3 and mean PBR 20–25 was 2.5 ± 0.4. In female patients with mean office BP 157 ± 18/95 ± 13 mmHg and mean ABPM 136 ± 9/81 ± 9 mmHg, we found that mean PBR 5–25 was 2.1 ± 0.3, mean PBR 5–9 was 1.2 ± 0.1, mean PBR 10–19 was 2.2 ± 0.4 and mean PBR 20–25 was 2.7 ± 0.5. No correlation was found between PBR and age or BMI while a trend for systolic BP (office and 24 h) was revealed ($p = 0.09$).

Conclusions: Cardiovascular risk reduction in hypertensives is based not only in blood pressure decrease but also in target organ damage improvement. EG might work as a future valuable tool in CVR estimation, so reference values for normotensives and several groups of hypertensives are needed. Further studies are needed to confirm our results in a larger population and establish EG measurement within target organ damage indices evaluation.

PP.13.05 RENIN ANGIOTENSIN ALDOSTERONE SYSTEM ANTAGONISTS IMPROVE ENDOTHELIAL GLYCOCALYX AND PWV AFTER 1 YEAR SUCCESSFUL TREATMENT IN UNTREATED PATIENTS WITH ESSENTIAL HYPERTENSION

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Objective: Aortic stiffness is considered valuable index of subclinical damage in hypertensive patients offering to cardiovascular risk estimation. The integrity of endothelial glycocalyx plays a vital role in vascular permeability, inflammation and elasticity. We aimed to explore any changes in aortic stiffness as well as in endothelial glycocalyx in patients with well controlled essential hypertension under treatment.

Design and method: We studied 48 patients with newly diagnosed and never treated essential hypertension (mean age 48 ± 10 years, 31 males). We performed carotid-femoral artery pulse wave velocity (PWV) in order to evaluate aortic stiffness. Increased perfusion boundary region (PBR) of the sublingual arterial microvessels (ranged from 5–25 micrometers) using Sideview Darkfield imaging (Microscan, Glycocheck) was measured as a non-invasive accurate index of reduced endothelial glycocalyx thickness. All patients started antihypertensive treatment and they re-evaluated in a period 16 ± 8 months later.

Results: Regarding total population, 30 patients (63%, group A) were well controlled regarding their blood pressure (<140/90 mmHg), 11 patients (22%, group B) were uncontrolled while 7 patients (15%, group C) stopped medication. We found that in group A: a. 17 patients (57%) significantly reduced their PWV ($p < 0.001$) in a period of 14 ± 8 months and their therapy was based in RAAS antagonists (72%), b. 15 patients (50%) improved their endothelial glycocalyx (PBR5–9) ($p = 0.002$) after 15 ± 8 months based in RAAS antagonists (73%) and c. 11 patients (37%) both PWV ($p < 0.001$) and endothelial glycocalyx (PBR5–9) ($p = 0.006$) were improved after 14 ± 9 months based in RAAS antagonists (73%).

Conclusions: Cardiovascular risk reduction in hypertensives is based not only in blood pressure decrease but also in target organ damage improvement. This is the first study showing the parallel improvement of aortic stiffness and endothelial dysfunction in well controlled hypertensives after at least one year antihypertensive treatment based on RAAS antagonists. Further studies are needed to confirm our results and establish endothelial glycocalyx measurement as a valuable tool in cardiovascular risk estimation

PP.13.06 ENDOGENOUS INHIBITORS OF NITRIC OXIDE AND ARTERIAL STIFFNESS IN ESSENTIAL HYPERTENSIVES

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Objective: Increased arterial stiffness (AS) is an independent risk factor for cardiovascular disease. Endothelial nitric oxide (NO) is vasoprotective by decreasing not only vascular tone in resistance arteries, but also stiffness in conductance arteries. Asymmetric (ADMA) and symmetric (SDMA) dimethylarginines, endogenous inhibitors of NO synthesis from the precursor L-arginine (ARN), increase in conditions of oxidative stress and contribute to progression of endothelial dysfunction and arteriosclerosis.

In essential hypertensives (EH) we investigated the relationship between systemic AS, as assessed by the ratio of pulse pressure (PP) to stroke volume (SV), with circulating levels of ADMA, SDMA, ARN and the activity of the renin-aldosterone system in resting conditions.

Design and method: In 25 untreated grade I-II EH (age 50 ± 12 yrs, range 19–71, M/F = 15/10) blood pressure (BP, sphygmomanometer), heart rate (HR, EKG), stroke volume (SV, impedance cardiography) were measured after supine rest; venous blood was simultaneously sampled for plasma ADMA, SDMA, ARN (by HPLC), plasma renin activity (PRA) and aldosterone (Aldo) (by RIA).

Results: Table shows means ± sd:

PP mmHg	SV, ml	AS, mmHg/ml	ADMA, nM	SDMA, nM	ARN, μM
46.2±11.0	69.7±20.5	0.74±0.35	0.89±0.16	0.88±0.38	57.5±17

Supine BP was 142/96 ± 15/8.4 mmHg, HR = 70.0 ± 9.5 bt/min; PRA was 0.3 ± 0.05 ng/ml/h (range 0.1–0.9) and Aldo 9.8 ± 0.7 ng/dl (range 3.7–17). AS (range 0.89–2.21 mmHg/ml) was directly related to age ($r = 0.61$, $p < 0.05$), to SDMA ($r = 0.83$, $p < 0.01$) and inversely to ARN/ADMA ratio, an indicator of NO production ($r = -0.64$, $p < 0.05$); AS was not related to PRA or Aldo. In a multiple regression analysis, SDMA was the best predictor of AS ($p < 0.05$).

Conclusions: Systemic AS in EH was directly related to circulating levels of endogenous inhibitors of NO production. These data are compatible with an impaired activity of endothelial NO associated with increased stiffness of conductance arteries, a condition at higher cardiovascular risk in uncomplicated hypertensives.

PP.13.07 REDUCED ENDOTHELIAL REGENERATIVE CAPACITY IN CHRONIC KIDNEY DISEASE

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Objective: Endothelial dysfunction and impaired endothelial regenerative capacity play a key role in the pathogenesis of cardiovascular disease, which is one of the major causes of morbidity and mortality in chronic kidney disease (CKD) population. Circulating endothelial cells (EC) may be an indicator of vascular damage, while circulating endothelial progenitor cells (EPC) may be a biomarker for vascular repair. However, the simultaneous evaluation of EC and EPC circulating levels and its relation were not previously examined.

Design and method: In this study we presented the preliminary findings of circulating levels of both ECs and EPCs and its relation in CKD patients, assessed by multicolor flow cytometry.

A blood sample (26 ml) of CKD patients (n=5) and healthy subjects (n=5) was used for the isolation of ECs and EPCs, identified by flow cytometry (BD FACSCanto™ II system) using a combination of fluorochrome-conjugated primary antibodies for their specific cell surface markers: CD45, CD133, CD146, and CD309. Due to the rare nature of ECs and EPCs, a large number of events was collected, at least 500,000. Exclusion of dead cells was done according to a fixable viability dye staining. Identification of ECs and EPCs was performed by CD45-/CD309-

/CD133-/CD146+ and CD45low/CD309+/CD133+/CD146 multiple labeling, respectively.

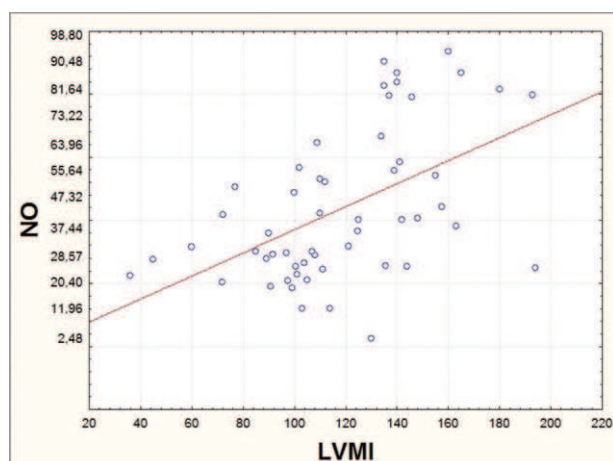
Results: The absolute number of circulating ECs (CD45-/CD309-/CD133-/CD146+) in CKD patients was significantly increased in comparison with control group (2.50 ± 0.25 vs 0.51 ± 0.17 , $p < 0.01$), thus indicating that these patients may have more endothelial lesion. In addition, the absolute number of circulating EPCs (CD45low/CD309+/CD133+/CD146+) was non-significantly reduced in CKD population in comparison with control group (0.03 ± 0.01 vs 0.05 ± 0.01 , ns). Moreover, the ratio between EPCs/ECs was markedly reduced in patients in CKD patients, compared to controls (0.01 ± 0.01 vs 0.48 ± 0.24 , $p < 0.05$), which indicate that their regenerative capacity is reduced.

Conclusions: Taken together, our results provide evidence suggesting an imbalance in the process of endothelial damage and repair in CKD population. Our results further suggest the potential value of the ratio EPCs/ECs as a useful indicator of endothelial regenerative capacity. This index could help to select the patients to benefit from guiding intervention strategies to improve cardiovascular health by inducing vascular protection.

PP.13.08 STABLE NITRIC OXIDE METABOLITES LEVELS IN HYPERTENSIVES WITH SUBCLINICAL ORGAN DAMAGE

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Objective: To investigate stable nitric oxide metabolites levels (NOx) in patients with essential hypertension (EH) with subclinical organ damage (SOD).



Design and method: We examined 124 untreated patients (45 men and 79 women) with EH (mean age $51.4 \pm 6y$, mean EH duration $8.5 \pm 7y$) and 25 healthy volunteers (10 men and 15 women) with comparable age ($47.2 \pm 7y$). Plasma NOx levels were measured by spectrophotometry. Results were processed with Statistica 8.0 software.

Results: Microalbuminuria (MAU) was detected in 22% of hypertensive patients, decreased level of glomerular filtration rate (GFR) ($90 < GFR > 60$ ml/min/1.73m²) - 26%, increased GFR level ($GFR > 130$ ml/min/1.73m²) - 12%, left ventricular hypertrophy (LVH) - 37%. NOx levels were significantly higher in hypertensives (43.2 ± 21 μ mol/l) than in controls (28.3 ± 9 μ mol/l) ($p < 0.05$). In patients with MAU NOx concentration was significantly higher than in those without it (46.5 ± 22 and 31.3 ± 12 μ mol/l, accordingly, $p < 0.05$). NOx levels correlated with the presence of MAU ($r = 0.48$, $p < 0.05$). NOx concentration did not differ between hypertensives with decreased GFR, normal GFR and increased GFR levels (43.1 ± 20 , 43.8 ± 16.1 and 44.2 ± 18 μ mol/l, accordingly, $p > 0.05$). In patients with LVH NOx levels were significantly higher than in those without it (49.9 ± 19 and 39.8 ± 18 μ mol/l, accordingly, $p < 0.05$). NOx concentration correlated with left ventricular mass index (LVMI) ($r = 0.44$, $p < 0.05$) (fig.), interventricular septum thickness ($r = 0.36$, $p < 0.05$), left ventricle posterior wall thickness ($r = 0.44$, $p < 0.05$).

Conclusions: In essential hypertension NOx elevated in the presence of certain subclinical organ damage, namely LVH and MAU.

PP.13.09 ASSOCIATION WITH CIRCULATING ENDOTHELIAL PROGENITOR CELL COUNTS AND ERYTHROPOIETIN RESISTANCE INDEX IN PATIENTS WITH END-STAGE RENAL DISEASE ON MAINTENANCE HEMODIALYSIS

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Objective: Circulating bone marrow-derived endothelial progenitor cells (EPCs) correlates with endothelial function and cardiovascular risk. The cytokine erythropoietin (EPO) are thought to stimulates EPCs. Patients with end stage renal disease (ESRD) on hemodialysis (HD) have markedly decreased EPC counts although they are treated with erythropoietin. We hypothesized that the decreased number of circulating EPCs might associate with erythropoietin resistance index (ERI) in patients with ESRD on HD.

Design and method: We quantified EPCs in blood samples from 70 patients with ESRD on HD. Circulating EPCs were counted by flow cytometry as the number of CD45lowCD34+ VEGFR2+ cells. The ERI was calculated by dividing the weekly erythropoietin dose per kilogram of weight (ug/wk.kg) by the Hb level (g/dL).

Results: The number of circulating EPCs at baseline ranged from 1 to 350 cells/200ul, with a mean \pm SD of 26.0 ± 48.2 cells/200uL. There was no significant association with erythropoietin dose and EPC counts. The EPCs count of lowest, low-medium, high-medium and higher EPI quartile were 43.6 ± 50.2 , 11.1 ± 4.0 , 14.8 ± 19.9 , and 16.9 ± 12.7 cells/200uL, respectively. Patients with lowest EPI quartile showed significantly higher EPC counts.

Conclusions: Administration of EPO may not always increase the number of circulating EPCs in ESRD patients on HD. The resistance to erythropoietin may associate with decreased circulation EPC counts.

PP.13.10 DISTRIBUTION OF CHOLINERGIC SYSTEM COMPONENTS GENE EXPRESSION IN INTACT RAT AORTA

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Objective: Acetylcholine-induced (ACh) relaxation is routinely used to evaluate endothelial function. Via muscarinic M3 receptors (M3MR), ACh stimulates synthesis of NO and EDHF resulting in endothelium-dependent relaxation. Vascular cholinergic system remains practically unexplored. The objective of this project was to determine the localization of mRNA of acetylcholinesterase (AChE), butyrylcholinesterase (BChE), M3 MR, cholinesterase anchoring proteins PRiMA1, and ColQ1 within the endothelium and smooth muscle (SM) of freshly isolated rat aorta.

Design and method: Thoracic aortas of adult male Wistar rats were used. Expression of the cholinergic markers was analyzed by RT-PCR in endothelium-intact aortic rings (AoE+), endothelial RNA fractions obtained by aorta perfusion with Tri-Reagent (E1-E3) and in aorta fraction without endothelium (AoE-). Endothelial and SM origin of fractions was evaluated endothelial markers (endothelial nitric oxide synthase, NOS3; preproendothelin-1, ET1), SM markers (L-type calcium channel, Cav1.2; endothelin receptor type A, ETA; smooth muscle actin, ACTA2) and genes reported to be expressed both in the endothelium and SM (endothelin receptor type B, ETB). Cholinergic markers -AChE, AChE-T, BChE, M3MR, PRiMA1, and ColQ1 mRNA were assayed in all obtained fractions.

Results: E1-E3 were strongly enriched with NOS3, ET1, while SM markers (Cav1.2, ETA) were scarce, slightly increasing from E1 to E3 and abundant in AoE- and AoE+. ETB mRNA was similar in all fractions. All cholinergic markers were detected in AoE+. Expression of BChE was 30-fold higher than AChE. AChE, BChE, PRiMA1 and ColQ1 mRNAs all had an expression pattern similar to that of the SM markers. M3MR mRNA was present in both endothelial and SM fractions.

Conclusions: Despite the lack of parasympathetic innervation, cholinergic markers are abundant in rat aorta. M3MR distribution suggest an action of ACh on both endothelium and SM. Expression of cholinesterase in SM could prevent the diffusion of ACh into the media layers and thus control its vasoconstrictor action. The absence of cholinesterases in the endothelium could allow ACh-induced vasorelaxation.

PP.13.11

CHLOROGENIC ACID IMPROVES VESSEL FUNCTION AND PROTECTS ENDOTHELIUM AGAINST HOCL-INDUCED OXIDATIVE DAMAGE, VIA INCREASED PRODUCTION OF NITRIC OXIDE AND INDUCTION OF HEME OXYGENASE-1

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Objective: Coffee consumption may be associated with reduced risk of cardiovascular disease (CVD). The mechanisms by which coffee can exert potential protective effects remain unclear. Dietary polyphenols are potential contributors for improved cardiovascular health. Coffee is one of the richest sources of dietary polyphenols in a coffee drinking population, the most abundant form being chlorogenic acid (CGA). Endothelial dysfunction (ED) is an early and major risk factor for CVD, and oxidative stress plays a critical role in the development of ED. Nitric Oxide (NO) is a key factor in regulation of endothelial function. Heme oxygenase-1 (Hmox-1) is an inducible isoform of heme oxygenase that is produced in response to stressors such as oxidative stress and may play a key role in vascular protection.

Design and method: Aortic rings from 10-week-old C57BL mice were collected and incubated with or without CGA, before exposure to HOCl. Endothelial dependent relaxations were determined using myography. Confluent human aortic endothelial cells (HAECs) were serum starved before pre-treatment with CGA and exposure to HOCl. MTS formation was used to determine cell viability and western blot to determine eNOS phosphorylation, dimer formation and Hmox-1 induction. NO production was measured by gas phase chemiluminescence.

Results: Pre-treatment of isolated aortic rings with 10 μ M CGA protects vessels against HOCl-induced endothelial dysfunction ($P < 0.05$). Pre-treatment of cultured HAECs with 10 μ M CGA increased endothelial cell viability following exposure to HOCl ($P < 0.05$). Moreover, CGA increases NO production in HAECs culture media in a dose-dependent manner, peaking 6 h ($P < 0.05$). In addition, CGA induced Hmox-1 protein expression in HAECs.

Conclusions: These results are consistent with the cardiovascular protective effects of coffee polyphenols and demonstrate that CGA can protect vessels and cultured endothelial cells against oxidant-induced damage. The mechanism behind the beneficial effect of CGA appears to be in part via increased production of NO and induction of Hmox-1.

PP.13.12

DELETION OF THE MAS RECEPTOR AGGRAVATES THE DEVELOPMENT OF ATHEROSCLEROSIS AND ABDOMINAL AORTIC ANEURYSMS IN APOLIPOPROTEIN E-DEFICIENT MICE

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Objective: Atherosclerosis and hypertension are commonly observed in patients and strongly associated with increased mortality. Recently, we have shown that chronic Ang-(1-7) treatment acting through the Mas receptor improves vascular dysfunction in atherosclerotic apolipoprotein E-deficient (apoE^{-/-}) mice. To test whether the G-protein-coupled Mas receptors plays also role in the development of atherosclerosis and abdominal aortic aneurysm (AAA), we generated apoE/Mas receptor deficient (apoE^{-/-}/Mas^{-/-}).

Design and method: ApoE^{-/-} and apoE^{-/-}/Mas^{-/-} mice fed on a lipid-rich Western diet were treated via osmotic minipumps with either saline or Ang-(1-7) (82 μ g•kg⁻¹•h⁻¹) for 6 weeks. Aortae were stained with red oil and quantified for atherosclerosis. To better recognize the meaning of Mas receptors in the formation of AAA, both mice were infused with angiotensin II (AngII) (1000 ng/kg/min) for 4 weeks. Maximal external abdominal aortic diameter was measured by ultrasound in vivo and ex vivo on formalin fixed tissues.

Results: Atherosclerosis was significantly increased in apoE^{-/-}/Mas^{-/-} mice compared to apoE^{-/-} (relative lesion area of the aortic arch: 38.7 ± 3.0 vs. $25.4 \pm 2.0\%$; $P < 0.01$; specific lesion area 11.7 ± 0.9 vs. 8.1 ± 1.0 mm² $P < 0.01$). In contrast, chronic Ang-(1-7) infusion significantly attenuates atherosclerotic lesions in apoE^{-/-} (apoE^{-/-} vs. apoE^{-/-} + Ang-(1-7): 25.4 ± 2.0 vs. $11.1 \pm 2.6\%$ $P < 0.01$ and 8.1 ± 1.0 vs. 3.1 ± 0.8 mm² $P < 0.01$) but not in apoE^{-/-}/Mas^{-/-} mice (apoE^{-/-}/Mas^{-/-} vs. apoE^{-/-}/Mas^{-/-} + Ang-(1-7): 38.7 ± 3.0 vs. $38.0 \pm 14.2\%$ and 11.7 ± 0.9 vs. 11.4 ± 5.0 mm²). During chronic Ang II infusion, the incidence of AAA was increased in apoE^{-/-}/Mas^{-/-} compared to the apoE^{-/-} mice (75% vs. 45% $n = 8-11$). Moreover, the maximal external abdominal aortic diameter was significantly larger in Ang II treated apoE^{-/-}/Mas^{-/-} mice compared to Ang II treated apoE^{-/-} mice (2.24 ± 0.22 mm vs. 1.51 ± 0.17 mm; $P < 0.05$). Interestingly, blood pressures and cardiac hypertrophy did not differ during chronic AngII infusions in apoE^{-/-} and apoE^{-/-}/Mas^{-/-} mice suggesting that the incidence and the extend of AAA seemed to be blood pressure independent.

Conclusions: These findings indicate an important role for the Mas receptors in the progress of atherosclerosis and AAAs. Chronic Ang-(1-7) infusion stimulates the Mas receptor and attenuates atherosclerosis. Further research is required to investigate the underlying mechanisms and the specific cell type responsible for these findings.

PP.13.13

ATHEROSCLEROSIS AND OSTEOPOROSIS: THE ONE DISORDER?!

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Objective: The purpose of our study was to investigate the possible association between atherosclerosis and osteoporosis and to evaluate the common risk profile for both disorders.

Design and method: A clinical prospective open label study has been designed. Total of 36 patients with a severe osteoporosis were screened for atherosclerotic changes in aorta and heart valves. The 2D and 3D transthoracic echocardiography including the color doppler was performed in all subjects. The morphology of build-up calcium and functional assessment of the blood flow either as regurgitation or stenosis through the valves was estimated. The transoesophageal echocardiography was performed in a selective cases where indicated. The analysis of severity of osteoporosis and atherosclerosis was done. The cardiovascular risk profile for both disease including arterial hypertension, smoking, lipid profile, diabetes, comorbidities etc was notified.

Results: All 36 patients with established severe osteoporosis had a significant atherosclerosis manifested by high calcification of mitral annulus, mitral valves and aortic valves. The severe atherosclerosis was manifested also functionally with a mitral and aortic regurgitation and stenosis. The average T-score in osteoporotic patients was -3,1 proving severe osteoporosis with a high risk for the bone fractured. The cardiovascular risk factors were the significantly similar in atherosclerosis and osteoporosis. The arterial hypertension, smoking, high cholesterol and diabetes were the mostly presented.

Conclusions: Our results indicate the common risk factor profile for both degenerative disorders, atherosclerosis and osteoporosis. The severe osteoporosis, the more severe atherosclerosis. The loss of calcium from the bones has to be stored in other tissue like aortic, coronary arteries and heart valves. The hypothesis raise from this study is whether atherosclerosis and osteoporosis is a single disease?!

PP.13.14

ASSOCIATION BETWEEN BLOOD CREATININE CONCENTRATION AND SUBCLINICAL ATHEROSCLEROSIS IN HYPERTENSIVE AND NORMOTENSIVE PATIENTS

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Objective: Elevated serum creatinine concentration was proposed to be a marker for increased risk of cardiovascular disease mortality. Revealing of factors, which are simple and cheap to assess and might indicate subclinical atherosclerosis, have highest importance. The aim of our study was to evaluate a possible association between serum creatinine concentration and extent of coronary and carotid artery atherosclerosis in Georgian population.

Design and method: 447 patients (mean age \pm SD, 63.9 ± 11.6 years), 238 females and 209 males were included in the study. 334 of them had arterial hypertension (AH) and 113 normal blood pressure. Measurement of blood creatinine level, coronarangiography and carotid artery ultrasound was performed in all patients. Gensini score was used for assessment of coronary artery disease severity.

Results: In comparison with hypertensives, normotensive subjects had significantly lower creatinine level (1.12 ± 1.04 vs 0.91 ± 0.29 ; $P = 0.038$). Creatinine showed positive correlation with the stage of AH ($r = 0.198$; $P = 0.000$). Creatinine showed strong positive correlation with the Gensini score independent from the having of AH ($P < 0.05$ in both groups). According to the Gensini score, hypertensive patients had more severe atherosclerotic lesions of coronary arteries than normotensives (43.47 ± 49.41 vs 21.81 ± 37.00 ; $P < 0.05$). Right carotid artery (RCA) was more frequently and markedly damaged with atherosclerosis in comparison with left carotid artery (LCA). Creatinine showed significant positive correlation with the level of carotid artery damage in hypertensive and normotensive populations ($r = 0.268$ in RCA and $r = 0.244$ in LCA, $P = 0.000$ in hypertensives and $r = 0.407$ in RCA and $r = 0.375$ in LCA, $P = 0.000$ in normotensives, consequently). There was revealed strong positive correlation between coronary artery atherosclerosis expressed in Gensini scores and carotid artery atherosclerotic damage severity in both, hypertensive and normotensive populations ($r = 0.791$, $P = 0.000$ LCA, $r = 0.802$, $P = 0.000$ RCA in normotensives and $r = 0.745$, $P = 0.000$ LCA, $r = 0.769$, $P = 0.000$ RCA in hypertensives, respectively).

Conclusions: Results of our study point out that elevated creatinine level signifies an existence and severity of coronary and carotid artery atherosclerosis. Therefore, patients with increased blood creatinine level may be considered as a high risk group for subclinical atherosclerosis and undergo examinations for carotid and coronary artery atherosclerosis assessment.

PP.13.15 **HYPERCHOLESTEROLEMIA UP-REGULATES THE EXPRESSION OF INTERMEDIN AND ITS RECEPTOR COMPONENTS IN THE AORTA OF RATS VIA INDUCING THE OXIDATIVE STRESS**

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Objective: Hypercholesterolemia can cause damage to the artery before the atherosclerotic lesion has formed. Intermedin (IMD) is a novel member of the calcitonin gene-related peptide family. Endogenous IMD is reported to participate in several cardiovascular pathological states. Using the rats fed with high-cholesterol diet, this study aims to investigate the aortic expression of IMD and its receptors in hypercholesterolemia without atherosclerosis. Furthermore, by the antioxidant intervention, we also explore the influence of oxidative stress.

Design and method: Male Wistar rats were fed with high cholesterol diet, with or without concurrent administration of simvastatin and vitamin C. The serum lipid levels were measured, and the aortic histopathology features were examined. Both the malondialdehyde (MDA) and superoxide dismutase (SOD) in plasma and aorta were determined as the oxidative stress biomarkers. The plasma IMD was assessed by radioimmunoassay. Within the aorta, the mRNA expression of IMD along with its receptor components were determined by quantitative Real-Time Polymerase Chain Reaction (qRT-PCR), and the corresponding protein level of the CRLR/RAMPs were assessed by Western blot analysis.

Results: The hypercholesterolemia rats without atherosclerotic lesion manifested higher level of MDA and SOD. The IMD in plasma was elevated. Within the aorta, increased expression of IMD and all its receptor components (CRLR, RAMP1, RAMP2, and RAMP3) were displayed. The simvastatin indirectly attenuated oxidative stress by improving lipid profiles, while the vitamin C directly reduced oxidative stress without interfering with the serum lipids. Both simvastatin and vitamin C ameliorated the aortic injury, decreased the plasma IMD level, and recovered the expression of IMD and its receptors within the aorta.

Conclusions: For the first time, the up-regulated expression of IMD is observed within the aorta of the hypercholesterolemia rats, demonstrating the pathophysiological role which IMD has performed in hypercholesterolemia absent of atherosclerosis lesion. In addition, the oxidative stress is evidenced to participate in the up-regulation.

PP.13.16 **ATHEROSCLEROSIS IN TAKAYASUS DISEASE**

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Objective: Chronic inflammatory diseases such as rheumatoid arthritis (RA), are accompanied by a high cardiovascular morbidity and mortality. Vasculitis of large arteries as Takayasu disease, are characterized both by chronic systemic inflammation and local vascular inflammation parietal. The main objective of our study was to demonstrate accelerated and premature atherosclerosis in Takayasu's disease compared to a control population.

Design and method: We prospectively analyzed in a case-control study, a group of 64 carriers of Takayasu's arteritis patients with a mean age of 41 years [\pm 11.94], a group of 50 RA. all females aged 45 years [\pm 10.27] and a control group with an average age of 44 years [\pm 12.63]. We proceeded to the collection of the cardiovascular risk factors and we used the Framingham equation to calculate risk. We have performed a measurement of the intima-media thickness (IMT) in carotid level and we looked for the presence of carotid, aortic and femoral atheroma.

Results: The cardiovascular risk calculated averaged 3.5% in Takayasu group. It was 4.4% in the RA group, and 4.5% in controls with no significant difference between the 3 groups (p: 0.153). 87% of patients Takayasu group had subclinical atherosclerosis defined in our study by IMT > 0.70 mm and / or the presence of a plate versus 76% of RA patients. (P: 0.088) and 48% of controls (p: 0.000). We found most of atherosclerotic plaques in Takayasu group; the carotid IMT was significantly higher in the group and Takayasu PR group. Compared to the control group. The average IMT of Takayasu group was 0.91 mm [\pm 0.368]. She was 0.76 mm [\pm 0.151] for the RA group, and 0.71 mm [\pm 0.141] for witnesses.

Conclusions: Atherosclerosis observed in Takayasu disease was accelerated and premature, occurring in young patients with a low overall cardiovascular risk. Systemic inflammation associated with parietal local inflammation observed in

Takayasu's arteritis, appear to be responsible for accelerated atherosclerosis. The results of our study and literature review challenge us in more ways than one and lead us to adopt an active strategy for cardiovascular prevention in Takayasu disease.

PP.13.17 **ARTERIAL STIFFNESS AND SYSTEMIC INFLAMMATION IN PATIENTS WITH RHEMATOID ARTHRITIS AND ANKYLOSING SPONDYLITIS**

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Objective: Patients with inflammatory arthritis have increased cardiovascular risk. The aim of this study was to assess large arterial stiffness and inflammatory markers in patients with short duration rheumatoid arthritis (RA) and ankylosing spondylitis (AS).

Design and method: The 77 patients with RA and AS, and 29 healthy subjects were examined. Traditional cardiovascular risk factors, markers of inflammation and endothelial activation (IL-6, IL-18, TNFα, hsCRP, fibrinogen, sICAM) as well as carotid-femoral pulse wave velocity (PWV) were measured. The overall measure of inflammation based on the individual values of above-mentioned inflammatory markers were calculated. To compare differences between the groups the Mann-Whitney or Kruskal-Wallis tests were calculated.

Results: There were no significant differences in traditional cardiovascular risk factors between examined groups with exception of HDL-cholesterol level (p<0.05). The mean duration of disease symptoms was one and six years for RA and AS respectively. The results of inflammatory markers analysis are summarized in Table 1.

Table 1. Inflammatory markers levels in RA, AS patients and control group.

	RA patients (n=29) Median (IQR)	AS patients (n=48) Median (IQR)	Control group (n=29) Median (IQR)	p value
Age [years]	41(34-50)	33(26-36)	32(25-38)	p<0.001
Sex [male gender %]	24	88	55	p<0.001
hsCRP [mg/L]	4,36(1,85-17,2)	5,19(2,76-15,9)	0,66(0,32-1,09)	P<0,05* ^a
IL-6 [pg/ml]	5,736(1,82-11,9)	3,373(1,81-5,79)	0,757(0,58-0,99)	p<0,001* ^b
IL-18 [pg/ml]	436,7(323-539,5)	409,42(325,2-509,34)	429,05(354,62-461,39)	0,59
TNF α [pg/ml]	2,35(1,75-2,87)	1,8(1,59-2,16)	1,51(1,34-1,77)	0,4*
Fibrinogen [g/L]	3,58(2,91-5,57)	4,19(3,41-5,2)	3,07(2,41-3,5)	p<0,001* ^b
sICAM [ng/ml]	159,7(123,8-223,5)	252,4(226,04-306,04)	204,85(186,05-231,82)	p<0,001* ^c
Combined indices of inflammation	3(2-5)	4(3-5)	1(0-2)	p<0,001* ^b
PWV [m/s]	10,12(8,81-11,24)	10,17(8,94-11,71)	9,18(8,26-11,36)	0,18

Values are presented as medians (IQR=interquartile range) or numbers (%).
*age, sex, HDL-cholesterol level and duration of symptoms adjusted p value. Statistically significant differences between groups are denoted: a - control group to AS patients; b - control group to both RA and AS patients; c - AS patients to both control group and RA patients

The positive correlation (r=0,23, p<0,05) between TNFα and PWV was observed, but it was no longer significant after adjustment for age.

Conclusions: In comparison to healthy subjects, patients with inflammatory arthritis of short duration were not presented increased arterial stiffness despite high grade systemic inflammation. Our findings do not support the hypothesis that systemic inflammation is involved in acceleration of atherosclerosis early in the course of the disease.

PP.13.18 **INCREASED SERUM LEVELS OF VASCULAR ENDOTHELIAL GROWTH FACTOR-A ARE REVERSELY CORRELATED WITH TIMP-1 IN HYPERTENSION AND ATHEROSCLEROSIS IN EARLY STAGES OF CHRONIC KIDNEY DISEASE AND PRIMARY CHRONIC GLOMERULONEPHRITIS**

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Objective: Recent evidence suggests that renal vascular changes contribute to progressive renal disease and that alteration of vascular endothelial growth factor-A (VEGF-A) might play an important role in modulating microvascular loss of macrovascular remodeling in the kidney, as well as in the vessels. It remains controversial the mechanism by which VEGF works in the kidney, as well as in the

vessels at least in the early stages of chronic kidney disease (CKD). Whether VEGF-A is detrimental in early stages of CKD or whether in other renal conditions has not yet been clearly answered. Tissue inhibitor of metalloproteinase -1 (TIMP-1) has been identified in humans and its expression is regulated during development and tissue remodeling. TIMP-1 overexpression in a mouse model of atherosclerosis showed a lesion reduction. The aim of the present study was to determine the serum levels of VEGF-A and TIMP-1 and to investigate their potential correlation with hypertension (HT), atherosclerotic markers and albuminuria in early stages of CKD and primary chronic glomerulonephritis (CGN).

Design and method: CKD patients of stages 1 and 2 with CGN (n=50) were included. As controls, there were healthy individuals (n=40). Clearance of creatinine (Clcr) and albumin excretion were examined in the 24 h urine. VEGF-A and TIMP-1 levels were measured by an ELISA method. Intima media thickness (IMT) of carotid and femoral arteries and atheromatic plaque were evaluated by a high resolution ultrasonography.

Results: There was a statistically significant difference between VEGF-A (200 ± 30 , $p < 0.0001$), TIMP-1 (400 ± 20 , $p < 0.0001$), HT (20 ± 5 , $p < 0.0001$) and IMT (0.3 ± 0.09 , $p < 0.0001$) in the patient group. There was a statistically significant negative strong correlation between levels of VEGF-A and TIMP-1 ($r = -0.7$, $p < 0.0001$), such as between TIMP-1 and IMT ($r = -0.65$, $p < 0.0001$). There was a statistically positive correlation between VEGF-A and IMT ($r = 0.6$, $p < 0.0001$). Further, VEGF-A and TIMP-1 levels were independently correlated with HT, IMT and atheromatic plaque.

Conclusions: Our study suggests that serum levels of VEGF-A and TIMP-1 might present independent risk factors of hypertension, atherosclerosis and albuminuria, at least in the early stages of primary glomerulonephritis to the progression of CKD.

PP.13.19 EVOLUTION OF CAROTID ATHEROSCLEROSIS IN TYPE 2 DIABETES AND HYPERTENSION

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Objective: To investigate the relationships between carotid atherosclerosis, evaluated by cIMT and plaques and the presence of diabetes associated or not with hypertension in comparison with a control group.

Design and method: A cross sectional study was done between the years 2010 and 2014 on a population of 315 patients with age between 31 and 80 years, 164 patients (52.1%) with diabetes, including 79 (48.2%) hypertensive and a control group of 151 (47.9%). Carotid arteries were examined with an ultrasound system Sonoscape SSI 8000 equipped with software that automatically identified the borders of the CCA and calculated cIMT.

Results: There were significant differences between the diabetes and control group concerning cIMT, weight, BMI, history of hypertension, blood pressure values, LDL, HDL cholesterol and glucose ($p < 0.05$ for all comparisons). Mean cIMT and plaques correlated best with age, being 0.72 ± 0.15 mm under 50 years, 0.82 ± 0.35 mm between 50–64 years, 0.92 ± 0.34 mm between 65–74 years and 0.96 ± 0.26 mm over 75 years. Carotid plaques were present in diabetes patients under 50 years at 10.5%, in the 50–64 years group at 16.6%, in the 65–74 years group at 31.1% and over 75 years at 56.6%. cIMT correlated significantly with the duration of diabetes, the presence of microalbuminuria and with the association of cardiovascular diseases ($p < 0.05$).

Conclusions: We found a statistical significant association between increased cIMT, plaques, type 2 diabetes mellitus and hypertension. Other factors associated with increased cIMT were age, male gender, low HDL cholesterol, high LDL cholesterol levels, duration of diabetes, presence of microalbuminuria, of coronary heart disease and cerebrovascular disease.

PP.13.20 VALVULAR HEART DISEASE IN WOMEN AND ATHEROSCLEROSIS: RELATIONSHIP?

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Objective: Valvular heart disease's etiologies has markedly changed over the last decades. Rheumatic fever, very common cause of this affection in the first half of the last century, has almost disappeared in industrialized countries and in regression in emergent countries.

The aim of the present study was to retrospectively evaluate the prevalence of atherosclerosis risk factors in women who underwent surgery for severe valvular heart disease.

Design and method: A total of 114 women underwent single left-sided valvular heart surgery between 2008 and 2014 were included in the study. The patients were divided into four groups: patients with severe mitral stenosis (MS), patients with

severe mitral regurgitation (MR), patients with severe aortic regurgitation (AR), and patients with severe aortic stenosis (AS). We evaluate the prevalence of significant coronary artery disease and risk factors for atherosclerosis (Age, hypertension, smoking, diabetes mellitus, hyperlipidemia) in the general population than in each group.

Results: Table: Prevalence of atherosclerosis risk factors

	Total population (114pts)	Aortic stenosis (36pts)	Aortic regurgitation (7pts)	Mitral stenosis (44pts)	Mitral regurgitation (27pts)
Age > 60ans	48.25%	58%	28%	20%	35%
Age <= 60ans	51.75%	42%	72%	80%	15%
Coronary artery disease	12.28%	16.6%	0%	6.8%	18.5%
HTA	40.35%	53%	43%	23%	52%
Diabetes mellitus	29%	42%	0%	20%	33%
Hyperlipidemia	14%	25%	0%	7%	15%
Smoking	5.26%	11%	0%	4.5%	0%

Conclusions: The differentiating features of valvular heart diseases in women have not been very widely studied but the prevalence rates reported in the present study are similar to those reported in literature. The atherosclerosis plays a role in the etiology of valvular heart disease as it already does in of coronary artery disease.

PP.13.21 MECHANISM OF ACROLEIN-INDUCED VASCULAR TOXICITY: INVOLVEMENT OF SERUM RESPONSE FACTOR, EARLY GROWTH FACTOR-1 AND HEME OXYGENASE-1

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Objective: Modulation of inflammatory signaling has been elucidated in different disease models including vascular biology. Acrolein is an environmental pollutant and a product of lipid peroxidation. Acrolein-induced toxicity in vasculature has been linked to activation of inflammatory pathways. Serum response factor (SRF), a transcription factor, has been shown to regulate cell development, differentiation and proliferation. SRF-induced proliferation involves molecule such as Early growth response-1 (Egr-1). Egr-1, a nuclear protein, functions as a transcriptional regulator and activates the transcription of several hundred genes. Heme oxygenase-1 (HO-1) is important in resistance to oxidative stress. This study explored regulatory influence of SRF on Egr-1 and HO-1-dependent signaling in acrolein-mediated inflammatory responses.

Design and method: Male sprague-dawley rats (8 weeks old) were exposed to 2 mg/kg/day of acrolein (gavage, 1 week) alone or in combination with rosiglitazone [ROZ, peroxisome proliferator-activated receptor gamma (PPAR gamma agonist, 10 mg/kg/day, gavages, 1 week] or clofibrate [CLO, peroxisome proliferator-activated receptor alpha (PPAR alpha agonist, 250 mg/kg/day, i.p. 1 week]. At the end of the treatment period isoprostane level was measured in urine. Changes in the expression of SRF, Egr-1, and HO-1 proteins in kidney homogenate were determined by western blot.

Results: Our results indicated increased generation of ROS in rats treated with acrolein with a reduction after treatment with ROZ and CLO. Acrolein increased SRF and decreased Egr-1 and HO-1 protein expression (~2-fold, 1.5 fold and 1.8 fold respectively). SRF expression was attenuated in the presence of CLO/ROZ (52% and 45% respectively; $p < 0.05$). Acrolein treatment significantly reduced TAS expression and only ROZ treatment improved TAS expression. ROZ reduced SRF band increased Erg-1 and HO-1 expression.

Conclusions: We concluded that PPAR gamma agonist can improve acrolein toxicity through up-regulation of HO-1 and Egr-1 expression which seems to be SRF dependent.

PP.13.22 TNF-ALPHA MEDIATES SIGNALING PATHWAYS OF OXIDATIVE STRESS INDUCED BY ETHANOL CONSUMPTION: ROLE OF PERIVASCULAR ADIPOSE TISSUE

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Objective: The aim of this study was to evaluate the role of TNF-alpha in the induction of oxidative stress caused by chronic ethanol consumption and the involvement of PVAT in such response.

Design and method: Wild type (WT) C57/BL6 and knockout mice for TNFR1 receptors (TNFR1^{-/-}) were treated with ethanol 20% (v/v) for 9 weeks. The thoracic aorta was used in the following biochemical experiments: detection of superoxide anion (O₂⁻); determination of thiobarbituric acid reactive species (TBARS) and 8-isoprostane; evaluation of nitrate, cytokines, catalase activity and GSH levels (Ethical committee:12.1.1654.53.9).

Results: In WT mice, ethanol treatment increased the levels of cytokines (TNF-alpha, IL-6, IL-1beta and IL-18) in the aorta with PVAT. Treatment with ethanol increased O₂- levels (RLU/mg protein) in aortas with PVAT from WT mice (Control: 149 ± 8, n = 5; Ethanol: 235 ± 13, n = 5). This increase was not observed in aortas from TNFR1^{-/-} mice. Ethanol treatment increased plasma TBARS levels (nmol/ml) (Control: 16.2 ± 1.5, n = 7; Ethanol: 23.9 ± 1.7, n = 6) in WT mice. In WT mice, ethanol increased the levels of TBARS (nmol/mg protein) in aortas without PVAT (Control: 12.1 ± 0.8, n = 5; Ethanol: 18.6 ± 2.0, n = 6) and with PVAT (Control: 9.5 ± 0.8, n = 5; Ethanol: 16.9 ± 2.5, n = 5). This increase was not observed in aortas and plasma from TNFR1^{-/-} mice. Furthermore, 8-isoprostane levels were reduced in TNFR1^{-/-} animals treated with ethanol compared to others groups. In WT mice, the levels of nitrate/nitrite (mmol/mg protein) were reduced in the aorta without PVAT (Control: 16.6 ± 1.6, n = 5; Ethanol: 7.7 ± 0.8, n = 6) and with PVAT (Control: 15.0 ± 3.5, n = 5; Ethanol: 1.9 ± 0.3, n = 5). This increase was not observed in aortas from TNFR1^{-/-} mice. WT showed reduced catalase activity in aorta without PVAT, but not TNFR1^{-/-} mice after treatment with ethanol. GSH levels were higher in aorta with PVAT than aorta without PVAT in both groups.

Conclusions: TNF-alpha modulates vascular oxidative stress induced by chronic ethanol consumption and is supposed to PVAT does not display a beneficial/protective action in reducing the vascular inflammation and oxidative damage caused by ethanol.

PP.13.23 EFFECT OF CHRONIC ETHANOL CONSUMPTION ON THE ERECTILE FUNCTION AND BLOOD PRESSURE OF RATS: ROLE OF OXIDATIVE STRESS

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Objective: The aim of this study was to assess the consequences of chronic ethanol consumption on the erectile function and blood pressure, and on the endothelineric system and oxidative stress in cavernosal tissue of rats.

Design and method: All protocols were approved by the local Ethics Committee (12.1.317.53.9). Male Wistar rats were divided in two groups: ethanol group—treated with ethanol (20% vol/vol) for 6 weeks; control group—water for 6 weeks.

Results: In cumulative concentration-response curves for Endothelin 1 (ET-1), the ET-1-induced contraction was higher in ethanol-treated rats (36.1 ± 2.7% KCl 120 mM; n = 5) compared to control group (20.7 ± 0.9% KCl 120 mM; n = 5). In ethanol group, the contraction induced by ET-1 was significantly reduced in the presence of apocynin (100 µmol/L), an inhibitor of NAD(P)H oxidase. Plasma antioxidant activity was higher in ethanol group (4.81 ± 0.19 mmol/L; n = 11) than control group (2.52 ± 0.17 mmol/L; n = 10). Catalase levels were higher in ethanol group (156.0 ± 13.42 U/mL; n = 10 and 225.3 ± 37.54 U/mg protein; n = 9) when compared to control group (108.0 ± 10.34 U/mL; n = 10 and 93.52 ± 17.57 U/mg protein; n = 9) in plasma and cavernosal tissue, respectively. Superoxide dismutase (SOD) activity and hydrogen peroxide (H₂O₂) levels in the cavernosal tissue were lower in ethanol group (3.13 ± 0.63 pmol/µg protein; n = 7 and 3.77 ± 0.32 pmol/µg protein; n = 8) when compared to control group (5.12 ± 0.53 pmol/µg protein; n = 7 and 6.15 ± 0.76 pmol/µg protein; n = 8), respectively. No difference was found in level of glutathione between groups. Mean arterial pressure (MAP) was higher in ethanol group (119.9 ± 1.57 mmHg; n = 9) than control group (103.5 ± 2.89 mmHg; n = 10). The intracavernosal pressure (ICP)/MAP measured in vivo under electrical stimulation of the major pelvic ganglion was lower in rats of ethanol group (0.23 ± 0.04; n = 7) compared to control group (0.39 ± 0.05; n = 9).

Conclusions: These results show that the chronic ethanol consumption affects the blood pressure and erectile function, which can be related to activated endothelineric system and increased oxidative stress in cavernosal tissue. Financial Support: FAPESP.

PP.13.24 NEW MARKERS OF INFLAMMATION IN METABOLIC SYNDROME

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Objective: Jupiter Study supports the clinical use of the inflammatory status to limit cardiovascular events. Inflammation is now a theoretic concept which will start to be applied in practice to evaluate CV risk and the therapeutic target. The aim of this study is to investigate the relation between the classical cardiovascular

risk factors and inflammation markers (hsCRP, TNF-alpha, MPO-mieloperoxidase, AOPP-advance oxidation protein products) in an adult patients group with metabolic syndrome (MetS).

Design and method: MPO and AOPP were assessed spectrophotometrically, hs-CRP and TNF-alpha by sandwich ELISA, and all the other risk factors (BMI, fasting glucose, lipid profile) by validated standard procedures, respectively, in a group of 108 patients diagnosed with the metabolic syndrome, free of coronary disease or cardiac insufficiency and without having any treatment vs. 33 age- and sex-matched control group patients (C).

Results: The CV SCORE risk for MetS group was moderate. The MPO level was not statistical significantly different between the two groups. The AOPP level and the other inflammatory markers considered was higher in MetS group. TNF-alpha was strongly correlated with the number of inclusion criteria in MetS, was average correlated with weight, waist, BMI, FPG, serum TG, HDL-c and is not correlated with the values of blood pressure, uric acid, LDL-c, TC. HsCRP are significantly higher than the control group and are strongly correlated with the number of criteria for MetS, waist, FPG, HbA1c, LDL-C and has an average correlation with SBP, BMI.

Conclusions: The MPO level was not statistical significantly different between the two groups, probably because of one of the inclusion criteria, the absence of the coronary disease, which translate into the absence of an important atherosclerotic plaque, which can potentially break down. Moreover for the MetS group we found higher values not only for the AOPP level, but also for all the other inflammatory markers considered, probably due to the inclusion of patients with DM type II or with modified glucose tolerance who already have an endothelial dysfunction, even though most of the patients were non-smokers and were not diagnosed with end organ damage.

PP.13.25 THE IMPACT OF OXIDATIVE STRESS UPON PHYSIOLOGICAL AND BIOCHEMICAL PARAMETERS IN RAT HEART WITH EXPERIMENTAL (DOCA)-SALT ARTERIAL HYPERTENSION

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Objective: Using a (DOCA)-salt arterial hypertension rat model we aimed to test in isolated, ischemised and reperused rat heart, physiological parameters as well as LDH, CK, GGT, Lipid peroxides, HDL, LDL, Cholesterol, both on myocardium and in plasma, in order to characterize modifications induced by DOCA-salt treatment.

Design and method: 20 rats aged 10 months old divided into two groups of 10 rats each control and treated have been used in our study. The treated group has been fed on standard chow and 0,9% NaCl+0,2% KCl solution instead of drinking water and have received for 4 weeks 2 subcutaneous injections /week with DOCA (20 mg/b.w. in solution of 0,9% NaCl+0,2% KCl) according to the protocol. 10–14 days since the last dose of treatment, the animals have been sacrificed. Physiological parameters have been measured on isolated and perfused heart with Langendorff buffer at a constant pressure and total lipids, cholesterol, HDL and LDL, lipid peroxides as well as GGT, LDH, CK have been assessed using standard biochemical methods and Randox and Sigma kits.

Results: There was an increase in C.F., H.R. and LVPD in DOCA-salt treated hearts, accounting for an intense mechanic cardiac activity generated by the hypertension following DOCA-salt treatment, accompanied by an increase in lipid peroxides, in CK and LDH as markers of myocardial lesion and a reduction of GGT activity in myocardial tissue probably due to hypoxia generated by the cardiac insufficiency generated by the increase in arterial blood pressure and a decrease in antioxidant potential.

Conclusions: DOCA-salt hypertension is associated with rapid development of high blood pressure, vascular growth, vascular stiffening, and cardiac hypertrophy with increasing in mechanical activity of the heart accompanied by high levels of CK and LDH, as markers of myocardial lesion, and a decrease in GGT activity generated by cardiac insufficiency and a decrease in antioxidant potential.

PP.13.26 CARDIAC PRO-INFLAMMATORY CYTOKINES, NO SYSTEM AND OXIDATIVE STRESS IN A FETAL PROGRAMMING MODEL OF HYPERTENSION INDUCED BY MODERATE ZINC DEFICIENCY SINCE FETAL LIFE

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Objective: Moderate zinc deficiency during intrauterine and postnatal growth is a fetal programming model of hypertension, renal and cardiovascular dysfunction.

Male zinc deficient rats showed reduced left ventricular (LV) wall thickness and ejection fraction.

The aim of this study was to evaluate, nitric oxide (NO) system, pro-inflammatory cytokines and oxidative state in LV of adult male rats exposed to this deficiency.

Design and method: Wistar rats received during pregnancy up to weaning low (L:8 ppm) or control (C:30 ppm) zinc diet. After weaning, male offspring fed low (l) or control (c) zinc diet during 60 days (Cc, Ll, Lc). At day 81, we evaluated in LV: Interleukin-6 and Tumor Necrosis Factor- α (IL-6, TNF- α), basal NO synthase (NOS) and endothelial (eNOS), neuronal (nNOS) and inducible (iNOS) isoforms activities; eNOS and Ser1177 eNOS phosphorylation protein expression (eNOS/ β -actin, pSer1177eNOS/eNOS), mRNA expression (eNOS/GAPDH) and lipid peroxidation end products levels (TBARS). Values are means \pm SEM, n = 6/group. One way ANOVA, Bonferroni post-test.

Results: *p < 0.01 vs Cc; †p < 0.01 vs Ll. NO production is mainly produced by eNOS, because basal NOS activity was not affected by nNOS and iNOS inhibitors, but was decreased by blocking Ca²⁺-calmodulin in all groups.

	Cc	Ll	Lc
TNF- α (immunohistochemistry,% of positive staining/area)	1.4 \pm 0.4	20.4 \pm 2.0*	1.7 \pm 0.3
IL-6 (immunohistochemistry,% of positive staining/area)	1.8 \pm 0.3	21.1 \pm 1.7*	2.8 \pm 0.8
Basal NOS Activity (pmol ¹⁴ C L-citrulline/g tissue.min)	204 \pm 6	164 \pm 10*	157 \pm 11*
pSer ¹¹⁷⁷ eNOS/eNOS (Western Blot, relative to Cc)	1.00 \pm 0.02	0.74 \pm 0.03*	1.02 \pm 0.16
TBARS (nmol/mg protein)	0.21 \pm 0.02	0.78 \pm 0.08*	0.47 \pm 0.02*†

Conclusions: Zinc deficiency during fetal and postnatal life programs a lower production and bioavailability of cardiac NO due to decreased activity and pSer1177 of eNOS and increased oxidative stress. Oxidative stress and NO impairment, jointly with higher levels of pro-inflammatory cytokines, could contribute to the cardiac disorders observed in adult males. Adequate zinc diet after weaning was unable to totally avoid the cardiac alterations induced during fetal life.

PP.13.27

COMPARE THE TWO THERAPEUTIC COMBINATIONS OF ARB WITH DIURETIC: PAY ATTENTION THE LEVEL OF URIC ACID

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Objective: Angiotensin Receptor Blocker (ARB) and Calcium Channel Blocker (CCB) were listed as the first choice therapeutic drugs in the Guideline of Japanese Society of Hypertension (JSH) 2012. In JSH guideline, Diuretics (DU) was listed as the second choice drugs which has a side effect to increase the Uric Acid (UA) levels. And previous study showed that upregulating UA was an independent risk factor for cardiovascular disease. Although the combination therapy ARB with DU is common now, it is not clear the affinity for Hypertension what the best combination which ARB with which DU. Here, we show that compare the two therapeutic combination Valsartan (VAL) with Hydrochlorothiazide (HCTZ) and Irbesartan (IRB) with Trichlormethiazide (TCTZ).

Design and method: 40 patients with essential hypertension without diabetes mellitus aged 50 to 80 year old were first prescribe 80 mg VAL, next randomly allocated to VAL with HCTZ or IRB with TCTZ. Blood exams were checked at before and after 1 month single medication of VAL, and 3 months after changed to ARB with DU. (VAL + HCTZ or IRB + TCTZ, the significant difference between both groups were not seen.)

Results: Through an observation period, we did not recognize the significant difference to the blood pressure of both groups. Significant difference was recognized only to the UA level three months after the dosage of ARB with DU, the group using IRB with TCTZ was a low value for significant difference from VAL with HCTZ.

Conclusions: Our conclusion was we should have pay attention to UA levels increasing by using of ARB with DU, because upregulating UA was independent risk factor for cardiovascular disease.

POSTERS' SESSION

POSTERS' SESSION PS14

EXPERIMENTAL PHARMACOLOGY

PP.14.01 PEROXISOME PROLIFERATOR-ACTIVATED RECEPTOR ALPHA STIMULATION FAVORS AN ANTIOXIDANT AND VASODILATOR ENVIRONMENT IN AN AORTIC COARCTATION-INDUCED STRESSED LEFT VENTRICLE

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Objective: Our group previously reported that Peroxisome proliferator-activated receptor alpha (PPAR α)-stimulation lowered blood pressure in aortic coarctation rats through an antioxidant and vasodilator mechanism, but the effect on the stressed heart has not been studied. Our objective is analyze the effect of PPAR α stimulation in the left ventricle of aortic coarctation-induced hypertensive rats on the activity of renin-angiotensin system and the production of ROS.

Design and method: Male Wistar rats (250–300 g) were randomized into three groups: 1- Sham-operated vehicle-treated (Sham-V); 2- Aortic coarctation vehicle-treated (AoCo-V); or 3- Aortic coarctation clofibrate-treated (AoCo-C) (100 mg/kg/i.p). Each group was further divided to be treated daily for 1 or 21 days, starting the day of the AoCo. We measured ROS, angiotensin II (AngII) and ang-(1–7) in tissue and plasma, as well as expression and activity of superoxide dismutase (SOD) and endothelial nitric oxide synthase (eNOS). Cardiac function was evaluated by Langendorf system.

Results: Plasmatic and cardiac AngII increased in AoCo-V and decreased in AoCo-C (1 and 21d) ($p < 0.05$). Ang-(1–7) decreased in AoCo-V and increased in AoCo-C (1 and 21d) ($p < 0.05$). We found that angiotensin receptor 1 increased in AoCo-V while clofibrate prevented this raise (1 and 21d). Respect to angiotensin receptor 2, clofibrate increased the expression in AoCo-C and decreased in AoCo-V ($p < 0.05$). The oxidative stress evaluated by MDA and ROS production augmented in the left ventricle from AoCo-V (1 and 21d); clofibrate prevented this effect. Total antioxidant capacity show an opposite pattern; while AoCo lowered that parameter, clofibrate maintained ($p < 0.05$). Regarding antioxidant enzymes, the expression and activity of superoxide dismutase (SOD) decreased in AoCo-V; that response was prevented by clofibrate ($p < 0.05$). We also explored eNOS; AoCo-V rats show a decreased eNOS expression and activity ($p < 0.05$), clofibrate prevented this effect. The evaluation of cardiac function show an improvement in mechanical work developed and coronary resistance returned to control values.

Conclusions: Our results suggest that clofibrate-induced PPAR α stimulation activates the antioxidant defense, facilitates NOS activity, and decreased AngII receptors, decreasing vasoconstrictor environment and favoring vasodilation. This may represent a protection for the stressed heart.

PP.14.02 PSIADIA PUNCTULATA AND GARCINIA MANGOSTANA HAVE POTENT VASORELAXANT ACTIVITY ON ISOLATED RAT AORTA

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Objective: Hypertension and vascular dysfunction are major complications of many diseases like diabetes and metabolic syndrome. Psiadia punctulata Vatke (PP), Garcinia mangostana L. (GM) are two plants used in Saudi community. The present work investigated the effect the vasodilatation effect of the extracts and their fractions in isolated rat aorta through bioassay-guided fractionation procedures.

Design and method: The aerial parts of PP and GM were dried and extracted with methanol. Methanol extract was suspended in a suitable amount of water and extracted with chloroform (I). The remaining mother liquor was fractionated on a Diaion HP-20 step wisely eluted with H₂O, 50% and 100% methanol. The eluates were evaporated under vacuum to afford 50% MeOH fraction (II), and 100% methanol fraction (III). The vasorelaxant effect of the total extract of PP and GM as well as their fractions were examined in isolated adult rat aorta by adding cumulative concentrations (0.01- 1 mg/ml) of the extracts or the fractions to the organ bath after precontraction with phenylephrine (PE) at concentration of 10 μ M.

Results: Addition of PP total extract to the organ bath led to concentration dependent relaxation of isolated rat aorta with 100% relaxation of PE pre-contraction at concentration of 1 mg/ml. The same relaxation response was observed with fraction I of PP while fraction II did not show any relaxation and fraction III showed mild relaxation. On the other hand, addition of GM total extract to the organ bath led to concentration dependent relaxation of the isolated rat aorta with 90% relaxation of PE pre-contraction at concentration of 1 mg/ml. The same relaxation response was observed with fraction II of PP while fraction I did not show any relaxation and fraction III showed mild relaxation.

Conclusions: In conclusion, PP and GM have strong vasorelaxant activity. Addition of PP and GM to the standard therapies may provide superior means to alleviate the associated vascular complications.

PP.14.03 CHRONIC ESTRADIOL INCREASE HYPOXIA-INDUCED INJURE IN LUNG AND ADRENALS OF GONADECTOMIZED FEMALE AND MALE RATS WITH HYPOXIC PULMONARY HYPERTENSION

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Objective: Sex hormones play a significant role in human physiology. Estrogen may have protective effects in the cardiovascular system, as evidenced by the decreased incidence of cardiovascular diseases in premenopausal compared with postmenopausal women. Estrogen protects against hypoxia-induced injury in different tissues (LeeM.Y., et al., Circ. Res. 2008). But we found no evidence of an effect of estradiol on hypoxia-induced injury in different organs gonadectomized Wistar rats with hPH. The aim of current research was to study the possible effects of estradiol on indexes of different organs of gonadectomized female and male rats with hPH.

Design and method: Female and male gonadectomized Wistar rats were divided into 4 groups, which were injected subcutaneously during 4 weeks with: 1,2-proprandion (F-control and M-control); estradiol (15mg/kg/day (F-E15 and M-E15). The procedures followed the FELASA/ICLAS guide for use of laboratory animals. hPH was induced by exposure to hypobaric hypoxia in all 4 groups. Rats were housed in a hypobaric chamber (10%O₂), 10h/day, 2 wk. Right ventricular systolic pressure (RVSP) was measured as indices of hPH. Uterus index (Uterus weight/rat bw) for female groups was measured as a marker of plasma estradiol. To study possible effects of estradiol in the development of PH on internals we measured lungs, adrenals, kidneys, spleen, thymus, liver, prostate and seminal vesicles (for male groups) indexes.

Results: Two weeks after hypoxia exposure all gonadectomized rats developed hPH. RVSP and systemic mean arterial pressure was less in M-control vs F-control and M-E15 groups. Chronical administration of estradiol leads to significant decrease in thymus index and increase of adrenals, kidneys and lung indexes in groups F-E15 and M-E15 vs controls groups ($p < 0,05$). We detected significant difference of adrenals and lung indexes between M-control and M-E15 group and adrenals index between F-control and F-E15 groups ($p < 0,05$). Estradiol did not effect on spleen, prostate and seminal vesicles indexes. Also we have found gender-dependent differences in spleen index (less in female groups) and adrenals index (less in males).

Conclusions: Our data suggest that estradiol (15 mkg/kg/day) enhances the pathological effects of hypoxia, causing hypertrophy of lungs. The increase in adrenals indicates on stress during development of hypoxia.

PP.14.04 **CHRONIC ESTRADIOL ADMINISTRATION AFFECTS ON REACTIVITY OF SYSTEMIC AND PULMONARY VESSELS IN FEMALE AND MALE GONADECOTOMIZED WISTAR RATS IN HYPOXIC PULMONARY HYPERTENSION**

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Objective: Pulmonary hypertension (Ph) is characterized by vascular growth and proliferation, leading to increased vascular resistance and right heart dysfunction. Gender differences in pulmonary hypertension (PAH) are recognized but not well understood. Endothelial dysfunction plays a pathogenetic role in PAH. Estrogen may have protective effects in the cardiovascular system. Experiments in adult female animals have shown that estrogen induces endothelium-dependent vascular relaxation via the nitric oxide, prostacyclin, and hyperpolarization pathways (Khalil R., Cardiovasc Hematol Agents Med Chem.2010). The aim of current research was to study the influence estradiol on sensitivity of isolated pulmonary and systemic (popliteal) arteries to vasoconstrictor (serotonin) and vasodilators (sodium nitropruside and estradiol) in male and female gonadectomized rats with hypoxia Ph(hPh,O₂ = 10%).

Design and method: Female and male gonadectomized Wistar rats were divided into 4 groups: 2 groups were injected subcutaneously during 4 weeks with: 1,2-propandion (F-control and M-control) and 2 - with estradiol (E-15mg/kg/day (F-E15 and M-E15)). The procedures followed the FELASA/ICLAS guide for use of laboratory animals. hPH was induced by exposure to hypobaric hypoxia in all 4 groups. Rats were housed in a hypobaric chamber(10%O₂),10h/day,2wk. Right ventricular systolic pressure (RVSP) was measured as sign of hPH. Uterus index (Uterus weight/rat bw) for female groups was measured as a marker of plasma estradiol. To examine influence of estradiol on reactivity of pulmonary and systemic vessels, perfusion pressure responses of isolated lung and popliteal artery to vasoconstrictor serotonin was measured. Sodium nitropruside and estradiol were used as vasodilators.

Results: Two weeks after hypoxia exposure all rats developed hPH. RVSP and systemic mean arterial pressure was less in M-control vs F-control. Chronic E didnt effect on RVSP in F-E15 and increased in M-E15 vs M-control. In pulmonary arteries of female groups we noted increase response to serotonin (vs male groups) (ANOVA/MANOVA,p<0,05). In popliteal arteries vasoconstriction was increased in M-E15 group vs M-control (10–6,5 M, 98,4 vs 56,3mmHg). Systemic isolated vessels of M-control group demonstrated increased vasodilation to SNP vs. F-control (10–5 M,82,7% vs.64,0%).

Conclusions: We suppose that alteration in reactivity of pulmonary and systemic vessels might underlay potentiation of hPH in gonadectomized male Wistar rats.

PP.14.05 **DINITROSYL IRON COMPLEXES, AS HYPOTENSIVE SUBSTANCE AND REGULATING AGENT OF NO LEVEL IN THE ORGANISM OF NORMOTENSIVE AND HYPERTENSIVE RATS**

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Objective: It is well known that dinitrosyl iron complexes (DNIC) play essential role, as physiological NO forms in mammalian organism. The injection of this substance exerts prolonged hypotensive action. The aim of the present research was study of DNIC with glutathione ligand (DNIC-GH) action in rat organism in different physiological states.

Design and method: The experiments were carried out on normotensive and hypertensive rats. Standard doses of DNIC were injected into rats by intravenous, intraperitoneal, intramuscular, subcutaneous injections, and rectal introduction. Most experiments were carried out on the rats in native physiological conditions, while the others were performed on the model of regional cardiac ischemia, or during general endotoxic shock. In all experiments registration of mean aortic pressure and heart rate were carried out, and DNIC concentrations in whole blood and organs were obtained by EPR method. DNIC-GH effect on NO levels was studied using spin traps.

Results: It has been shown that DNIC injection exerted substantial and prolonged hypotensive effect on normotensive and hypertensive rats. The hypotensive action of DNIC and its accumulation in whole blood and mammalian organs depended on the mode of introduction of this substance, and the most substantial and prolonged effects were registered after intravenous and subcutaneous injections. We have shown that DNIC-GH in organism operated mostly, as potent origin of NO physiological forms, such as DNIC with protein ligands and S-nitrosothiols, and its effect on free NO level was substantially slower. Meantime, DNIC-GH molecules also exerted protective action under the condition of NO hyperproduction. In particular, on the model of regional myocardial ischemia DNIC-GH injection resulted in cardioprotective action by suppression of free NO hyperproduction in ischemic area and effective scavenging of toxic oxygen active species. In the other experiments,

DNIC-GH injection also exerted cytoprotective effect, causing the suppression of NO hyperproduction in rat lung and liver during endotoxigenic shock.

Conclusions: DNIC-GH molecules in organism act generally, as the origin of NO physiological forms which cause prolonged hypotensive action. Meantime, this substance exerts regulating effect on NO level, suppressing its hyperproduction in organs.

PP.14.06 **EFFECTS AND MECHANISMS OF ACTION OF THEOPHYLLINE FOR POSTPRANDIAL HYPOTENSION**

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Objective: Postprandial hypotension is a common disorder of blood pressure regulation in the elderly, associated with falls and syncope. The pathophysiological mechanism is thought to be related to impaired vascular compensation for splanchnic blood pooling after a meal.

Several studies have suggested that caffeine, acarbose, and Guar gum can improve reduction of postprandial blood pressure (BP). However, these treatments may not necessarily be effective in the patients with symptomatic PPH.

Recently, we first experienced the effect of Theophylline on PPH which categorized as xanthine like caffeine. In this study, we investigated the mechanism of action of Theophylline.

	Theophylline(-)		Theophylline(+)	
	before breakfast	90min after breakfast	before breakfast	90min after breakfast
PRA (ng/mL/h)	0.4	1.0	1.1	2.5
NA (ng/ml)	0.48	0.61	0.90	1.1

Design and method: The case is an 92-year-old man under outpatient care for hypertension was admitted to Aoyama Hospital, Tokyo Women's Medical University, Tokyo, Japan, for the investigation and treatment of faintness after breakfast in December 2014. Ambulatory BP monitoring (ABPM) over a 24 hours period showed a decrease in systolic BP of more than 20 mmHg within 2 hours after meal, leading to the diagnosis of PPH.

We performed meal test during two days hospitalization. Measurement items were blood pressure, blood test including plasma levels of glucose, insulin, noradrenaline (NA) and renin activity (PRA) before and after breakfast. At the first day, we tested in control (without Theophylline). Next day, we evaluate the effects of Theophylline on PPH. Four hundred mg of Theophylline was given at once before going to sleep at the first day

Results: In control, the systolic blood pressure (SBP) decreased from 134mmHg to 97mmHg at 90 minutes after eating. Surprisingly, Theophylline maintained to the drop of SBP from 114mmHg to 97mmHg.

Serum NA and PRA levels showed marked elevation under Theophylline administration.

Moreover, after taking Theophylline, the patient's symptoms had disappeared

Conclusions: We report a case of postprandial hypotension improved by theophylline administration. The part of mechanism may involve the effects of Theophylline as an Adenosine receptor antagonist.

PP.14.07 **DUAL AT1 RECEPTOR/NEPRILYSIN INHIBITION (ARNI) VS. AT1 RECEPTOR BLOCKADE IN DIABETIC TGR(MREN2)27 RATS**

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Objective: The recently developed combination of an Angiotensin Receptor blocker (ARB) and a Neprilysin Inhibitor (NEPi) has beneficial effects on clinical progression and mortality of patients with heart failure as compared to enalapril. However, since NEP also degrades endothelin-1 (ET-1), ARNI may cause side effects by increasing the levels of ET-1. Indeed, we recently observed in hypertensive heterozygote TGR(mREN2)27 rats that a low but not a high (0.1 vs. 1.0 mg/kg.day) dose of the NEPi thiorphan reduced blood pressure and cardiac hypertrophy on top of the ARB irbesartan. This was due to the fact that the high dose increased ET-1, upregulated constrictor vascular ET-1 type B receptors and induced an increase in renal sodium–hydrogen exchanger 3 protein abundance. In the present study, we studied the effects of the low thiorphan dose on top of irbesartan in diabetic TGR(mREN2)27 rats.

Design and method: Heterozygote TGR(mREN2)27 rats were made diabetic with streptozotocin for 5 or 12 weeks. Rats were treated in the final 3 weeks with vehicle, irbesartan (15 mg/kg.day; IRB) or IRB plus the NEPi thiorphan (0.1 mg/kg.day; ARNI). Haemodynamics were measured by telemetry in the 5 week diabetic animals. In the 12 week diabetic animals vascular reactivity was determined in isolated mesenteric arteries, renal Na⁺ transporters were analysed by immunoblotting, and plasma and urine were collected for biochemical analysis.

Results: Baseline mean arterial blood pressure (MAP) was 156.8 ± 5.4 mmHg. IRB and ARNI lowered MAP identically over the 3-week period, a maximum reduction of ~50 mmHg being reached around day 7. Heart weight/tibia length ratio was reduced after treatment with ARNI only. Proteinuria and albuminuria were observed from 8 weeks of diabetes onwards and proteinuria was significantly reduced by ARNI treatment only. Urinary volume and plasma and urinary creatinine did not change. No ET-1 rises were observed, vascular reactivity was not influenced, and the pattern of kidney sodium transporters was not affected by ARNI or IRB treatment.

Conclusions: ARNI reduces cardiac hypertrophy and proteinuria in diabetic TGR(mREN2)27 rats independently of blood pressure.

PP.14.08 SUBTLE CHANGES IN THE GENE EXPRESSION PATTERN OF ADIPOCYTES AND VSMCS TREATED WITH MANIDIPINE

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Objective: Manidipine is a dihydropyridine calcium channel blocker (CCB) used in the treatment of hypertension and coronary heart disease. Its beneficial effects extend beyond those expected to accompany reductions in blood pressure. Of particular interest are studies with manidipine which suggest that this agent may be associated with greater improvements in insulin sensitivity. We evaluated the expression pattern of adipocyte differentiation-related genes in murine fibroblasts differentiated to adipocyte and treated with manidipine. Analyses were also conducted in vascular smooth muscle cells (VSMCs) exposed to angiotensin-II and treated with manidipine.

In mature and hypertrophied adipocytes manidipine preserves PPAR γ activity, promoting adipocytes differentiation. However, we observed subtle differences in Scarb1 and Cd36 gene expression. Thus, while manidipine treatment preserves Scarb1 expression, Cd36 gene expression was downregulated respect to mature untreated adipocytes.

Design and method: These facts take us to think that manidipine associated with preserving PPAR γ activity in mature adipocytes.

Results: Regarding VSMCs gene expression, we observed that PPAR γ is upregulated in manidipine treated cells, even when cells have been previously exposed to Ang II. A decreased expression of PPAR γ by exposing the cells to Ang II compared to those treated only with manidipine was noted. We observed that Cd36 is upregulated in treated cells with manidipine even being previously exposed to Ang II. Interestingly, Scarb1 considered antiatherogenic because of its role as HDL-C receptor, were also upregulated in manidipine treated cells after exposure to Ang II.

Conclusions: In VSMCs, PPAR γ and its response genes, Scarb1 and Cd36 increases with manidipine treatment in cells that are also treated with Ang II, though does not become as relevant as in cells treated only with manidipine.

PP.14.09 EFFECTS OF ANTI-BETA1- AND β_3 - ADRENERGIC RECEPTOR ANTIBODIES ON LEWIS RAT THORACIC AORTA

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Objective: To evaluate 1) whether β_3 -adrenergic receptor (AR) antibodies (ABs) possess an agonist-like activity on β_3 -ARs and 2) whether active immunization producing both β_1 - and β_3 -ABs has deleterious effects on vascular reactivity in Lewis rats.

Design and method: Lewis rats were immunized for 6 months with peptidic sequences corresponding to the second extracellular loop of β_1 - and β_3 -ARs. During the immunization, systolic blood pressure (SBP) was monitored using the tail plethysmography. The β_3 -ABs were purified and characterized by Enzyme-linked immunosorbent assay and their agonistic effect was evaluated on electrically field-stimulated isolated cardiomyocytes from adult rabbit by measuring the cell shortening. The vascular reactivity of immunized rats was assessed by ex vivo studies on isolated thoracic aorta using various β -AR agonists (isoproterenol, dobutamine, salbutamol, nebivolol) and phenylephrine.

Results: SR58611A (10 nM), a preferential β_3 -AR agonist and purified β_3 -ABs (25 μ g/mL) induced a decrease of cell shortening ($-39.56 \pm 4.4\%$ (n = 11) and -

$16.47 \pm 3.5\%$ (n = 12) respectively). This decrease was significantly inhibited when the cardiomyocytes were preincubated with the L-748337 (1 μ M), a selective β_3 -AR antagonist (p < 0.05), and with pertussis toxin (0.3 μ g/ml), a Gi protein inhibitor (p < 0.05). The immunizations producing functional β_1 - and β_3 -ABs had not affected the SBP. However, in β_1 -AR-immunized rats, the relaxations mediated by isoproterenol, dobutamine and salbutamol were significantly impaired, but nebivolol-induced relaxation was not modified. Moreover, phenylephrine-mediated contraction was improved in these rats. In contrast, immunization with β_3 -AR peptide led to the improvement of relaxations induced by isoproterenol and dobutamine but did not affect those induced by salbutamol, nebivolol and phenylephrine-induced contraction.

Conclusions: The results show that β_3 -ABs induced a β_3 -AR agonist-like activity. In addition, our study shows for the first time that β_1 - and β_3 -ABs, whose role is usually studied in the heart, can affect thoracic aorta reactivity. β_1 -ABs would have a pathogenic action by altering the β -AR vasorelaxation whereas β_3 -ABs would have a beneficial effect on aorta reactivity.

PP.14.10 EFFECT OF DIFFERENT LEVELS OF HYPOXIA (13% AND 10% O₂), SEX OF THE ANIMAL AND ESTRADIOL ON THE DEVELOPMENT OF HYPOXIC PULMONARY HYPERTENSION IN GONADECTOMIZED RATS

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Objective: Pulmonary hypertension (PAH) is characterized by increased of right ventricular (RV) systolic pressure and hypertrophy of RV. Women of various ages are more subjected to PAH, compared with male, what contradicts the protective effect of estradiol on the cardiovascular system. Gender differences in PAH are recognized but not well understood. Previously we demonstrated that estradiol potentiates hypoxic PAH (hPAH with O₂=6%) in female gonadectomized rats. The aim of current research was to test the hypothesis that the gender differences in effect of estradiol on the development of experimental hPAH depend on the level of oxygen in the inspired air.

Design and method: Female and male gonadectomized Wistar rats were divided into 8 groups, four from which (2M and 2F) were injected subcutaneously during 4 weeks with 1,2-proprandion (vehicle, 200ml/rat/day, C.); and four groups with estradiol (15mg/kg/day - 2ME and 2FE). The procedures followed the FELASA/ICLAS guide for use of laboratory animals. hPH was induced by exposure to hypobaric hypoxia in all 8 groups. 4 groups (MC, FC, FE, ME) had hypoxia with 13%O₂, and 4 groups - 10%O₂. Rats were housed in a hypobaric chamber 10 h/day, 2wk. Right ventricular systolic pressure (RVSP) was measured as indices of hPH.

Results: Two weeks after hypoxia exposure all gonadectomized rats developed hPH and RVSP was greater in MC, FC, FE, ME groups with 10% O₂ than 13% O₂. Chronic estradiol administration in groups with hypoxia 13% caused a decrease of RVSP in group FE on 14.6% compared with FC (p < 0.05) without any change in the group of ME. In groups with hypoxia 10% estradiol caused the increase of RVSP in group ME on 24% compared with MC (p < 0,05) without any change in the group of FE

Conclusions: Our data suggest that estradiol (15 mkg/kg/day) leads to differently changes of pulmonary system in female and male gonadectomized rats with hPH. This effect depends on levels of hypoxia (13% and 10% O₂).

PP.14.11 MODE OF ACTION OF THE ANTIHYPERTENSIVE EFFECT OF THE CREATINE ANALOGUE BETAGUANIDINOPROPIONIC ACID: THE ROLE OF CK GENE EXPRESSION

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Objective: Increasing evidence indicates that the ATP regenerating enzyme creatine kinase (CK) is involved in hypertension. The enzyme catalyzes the reversible transfer of a phosphoryl group of phosphocreatine to ADP, thus rapidly regenerating ATP near ATPases involved in sodium retention and vascular contractility, thereby promoting high blood pressure. Accordingly, plasma CK after rest was reported to be the main predictor of blood pressure and failure of antihypertensive therapy in the general population. Furthermore, human resistance artery contractility was shown to be highly CK-dependent. The CK system is competitively inhibited by the creatine analogue beta-guanidinopropionic acid (GPA). This reduces blood pressure in the spontaneously hypertensive rat (SHR). However, it is unknown whether the mode of action of GPA involves reducing CK. Therefore, we assessed the expression of the CKM and B isoenzyme in tissues of GPA-treated SHR.

Design and method: In a 4-week randomized controlled trial, male, 16-week-old SHR (N = 16) have been randomly assigned to a standard diet, or a diet supplemented with 3% beta-guanidinopropionic acid. Blood pressure was measured by the tail-cuff method. CKM and CKB mRNA in brain, heart, skeletal muscle, kidney, and mesenteric artery were estimated using quantitative real-time polymerase chain reaction, using HRPT1 as the reference gene.

Results: Data are mean (SE). Baseline blood pressures (mmHg) were 191.5(4.3) systolic; and 143.1(4.1) diastolic; HR 457(8) bpm. The CK inhibitor GPA greatly reduced blood pressure with respectively 42.7(5.5) systolic and 35.3(4.8) diastolic ($p < 0.001$). HR was 442(7) after GPA treatment, vs 454(10) bpm in controls. Tissue CKM and CKB expression were not significantly different after GPA treatment, except for reduced CKM mRNA in skeletal muscle, normalized copy number 773(50) vs 1058(60) in controls, ($p < 0.05$).

Conclusions: We found no significant difference in CKM or CKB gene expression, except for skeletal muscle. Therefore, the decrease in blood pressure upon GPA is more likely to depend on the well-known reversible, competitive inhibition of CK, with a decrease in intracellular creatine and phosphocreatine, rather than a modulation of CK proper.

PP.14.12 ALTERATIONS IN THE FUNCTIONAL PROPERTIES OF HEART MITOCHONDRIA AS A RESULTS OF THE IN VITRO ACTION OF ANTIHYPERTENSIVE AGENTS CAPTOPRIL AND NIFEDIPINE

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Objective: Explanation of action mechanism of the antihypertensive pharmacotherapy represented by captopril and nifedipine in terms of cellular bioenergetics gives the opportunity for more comprehensive characterization of their therapeutic effect. It can also help in the correct choice of therapy in clinical practice. The aim of this study was to contribute to the elucidation of the action mechanism of antihypertensive agents on the functional membrane properties of heart mitochondria.

Design and method: Functional properties of mitochondrial membrane were assessed parameters of DNP-stimulated Mg²⁺-ATPase activity (ATP-synthase activity), determined spectrophotometrically as the amount of inorganic phosphate liberated from ATP splitting, and parameter of mitochondrial membrane fluidity, determined spectrofluorometrically as anisotropy of fluorescent probe DPH (1,6-diphenyl-1,3,5-hexatriene) in the fraction of mitochondria isolated from myocardium of normotensive Wistar rats in vitro conditions.

Results: In experimental model in vitro, we observed a significant changes in ATPase activity caused by inhibitory action of captopril, nifedipine and their combination. These changes were not accompanied by statistically significant differences in the parameter of mitochondrial membrane fluidity. We determined the kinetic parameters: v_{max}- maximal reaction rate and K_m - Michaelis constant by method of enzyme kinetics. Observed decreased values of v_{max} and unchanged values of K_m testify about direct interaction of selected drugs with enzyme ATP-synthase through noncompetitive inhibition.

Conclusions: To clarify the mechanism of action of antihypertensive agents was necessary to use an experimental model of normotensive animals, which exclude the impact of the disease itself. Demonstrated a noncompetitive type of inhibition suggests a direct interaction of the drug with the enzyme in a place other than the active site. We can assume that the observed antihypertensive drugs bind to one of the subunits of ATP synthase, thus inducing conformational change of the enzyme and irreversibly inactivate the active site.

PP.14.13 CARDIAC DYSREGULATION OF NO SIGNALING CASCADE IN METABOLIC SYNDROME INDUCED BY PROLONGED CONSUMPTION OF COLA BEVERAGE IN WISTAR RATS

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Objective: We aimed to describe the influence of long-term consumption of cola beverage on expressions of cardiac NO signaling proteins.

Design and method: Male Wistar rats received a standard diet. Additionally, a group of rats received a commercially available cola beverage (CC, n = 12). Controls (CON, n = 7) received drinking water. We measured weight gain and triglycerides

(TG), cholesterol (CHOL) levels by using standard glucometer in capillary blood drops. Blood glucose was determined by conventional oral glucose tolerance test (oGTT). In addition, heart rate (HR), systolic and diastolic blood pressures (sBP and dBP) were measured by using tail-cuff method. Protein expression was determined by Western blotting in left ventricles.

Results: We observed a significantly increased body weight in CC rats (541 ± 12 g; $P < 0.01$) when compared to controls (443 ± 23 g). This was in accordance with significantly increased sBP (CC: 135 ± 3 mmHg vs. CON: 120 ± 4 mmHg; $P < 0.01$) and unaltered dBP (CC: 86 ± 1 mmHg vs. CON: 85 ± 1 mmHg; NS) and significantly increased HR (CC: 383 ± 9 mmHg vs. CON: 312 ± 15 mmHg; $P < 0.01$). Postprandial glycaemia was significantly changed after 60 minutes (CC: 9.3 ± 0.5 mmol/L vs. CON: 6.6 ± 0.6 mmol/L; $P < 0.01$) and after 90 minutes of follow up (CC: 8.3 ± 0.4 mmol/L vs. CON: 6.6 ± 0.5 mmol/L; $P < 0.01$). We observed a non-significant tendency of increased TG (CC: 5.2 ± 0.4 mmol/L vs. 5 ± 0.5 mmol/L; NS). Paradoxically, CHOL levels were significantly decreased (CC: 3.7 ± 0.4 mmol/L vs. 4.0 ± 0.4 mmol/L; NS). In conclusion, we found a significant increase in the expression of endothelial NO synthase (eNOS) (CC: 142 ± 26 % vs. CON: 100 ± 26 %; $P < 0.01$), but the protein expressions of its modulators heat shock protein 90 (hsp90) and caveolin 1 (cav-1) were significantly unchanged.

Conclusions: Six months of administration of cola beverage can lead to development of cardiovascular (increased eNOS, BP, HR) and also metabolic manifestations (impaired glucose tolerance) in Wistar rat. Accordingly, we propose this model as a reliable experimental model of rat metabolic syndrome for further use in pharmacological research.

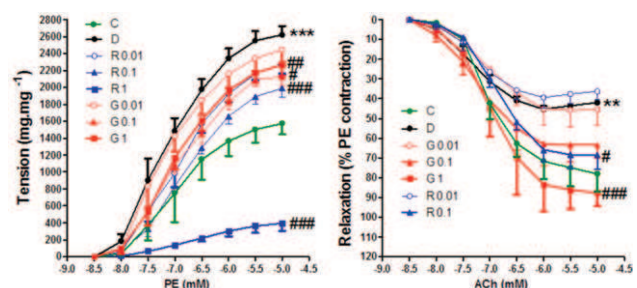
PP.14.14 GERANIOL AND 10-GINGEROL RESTORE NORMAL VASCULAR REACTIVITY IN AORTA ISOLATED FROM DIABETIC RATS

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Objective: Alterations in vascular reactivity play important roles in diabetic vascular complications which, in turn, can develop into further serious complications. Geraniol and 10-gingerol are two ginger ingredients with reported anti-inflammatory and antioxidant activities. The present work investigates the effect of geraniol and 10-gingerol on the changes in vascular reactivity associated with diabetes.

Design and method: Diabetes was induced in rats by single intraperitoneal injection of streptozotocin (50 mg.kg⁻¹). Animals were left for 8 weeks after streptozotocin injection to develop vascular complications. Then, rings of rat isolated thoracic aorta were used to measure the vasoconstrictor responses to cumulative concentrations of phenylephrine (PE) and the relaxation responses to the endothelial dependent relaxant acetylcholine (ACh).

Results: Streptozotocin injection induced moderate hyperglycemia that lasts for 8 weeks. Aortic rings isolated from diabetic animals (C) showed exaggerated contractility responses to PE while showing impaired dilatation responses to ACh compared with control animals (C). While not affecting basal aortic contractility, incubating diabetic aorta for 1 hour with geraniol (R) or 10-gingerol (G) in a concentration range (0.01–1 μM) reduced the exaggerated response to PE. In addition, geraniol or 10-gingerol incubation improved the impaired relaxation response to ACh in a dose dependent manner.



Conclusions: In conclusion, both geraniol and 10-gingerol restore normal vascular reactivity in aorta isolated from diabetic rats. Addition of geraniol and 10-gingerol to diabetic therapy may provide superior to alleviate the associated vascular complications.

PP.14.15 **CARDIO-ANKLE VASCULAR INDEX (CAVI) DIFFERENTIATES PHARMACOLOGICAL PROPERTIES OF VASODILATORS NICARDIPINE AND NITROGLYCERIN IN ANESTHETIZED RABBIT**

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Objective: Vasodilators are clinically used in accordance with each pharmacological property. For example, Ca²⁺ channel blockers are prescribed for patients with hypertension, which dilate arterioles leading to reduction of peripheral vascular resistance. Organic nitrates are used for the treatment of various cardiovascular diseases including angina and heart failure to reduce ventricular preload and afterload, which dilates all segments of the vascular system from large conductance arteries to large veins. Since useful indexes reflecting vascular functions of larger conductance arteries are unavailable using non-invasive methods in contrast to the resistant arteries, we assessed whether the cardio-ankle vascular index (CAVI), established as a marker of arterial stiffness, could reflect different pharmacological actions of nicardipine and nitroglycerin on the systemic vasculature in anesthetized rabbits.

Design and method: New Zealand White rabbits were anesthetized with halothane. The CAVI was calculated from the well-established basic equations obtained from the variables of brachial and tibial blood pressure and phonocardiogram.

Results: Intravenous administration of nicardipine (1, 3 and 10 µg/kg) decreased the blood pressure, femoral arterial vascular resistance, and heart-ankle pulse wave velocity (haPWV) in a dose-dependent manner. Meanwhile, no significant change was detected in the CAVI at 1 and 3 µg/kg, which reflect the defining feature that CAVI is independent of blood pressure. At the highest dose of 10 µg/kg, the index increased. Intravenous administration of nitroglycerin (2, 4 and 8 µg/kg) also decreased the blood pressure, femoral arterial vascular resistance, and haPWV in a dose-dependent manner. Meanwhile, the CAVI decreased in a dose-dependent manner, which may reflect the pharmacological action that nitroglycerin dilates conductance arteries.

Conclusions: These results suggest that CAVI is a useful index that can differentiate pharmacological properties of vasodilators nicardipine and nitroglycerin in anesthetized rabbit.

PP.14.16 **EVALUATION OF LEFT VENTRICLE WALL MOTION BY REGIONAL FRACTIONAL AREA CHANGE (RFAC) IN A MOUSE MODEL OF MYOCARDIAL INFARCTION: EFFECT OF VALSARTAN TREATMENT**

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Objective: Cardiac magnetic resonance (CMR) imaging allows longitudinal and non-invasive evaluation of global and regional cardiac function. In particular, regional left ventricle (LV) endocardial wall motion can be evaluated in order to identify a regional dysfunction and could be applied to assess the effectiveness of pharmacological or regenerative therapies.

Here we investigate the ability of regional fractional area change (RFAC), index of regional LV endocardial wall motion, to discriminate the effect of pharmacological treatment with valsartan, a selective antagonist of the angiotensin II AT₁-receptor, in a model of myocardial infarction.

Design and method: C57BL/6N mice, undergoing coronary artery ligation, were divided into two experimental groups: untreated (MI) or treated daily with valsartan 1 mg/Kg/die (MI+Val). Sham-operated mice were used as a control. Cardiac dimensions and function were assessed at baseline and at 24 hours, 1 and 4 weeks post surgery by CMR and echocardiography. At sacrifice histology and whole-genome gene expression profiling were performed.

Results: RFAC showed in MI mice a progressive loss of contractility non-only in infarcted myocardium, but also in remote non-infarcted tissue. More interestingly, RFAC analysis was able to reveal on inferior and posterior sectors, corresponding to remote non-infarcted LV, the regions were valsartan exerts its protective effect, highlighting its efficacy in improving contractile function and reducing maladaptive remodeling.

These beneficial effects observed in vivo by RFAC were additionally confirmed by histology and whole-genome gene expression. These analyses showed that valsartan attenuated myocyte hypertrophy and reduced the number of proliferating fibroblast and the deposition of interstitial collagen, exerting its function by modulating target genes significantly altered by myocardial infarction and almost restored

to the normal level by valsartan treatment. Consistently, echocardiographic analysis showed preserved left atrium (LA) volumes, LA appendage length and duct contractility.

Conclusions: In this study RFAC was enabled to estimate the degree of systolic dysfunction identifying and discriminating the regions preserved by the pharmacological treatment. RFAC index is a promising tool that may be used clinically to monitor the changes in left ventricle wall motion.

PP.14.17 **TETRAHYDROBIOPTERIN AND NEBIVOLOL IMPROVE SYNERGISTICALLY THE CARDIAC DIASTOLIC FUNCTION IN SPONTANEOUS HYPERTENSIVE RATS**

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Objective: To investigate whether tetrahydrobiopterin (BH4) combination with Nebivolol recouple eNOS and reverse or prevent cardiac hypertrophy, fibrosis, and diastolic dysfunction in spontaneous hypertensive rats (SHR).

Design and method: 12 weeks, 60 SHR were purchased from Vital River Laboratories in Beijing and were randomized to 10 groups (n=6 for each). All SHR were acclimatized to a new situation for a week and receive low-dose (87.5 mg/kg.d) or high-dose (175 mg/kg.d) BH4, or combination with low dose nebivolol (5 mg/kg.d) and high dose (10 mg/kg.d) and placebo for one week. Cardiac function was measured by arious conventional and tissue Doppler echocardiographic index transthoracic check and invasive conductance catheter analysis before and after treatment. RT-PCR, western-blot and immunohistochemistry were used to detect the levels of myocardium BH4, superoxide, eNOS, phospholamban (PLB), protein kinase G(PKG), sarcoplasmic reticulumCa²⁺-ATPase(SERCA 2a) expression of mRNA and their protein expression in myocardium. We also measured Brain Natriuretic Peptid (BNP) and nitrite (an NO storage molecule). α

Results: The results showed that cardiac diastolic function of SHR in vehicle(VEH) group trend worsen than that of baseline. After feeding high dose or low dose BH4 the index of diastolic function, such as tau, min dp/dt, left ventricular end of diastolic pressure(LVEDP) reversed especially low dose BH4, but P=NS. High dose nebivolol didn't reverse the LVEDP increase, even showed mildly improvement compared with VEH. However, low dose nebivolol reversed the increasing LVEDP (12.318 ± 3.177 vs 18.1295 ± 2.0673, P=0.029). The mRNA level of eNOS increase mildly after separately feeding nebivolol or BH4, while cosupplementation BH4 and nebivolol the mRNA of eNOS increased significantly. The protein expression of eNOS in myocardium suggested the same trend. This finding indicated that low dose BH4 (17.5 mg/d) combination low dose nebivolol (1.25 mg/d) were better than higher doses of them for expression of mRNA and protein in eNOS, especially in the enhance aspect of diastolic function. ± ±

Conclusions: Oral BH4 cosupplementation nebivolol for one week improves the cardiac diastolic function in SHR by activation eNOS, augment NO production and its bioactivity. They act synergistically to improve the diastolic function after combination them with low doses.

PP.14.18 **TETRAHYDROBIOPTERIN IMPROVE LEFT VENTRICULAR DIASTOLIC FUNCTION THROUGH PI3K/P-AKT SIGNALING PATHWAY IN DEOXYCORTICOSTERONE ACETATE HYPERTENSIVE MICE**

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Objective: To elucidate whether tetrahydrobiopterin(BH4) could induce improve left ventricular diastolic function through phosphoinositide-3 kinase/phosphorylated protein kinase B (PI3K/p-Akt) signaling pathway in hypertensive mice.

Design and method: Ninety male C57BL/6 mice were randomly divided into two groups: sham-operation group (n=40); deoxycorticosterone acetate (DOCA)-salt group (n=50). After two weeks, sham-operation group was divided into: SHAM group (n=20) and BH4 group (n=20); DOCA-salt group was divided into DOCA group (n=22) and DOCA+BH4 group (n=22). The blood pressure measurements were performed three weeks later. Cardiac function were assessed by echocardiography and hemodynamic parameters. The myocardial cyclic guanosine monophosphate (cGMP), malondialdehyde (MDA), superoxide dismutase (SOD) and nitric oxide (NO) were detected by ELISA. The levels of BH4 and dihydrobiopterin (BH2) were tested by high-performance liquid chromatography (HPLC). PI3K, Akt and p-Akt protein expression were determined by Western blot.

Results: Three weeks after coarctation, comparing with the SHAM group, systolic blood pressure (SBP) and diastolic blood pressure (DBP) were significantly increased in DOCA-salt hypertension group (all P < 0.001). The parameters of left ventricular

diastolic function were significantly decreased. The levels of BH4 and BH2 were reduced (all $P < 0.001$). cGMP, SOD and NO were declined significantly. MDA was augmented markedly. In addition, the PI3K and Akt (Ser473) protein phosphorylation in DOCA group were significantly down-regulated. Treatment with BH4 effectively decreased SBP, improved left ventricular diastolic function, augmented SOD, PI3K and p-Akt (Ser473) in DOCA group.

Conclusions: These results suggested that BH4 could improve left ventricular diastolic function in hypertensive mice possibly through PI3K/p-Akt signaling pathway.

PP.14.19

N-TYPE CA2+ CHANNEL BLOCKADE RESTORES THE CARDIAC AUTONOMIC BALANCE AND PREVENTS LETHAL ARRHYTHMIAS IN MICE WITH DILATED CARDIOMYOPATHY

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Objective: Dysregulation of autonomic nervous system activity can trigger ventricular arrhythmias and sudden death in patients with heart failure. N-type Ca²⁺ channels (NCCs) play an important role in sympathetic nervous system activation by regulating the calcium entry that triggers release of neurotransmitters from peripheral sympathetic nerve terminals. In this study, we have investigated the ability of NCC blockade to prevent lethal arrhythmias associated with heart failure in mice.

Design and method: We assessed the effects of pharmacological blockade of NCCs and their genetic titration on arrhythmicity and sudden death in transgenic mice expressing a cardiac-specific, dominant-negative form of neuron-restrictive silencer factor (dnNRSF-Tg), a mouse model of dilated cardiomyopathy leading to sudden arrhythmic death.

Results: We compared the effects of cilnidipine, a dual N- and L-type Ca²⁺ channel blocker, with those of nitrendipine, a selective L-type Ca²⁺ channel blocker, in dnNRSF-Tg mice. Cardiac structure and function did not significantly differ among the control, cilnidipine and nitrendipine groups. However, cilnidipine dramatically reduced arrhythmias in dnNRSF-Tg mice with significantly improving their survival rate and correcting the imbalance between cardiac sympathetic and parasympathetic nervous system activity. A beta-blocker bisoprolol similarly restored the cardiac autonomic balance and prevents malignant arrhythmias, thereby improving the survival in dnNRSF-Tg mice. Genetic titration of NCCs, achieved by crossing dnNRSF-Tg mice with mice lacking CACNA1B, encoding the alpha1 subunit of NCC, improved survival rate. With restoration of cardiac autonomic balance, dnNRSF-Tg;CACNA1B^{+/-} mice showed fewer malignant arrhythmias than dnNRSF-Tg;CACNA1B^{+/+} mice.

Conclusions: Both pharmacological blockade of NCCs and their genetic titration improved autonomic nervous system balance and prevented lethal arrhythmias in a mouse model of dilated cardiomyopathy and sudden arrhythmic death. This study suggests NCC blockade is a potentially useful approach to preventing sudden death in patients with heart failure.

PP.14.20

ASTRAGALOSIDE IV IMPROVED LEFT VENTRICULAR DIASTOLIC DYSFUNCTION IN METABOLIC SYNDROME RATS THROUGH ENOS/NO/cGMP PATHWAY

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Objective: Metabolic syndrome (MS) was the major risk factors for heart failure, initially manifesting as diastolic dysfunction. In this present study, the effects and the mechanisms of astragaloside IV (AST) were investigated on high fructose/high fat diet (HFFD) induced MS rats.

Design and method: The rat MS model was established by feeding HFFD for 24 weeks. Rats were divided into four groups as normal control group, MS group, MS+AST 0.5 (0.5 mg/kg, i.p.) group and MS+AST 2 (2 mg/kg, i.p.) group. The hemodynamic and echocardiographic parameters were used to assess the left ventricular functions. Rat left ventricular tissue and plasma samples were collected for biochemical and molecular analysis.

Results: Our HFFD fed rats had hypertriglyceridaemia, high blood glucose, hyperinsulinemia, elevated blood pressure, weight gain, and diastolic dysfunction. AST could improve diastolic dysfunction without any effect on systolic function in MS rats. In the present study, the experimental results showed that nitric oxide (NO) production and superoxide dismutase (SOD) level decreased while the level of malondialdehyde (MDA) increased in the left ventricular cardiomyocytes of MS rats. After treatment with AST in MS rats, cardiac MDA was attenuated as well as NO

production and SOD level were dose-dependently improved. The highest dose of AST (2.0 mg/kg) increased cyclic guanosine monophosphate (cGMP) production in the myocardium. At the mean time, the total endothelial nitric oxide synthase (eNOS) and neuronal NOS (nNOS) expression had no significant changes. Compared with the normal control rats, eNOS dimer was decreased in HFFD induced MS rats. Both low and high dose AST treatments restored the eNOS dimer expression of myocardium in MS rats.

Conclusions: The present study demonstrated that AST ameliorated the oxidative stress damage and metabolic abnormalities in HFFD induced MS rats. The antioxidant properties of AST and its protection function of the left ventricular diastolic function worked through the eNOS/NO/cGMP pathway.

PP.14.21

THE DUAL REGULATORY EFFECTS OF CALCIUM CHANNEL BLOCKERS IN SIGNAL TRANSDUCTION IN VASCULAR SMOOTH MUSCLE CELLS

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Objective: Rgs2 (regulator of G-protein signaling-2)-deficient mice exhibit persistent vascular constriction and severe hypertension, and genetic variations of RGS2 occur in hypertensive patients. Moreover we have known that RGS2 mRNA expression was up regulated by angiotensin II (Ang II) stimulation in vascular smooth muscle cells (VSMC). This study was to disclose the role of calcium channel blockers (CCBs) in signal transduction through RGS2.

Design and method: VSMCs were isolated from thoracic aortas of male Wistar rats and cells between passages 4 to 6 were used at semi-confluence growth state. VSMC were incubated in azelnidipine, amolnidipine or cilnidipine (~40 nM) and cells were collected. RGS2 mRNA expression was performed by real-time quantitative reverse transcription-polymerase chain reaction (QRT-PCR).

Results: Azelnidipine (~4 nM and ~40 nM) dose-dependently increased RGS2 mRNA expression in VSMC ($p < 0.01$). On the other hand, RGS2 mRNA expression was increased with cilnidipine (~40 nM) stimulation and the cells were pre-incubated with PKC inhibitor for 30 minutes. PKC inhibitor significantly decreased cilnidipine-induced RGS2 up-regulation by 50% ($p < 0.05$).

Conclusions: These results suggest that CCBs decreased post-receptor signal transduction through the up-regulation of RGS2 mRNA expression and this upregulation of RGS2 mRNA expression possibly via N-type calcium channel.

PP.14.22

EVIDENCE THAT THE ANGIOTENSIN AT2-RECEPTOR AGONIST COMPOUND 21 IS ALSO A LOW AFFINITY THROMBOXANE TXA2-RECEPTOR ANTAGONIST

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Objective: The objective of this study was to test whether Compound 21 (C21), a high-affinity, non-peptide angiotensin AT₂-receptor agonist, is also an antagonist of thromboxane A₂ (TXA₂) receptors thus reducing both vasoconstriction and platelet aggregation.

Design and method: Binding of C21 to the TXA₂ receptor was determined by TBXA₂R Arrestin Biosensor Assay. Mouse mesenteric arteries were mounted in wire myographs, and responses to increasing concentrations of C21 (1 nM – 10 μM) were recorded during submaximal contractions with 0.1 μM U46619 (TXA₂ analogue) or 1 μM phenylephrine. To control for AT₂-receptor specificity, arteries were pre-incubated with the AT₂-receptor antagonist PD123319 (10 μM), or mesenteric arteries from AT₂-receptor knock-out (AT₂R^{-/-}) mice were used. An inhibitory effect of C21 (100 nM - 10 μM) on U46619 (0.3 μM) induced platelet aggregation was examined in whole human blood.

Results: In TXAR₂ binding, C21 had an IC₅₀ of 8.6 μM. C21 significantly reduced U46619-induced contractions in mesenteric arteries of C57BL/6 and also of AT₂R^{-/-} mice, and PD123319 was not able to block this effect, indicating that the vasorelaxant effect was AT₂-receptor independent and rather due to TXA₂ blockade. C21 also reduced phenylephrine-induced vasoconstriction, but this effect was abolished by PD123319 pointing to an AT₂-dependent effect. U46619-induced, but not ADP-induced platelet aggregation was dose-dependently and significantly (at 10 μM) inhibited by C21, again suggesting a TXA₂-antagonistic effect of C21.

Conclusions: Apart from being a high affinity angiotensin AT₂-receptor agonist, C21 is also a low affinity antagonist of the TXA₂ receptor. By blocking the TXA₂ receptor it inhibits TXA₂-mediated vasoconstriction and platelet aggregation.

PP.14.23 **ATRAP, A NOVEL INTERACTING MOLECULE WITH AT1 RECEPTOR, INHIBITS ANG II-INDUCED PROLIFERATIVE ACTIVITY AND OXIDATIVE STRESS IN RAT VASCULAR SMOOTH MUSCLE CELLS**

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Objective: Ang II is a pluripotent hormone in vascular smooth muscle cells and stimulates arterial remodeling in hypertension. Ang II influences the structure and function of vascular smooth muscle cells, and plays an important role in reactive oxygen species production. Superoxide anions are recognized as mediators of intracellular signaling cascades and are known to participate in cardiovascular diseases such as arteriosclerosis and hypertension.

Previous studies reported that the production of superoxide is modulated by many factors including Ang II - AT1 receptor signaling. One of the major sources of superoxide in the aorta is NADPH oxidase located in the smooth muscle cells.

Design and method: The NADPH oxidase complex consists of p22phox, Rac1, and Nox1 etc. With respect to AT1 receptor signaling, the carboxy-terminal cytoplasmic

domain of AT1 receptor is involved in the control of receptor internalization and in linking receptor-mediated signal transduction to the specific biological response. We cloned a novel molecule interacting with carboxy-terminal domain of AT1 receptor, which we named ATRAP (for AT1 receptor-associated protein), using the yeast two-hybrid strategy. In this study, we tested the hypothesis that vascular smooth muscle cells express ATRAP and that ATRAP attenuates Ang II-induced proliferative activity and oxidative stress in vascular smooth muscle cells. We used rat smooth muscle cells and used adenoviral gene transfer for ATRAP overexpression. We used real time PCR, ELISA of TGF- β , p22phox, Rac1, Nox1 and BrdU incorporation assay for cell proliferation.

Results: We identified that the ATRAP mRNA and protein were endogenously expressed in VSMC, and found a colocalization of ATRAP and AT1 receptor in Ang II-stimulated VSMC. The results of gain-of-function studies by adenoviral gene transfer demonstrated that overexpression of ATRAP significantly inhibited Ang II-mediated increases in c-fos gene transcription, BrdU incorporation, and mRNAs expression of NADPH oxidase complex ($p < 0.05$, $n = 6$).

Conclusions: These results indicate that ATRAP significantly attenuates Ang II-mediated proliferative activity and oxidative stress in vascular smooth muscle cells, and suggests a novel strategy to inhibit cardiovascular disease such as arteriosclerosis and hypertension.

POSTERS' SESSION

LATE-BREAKERS POSTERS' SESSION 1

PP.LB01.01 SUPERIOR DYNAMIC HEART RATE CONTROL AND NON-INFERIOR BLOOD PRESSURE CONTROL WITH BISOPROLOL VS METOPROLOL SUSTAINED RELEASE TABLET IN MILD-TO-MODERATE HYPERTENSION: CREATIVE STUDY

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Objective: Both bisoprolol and metoprolol sustained release tablet (SR) are indicated in the management of hypertension. While long duration of effect in metoprolol SR was achieved through its sustained-release formulation, bisoprolol has intrinsic long duration of action. This study aimed to investigate long action of bisoprolol compared with metoprolol SR in controlling mean dynamic heart rate and diastolic blood pressure in the last 4 hours of a 12-week treatment period in patients with mild-to-moderate primary hypertension

Design and method: 186 mild-to-moderate hypertensive patients from 7 centers in China were enrolled in this randomized, parallel, multicenter, open-label clinical study from Dec 2011 to Dec 2014. Patients were treated with either bisoprolol 5–10 mg or metoprolol SR 47.5–95 mg once daily for 12 weeks. Primary end points were mean dynamic heart rate control and mean dynamic diastolic blood pressure control in the last 4 hours of the treatment period. Secondary endpoints included ambulatory monitoring of the blood pressure and heart rate, safety, and compliance.

Results: A total of 186 subjects were enrolled and analyzed, 93 subjects in each group respectively. In the last 4 hours of the treatment period, bisoprolol demonstrated significantly better control of mean dynamic heart rate compared with metoprolol SR (LSmeans difference: -3.79 bpm, 97.5% CI: -7.45 , -0.14). In the last 4 hours of the treatment period, the LSmeans difference of diastolic blood pressure was -1.00 (97.5% CI: -4.79 , 2.78), with the upper limit less than 4, indicating that bisoprolol group was noninferior to metoprolol sustained release tablets group bisoprolol further provided significantly better control in 24 hour mean ambulatory, mean daytime, and nighttime heart rate. The overall adverse event (AE) rate was similar in bisoprolol group and metoprolol SR group (20.43% vs 17.20%). Noncompliance was reported in 3(3.53%) and 6(7.32%) subjects in bisoprolol and metoprolol sustained release tablets group respectively.

Conclusions: Both bisoprolol and metoprolol SR could have long action. Bisoprolol provided superior dynamic heart rate control and non-inferior dynamic blood pressure control vs metoprolol SR in patients with mild-to-moderate hypertension. No new safety concern was found.

PP.LB01.02 INFLUENCE OF THREE TREATMENT REGIMENS ON HEMODYNAMIC AND METABOLIC FEATURES IN ELDERLY WITH HYPERTENSION, CORONARY ARTERY DISEASE AND OBESITY

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Objective: To reveal metabolic alterations and haemodynamic rates under the influence of three different treatment regimens in elderly with primary hypertension (PH), coronary artery disease (CAD) and obesity

Design and method: 60 patients with abovementioned states were examined and treated according to clinical recommendations in the Odessa University Clinic. Their average age was 67.2 ± 5.6 years. According to the received treatment all the patients were divided into three groups. In the first group was prescribed lisinopril+atorvastatin+aspirin (combination I). Second group was given lisinopril+atorvastatin+bisoprolol+aspirin (combination II). Pharmacotherapy (PT) of the third group consisted of: lisinopril + bisoprolol + indapamide + atorvastatin + aspirin (combination III). N=20 in all the investigated groups. The special research method for estimation of homeostatic alterations during PT was laser correlation spectrometry (LCS). Data were processed with biostatistical methods.

Results: All three combinations equally caused stabilization of systolic blood pressure in the target borders (less than 140 mm Hg). There was not any influence of all the three combinations on EF rate. In all three groups cholesterol level was brought to the normal values. Glucosae level remained the same increased value after administration of Ist and IIIrd combinations, and IInd combination even led to the growth of glucosae up to abnormal rate (6.56 ± 1.44 vs 5.42 ± 0.76 mmol/L). Only IIIrd combination caused growth of GFR (92.73 ± 2.12 vs 79.62 ± 13.62 ml/min/1.73m²). In LCS data Ist combination lead to prevalence of III LSP, which are correspondent to intoxication processes. Combination II caused prevalence of II LSP, which can be determined in catabolic processes. In prescription of the combination III prevalence of LSP IV is observed and they are considered to be anabolic reactions.

Conclusions: PT of the elder patients have to be individualised with taking into consideration all the comorbidities, which patient has. LCS data are very sensitive to homeostatic alterations and reflex metabolic transformation after the carried out treatment. But these results can be estimated only together with the clinical information.

PP.LB01.03 A COHORT STUDY. IS THERE A BLUNTING EFFECT OF INCREASE IN SUPINE AUGMENTATION INDEX WITH ANTI-HYPERTENSIVE? IS THIS A EFFECT WITH SIGNIFICANCE?

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Objective: Augmentation index (AI), is a measure of arterial stiffness and cardiovascular mortality. Postural variation of AI has not been described in literature. We observed that the AI increased in supine position in most non hypertensive volunteers not on treatment.

Design and method: This study analysed AI in both supine and sitting position for patients without hypertension (n=21) and hypertensive subjects on treatment (n=21). Variations in AI with postural changes were compared between hypertensive and non-hypertensive subjects; and subsequently compared among hypertensive patients using ACEI/ARB, beta-blocker, calcium channel blocker and diuretics to see effects of different anti-hypertensives on postural AI variations. Measurement were done by SphygmoCor, gold standard for non-invasive central pressures assessment. Wilcoxon signed-rank test and paired t test were used for statistical analysis. A value of $P < 0.05$ was accepted as statistically significant.

Results: In normotensive subjects, aortic AI significantly increased from sitting to supine position ($P < 0.05$), whereas significant postural changes of AI was not seen in hypertensive patients on treatment. AI on the contrary, significantly decreased with posture from sitting to supine in subgroup of patients on ACE inhibitors ($P = 0.05$).

Conclusions: AI increases in supine posture in subjects who are not on treatment but this effect is abolished or blunted when patients are on anti-hypertensives. These findings may suggest that patients who are hypertensive's not on treatment may have a greater increase in supine AI; thus pre-disposing them to early morning cardiovascular events. Further studies need to be done to establish these findings.

PP.LB01.04 A NEW METHOD TO MEASURE THE SHORT TERM BLOOD PRESSURE VARIABILITY

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Objective: Beside the well-known evidences of the additional cardiovascular risk linked to a chronic increase of the pressure values, it is also likely that their variability may play a role as a risk factor. The blood pressure variability (BPV) is usually estimated using the Standard Deviation (SD) from the mean; our study allowed to elaborate a new method to assess the BPV as the average of the absolute difference between subsequent blood pressure measures; this method of calculating BPV was applied to the BP values measured routinely with standard ambulatory blood pressure monitoring (ABPM).

Design and method: The ABPM data gathered by means of the Spacelab devices were used to calculate the BPV and the BPV% (corrected by average blood pressure values) for each patient. The BPV% was calculated for daytime and nighttime separately and the range of BPV% was compared with the range of SD for the entire group of patients and the relation of BPV% with other common variables such as age and sex, normal or above normal blood pressure and Dippers or Non Dippers conditions, was analysed.

Results: 196 ABPMs of male and female patients have been examined; average age = 59 years (38% of the ABPM were obtained in patients > 65 yrs); in 23% of the cases the average blood pressure values measured by ABPM was above normal. The average BPV% taken during the day, for the entire group of the examined patients, was 6,8%, 9% and 8,1 % respectively for SBP, DBP and MBP; BPV% during nighttime was excluded for methodological reasons (limited number of measures and overlap with values obtained while awake). Comparisons between the subgroups has shown an increased variability for the women, the elders and the Non Dippers.

Conclusions: The BPV% is only partially related to the SD (which is more commonly used as variability index) and could be more informative; it is easy to perform and if its usefulness and reliability will be confirmed, it could even be used routinely for the evaluation of ABPM.

PP.LB01.05 RIGHT AND LEFT VENTRICULAR DYSFUNCTION IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE COMPARED TO ASTHMATIC PATIENTS DURING EXACERBATION AND IN BETWEEN THE ATTACKS

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Objective: To determine the prevalence of right and left ventricular dysfunction in patients with chronic obstructive pulmonary disease (COPD) compared to asthmatic patients during exacerbation and in between the attacks.

Design and method: Thirty patients, 22 males and 8 females, 56 ± 10 years old, with COPD: Group I, were compared to thirty asthmatic patients, 20 males and 10 females, 55 ± 8 years old, Group II. Complete echo-Doppler study and spirometry were done to all patients during exacerbation and in between the attacks.

Results: In group I with COPD, right ventricular wall thickness (RVWT), right ventricular end diastolic area (RVEDA) and right atrial area (RAA) were increased significantly in addition to a significant decrease in pulmonary acceleration time (ACT) and ACT/ET ratio (ET: ejection time), compared to asthmatic group II, ($P < 0.05$). In group I with COPD, mitral E/A ratio was decreased and isovolumic relaxation time (IVRT) was increased significantly when compared to other studied asthmatic group II, ($P < 0.05$), reflecting LV diastolic dysfunction. It was also found, In group I with COPD, right ventricular end diastolic area (RVEDA) and right atrial area (RAA) were increased significantly together with a significant decrease in pulmonary acceleration time (ACT) and ACT/ET ratio (ET: ejection time), in addition, mitral E/A ratio was decreased and isovolumic relaxation time (IVRT) was increased significantly during exacerbation when compared to in between the attacks in the same group I, ($P < 0.05$). Also, there was a significant inverse correlation between FEV1 and diastolic dysfunction parameters in group I with COPD only.

Conclusions: RV dilatation and Doppler evidence of pulmonary hypertension and LV diastolic dysfunction were reported in all patients with COPD compared to asthmatics with more profound RV affection associated with higher pulmonary artery pressure and more impairment of diastolic function parameters during exacerbation in COPD patients. Further studies are recommended in high risk COPD patients with concomitant diabetes, hypertension or with evidence of coronary heart disease.®

PP.LB01.06 HYPERTENSION IN NURSING PROFESSIONALS WORKING IN ONCOLOGY: PREVALENCE AND ASSOCIATED FACTORS

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Objective: Assess the prevalence of arterial hypertension and identify associated factors, in nursing professionals from a high-complexity oncology center in Brazil.

Design and method: Cross-sectional study involving 150 nursing professionals (82,7% women, 39 (8.3) years, time since graduation 15.6 (7.7) years, per capita income 1988.58 (900.7) US \$) selected through random sampling. The study received Institutional Review Board approval. Blood pressure was measured with validated automatic device in the sitting position, with appropriate cuff size to the arm, following the recommendations of the VI Brazilian Guidelines of Hypertension. Hypertension was defined for blood pressure values greater than or equal to 140 and / or greater than or equal 90 mmHg or use of antihypertensive medication. Fischer's exact test and chi-square were used to check for differences between the prevalence rates and Student's t-test to check for differences of means. The prevalence ratio of hypertension was used to analyze the association between variables, using Poisson regression. Statistical significance was set as p smaller than or equal 0.05. In the multivariate analysis model we included the variables with p smaller than or equal 0.20.

Results: The prevalence of hypertension was 23.3%. There was statistically significant difference among hypertensive and non-hypertensive, respectively, for the following variables: age [44.6 (8.6) vs 37.0 (7.5) years], Body Mass Index [30.2 Kg/m² (4.4) vs 26.8 Kg/m² (4.6)], Waist/hip ratio [(0.89 (0.07) vs 0.83 (0.08)], time since graduation [22.3 years (8.4) vs 13.6 years (6.2)] and the smoking habit. In the multivariate analysis remained associated with hypertension the following variables: length of work experience, monthly income, waist-hip ratio, Body Mass Index and the smoking habit (Table 1).

Table 1. Non-adjusted and adjusted prevalence ratio for factors associated with hypertension in employees from a High Complexity Oncology Center, Brazil, 2014.

Variables	Hypertension			
	Non-adjusted PR	95% CI	Adjusted PR	95% CI
Smoking habit	Yes	1	1	1
	No	0.42	0.19-0.92	0.48
Work experience (years)	1.09	1.06-1.12	1.08	1.05-1.12
Per capita income (US \$)	0.96	0.93-0.99	0.96	0.93-0.99
Waist/hip ratio	1.08	1.05-1.13	1.05	1.01-1.12
Body mass index (Kg/m ²)	1.03	1.01-1.04	1.02	1.004-1.03

Conclusions: It was observed that the prevalence of hypertension was similar of the other studies with similar samples. The association of hypertension with increased anthropometric indicators and smoking, reinforce the importance of adopting habits and styles of healthier life, mainly because they are health care professionals, who have the main focus of its activity in the 'care'.

PP.LB01.07 MORTALITY DUE TO ACUTE MYOCARDIAL INFARCTION IN BRAZIL ACCORDING TO SEX BETWEEN 1980 AND 2009. STUDY OF AGE-PERIOD-COHORT EFFECTS

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Objective: To analyze the effect of age-period-birth cohort on mortality due to acute myocardial infarction in Brazil according to sex between 1980 and 2009.

Design and method: Mortality data due to acute myocardial infarction were analyzed for men and women aged 20 years or older. The age-period-birth cohort effect was calculated using Poisson's regression model, using estimated functions, deviations, curvatures and drift, through the EPI library of the statistical software R version 2.7.2. Significance was set as p value smaller than or equal 0.05. Thirteen age groups, six periods and 19 birth cohorts were analyzed.

Results: The overall mortality rate due to acute myocardial infarction (deaths / 100.000) was higher in men (78.7) than in women (48.1), in all age groups and periods. The age-period-birth cohort analysis indicated a downward trend in the risk of death in the successive birth cohorts, in both sexes, (RR < 1) in individuals born after the 1940's and in the successive periods as from 2000–2004 in women. In men, a slight increase was evidenced in the risk of death in 2000–2004, which again dropped in the subsequent period (Table 1).

Table 1. Estimates of acute myocardial infarction, Relative Risk (RR) and confidence interval with 95% reliability, birth cohort and period 1980-2009, according to gender, Brazil.

Period	Female		Male	
	RR	95% CI	RR	95% CI
1980-1984	0.94	0.93-0.95	0.99	0.98-1.001
1985-1989	0.99	0.98-0.994	1.06	1.05-1.07
1990-1994	1		1	
1995-1999	0.99	0.98-0.995	1.007	1.002-1.03
2000-2004	0.98	0.97-0.99	1.02	1.01-1.03
2005-2009	0.94	0.93-0.95	1.01	1.01-1.03
Birth Cohort	RR	95% CI	RR	95% CI
1895-1989	1.36	1.34-1.39	1.41	1.39-1.43
1900-1904	1.31	1.30-1.33	1.34	1.33-1.36
1905-1909	1.29	1.27-1.30	1.3	1.29-1.32
1910-1914	1.25	1.24-1.26	1.25	1.24-1.26
1915-1919	1.22	1.21-1.23	1.2	1.19-1.21
1920-1924	1.19	1.18-1.20	1.17	1.16-1.18
1925-1929	1.17	1.15-1.17	1.15	1.14-1.16
1930-1934	1.04	1.03-1.04	1.08	1.07-1.09
1935-1939	1		1	
1940-1944	0.97	0.96-0.98	0.93	0.94-0.95
1945-1949	0.92	0.91-0.93	0.88	0.87-0.88
1950-1954	0.85	0.84-0.85	0.8	0.79-0.81
1955-1959	0.77	0.76-0.78	0.71	0.70-0.72
1960-1964	0.69	0.68-0.70	0.62	0.61-0.63
1965-1969	0.63	0.61-0.64	0.54	0.53-0.55
1970-1974	0.56	0.54-0.58	0.47	0.46-0.48
1975-1979	0.51	0.49-0.52	0.41	0.39-0.42
1980-1989	0.45	0.44-0.47	0.35	0.34-0.36
1985-1989	0.41	0.39-0.43	0.30	0.29-0.32

Conclusions: The study identified the period effect, in view of the drop in the death risk due to acute myocardial infarction as from 2000–2004 in individuals born as from the 1940's. The findings of this analysis can be results of creating control programs of hypertension and diabetes, which are important cardiovascular risk factors, in addition to implementation of a universal access to health care in Brazil.

PP.LB01.08

SERUM CONCENTRATION OF INTERLEUKIN-6 AND ITS CORRELATIONS WITH MYOCARDIAL REMODELING, RENAL FUNCTION AND HEMOGLOBIN LEVEL IN PATIENTS WITH EARLY STAGES OF DIABETIC NEPHROPATHY

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Objective: Interleukin-6 (IL-6) is involved in the pathogenesis of diabetes complications. Experimental studies have shown that this cytokine may have an influence on myocardial remodeling, progression of nephropathy and development of anemia. The aim of this study was to assess the interconnection of serum IL-6 concentration with myocardial remodeling, renal function and hemoglobin level in patients with early stages of diabetic nephropathy.

Design and method: We investigated 122 patients with type 2 diabetes mellitus and chronic kidney disease (stages 1–3). Glomerular filtration rate (GFR) was calculated by Cockcroft-Gault formula. In addition to routine clinical tests we measured serum level of IL-6 using immunoassay and performed echocardiography. Correlations were assessed by Spearman's correlation coefficient (rs).

Results: We found elevated levels of IL-6 in 70.5% anemic patients and 34.4% non-anemic patients. There were no significant correlations between serum concentration of IL-6 and the following parameters: age, body mass index, total cholesterol level, urinary albumin excretion and echocardiographic data (end-diastolic dimension, end-systolic dimension, thickness of interventricular septum and posterior wall of left ventricular, ejection fraction, left ventricular mass index). In the meantime, serum level of IL-6 had negative correlations with hemoglobin level (rs = -0.301, p = 0.001) and GFR (rs = -0.238, p = 0.013) and a positive correlation with serum urea level (rs = 0.326, p = 0.010).

Conclusions: The results of the study suggest that serum concentration of IL-6 correlates with hemoglobin level and renal function but not with echocardiographic parameters in patients with early stages of diabetic nephropathy.

PP.LB01.09

CLINICAL PROFILE, TREATMENT AND CONTROL RATES OF ARTERIAL HYPERTENSION IN PRIMARY CARE IN MADEIRA ISLAND. THE CONTROLRAM STUDY

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Objective: Evaluate the clinical profile of hypertensive patients, hypertension management and BP control rates in primary care setting in the Portuguese Autonomous Region of Madeira Island and compare the results for the same variables from the Portugal mainland (Conta Study 2011).

Design and method: Prospective, cross-sectional and multicenter study approved by the local and national authorities and the Ethics Committee. A total of 69 general practitioners (of a total of 141 working on the island) at 23 primary care centers participated in the study. Investigators and centers involved were chosen to be representative of the whole public health system of the island.

Each investigator was asked to include all the patients who attended the primary care consultation during the last two weeks of December 2014 and met the inclusion criteria: 1) patients of both sexes; at least 18 years old, 2) with an established diagnosis of hypertension and 3) treated for hypertension during at least 3 months previous to the inclusion. Before inclusion, every recruited patient gave a written informed consent. The biodemographic data, cardiovascular (CV) risk factors, target organ damage, history of cardiovascular disease (CVD), and individual global CV risk were defined according to the 2013 European Guidelines. The presence of subclinical organ damage, CVD and the actual antihypertensive treatment (type and number of drugs) were recorded from the patient's clinical registries. In every patient, arterial blood pressure (BP) was measured at 2 distinct moments on the same day by a doctor and a nurse (3 measurements each).

Results: A total of 961 hypertensive patients were included for the final analyses. The main clinical characteristics of the study population according to sex are shown in Table 1.

	Control RAM Study - 2014				Conta Study - 2011			
	Men N=463 (37.8%)	Women N=598 (62.2%)	p (men vs women)	Total N=961	p (Control RAM vs Conta)	Total N=890	Men N=491 (43.9%)	Women N=499 (56.1%)
Mean age (years)	62.9 ± 11.0	65.1 ± 11.5	p < 0.05	64.3 ± 11.4	ns	64.3 ± 12.0	62.9 ± 11.4	65.5 ± 12.3
BP control rate	40.5%	57.2%	p < 0.05	50.9%	p < 0.05	46.5%	43.5%	48.9%
SBP (mmHg)	142.5 ± 18.3	138.0 ± 18.3	p < 0.05	139.7 ± 18.4	ns	141.0 ± 18.3	141.2 ± 17.0	140.8 ± 19.3
DBP (mmHg)	79.0 ± 11.4	77.1 ± 11.7	p < 0.05	77.9 ± 11.6	ns	78.6 ± 11.0	78.9 ± 10.7	78.4 ± 11.2
Weight (Kg)	80.4 ± 13.4	72.8 ± 14.5	p < 0.05	75.6 ± 14.5	ns	76.0 ± 14.4	81.6 ± 13.8	71.6 ± 11.2
Height (cm)	168.0 ± 6.8	156.2 ± 6.1	p < 0.05	160.6 ± 6.6	p < 0.05	162.1 ± 9.1	168.8 ± 6.9	156.7 ± 6.7
BMI	28.4 ± 4.1	29.7 ± 5.8	p < 0.05	29.2 ± 5.3	ns	28.9 ± 4.7	28.6 ± 4.2	29.2 ± 5.0
Diabetes (%)	27.3%	29.8%	ns	28.8%	ns	28.3%	31.7%	25.7%
Dyslipidemia (%)	63.6%	65.8%	ns	64.7%	ns	64.7%	64.7%	64.7%
CAD	11.8%	9.2%	p < 0.05	10.2%	p < 0.05	8.2%	10.2%	6.6%
Stroke	10.1%	8.0%	ns	9.1%	ns	9.1%	9.7%	8.6%
PAD	3.6%	2.0%	ns	2.7%	ns	2.6%	3.8%	1.6%
Low risk	17.9%	17.6%	ns	17.7%	p < 0.05	22.7%	17.7%	26.6%
Moderate risk	22.6%	33.1%	p < 0.05	29.1%	ns	28.3%	25.9%	30.2%
High risk	36.6%	28.1%	p < 0.05	39.3%	p < 0.05	27.6%	31.5%	24.5%
Very high risk	22.9%	21.2%	ns	21.9%	ns	21.4%	24.9%	18.7%
0 drugs	1.4%	3.0%	p < 0.05	2.4%	ns	3.6%	3.3%	3.8%
1 drug	25.1%	23.4%	ns	24.0%	p < 0.05	30.1%	32.3%	28.3%
2 drugs	42.1%	45.8%	ns	44.4%	ns	45.8%	44.8%	46.7%
3 drugs	26.4%	22.9%	ns	24.2%	p < 0.05	15.2%	14.6%	15.6%
4 or more drugs	3.0%	4.8%	ns	4.9%	ns	3.3%	4.9%	3.6%
FDC	55.1%	55.7%	ns	55.5%	p < 0.05	49.7%	47.3%	51.5%
BP control: 3 drugs	6.9%	11.4%	p < 0.05	9.7%	ns	8.4%	7.4%	9.2%
BP control: FDC (only)	52.3%	63.3%	p < 0.05	55.6%	ns	59.4%	55.2%	55.9%

FDC – fixed dose combination

Conclusions: Global cardiovascular risk of hypertensive patients in primary care in Madeira Island is worse than in Portugal mainland but, globally, the BP control rate is better. There are important differences between gender with men showing higher CV risk and worse BP control rate. The identification of the factors responsible for such differences is needed to implement specific prevention and treatment policies.

PP.LB01.10

WHAT IS THE IMPACT TO A CARDIOVASCULAR HEALTH PROGRAMME IN PRIMARY CARE IN PATIENTS BEFORE SUFFERING AN ACUTE MYOCARDIAL INFARCTION OR A STROKE?

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Objective: The Cardiovascular Health Program (CHP) is an important strategy of the Chilean Ministry of Health to reduce morbidity and mortality associated with cardiovascular diseases. However, the coverage and impact of this program have not been tested in our area. The aim of this study was to determine the adherence to this program at Primary Health Care (PHC), evaluating whether patients who consulted for acute myocardial infarction (AMI) or Stroke, were in control in CHP before the cardiovascular event.

Design and method: Transversal descriptive study of patients (pts) admitted to the Emergency Unit of our area for AMI or Stroke from January 2012 to December 2013. From the Civil Registry Service we obtained information about death up to June 2014. Data collected were processed with STATA 11.1 statistical software.

Results: A cardiovascular event occurred in 397 pts, 225 Stroke (57%) and 172 AMI (43%); 232 were male (58%). Women had a higher proportion of Stroke (62% of events), whereas in men the proportion of AMI and Stroke was similar. A total of 185 pts (46.6%) were enrolled in our CHP at PHC, and 212 pts were not enrolled. Of the 185 enrolled, 147 were in regular control and 38 did not attend after enrollment.

Up to June 2014, 61 (33%) of the enrolled pts died (Stroke 38/AMI 23), in contrast 110 (52%) of not enrolled died (Stroke 79/AMI 31; $p < 0.001$). In the group of enrolled pts, those in regular control had 21% (31/147) vs 79% (30/38) of mortality in enrolled but not adherent to control was significant ($p < 0.01$). The scope of control targets for hypertension, diabetes and dyslipidemia in the pts enrolled was achieved more successfully in those > 65 years.

Conclusions: Patients enrolled and adherent to the CHP at The East Metropolitan Health Service are only about one third of patients (147/397). Since they had the lowest death rate, an effort has to be done to improve participation in prevention programs. Access to health care and education of these groups appear to be strategies to add strongly to the ministerial program.

PP.LB01.11 EFFECT OF HYPERTENSION ON LEFT VENTRICULAR WALL SIZE IN LAGOS NIGERIA

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Objective: The rising prevalence of hypertension in Nigerian may account for increase in rate of cardiac disease, most often associated with left ventricular hypertrophy, an end point measure of cardiac end organ damage.

Design and method: One hundred and eighty consecutive patient including 108 men and 72 woman of mean age 53.2 of plus or minus years were clinically evaluated by measurement of systolic and diastolic blood pressure using mercury sphygmomanometer. the blood pressure were classified according to the seventh joint national committee the left ventricular heart was determine by measurement of left ventricular posterior wall thickness using two dimensional echocardiography of a color flow echocardiography device.

Results: Patient with normal blood pressure 114.7 plus or minus 11.7 mmhg, DBP 69.4 plus or minus 3 mmhg were $n = 17$, the LVPWT = 14.12 plus or minus 2.74 mm. patient with pre hypertension (SBP = 133.8 plus or minus 18.5 mmhg, DBP = 80.1 plus or minus 0.85 mmhg) were $n = 33$, LVPWT = 15.4 plus or minus 2.74 mm. patient with stage 1 hypertension (SBP = 144 plus or minus 13.9 mmhg, DBP = 90.1 plus or minus 0.9 mmhg) were $n = 59$, LVPWT = 15.2 plus or minus 2.6 mm. patient with stage 2 hypertension (SBP = 159.6 plus or minus 20.6 mmhg, DBP = 106.7 plus or minus 10.4 mmhg) were $n = 71$ LVPWT = 16.67 plus or minus 3.5 mm. Analysis of variance revealed significant different in SBP $F(3,176) = 217.7, P < 0/0001$ and LVPWT $F(3,176) = 4.66, P < 0.01$

Conclusions: The LVPWT at pre hypertension did not significantly ($p > 0.05$) with the LVPWT of hypertension stage 1. this may therefore suggest that the based on cardiac end organ damage estimated by end point of LVH Lagos Nigeria, the distinction between pre-hypertension and hypertension stage 1, may not be a useful distinction, rather therapeutic intervention should be started early in Lagos Nigeria. hypertension in Lagos may account for the rising level of heart disease due to the effect of blood pressure on left ventricular hypertrophy. An effective strategy toward reduction in the prevalence of heart disease in Lagos Nigeria must take into account effective blood pressure control.

PP.LB01.12 ADHERENCE PATTERNS OF PHYSICIAN'S PRESCRIPTIONS FOR PATIENTS WITH CHRONIC HEART FAILURE ON BASE OF HYPERTENSION AND CORONARY ARTERY DISEASE IN UKRAINE

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Objective: CHF is the inevitable outcome of all cardiovascular disease as CAD and AH. The morbidity of CHF is only 3.1 %, but at age more than 70 years, it is above 10 %. The treatment of CHF due to CAD and AH should include as first-line therapy beta-blockers or ivabradine, ACE inhibitors or ARBs with diuretics, nitrates with hydralazine (for African Americans). Amlodipine could be reserve drug in contraindications of beta-blockers or ivabradine. The additional treatment should include Aldosterone antagonists, non-dihydropyridine CCBs or Amiodarone, Digoxin as 'therapy of despair'. Aspirin, Statins, Omega-3 polyunsaturated acids.

The purpose of our research was to analyze practical doctor's prescriptions for patients with CHF on base of CAD and AH.

Design and method: We have studied 57 case history of patient with CHF, CAD and AH from one of therapeutic hospital in Ukraine. Doctor's prescriptions were analyzed according to modern guidelines. There are no cases of African patients.

Results: Beta-blockers were prescribed to 41 patients (71.92 %), in 2 cases (3.51 %) it was non-selective one. ACE inhibitors were prescribed to 33 patients (57.89 %), ARBs to 22 (38.60 %), diuretics to 20 (35.09 %), nitrates to 6 (10.53 %), Hydralasin to no one. Dihydropyridine CCBs were in 5 cases (8.77 %), 3 of them (5.26 %) Amlodipine and 2 (3.51 %) Nifedipine. Non-dihydropyridine CCBs (Verapamil) were met in 2 cases (3.51 %). Cardiac glycoside have received 5 patients (8.77 %), 3 of them (5.26 %) digoxin, and rest sol. Corgliconi. ASA were prescribed to

40 patients (70.17 %), Statins only to 2 persons (3.51 %). Ivabradine, Amiodarone, Omega-3 polyunsaturated acids doctors have not prescribed. Patients have received 5.83 ± 1.02 drugs for treatment of CHF in average. But, there were metabolic, sedative, other drugs in case history, that were increased the number of prescriptions till 10.10 ± 2.16 .

Conclusions: The therapy of particular patient with CHF on base of CAD and AH should minimizing the amount of prescription drugs through the correct use of clinical pharmacological aspects of active ingredients, avoiding prescription drugs that are contraindicated in this case.

PP.LB01.13 COMPARISON OF MORTALITY RATE IN SIGNIFY, BRITISH REGIONAL HEART STUDY AND REACH

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Objective: The aim of our study was to reveal possible specific contribution of ivabradine induced heart rate reduction (HRR) to mortality rate in patients with CAD.

Design and method: Results from 3 studies with relatively similar population and medications were used for comparison.

Results: SIGNIFY study-Patients(pts) with CCS class II or higher angina ($n = 12,049$), on ivabradine - 6,037, on placebo 6,012 pts. All cause death (ACD), cardiovascular death (CVD), coronary death (CD) in pts with angina class II or higher on ivabradine vs placebo (325 (5.4%) vs 288 (4.8%); 245 (4.1%) vs 210 (3.5%); 199 (3.3%) vs 182 (3.0%) relatively). Pts with no angina or CCS class I ($n = 7053$), on ivabradine-3513, on placebo 3540. ACD, CVD, CD (160 (4.6%) vs 170 (4.8%); 84 (2.4%) vs 91 (2.6%); 64 (1.8%) vs 67 (1.9%). Sudden cardiac death (SCD) on ivabradine 201 vs 202 (2.1%) from total 19102 pts.

The British Regional Heart Study (follow-up period 8 year), total 7735 men. Age adjusted rate for mortality from Ischemic heart disease (IHD) mortality and sudden death (SD) in pts with pre-existing IHD with heart rate (HR) < 60 beats per minute, 60-69, 70-79, 80-89 and > 90 b.p.m (18(6.1%), 7(2.4%); 36(8.0%), 23(4.9%); 32(8.6%), 19(5.0%); 15 (6.3%), 11 (4.6%); 23 (14.4%), 11 (6.8%) relatively).

REACH (Reduction of Atherothrombosis for Continued Health) registry, median follow-up 44 month. I cohort- 14043(3379 with b-blockers use, 3379 without b-blockers) pts with known prior myocardial infarction (MI), II cohort -12012(3599 with b-blockers use, 3599 without) pts with known coronary artery disease (CAD) without prior MI, III cohort -18653 (3952 with b-blockers use, 3952 without) with CAD risk factors only. Cardiovascular death in pts with b-blocker use in comparison to CVD in pts without b-blockers use: in I cohort - 9,68 % vs 10,27%; in II cohort - 5,9% vs 6,97%; 6,41% vs 6,4%.

Conclusions: Despite of differences of studies, heterogeneity of studies population, different statistical approach, taking into account years trials took place, pts with CAD either on b-blockers or ivabradine have low mortality rate and, possibly, relatively high mortality rate on ivabradine induced HRR vs placebo in SIGNIFY not specific. Possibly, we have to determine j-curve, tailored for each patient.

PP.LB01.14 CENTRAL ARTERIOVENOUS ANASTOMOSIS FOR PATIENTS WITH UNCONTROLLED HYPERTENSION (THE ROX CONTROL HTN STUDY). A RANDOMISED CONTROLLED TRIAL. DATA FROM THE HOME BP SUBSTUDY

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Objective: We previously demonstrated the safety and effectiveness of a fixed caliber 4 mm central iliac arteriovenous (AV) anastomosis to reduce clinic and ambulatory blood pressure (BP) in patients with uncontrolled hypertension (Lobo et al, Lancet 2015). We now describe the effect on home BP of this novel therapy.

Table 1	Controls	AV coupler	p value
N	27	29	
	SBP/DBP	SBP/DBP	
Baseline	160.2/96.6	157.7/95.1	NS/NS
1 month visit	161.6/96.3	145.2/83.2	0.0003/0.0002
3 month visit	164.1/98.7	146.5/83.7	0.0009/0.0001
6 month visit	164.5/99.5	147.9/83.5	0.0038/0.0002

Design and method: ROX Control HTN was a multicentre, prospective, randomised trial in which patients with uncontrolled hypertension were randomly allocated in a one-to-one ratio to undergo implantation of an AV coupler device with previous treatment, or to maintain previous treatment alone (control group). As part of the study protocol patients were invited to monitor their home BP in accordance with guidelines.

Results: Eighty-three patients were randomly allocated to AV coupler therapy or control groups. Data on fifty six patients is presented here (27 controls and 29 AV coupler patients) with data available from each visit. At one month home BP measurements reduced by 12.5/11.9 mmHg in the AV coupler group, and by -1.4/0.3 in the control group (net paired group difference $p < 0.0001$). Table 1 demonstrates follow-up visit BP results.

Conclusions: There was an early and sustained reduction in home BP following central iliac AV anastomosis therapy compared to control patients receiving pharmacotherapy. These findings suggest an approach targeting mechanical aspects of the circulation might provide valuable adjunctive antihypertensive therapy along with drugs and device-based sympathomodulation.

PP.LB01.15 HTA AND ITS IMPORTANCE IN RISK SCALES NSTEMI

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Objective: To analyze the clinical characteristics, serum biomarkers, functional classification, hemodynamic, treatment, prognosis, complications and mortality in a cohort of patients with acute coronary syndrome without ST elevation (NSTEMI) admitted to the ICU and compare them of a cohort of patients with NSTEMI admitted to an inpatient unit.

Design and method: Descriptive analysis of 1,380 patients diagnosed with acute coronary syndrome between January 1, 2013 and December 31, 2014, divided into two groups (patients admitted to the ICU and patients admitted to the inpatient unit). Patients were indexed to two risk (TIMI and GRACE) and the following parameters on admission were recorded: age, sex, cardiovascular risk factors HTA, previous history of HF, Killip class, stroke, ST segment depression, negative T waves in the ECG, previous surgical revascularization and elevated markers of myocardial damage; echocardiographic findings and serum biomarkers at the time of diagnosis (troponin T, proBNP, D-dimer, LDH and creatinine levels).

Results: Table 1.

	UCC/UCI	Hospitalización	p
Edad (años)	64.3 (15.4)	73.6 (13.2)	0.012*
Sexo(hombre/Mujer)	60/90	570/660	0.642**
HTA (si/no)	60/90	120/1110	0.005**
Clase Killip I-II/III-IV	10/140	700/520	<0.001**
Historia previa IC (Si/no)	20/90	50/1140	0.108**
TIMI Alto riesgo (5,6,7)	560 (34)	46 (20)	0.408***
NT ProBNP	433 (7808)	1023 (3330)	0.376***
GRACE alto riesgo (141/312)	4.45 (0.32)	4.2 (1.65)	0.075***
I-Troponina	0.1 (0.12)	0.01 (0.05)	0.002***
Inestabilidad hemodinámica (si/no)	6/8	8/112	<0.001**
Coronarografía urgente (si/no)	60/80	0/1240	<0.001**
Exitus (si/no)	10/140	110/1060	1**

*t Student; **Chi2 Pearson/Fisher's exact test; *** Mann Whitney

Conclusions: In our sample, patients with NSTEMI admitted to CCU / ICU were found to be younger, have cardiovascular risk factors (hypertension, diabetes, dyslipidemia) more often and were classified as high risk according to the GRACE and TIMI scales. These patients hemodynamic instability and increased certain serum biomarkers such as troponin T. Nonetheless, no significant differences in mortality. The systematic application of risk scales can help the individual management of each patient to provide the best treatment available.

PP.LB01.16 INCREASED SBP AND PP PORTEND INCREASED RISK OF MICROALBUMINURIA IN HYPERTENSIVE ADULTS

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Objective: To evaluate the relationship between systolic blood pressure (SBP), pulse pressure (PP) and microalbuminuria (MAU) in hypertensive adults.

Design and method: Observational study was performed and totally 1858 adults with newly-diagnosed essential hypertension but without previous anti-hypertensive therapy were enrolled. According to the definition of MAU (30–300 mg/24h), 1858 participants were divided into two groups named the MAU (n=967) and normo-albuminuria (n=891) groups. Baseline characteristics were evaluated and compared, and then logistic regression analyses and receiver operating characteristic curve (ROC) were performed.

Results: Notably, the differences of 24 hours of albumin excretion between the normo-albuminuria (17.6 + 7.1 mg/24h) and MAU (182.5 + 156.5 mg/24h) groups were significant ($P < 0.001$). In addition, other variables including SBP (141.6 + 15.9 mm Hg versus 144.6 + 18.4 mm Hg), fasting blood glucose (5.2 + 1.1 mmol/L versus 5.6 + 1.8 mmol/L), urine creatinine concentration (15.3 + 10.6 mg/L versus 16.7 + 11.9 mg/L), serum total protein level (71.5 + 5.9 g/L versus 72.1 + 5.7 g/L), and serum creatinine level (76.0 + 24.8 μ mol/L versus 79.9 + 40.7 μ mol/L) were also significant difference between the normo-albuminuria and MAU groups ($P < 0.05$). After adjusted for the traditional risk factors for MAU including age, body mass index, fasting blood glucose, low density lipoprotein, serum creatinine level and diastolic blood pressure, both the SBP and PP were still independently associated with MAU, and the odd ratios for SBP and PP were 1.010 (95 % interval confidence (CI) 1.005–1.016, $P < 0.001$) and 1.009 (95% CI 1.003–1.015, $P = 0.003$), respectively. The ROC evaluations showed that area under the curve for SBP to predict MAU was 0.541 ± 0.013 ($P = 0.02$), and PP was 0.536 ± 0.013 ($P = 0.07$), which suggested that with respect to the sensitivity and specificity of evaluating the incidence of MAU in newly-diagnosed hypertensive adults, PP was as effective as SBP.

Conclusions: Collectively, present research indicates that increased SBP and PP portend increased risk of early impaired renal function as reflected in MAU in newly-diagnosed hypertensive adults.

PP.LB01.17 FIRST STEPS TO DEVELOP A CARDIOVASCULAR RISK ASSESSMENT EQUATION IN SPANISH YOUNG, WORKING POPULATION. THE IBERSCORE PROJECT

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Objective: To compare cardiovascular risk factors (CVRF) and SCORE charts, in workers who experienced or not a first cardiovascular event.

Design and method: This prospective study was part of the IBERSCORE project, aimed to develop a CVR predictive equation in Spanish working population. 5-years follow-up was carried-out in a cohort of 627,253 workers, selected between 2004–2006, without prior cardiovascular disease. Demographic, anthropometric, cardiovascular, work-related risk factors, information about treatments, and blood samples were recorded. CVR was stratified according to the SCORE model and the current Joint European Societies' guidelines (JESG) on cardiovascular disease prevention and the prevalence of CVRF. Episodes of sick leave for cardiovascular events and fatal events were also registered, during follow-up.

Results: 71.7% of participants were men (mean age 35.7 ± 10.7 years). 5.5% of subjects had high CVR (n=30,125). Prevalences of workers with CVRF were: smoking (48.9%); hypertension (21.0%); type 2 (1.0%) or type 1 (0.3%) diabetes; metabolic syndrome (8.0%); atherogenic dyslipidemia (5.4%). An average prevalence of 15.7% (SD = 16.7) for sedentary work, 6.6% (SD = 9) for shift work, and an average score of 60.4 (SD = 3.4) in a psychosocial score (0–100 points), were also estimated. Over five years 1,785 workers (0.3%) suffered a cardiovascular event (1,080 coronary heart diseases, 471 cerebrovascular diseases, 185 peripheral artery diseases, 49 heart failures). 10 of those events (0.6%) were fatal. According to current JESG on cardiovascular disease prevention, the distribution by CVR levels was: 16.1% very high (260); 12.0% high (192); 41.0% moderate (660); 31.0% low (500). From those with low CVR, 62 (3.5%) had a relative risk >4. SCORE $\geq 5\%$ affected 13.3% of the subjects with cardiovascular event.

Conclusions: As expected, the incidence of CV events in our cohort was low. Estimated high or very high CVR was present in a low percentage of workers when they really suffered CV events. There is an urgent need of more specific tools focussing on the particular risk profile of the working population (e.g. younger age or exposure to psychosocial risk factors at work).

PP.LB01.18 THE INFLUENCE OF PREGNANCY HYPERTENSION IN THE ENLARGEMENT OF LEFT ATRIUM

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Objective: There are many studies that evaluation the risk associated with increase LA volume but echocardiographic criteria aren't completely in pregnancy hypertension.

Design and method: To study whether a temporary condition as enlargement of left atrium is a marker of the severity and chronicity of diastolic dysfunction in pregnancy hypertension. We studied 250 women of the age 29.27(+ 7.29), 34.50(±5.21) week of pregnancy, who had previously been healthy. Left atrium volume, left ventricular geometry, dimensions and function were compared between groups using echocardiography. The LA size is measured at the end-ventricular systole when the LA chamber is at its greatest dimension.

Results: To study whether a temporary condition as enlargement of left atrium is a marker of the severity and chronicity of diastolic dysfunction in pregnancy hypertension. We studied 250 women of the age 29.27(+ 7.29), 34.50(±5.21) week of pregnancy, who had previously been healthy. Left atrium volume, left ventricular geometry, dimensions and function were compared between groups using echocardiography. Results; From the analysis of echocardiographic data resulted that women with hypertension during pregnancy had significant altered diastolic function compared to normotensive. Preeclampsia as well as pregnancy hypertension had increased dimension and volume of the left atrium had, increased LVMi with the abnormal geometric pattern of Eccentric hypertrophy, increased diastolic dysfunction, when compared with subjects with normal LV geometry. We found LA volume; (42.32 ± 7.9 ml), LV end-diastolic; (167.04 ± 28.53 ml) and end-systolic volume; (67.88 ± 16.85 ml), increased during hypertensive pregnancy to normotensive (37.00 ± 4.1, p < 0.001), (151.39 ± 15.64; and 58.36 ± 9.23; p < 0.001. The significant statistical relation was found between LA volume and Geometric Remodulation as well as Diastolic Dysfunction. The presence of geometric remodulation results in increase of LAV. (r = 0.215, p = 0.001). The increase of LAV results in increase of Diastolic Dysfunction. (r = 0.267, p < 0.001).

Conclusions: The data of this study found that, LA volume measurements should become a routine measure during pregnancy because they reflect the burden and chronicity of elevated LV filling pressure and are a strong predictor of future cardiovascular risk in these women.

PP.LB01.19 SUBCLINICAL CAROTID ATHEROSCLEROSIS IS ASSOCIATED WITH ALTERATIONS OF TIME-DOMAIN INDICES OF HEART RATE VARIABILITY

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Objective: Patients with atherosclerotic carotid disease usually do not present clinically overt signs of orthostatic dysregulation. In the present study we aimed at investigating if the presence of atherosclerotic plaque in the carotid sinus may alter baroreceptor function and thus heart rate variability (HRV) time-domain indices of autonomic tone and baroreflex sensitivity.

Design and method: This was a cross-sectional study. We evaluated ECG R-R intervals in asymptomatic patients with carotid disease with an intima-media thickening (IMT) more than 0.8 mm. The atherosclerotic artery IMT was determined by B-mode and duplex ultrasonography. Baroreflex sensitivity and autonomic tone were determined through time-domain measures of HRV.

Results: Of all time-domain measures of HRV investigated, we identified significant negative linear correlations between the common carotid artery IMT and time-domain HRV indexes reflecting baroreflex and autonomic tone: SDNN (standard deviation of R-R intervals), Spearman's r = -0.57, 95% CI: -0.78 to -0.25, P = 0.001; HRV triangular index (number of all R-R intervals / maximum number), Spearman's r = -0.62, 95% CI: -0.80 to -0.33, P = 0.0002; TINN (triangular interpolation of R-R intervals), Spearman's r = -0.59, 95% CI: -0.78 to -0.28, P = 0.0006. Similar strong negative correlations were found for subclavian IMT.

Conclusions: Our data indicate that the SDNN, triangular index and TINN HRV biomarkers may be early predictors of atherosclerotic carotid and subclavian in subjects at risk and may be an indicator for ultrasound evaluation.

PP.LB01.20 PROSPECTIVE ASSESSMENT OF THE DIRECT RENIN AND ALDOSTERONE ASSAY IN THE WORK-UP OF ARTERIAL HYPERTENSION

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Objective: Secondary potentially curable forms of arterial hypertension are markedly under-diagnosed in clinical practice, partly because of the difficulties encountered in the diagnostic work-up. These difficulties can be overcome by novel assays that are simpler and faster, provided that they are accurate.

To prospectively assess the diagnostic performance of a commercially available assay for plasma direct renin (DRA) and aldosterone concentration (PAC) in a relatively large cohort of hypertensive patients consecutively referred to a tertiary referral academic centre.

Design and Methods: Based on prior sample size estimation, we prospectively recruited 230 consecutive hypertensive patients referred for the work-up of arterial hypertension to the ESH Centre of Excellence for Hypertension of the University of Padua. The diagnosis of secondary HT was based on the "four corners of criteria" for primary aldosteronism, and on the outcome of renal revascularization for renovascular hypertension. Bland-Altman plots and Deming regression were used to assess the performance of the DRA/PAC combined assay as compared to the established previously validated PRA radioimmunoassay and the PAC ELISA assay.

Results: Among the 230 patients (45% Females; aged 45 ± 14yrs) 177 (77%) were found to have essential hypertension and the rest secondary HT: 19% PA, 1.7% renovascular hypertension, 0.9% Familial Hyperaldosteronism type 1 and 0.5% apparent mineralocorticoid excess. At Bland-Altman plot, the DRA assay showed an excellent performance as compared to the PRA assay, with only 4% of the values falling outside of the 95% confidence interval. Similar results were obtained for PAC measurement and also for ARR based on DRA or PRA. At Deming regression, the correlation coefficient between DRA and PRA was 0.920, at baseline, and 0.870 after captopril challenge (p < 0.0001 for both). Corresponding values were 0.909 and 0.869 (p < 0.001 for both) for PAC at baseline and after captopril. No significant differences of the area under the ROC curve between the DRA-based ARR and the ARR based on the established PAC and PRA assay was seen.

Conclusions: A novel automated combined PRA/PAC assays showed results similar to an established and clinically validated PRA/PAC assay and equivalent accuracy for the work-up of patients referred to a tertiary centre for the diagnosis of arterial hypertension.

PP.LB01.21 A PROPOSAL FOR THE IDEA OF A FLEXIBLE-COMBINATION POLYPILL IN ARTERIAL HYPERTENSION

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Objective: Modern pharmaceutical strategies in arterial hypertension, as well as in other fields, are directed toward two major apparently contrasting objectives: 1) simplification of treatment by grouping multiple drugs into single fixed-combination pharmaceutical units (including "polypill") to improve patient adherence, and 2: personalization of therapy to tailor treatments according to specific individual aspects including pharmacogenomics.

The combined fulfillment of these objectives would conceivably entail the unrealistic development of a very great variety of fixed-combination polypills, each different for drug composition and dosage.

An alternative view that could combine the need for both therapy simplification and personalization may be the concept of a flexible-combination polypill.

Design and Methods: In order to test this approach, we are devising a preliminary study aimed to assess the feasibility and efficacy of shifting individual patients' treatment from multiple daily administration (multi-administration) to a single once-a-day administration (mono-administration) of the same drugs.

After approval of Ethical Committee, a cross-over randomized study will be carried out for 24 weeks in 52 well controlled non complicated hypertensive outpatients under multiple therapy with at least one hypotensive drug and/or a statin and/or aspirin.

Each subject will remain for an 8 weeks period on multi-administration and for another 8 weeks period on mono-administration of the same therapy; the two periods will be separated by 8 weeks to avoid a carry-over effect and their sequence will be randomized.

Results: The study will provide information on the effects of mono-administration in comparison with multi-administration of the same drugs on adherence to treatment, adverse events, ambulatory blood pressure monitoring and lipid profile.

Conclusions: If results will be favorable, they could prompt large scale studies following the idea of a flexible-combination polypill and addressing the various regulatory and technological issues in the path for its realization and production systems.

PP.LB01.22 PATIENTS IN ACUTE PHASE OF ISCHEMIC STROKE HAVE SIGNIFICANTLY LOWER MICROVASCULAR RESPONSE TO THERMAL STIMULI COMPARING TO CONTROL GROUP

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Objective: The aim of this study was to assess endothelial function profile in subjects with acute ischemic stroke.

Design and method: There were 18 patients in acute phase of ischemic stroke enrolled to this study. Control group constituted n = 13 demographically-matched subjects hospitalized because of non-neurological diseases. Microvascular endothelial function assessment was performed by laser Doppler (Perimed, Järfälla, Sweden) at the first 24 hours from the onset of stroke and on the seventh day from the start of the research. Measurements of forearm cutaneous blood flow were recorded at baseline and during exposure to temperature 44 °C. Parallel, at baseline blood samples were obtained for complete blood count and basic biochemistry.

Results: Study group was characterized by lower mean platelet volume, lower high-density lipoprotein and potassium level, higher plasma glucose concentration. Excluding that both groups were homogenous regarding demographic and biochemical characteristics reflecting cardiovascular risk.

It was noted that the microvascular response to thermal stimuli was significantly lower in the study group comparing to the control group. The difference referred to both paretic and nonparetic limb. It persisted statistically important in the second examination after 7 days. There were no significant differences in study group between neither paretic and nonparetic limbs, nor between values observed at an interval of one week.

Conclusions: Microvascular dysfunction in reaction to thermal stimuli may reflect nerve or endothelial function impairment. As it is present in both disease-affected and nonparetic limb it is most likely systemic endothelial dysfunction, rather than direct expression of neurological dysfunction.

PP.LB01.23 ENDOTHELIAL FUNCTION IN PATIENTS WITH ISCHEMIC STROKE DEPENDS ON FOLIC ACID CONCENTRATION

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Objective: The aim of this study was to define the correlations between microvascular responsiveness and the results of basic biochemical laboratory tests.

Design and method: There were 19 patients in acute phase of ischemic stroke enrolled to this study. Microvascular endothelial function assessment was performed by laser Doppler (Perimed, Järfälla, Sweden) at the first 24 hours from the onset of stroke and on the seventh day from the beginning of study protocol. Measurements of the forearm cutaneous blood flow were recorded at baseline and during exposure to temperature 44 °C. Parallel, at baseline blood samples were obtained for basic biochemistry.

Results: Serum folic acid (FA) concentration is significantly and strongly positively correlated with the microvascular response to thermal stimuli one week after stroke symptoms onset. The relation in first 24 h was also positive, but statistically insignificant.

Conclusions: To our knowledge this is the first time to show that FA concentration influences vascular function in patients with stroke. Further studies are needed in order to define an exact role of folic acid supplementation in primary and secondary stroke prevention.

PP.LB01.24 HEART RATE VARIABILITY IN HYPERTENSIVE POSTMENOPAUSAL WOMEN

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Objective: To assess heart rate variability (HRV) parameters in hypertensive and normotensive postmenopausal women.

Indicator	Healthy controls (n=35)	Normotensive postmenopausal women (n=115)	Hypertensive postmenopausal women (n=88)
TP, ms ²	1864 [1221; 2348]	1050* [616; 1479]	761** [512; 961]
LF, ms ²	436 [362; 654]	245* [110; 373]	151** [71; 326]
HF, ms ²	588 [406; 729]	111* [64; 285]	85** [69; 250]
LF/HF, units	0,9 [0,8; 1,2]	1,25* [0,9; 2,31]	2,7** [2,3; 3,1]
SDNN, ms	185 [154; 202]	144* [122; 174]	127** [106; 139]
pNN50, %	21 [18; 27]	6* [3; 9]	3,5** [2; 6]
rMSSD, ms	60 [48; 74]	30* [22; 36]	25** [20; 35]

Statistically significant: * – compared with healthy controls (P<0,01); ** – compared with normotensive postmenopausal women (P<0,01).

Design and method: 203 women with surgical and natural menopause were included in the investigation: 115 normotensive women (average age 47,3 ± 5,4 years, menopause duration 4,8 ± 5,4 years) and 88 hypertensive patients (average age 43,2 ± 2,7 years, menopause duration 4,3 ± 2,1 years). 35 healthy women were included in the control group. Electrocardiogram was recorded in the supine position for 10 min. Spectral analysis included total power (TP), low and high frequencies (LF and HF) in absolute units. The LF/HF ratio was also calculated. All patients underwent ambulatory blood pressure and electrocardiogram monitoring (Cardiotens-01, Meditech, Hungary). Time-domain HRV parameters evaluated were the standard deviation of all normal RR intervals (SDNN), the root mean square of differences between adjacent R-R intervals (rMSSD) and the percentage of adjacent R-R intervals that varied by more than 50 ms (pNN50). Statistical methods such as Cruskell-Walles and Dan criteria were used.

Results: TP, LF, and HF were significantly reduced in all postmenopausal women compared with healthy controls. SDNN, rMSSD and pNN50 were also significantly reduced in all postmenopausal women compared with healthy controls. All above indicators were significantly reduced in hypertensive postmenopausal women in compared with normotensive ones. LF/HF ratio was 2,2 times higher in hypertensive postmenopausal than in healthy women and it was 54% more than in normotensive postmenopausal women. This fact testifies about increased cardiac sympathetic modulation in postmenopausal women, especially in hypertensive ones.

Conclusions: Decreased HRV at simultaneous signs of a sympathetic overactivity can reflect increased cardiovascular risk at postmenopausal (in particular hypertensive) women.

PP.LB01.25 PHARMACOKINETIC PARAMETERS OF FIMASARTAN IN RUSSIAN PATIENTS WITH ARTERIAL HYPERTENSION

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Objective: Fimasartan, a novel potent angiotensin receptor blocker, was developed by Boryung Pharmaceutical. Co. Ltd in Korea. Considering that Korean patients were studied in pivotal clinical trials, determination of Fimasartan pharmacokinetic (PK) parameters in Russian patients was performed.

Design and method: Fifteen adult patients with arterial hypertension grade I-II in one investigational site took a single dose of Fimasartan 60 mg in fasted condition. Blood samples were collected pre-dose, 0,25; 0,5; 1; 1,5; 2; 2,5; 3; 4; 6; 8; 12 and 24 hours post-doses. Plasma concentration of Fimasartan was determined by validated method. Area under concentration-time curve from time zero to last time point (tlast) with measurable concentration (AUC0-tlast), AUC from time zero to infinity (AUC0-inf), percentage of AUC0-inf that is due to extrapolation from tlast to infinity (%AUCextrap), maximum observed concentration (Cmax), time to maximum observed concentration (tmax), apparent terminal elimination half-life (t1/2) were calculated. The results were compared to previously obtained PK data from Korean hypertensive patients and Caucasian healthy volunteers.

Results: Following oral administration Fimasartan was rapidly absorbed and after attainment of C_{max}, plasma concentrations of Fimasartan appeared to decline in a generally bi-phasic manner. Geometric means of Fimasartan PK parameters and geometric coefficients of variation (CV%) are summarized in Table 1.

Table 1. Fimasartan PK Parameters in Russian Hypertensive Patients, n=15

Parameter	Result
AUC _{0-tlast} , ng·h/mL	412 (50.1%)
AUC _{0-∞} , ng·h/mL	446 (53.9%) ^a
%AUC _{extrap}	5.68 (66.1%) ^a
C _{max} , ng/mL	89.5 (86.8%)
t _{max} , h (median (min-max))	1.00 (0.5-4.0)
t _{1/2} , h	5.78 (18.0%) ^a

^a n = 13

Fimasartan 60 mg single dose PK parameters in fasted Russian to Korean hypertensive patients were similar: median t_{max} occurred approximately 1 h post-dose, ratios for C_{max}, AUC_{0-inf}, AUC_{0-tlast}, were 1.10, 0.95 and 0.91, respectively; in Caucasian healthy subjects, t_{max} occurred 2 hours later than in Russian patients and the ratio for peak exposure (C_{max}) was 1.35, total exposure for both populations was similar with AUC_{0-inf} ratio 1.05 and AUC_{0-tlast} ratio 1.08.

Conclusions: These findings considerably extended Fimasartan PK data and allowed to extrapolate results of earlier studies, including studies in Korean population, to Russian patients.