ANTIHYPERTENSIVE TREATMENT IN ROUTINE CLINICAL PRACTICE OF SPECIALIZED CARDIOLOGICAL CENTRE: SIX-YEAR TRENDS

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Objective: Guidelines describe algorithms on how to manage high blood pressure; however there is lack of information on true feasibility and impact on routine clinical practice. The main objective of this study was to assess prescribed in real life practice antihypertensive treatment and six-year trends in adult hypertensive patients referred to specialized cardiology clinic.

Design and method: Data included 68276 (24183 males and 43913 females) electronic records of patients, mean age 58.3 ± 13.8 years, referred due to uncontrolled hypertension (HTN). Descriptive statistics were used to estimate the means in gender, age [under 35 years (n = 4665), 35–49 (n = 9774), 50–65 (n = 29662), older than 65 (n = 24155)] years and antihypertensive drug classes (AHD) and severity of HTN [1 (n = 3973), 2 (n = 30629) and 3 degree (n = 20239)] subgroups. Linear regression was employed to determine the yearly trends. Age and gender-specific results were adjusted to Saint-Petersburg general population data for 6-years period and every studied year.

Results: The mean number of prescribed AHD per patients constituted 1.93. There was a 20.1% increase in mean number of AHD during 2010–2013 (R² = 0.99; p = 0.001) with subsequent decrease by 21.2% from 2013 till 2015 (R² = 0.98; p = 0.01), mostly due to subgroups with more severe HTN. The most frequently prescribed AHD classes were beta-blockers (BB; 30374 cases, 45%), angiotensin receptor blockers (ARB; 19474, 28%), calcium channel blockers (CCB; 17752, 26%), ACE inhibitors (ACEi; 15178, 22%). Monotherapy was prescribed up to 20% (13380) of patients, the top were ARB+CCB (15,1%) and ARB+BB (12,8%). Three-drugs combinations were taken by 19% (13407) of patients and 20% (13880) of patients, the top were ARB+CCB+ACEi (15,1%) and ARB+BB+ACEi (13,4%). Interesting- ly, women demand at least 2 AHD (2,03), while 13% of males used monotherapy mostly with ACEi (n = 1532) or ARB (n = 1499). There were no substantial yearly trends in AHD classes in overall population and specified subgroups.

Conclusions: Results demonstrated that real-life practice is sometimes far away from recommended pathways. This may be explained by a specific population of hypertensive patients referred to the centre with multiple concomitant cardiovascular and other diseases forcing to step away from optimal approach.

METABOLICALLY HEALTHY OBESITY AS A PART OF THE CARDIOMETABOLIC CONTINUUM

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Objective: Was used data from epidemiological survey ESSE-RF (Epidemiology of Cardiovascular Diseases and their Risk Factors in Regions of Russian Federation) including adult population at the age of 25–64 y.o. of 10 regions RF (n = 16936, including 64% females and 36% males): Volgorad, Vologda, Voronezh, Ivanovo, Krasnoyarsk, Orenburg, Samara, Tomsk, Tyumen and Northern Ossetia-Alania.

Design and method: Was used the systematic stratified multistage random sampling creating by the territorial principle of method by Keesh. Renal dysfunction was assessed on the basis of the calculation of glomerular filtration rate (GFR). GFR was conducted on the Chronic Kidney Disease Epidemiology Collaboration (GFR-EPI). Statistic data calculation was done with computer-based statistic software STATISTICA 10.0 and SPSS 14.0.

Results: Final analysis included 15570 persons. Arterial hypertension had 6820 (43.8%) respondents. The prevalence of obesity (BMI > 30 kg/m²) in patients with AH was 59%. Among the patients with arterial hypertension (AH) CKD (GFR < 60 ml/min/1.73 m²) was found 3 times more often than without 1.8% and 0.43% respectively, minor renal dysfunction (GFR 60–90 ml/min/1.73 m²) was twice higher in patients with AH (34.8%), than without (16.2%). Systolic blood pressure was significantly higher in hypertensive patients (152.6 ± 21.4 mmHg) with renal dysfunction (< 0.0001) than without (144.8 ± 17.9 mmHg). But diastolic blood pressure didn’t have differences. Patients with AH and obesity had minor renal dysfunction in 1,21 time more offer and CKD in 5,3 time more offer without AH and obesity (Tab. 1).

According multicariate analysis major risk factors associated with renal dysfunction (odds ratios) were hypercholesterolemia 1.92 (95% CI, 1.77–2.08), fasting hyperglycemia 1.63 (95% CI, 1.41–1.89) and systolic blood pressure 1.7 (95% CI, 1.56–1.88).
Conclusions: Study results showed high prevalence of renal dysfunction (26,5%) in the investigated Russian population, especially among patients with AH (36,6%). Obesity considerably enlarges the frequency of renal dysfunction, both at patients with AH, and without.

**PP.01.04 HEALTHY HEART AFRICA IN KENYA: EVALUATION OF PROGRAM IMPACT ON HEALTHCARE PROVIDERS’ KNOWLEDGE AND PROVISION OF CARE FOR HYPERTENSION**


**Taskforce, Bethesda, USA,** at patients with AH, and without.

### Objective:
Despite increased hypertension (HTN) prevalence in Africa, awareness, detection, and treatment remains universally low. The Healthy Heart Africa (HHA) program was developed with the goal of sustainably addressing multiple barriers to HTN care, including educating healthcare providers (HCPs) on HTN management/treatment. Here, we evaluate the impact of HHA on HCP knowledge and practice in Kenya over 12 months.

### Design and method:
HHA collaborated with local Kenyan organizations to develop/update HTN guidelines; provide training, equipment, and educational materials; and improve treatment availability. Among facilities chosen for inclusion, the evaluation used a sample of intervention facilities selected using stratified random sampling; matched comparison facilities were selected based on the implementing partner, location, and facility type. Facilities were surveyed at baseline and 12 months later. A difference-in-differences analysis was used to assess program effects by comparing outcomes from intervention and control facilities. HTN screening/treatment data were supplemental and abstracted from service delivery registers.

### Results:
The analysis included 66 intervention and 66 control facilities, consisting of dispensaries/clinics (55.9% and 67.2%, respectively), health centers (24.0% and 20.8%), and district/subdistrict hospitals (20.1% and 12.1%) (P = not significant for intervention vs control). At baseline, both groups did not differ significantly regarding HCP staff knowledge of HTN risk factors and management/treatment. Here, we evaluate the impact of HHA on HCP knowledge and practice in Kenya over 12 months.

### Discussion:
HHA improved HCPs knowledge of HTN risk factors and management/treatment. Here, we evaluate the impact of HHA on HCP knowledge and practice in Kenya over 12 months.

### Conclusion:
The average age of them [yrs]: 56 and 53 (p < 0.05). Following measurements were taken: BMI, total cholesterol (T chol), fasting plasma glucose and uric acid. Each patient was evaluated cardiovascular risk according to SCORE and Framingham scales. Statistical calculations were performed in the StatSoft Statistica 10. The t-student test was used for the statistical analysis, p Spearmann was taken to analyze the correlation of statistically significant values.

### 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 and uric acid level than men.
- In normotensive group women were characterized by lower uric acid level than men. In both groups women were characterized by lower cardiovascular risk according to SCORE and Framingham scales. In hypertensive group there were significant positive correlations between: uric acid and SCORE scale [p= 0.023] (*) [r = 0.32] moreover between uric acid and Framingham scale [p = 0.007] (***) [r = 0.37]. In normotensive group there were significant positive correlations between: uric acid and SCORE scale [p = 0.006] (***) [r = 0.38] moreover between uric acid and Framingham scale [p = 0.018] (**) [r = 0.33].

### Conclusions:
1. Men without stenosis in coronary angiography with and without hypertension were characterized by worse metabolic profile than women. 2. Men were characterized by higher cardiovascular risk according to SCORE and Framingham scales than women. 3. Uric acid was correlated with cardiovascular risk in both groups regardless the presence or absence of hypertension.

**PP.01.05 URIC ACID AND OTHER METABOLIC PARAMETERS AS THE CARDIOVASCULAR RISK FACTORS IN PATIENTS WITH AND WITHOUT HYPERTENSION**

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### Objective:
Assessment of metabolic profile and their impact on cardiovascular risk in women and men with and without hypertension who didn’t have coronary artery stenosis in the angiography.

### 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). Following measurements were taken: BMI, total cholesterol (T chol), fasting plasma glucose and uric acid. Each patient was evaluated cardiovascular risk according to SCORE and Framingham scales.
- Statistical calculations were performed in the StatSoft Statistica 10. The t-student test was used for the statistical analysis, p Spearmann was taken to analyze the correlation of statistically significant values.

### 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 and uric acid level than men.
- In normotensive group women were characterized by lower uric acid level than men. In both groups women were characterized by lower cardiovascular risk according to SCORE and Framingham scales. In hypertensive group there were significant positive correlations between: uric acid and SCORE scale [p= 0.023] (*) [r = 0.32] moreover between uric acid and Framingham scale [p = 0.007] (***) [r = 0.37]. In normotensive group there were significant positive correlations between: uric acid and SCORE scale [p = 0.006] (***) [r = 0.38] moreover between uric acid and Framingham scale [p = 0.018] (**) [r = 0.33].

### Conclusions:
1. Men without stenosis in coronary angiography with and without hypertension were characterized by worse metabolic profile than women. 2. Men were characterized by higher cardiovascular risk according to SCORE and Framingham scales than women. 3. Uric acid was correlated with cardiovascular risk in both groups regardless the presence or absence of hypertension.
Design and method: We analyzed and compared the data of 525 hypertensive patients divided in active group (92.4%), deceased group 31 (5.9%) and 1.7% lost to follow-up group at the end of the study.

Results: Mean age 62.06 ± 12.303 years, no significant differences (p = 0.28) among the gender distribution or by the origin (p = 0.09) in 21.1% smokers, 42.28% patients with hypercholesterolemia, and 35.23% with hypertriglyceridemia.

Risk factors: obesity, smoking/non-smoking status, hypercholesterolemia, hypertriglyceridemia, mixed dyslipidemia and diabetes, were analyzed, with no statistical significance (p > 0.05) for the prevalence of these risk factors in urban versus rural area, between the active and deceased group. In smoker versus non-smoker, we identified a p = 0.03 for active hypertensive patients in the urban area. Obesity was associated with statistically significant (p = 0.02) CV risk stratification of high and very high risk. In the same two analyzed groups, the presence of different concomitant CV risk factors was not statistically significant (p = 0.17); 50.7% of patients had at least 2 concomitant risk factors associated with hypertension. In the active hypertensive group, 30% of urban area, presents one CV risk factor versus 41.2% in rural area, but in the urban hypertensive patients there is a progressive increase in the percentage of patients presenting a higher number of different concomitant risk factors associated with hypertension, compared to rural areas. 52.1% of active hypertensive patients in urban area have more than two CV risk factors concurrently with hypertension. In rural area, for patients in the active group, the association of least three different CV risk factors concurrently with hypertension was found in 17.7% patients.

Conclusions: Dyslipidemia in hypertensive patients, represent a modifiable risk factor to reinforce the control strategies for, irrespective of urban or rural area. It is emphasized the importance for an individual cardiovascular risk assessment for each hypertensive patient.

Design and method: Between January 2015 and September 2016, 742 general practitioners in Belgium and Luxembourg retrospectively collected data from 8006 consecutive hypertensive patients recently seen in their routine practice and taking at least two antihypertensive drugs.

Results: Patients (mean age 67.2 ± 22 years [SD], 54% men, 37% with diabetes mellitus, 37% with a previous cardiovascular event) were treated with two (n = 4549), three (n = 2470) or more than three (n = 987) antihypertensive drugs. Combinations were free (n = 2089), single-pill (n = 2713) or mixed (n = 2204) (93 missing data). Blood pressure was 141±2/11±11 mm Hg (mean ± SD). According to the 2013 ESH/ESC Guidelines, control rates were: systolic BP 47%, diastolic BP 70%, and both systolic and diastolic BP 42%. Estimation by the GPs of both systolic and diastolic BP control rate was 61%. Actual control rates were comparable whatever the type of combination. Blood pressure control was better in patients with low cardiovascular risk compared to patients with high risk (respectively 43% vs 33% for systolic BP control and 63% vs 47% for diastolic BP control). Patients treated with single-pill combinations were younger and had a low cardiovascular risk. In 54% (n = 4361) of the patients, physicians considered to prescribe a single-pill combination. In 1452 (18%) patients, they were willing to switch to a single-pill 3-drug combination. Reasons were improved adherence (71%) and better BP control (69%).

Conclusions: In patients requiring at least two antihypertensive drugs, BP control rate remains low and is overestimated by GPs. Free combinations remain largely used although many GPs seem prone to switch free to single-pill combinations. Treatment simplification could improve adherence and BP control rate, which has in turn been shown to lead to reduced morbidity and mortality.
Objective: Despite the high prevalence of hypertension in low-middle-income countries, awareness, treatment, and control rates are alarmingly low. As of 2015, 56% of Kenyans have never been screened for high blood pressure (BP); 8% of those living with hypertension are receiving treatment and 3% are controlled. The Healthy Heart Africa (HHA) program, initiated in Kenya, was developed to sustainably address barriers to hypertension care in Africa, including hypertension screening, linkage, and retention in care.

Design and method: HHA was designed to increase hypertension awareness, education, screening, and referral for primary care. Hypertension awareness and education was promoted at outreach events (health fairs, health promoters visiting communities/homes, and awareness-building activities). Healthcare providers at participating HHA facilities received training materials/support for diagnosing, treating, and managing hypertension. A diverse population, across different regions and healthcare facilities (rural/urban), was reached through collaboration with national/county ministries of health and local implementation partners. The industry sponsor (AstraZeneca) contributed organizational and collaborative capabilities. A reliable source of high-quality, affordable hypertension medications was also sought using a competitive selection process.

Results: HHA conducted a number of stakeholder meetings at the international, national, and county level in Kenya, and 6 implementation partners were identified: AMPATH (a largely rural treatment platform); AMREF Health Africa (an integrated healthcare group reaching urban slums); Christian Health Association of Kenya (CHAK; a large faith-based organization); Jhpiego (public, private, and faith-based health facilities); Kenyan Conference of Catholic Bishops (KCCB; Catholic health facilities including training colleges); and Population Services Kenya (PSK; private clinics/pharmacies). The Mission for Essential Drugs and Supplies (MEDS) was identified as a logistics partner for medication supply. Approximately 27% of Kenyan adults living in project catchment areas received hypertension messaging/education through March 2016. To date, 2,014,285 individuals were screened for hypertension. There were 128,690 follow-up touch points (58,088 new patients), and patients were on combined medication/lifestyle changes for 74% of those touch points.

Conclusions: The Kenyan HHA study demonstrated that a collaborative, multi-sectoral approach between industry, government, and local healthcare partners is feasible to improve hypertension screening, diagnosis, and treatment in Africa.

PP.01.11 DEVELOPMENT OF HYPERTENSION OVER 10 YEARS DEPENDING ON BASELINE BLOOD PRESSURE CATEGORIES IN A SWEDISH POPULATION

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Objective: To explore the relationship between blood pressure categories at baseline and incident hypertension at follow-up in a representative Swedish population.

Design and method: A longitudinal study over 10 years in a Swedish population. Main measures were anthropometric data, blood pressure, fasting glucose, LDL, CRP, eGFR, current smoking, leisure time physical activity and medical history. Blood pressures were measured and categorized according to ESH guidelines with optimal blood pressure defined as <120 mmHg systolic and <80 mmHg diastolic, normal as 120–129/80–84 mmHg, high normal as 130–139/85–89 mmHg, and unstable as ≥140 and/or ≥90 mmHg at one or two visits but not on three. Hypertension was defined as ongoing treatment or readings of ≥140 and/or ≥90 mmHg at three consecutive visits. Subjects with hypertension at baseline were excluded. Data were analyzed with multivariate binary logistic regression.

Results: Among the 1129 participating subjects the proportion with optimal blood pressure at the baseline survey was 56.1% (n = 633), normal blood pressure 25.9% (n = 292), high normal blood pressure 12.5% (n = 141), and unstable blood pressure 5.6% (n = 63), respectively. Of those with optimal blood pressure at baseline 18 (2.8%), converted to hypertension during follow up. Corresponding numbers for subjects with normal, high normal and unstable blood pressure were 58 (19.9%), 56 (39.7%) and 47 (74.6%) respectively. Both normal, high normal and unstable baseline blood pressure were associated with an increased risk of development to manifest hypertension compared to optimal blood pressure, with odds ratios (OR) (95% CI) of 5.4 (CI 2.9–9.9), 12.5 (CI 6.3–25) and 88 (CI 33–231), respectively, independent of age and other main cardiovascular risk factors. A trend test showed that the OR for incident hypertension per unit of baseline blood pressure category was 3.8 (CI 2.9–5.0). The progression to hypertension was also independently predicted by age, BMI and heredity for hypertension.

Conclusions: Subjects with high normal or unstable blood pressure should be identified in clinical practice and evaluated for global risk accounting for family history of hypertension. Measures should be taken to avoid or postpone the development of hypertension and its complications.

PP.01.12 THE ASSESSMENT OF THE ASSOCIATED CARDIOVASCULAR RISK FACTORS IN HYPERTENSION PATIENTS WITH TYPE 2 DIABETES

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Objective: To assess the presence of additional cardiovascular risk factors that could worsen long term prognosis in hypertensive and type 2 diabetes mellitus (T2DM) patients.

Design and method: Patients with arterial hypertension and T2DM were assessed between January 2015 and September 2016 in a cross sectional study. We evaluated associated cardiovascular risk factors (dyslipidemia, obesity [BMI > 30 kg/m²], smoking) and subclinical renal damage (microalbuminuria).

Results: We evaluated 180 hypertensive patients with T2DM, 49.6% male, mean age 66.3 years, mean duration of T2DM 9.6 years, mean HbA1c 8.6% (20% with HbA1c < 7%), mean duration of hypertension 12.4 years, mean blood pressure 148/102 mmHg (35% controlled). Patients were treated with oral antidiabetics for T2DM and ACEi, ARBs, CCB, diuretics for hypertension. Mean BMI was 30.4 kg/m², 50.4% of the patients were obese, 21.1% smokers. Mean values for lipid parameters were: 186 mg/dl total cholesterol, 108.7 mg/dl LDL-C, 44.1 mg/dl HDL-C and 174.4 mg/dl triglycerides. 90% of patients had LDL-C > 70 mg/dl in spite of treatment with statins. 24.6% of patients had a history of major cardiovascular events (more frequent in people with >9 years duration of diabetes). In patients with microalbuminuria (30% of total number), mean duration of T2DM was 9.3 years, mean HbA1c 7.8% (40% with HbA1c < 7%), mean blood pressure 135/94 mmHg (35% controlled), mean BMI 31.7 kg/m². 62.3% of patients were obese, 20.1% smokers. Mean value for cholesterol was 169.1 mg/dl, LDL-C 93.3 mg/dl, HDL-C 43.7 mg/dl and triglycerides 180.8 mg/dl. 68% of patients had LDL-C>70 mg/dl in spite of treatment with statins. 30% of patients had a history of major cardiovascular events.

Conclusions: Associated cardiovascular risk factors are frequent in patients with type 2 diabetes and hypertension. Unfortunately, more than 50% of all parameters are uncontrolled in the majority of patients. A better control was achieved in patients with microalbuminuria, potentially due to an increased adherence of the subjects being informed on the severity of their disease. Patients with type 2 diabetes and hypertension remain at increased risk of developing macrovascular and microvascular complications. Large benefits are likely to be seen when medication is addressed to multiple risk factors simultaneously.

PP.01.13 SERUM URIC ACID IS INDEPENDENTLY ASSOCIATED WITH DIASTOLIC DYSFUNCTION IN APPARENTLY HEALTHY SUBJECTS WITH ESSENTIAL HYPERTENSION

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Objective: Accumulating evidence suggests a direct role of uric acid (UA) on left ventricular (LV) diastolic function in chronic kidney disease and heart failure (HF) patients. Recently, UA has been linked to LV hypertrophy (LVH) and diastolic dysfunction (DD) in women with preserved ejection fraction (EF) (PEF) but not in corresponding men. We sought to assess if UA could predict indices of DD in hypertensive subjects with PEF independently of gender.

Design and method: We consecutively recruited 382 apparently healthy hypertensive subjects (age: 61.7± 10.7, women: 61.3%, median EF: 64%). In 318 patients in sinus rhythm, LV mass-indexed to body surface area was calculated (LVMI). LVH was set as an LVMi more than 116 g/m² or 96 g/m² in men and women, respectively. The ratio of early transmural peak velocity (E) to the mitral annular early diastolic velocity (Em) was used as an approximation of mean left atrial pressure (E/Em).

Results: UA [median (interquartile range): 5.4 (2.5-9)] independently predicted E/Em (adjusted coefficient:1.01, p = 0.026) while an interaction term between gender and UA was no significant (p = 0.684). An ordinal score of DD was calculated taking into account increased E/Em, left atrium dilatation and LVH.
pp.01.14

URIC ACID AS A PREDICTOR OF CORONARY ARTERY DISEASE BUT NOT STROKE IN ESSENTIAL HYPERTENSION: DATA FROM A GREEK 8-YEAR-FOLLOW-UP STUDY


Objective: The exact role of uric acid in cardiovascular risk prediction remains to be further determined. The aim of the present study was to predict the prospective role of uric acid for the incidence of coronary artery disease (CAD) as well as stroke in essential hypertensive patients.

Design and method: We followed up 2415 essential hypertensives (mean age 58.4 years, 1208 males, office blood pressure (BP) = 143.88 mmHg) for a mean period of 8 years. All subjects had at least one annual visit and at baseline underwent echocardiographic study and blood sampling. Moreover, CAD was defined as the history of myocardial infarction or significant coronary artery stenosis and stroke was defined as rapid onset of a new neurological deficit persisting at least 24 hours unless death supervened confirmed by imaging findings.

Results: The incidence of CAD and stroke was 2.2% and 1% respectively. Hypertensives who developed CAD (n = 53) compared to those without CAD at follow-up (n = 2362) had at baseline higher baseline uric acid levels (5.8 ± 1.8 vs 5.2 ± 1.5 mg/dl, p = 0.011), left ventricular mass index (LVMI) (115.7 ± 27.1 vs 103.7 ± 27.1 g/m2, p = 0.001) and prevalence of LV hypertrophy (41% vs 25%, p = 0.017) whereas no difference was observed with respect to baseline office BP, renal function and lipid levels (p = NS for all). Hypertensives who developed stroke (n = 24) compared to those without CAD at follow-up (n = 2391) were older (63 ± 8 vs 58 ± 11 years, p = 0.006) whereas no difference was observed with respect to baseline office BP, uric acid, renal function and lipid levels (p = NS for all). Univariate Cox regression analysis revealed that baseline uric acid levels predicted CAD (hazard ratio = 1.219, p = 0.013) but not stroke. In multivariate Cox regression model baseline glomerular filtration rate (hazard ratio = 1.018, p = 0.017) LVMI (hazard ratio = 1.010, p = 0.026) and uric acid (hazard ratio = 1.226, p = 0.016) turned out to be independent predictors of CAD, while age (hazard ratio = 1.058, p = 0.014) predicted stroke.

Conclusions: In essential hypertensive patients uric acid predicts future development of CAD, whereas exhibits no prognostic value for stroke. These findings further support that uric acid estimation could improve overall risk stratification in essential hypertension.

pp.01.15

SYSTOLIC ARTERIAL HYPERTENSION IN UKRAINE: REALITIES OF CLINICAL PRACTICE BASED ON TRIAL SYSTEM

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Objective: The aim of this trial was to evaluate efficacy of SBP control among hypertensive patients in Ukraine based on data of the register of patients.

Design and method: The register included patients who visited cardiologist in the period from 28 October 2015 to 15 December 2015. 148 doctors from 11 regions of Ukraine were involved in the creation of this register during the trial.

Results: 2964 patients (1627 (54.9%) women) aged 19 to 90 years (60.6 ± 11.5 years) were included in the register. Results of office BP analysis indicate bad control of BP (average DBP 94.2 mmHg, SBP – 164.5 mmHg). Less than 7% of analyzed patients had target BP. Results of analysis indicate the relation between the level of SBP and DBP and age. Correlation analysis was performed for evaluation the relation between the levels of SBP and DBP and age. Results of analysis indicate the positive relation between age and SBP (r = 0.149, p < 0.001) and negative - between age and DBP (r = -0.158, p < 0.001). It was found the relation between the level of SBP and target-organs damage - LVH, CKD.

Conclusions: Analysis of results of the register indicates bad control of BP especially SBP in Ukraine. Only 7% of patients achieve target BP. The level of SBP increases with age and is associated with increasing of frequency of target-organs damages.

pp.01.17

ADDITION OF HYPERTENSION-RELATED MARKERS OF ORGAN DAMAGE TO RISK SCORE MODELS IMPROVES CARDIOVASCULAR RISK ASSESSMENT: RETROSPECTIVE ANALYSIS OF A LARGE COHORT OF ADULT OUTPATIENTS

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Objective: Global cardiovascular (CV) risk stratification is currently recommended in all adult outpatients in both primary and secondary prevention. Available risk score charts, however, do not include markers of organ damage (OD).

Design and method: Aim: To evaluate potential value of adding different markers of hypertension-related subclinical OD to US Framingham, European SCORE and Italian Cuore risk score calculators.

Methods: We retrospectively evaluated adult hypertensive outpatients, who underwent blood pressure (BP) assessment and global CV risk stratification at our Hypertension Unit. The following definitions were applied: 1) cardiac OD: electrocardiographic (Sokolow–Lyon index: >3.5 mV; Cornell Voltage Index: men >2.4 mV; women >2.0 mV) or echocardiographic left ventricular (LV) hypertrophy (LV mass index: men >115 g/m2; women >95 g/m2); 2) vascular OD: carotid atherosclerotic plaque (>1.5 mm); 3) renal OD: reduced estimated glomerular filtration rate (eGFR < 60 ml/min/1.73m2) or clearance creatinine (CrCl < 60 ml/min). Different risk score calculators were applied to all included patients.

Results: We included an overall population sample of 1,979 adult outpatients (44.0% female, age 57.2 ± 13.0 years, BMI 26.6 ± 4.4 kg/m2, clinic systolic/diastolic BP 145.4 ± 18.3/85.8 ± 10.7 mmHg), among whom 117 (5.9%) had cardiac, 161 (8.1%) vascular, and 117 (5.9%) renal OD, respectively. US Framingham, European SCORE and Italian Cuore risk scores were all significantly higher in patients with than in those without OD, independently by type and number of OD, as well as age and gender classes. In particular, direct comparisons for US Framingham CVD death, European ESC score and Italian Cuore score showed significantly higher risk in those patients with both ECG-detected LV hypertrophy, ECHO-detected LV hypertrophy, carotid atherosclerosis and reduced eGFR (Figure 4a) or CrCl than in those without the corresponding markers of OD.

Conclusions: Presence of cardiac, vascular or renal OD is associated with higher risk scores, independently by type of calculators, age and gender classes. OD detection should be included in individual CV risk stratification aimed at improving diagnostic and therapeutic processes.

pp.01.18

ARE WE LOOKING IN THE RIGHT DIRECTION FOR BLOOD PRESSURE CONTROL?

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Objective: The efficiency of antihypertensive treatment of free versus fixed combination and blood pressure control was assessed together with the number of antihypertensive classes used for on target blood pressure (BP) control in real life practice of adult population.

Design and method: An observational retrospective study was performed on a cohort of 484 adult hypertensive patients (mean age 62.06 ± 12.30 y.o.) from an
Objective: Type D (distress) personality should be taken into account in the treat-
ment and prevention of hypertension. We wanted to determine the prevalence of
type D behaviour and gender differences by analyzing the clustering of psycho-
logical and biological risk factors in our hypertensive patients.

Design and method: Research was conducted with 85 elderly patients with
hypertension (mean age 64.5 ± 7.9; men 37.6%), through a consecutive meth-
od of patient selection. Psychological variables: Type D personality, anxiety,
depression, overall distress, and four dimensions of aggression were measured by:
DS 14 Questionnaire, Hospital Anxiety and Depression Scale (HADS), and
the Buss-Perry Aggression Questionnaire. Biological parameters, taken from a
medical database were: systolic/diastolic blood pressure, total cholesterol level,
high density lipoproteins (HDL), low density lipoproteins (LDL), triglyceride,
blood sugar, Body Mass Index (BMI), presence of Diabetes Mellitus (DM), and
Metabolic syndrome.

Results: The Type D personality was present in 58% of the sample. Preva-
lence and intensity of all psychological variables and in the prevalence of
metabolic syndrome (60% vs 37.1%; p = 0.038) are significant higher in D
Type patients. Women with hypertension and Type D personality are more
anxious and distressed, resulting in higher cholesterol (5.97 vs 5.2 mmol/L;
p = 0.046), LDL cholesterol (3.79 vs 3.1; p = 0.032), obesity (29.75 vs
28.31; p = 0.02), and prevalence of DM (28.6% vs 6.25; p = 0.05) when
compared to men.

Conclusions: Hypertensive patients differ in relation to Type D personality and
gender. The finding could indicate that the combination of female gender and
Type D personality is prone to clustering risk factors for hypertension and adverse
future medical events.

PP.01.21 HYPERTENSION PREVALENCE, AWARENESS, TREATMENT AND CONTROL IN AMBULATORY TREATMENT-NAIVE HIV INFECTED PATIENTS IN LILONGWE, MALAWI

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Objective: In the Malawian national STEPS survey (2009) raised blood pressure
(BP) or antihypertensive medication was found in 36.9% male and 29.9% female
participants from the general population. Little is known about the prevalence of
arterial hypertension in HIV infected (HIV+) patients. As an integrated part of
the ongoing prospective LighTen Cohort Study (ClinicalTrials.gov NCT02381275)
we aimed at determining hypertension prevalence, awareness, treatment and con-
trol in ambulatory HIV+ patients prior to starting antiretroviral therapy (ART) in
Lilongwe, Malawi.

Design and method: BP values (oscillometric measurement) of adult patients
who consented to participate in the study were documented in a standardized
fashion together with data concerning known hypertension or antihypertensive
medication (treated hypertension). BP of 140/90 mmHg or higher during
the baseline visit was defined as raised blood pressure (rBP) and controlled
hypertension was defined as values below 140/90 mmHg in treated patients. Defi-
nite arterial hypertension (dHT) was defined as treated controlled or uncontrolled
hypertension or BP of 140/90 mmHg or higher independent of hypertension his-
tory during 2 or more measurements on at least 2 occasions within 8 weeks after
study inclusion.

Results: Data from 1387/1415 HIV+ patients (794 females, 593 males, mean
age 36.0 ± 9.3 years) could be analyzed. rBP was found in 256/1387 patients
(prevalence 18.5%), dHT was confirmed in only 103 cases for a total prevalence of
7.4% (females 7.7% vs. males 9.3%). Hypertension had been known from
medical history in 71 patients, 35 of these patients received treatment (49.3%)
and only eight were controlled (11.3%). However, in 22 of 36 untreated patients
with a history of hypertension, BP values below 120/80 mmHg were found at
the baseline visit.

Conclusions: Information from medical history concerning hypertension seems to be considerably flawed. In view of possible drug-drug interactions with ART a strictly defined diagnosis of arterial hypertension is mandatory prior to starting antihypertensive treatment in HIV+ patients. Systematic mea-
surements and documentation of arterial blood pressure and integrated patient
 instructing and educating programs at HIV centers may be helpful in order to
assure hypertension diagnosis as well as improved treatment and control rates in Malawi.

PP.01.19 PREDICTORS OF CARDIOVASCULAR EVENTS IN HYPERTENSIVE PATIENTS WITH HIGH CARDIOVASCULAR RISK

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Objective: Hypertension is a major risk factor for cardiovascular events. Patients
at high risk are particularly vulnerable and require adequate treatment and control.
The treatment is complex and requires good control of blood pressure and all
modifiable risk factors associated with the protection of target organ damage.
The goal of this study is to determine which factors have predictive significance of
cardiovascular events in patients with hypertension and high cardiovascular risk.

Design and method: We studied 258 participants (60% females). Each participant
underwent asymptomatic organ damage: 12-lead electrocardiogram examinations,
two-dimensional and Doppler echocardiographs, Doppler sonography of the
carotid arteries, and laboratory investigations were prospectively followed for fatal
and non-fatal cardiovascular event and total mortality over a median of 7 years.

Results: Mean age in the beginning of the study was 62.7 ± 9 years, body mass
index of 28.9 ± 4. kg/m2, office blood pressure of 150.3 ± 20/87.6 ± 13 mmHg,
left ventricular mass index (LVMI) of 129.8 ± 29.2 g/m2, carotid intima -media thickness
(IMT) of 0.92 ± 0.2 mm. Diabetes mellitus (DM) was in 28% patients, mean
total cholesterol 5.74 ± 1 mmol/l.

At a follow-up, the incidence of non-fatal and fatal cardiovascular events was
18.2%, and total mortality was 4.7%. Major cardiovascular events were more
common in men (p = 0.019) and were highly correlated with systolic blood
pressure (SBP) at the beginning of the study (p = 0.038), with cholesterol at the begin-
ning of the study (p = 0.019) and at the end of the study (p = 0.028), glaciases at the
beginning of the study(p = 0.004), DM at the beginning (p = 0.001) and at the
end (p = 0.006), LVMI (p < 0.001) and IMT (p < 0.001) at the beginning. Patients
with a cardiovascular death were significantly older (p = 0.002), had higher SBP
at the beginning (p = 0.017) and higher IMT (p = 0.017). During the study 7.4%
of participants got cancer and its positive correlation with DM was determined at
the end of the study (p = 0.002) and with IMT at the end of the study (p = 0.037).

Conclusions: Main predictors of major cardiovascular events among patients with
hypertension and high risk are: age, male sex, SBP, DM and IMT.

PP.01.20 D TYPE-GENERED DIFFERENCES IN PSYCHOLOGICAL AND BIOLOGICAL RISK FACTORS IN PATIENTS WITH HYPERTENSION

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Objective: Type D (distress) personality should be taken into account in the treat-
ment and prevention of hypertension. We wanted to determine the prevalence of
type D behaviour and gender differences by analyzing the clustering of psycho-
logical and biological risk factors in our hypertensive patients.

Design and method: Research was conducted with 85 elderly patients with
hypertension (mean age 64.5 ± 7.9; men 37.6%), through a consecutive meth-
od of patient selection. Psychological variables: Type D personality, anxiety,
depression, overall distress, and four dimensions of aggression were measured by:
DS 14 Questionnaire, Hospital Anxiety and Depression Scale (HADS), and
the Buss-Perry Aggression Questionnaire. Biological parameters, taken from a
medical database were: systolic/diastolic blood pressure, total cholesterol level,
high density lipoproteins (HDL), low density lipoproteins (LDL), triglyceride,
blood sugar, Body Mass Index (BMI), presence of Diabetes Mellitus (DM), and
Metabolic syndrome.

Results: The Type D personality was present in 58% of the sample. Preva-
lence and intensity of all psychological variables and in the prevalence of
metabolic syndrome (60% vs 37.1%; p = 0.038) are significant higher in D
Type patients. Women with hypertension and Type D personality are more
anxious and distressed, resulting in higher cholesterol (5.97 vs 5.2 mmol/L;
p = 0.046), LDL cholesterol (3.79 vs 3.1; p = 0.032), obesity (29.75 vs
28.31; p = 0.02), and prevalence of DM (28.6% vs 6.25; p = 0.05) when
compared to men.

Conclusions: Hypertensive patients differ in relation to Type D personality and
gender. The finding could indicate that the combination of female gender and
Type D personality is prone to clustering risk factors for hypertension and adverse
future medical events.

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Objective: The purpose of the study is to evaluate the antihypertensive therapy efficiency among offspring. The study includes 356 participants aged 65–93 years old. Average age was 74.8 ± 6.1 years, 80.4% were women. 54.8% of them had higher education and 9% still continue to work. Research conducted in Moscow polyclinic from November 2014 to May 2015. Anamnesis of arterial hypertension, cardiovascular, and arterial diseases and antihypertensive therapy was evaluated among 2 groups of the seniors: 65–79 y.o. (n = 277) and > 80 y.o. (n = 79). The measurement of blood pressure (BP) was made in sitting position using validated device. Results: Based on patients self-report prevalence of arterial hypertension was 88.5% (n = 315). It was insignificantly higher among patients > 80 y.o. (91.1%) than in group of 65–79 y.o. (87.7%). Around 92% of patients had antihypertensive therapy. Average BP level was 145.5 ± 24.1 / 78.8 ± 11.5 mm Hg. Systolic BP (SBP) without hypertension was 135.2 ± 17.5 mmHg. In group of treated hypertensive patients SBP was 145.8 ± 28.1 mmHg. In the group of untreated patients - 154.3 ± 26 mmHg, respectively. Systolic BP > 140 mm Hg was observed in 51.1%, diastolic BP > 90 mm Hg in 11.8% among all patients. In 38.6% treated subjects SBP was < 140 mmHg, in 34.7% > 150 mmHg. The age has significant impact on diastolic BP level. Average BP level among 65–79 y.o. patients reveal 145.5 ± 26.7 / 79.8 ± 14 mmHg However the results of BP level among > 80 y.o. was 145.5 ± 25.3 / 75.2 ± 11.5.

Conclusions: The study describes high prevalence of hypertension and lack of efficiency antihypertensive therapy within the offspring > 65 years in Moscow.

Objective: Increased aortic pulse wave velocity (PWV) is associated with higher cardiovascular risk in a general population as well as in several pathophysiological conditions. Similarly, decreased levels of soluble form of receptor for advanced glycation end products (sRAGE), were found in hypertensive patients. We investigated whether these two markers of cardiovascular risk might be modified in asymptomatic adult offspring of patients with premature onset (before age of 50) of ischemic heart disease (IHD).

Design and method: We investigated 114 offspring and 194 controls. We measured PWV using SphygmCor and sRAGE using enzyme-linked immunosorbent assay methods. In our analyses we used linear and logistic regression methods.

Results: Offspring and controls had similar age (28.5 ± 6.4 vs. 28.9 ± 5.3, p = 0.51) and blood pressure (118.6/78.9 vs. 116.5/77.0, p = 0.063). There were more men (49.1 vs. 35.6%, p = 0.023) and smokers (50.9 vs. 32.7%, p = 0.003) in offspring compared to control groups. After adjustment for potential covariates, PWV (6.17 ± 0.9 vs. 5.82 ± 0.06, p = 0.001) was higher while sRAGE (130.8 ± 49.8 vs. 147.8 ± 37.6, p = 0.008) was lower in offspring compared to control group. In multivariate logistic regression, main determinant of difference between offspring and controls were PWV, sRAGE and current smoking.

Conclusions: In our study, we observed that asymptomatic offspring of patients with premature IHD had increased aortic pulse wave velocity. This finding might be at least partially driven by lower levels of circulating soluble RAGEs.

Objective: Increased longevity and consequent major changes in demographics and population lifestyles necessitate new approaches to reduce the burden of aging-related diseases (including CVD) and maintain an optimal quality of life. This study aims to examine and longitudinally follow health status and disease risk factors in a Swiss rural cohort, evaluating all health related research and practice disciplines to assure development of new implementable and successful preventive strategies for healthy aging.

Design and method: Small villages of rural regions in Switzerland with low migration rates have been selected for this longitudinal prospective study. All residents (age > 6 years, no upper age limit) are eligible. Target enrolment number per village is 300. Examinations and measurements encompass medical history, anthropometry, cardiocirculatory and vascular health, pulmonary function, physical performance, nutritional, mental and emotional status, biochemical and molecular analyses. Follow-up examinations (identical to baseline) will be performed after 5 and 10 years, and in 10-year intervals thereafter.

Results: In the first participating village, more than 300 participants have been enrolled so far. Enrollment will start in a second participating village in 2017.

Conclusions: This study will allow to: (1) identify “hidden” (asymptomatic and/or unrecognized) health problems which enhance risk for chronic diseases; (2) identify barriers to accessing health care and adapting health behaviours; (3) evaluate efficacy of present preventive strategies and recommendations; (4) evaluate knowledge and attitude towards ongoing health programs and public health recommendations; (5) monitor change and progress towards the national health objectives; (6) formulate new preventive strategies and recommendations based on the findings and knowledge base of the last 10 years; (7) formulate models for successful prevention of chronic diseases and for healthy aging.
Objective: Arterial hypertension (AH) is a major health concern because of its prevalence and deaths related to its complications, being important to acknowledge the way it is evolving. The authors intended to identify and characterize the differences between patients with the diagnosis of AH admitted to an Internal Medicine ward 4 years apart.

Design and method: Observational retrospective study based on the collection of clinical data of patients admitted in an internal medicine ward during the year 2012 and 4 years later, in 2016. The hypertensive patients were divided in two groups: admitted in 2012 (H12); admitted in 2016 (H16). It was defined as cardiovascular event stroke or myocardial infarction (MI) as the motive of admission and registered all causes mortality.

Results: Total sample includes 407 patients, from which 69.8% (n = 284) have the diagnosis of AH (n = 339). (1) From 2012 to 2016 there is a fall in the number of patients with AH (74.5% in H12 vs 60.7% in H16; p < 0.001). (2) The female gender is more prevalent in both groups (51.8%). (3) The mean age is superior in H16 (77.9 ± 11.4 vs 80.4 ± 8.7 years; p = 0.042), as well as the length of stay (7.9 ± 6.6 vs 14.4 ± 10.6 days; p < 0.001). (4) There is a raise in the prevalence of other diseases in H16: heart failure (27.1% vs 43.5%; p = 0.008); atrial fibrillation (26.1% vs 38.8%; p = 0.035); obesity (8% vs 17.6%; p = 0.022); stroke (21.1% vs 22.4%; p = 0.875). (5) The cardiovascular events (6% vs 8.2%; p = 0.604; stroke – 7% vs 8.2%; p = 0.805; MI – 2.5% vs 3.5%; p = 0.7), death (6.5% vs 9.4%; p = 0.002) or either one (14.1% vs 21.2%; p = 0.160) become more frequent in H16.

Conclusions: In the studied sample there is a decrease of the number of patients with AH, but at the same time there is a tendency of increase of the cardiovascular events and death in the hypertensive patients, highlighting the importance of prevention and control of these important cardiovascular risk factor.

PP.01.33
RISK FACTORS OF ARTERIAL STIFFNESS MEASURED BY CARDIO-ANKLE VASCULAR INDEX IN PATIENTS WITH MILDLY DECREASED GLOMERULAR FILTRATION RATE

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Objective: Arterial stiffness (AF) measured by carotid-ankle vascular index (CAVI) has been proven to be an early marker of decreasing cardiac, vascular and renal function. However, most of the studies have been conducted in a general practice setting. Therefore, the aims of this study is to determine the risk factors of AF in a specific patient’s cohort with mildly decreased glomerular filtration rate (GFR).

Design and method: This was a retrospective study. Patients were initially recruited in 2011–2013 as participants of the Lithuanian High Cardiovascular Risk Primary prevention program. The patients selected for the study had a GFR form 60 to 90 ml/min/1.73smq according to the KDIGO definition of mildly decreased GFR. The data were grouped into two sections: (1) demographic and comorbidities, (2) laboratory values and instrumental tests. CAVI was chosen as a marker of impaired AF, the cut-off values were generated by implementing the median values of different age and gender groups. Stepwise multivariate logistic regression was performed and risk factors of AF were revealed in each data sections.

Results: This study included data of 653 patients aged from 40 to 70 years. Most of them were women 78.3% (n = 511), with a median GFR of 81.49 ml/min/1.73smq [75.73–86.36]. Six different cut-off values for each gender and age stratified group were generated, with an mean value of 7.7. The implementation of these values showed a distribution across AF groups, favoring the increased AF: 59.7 vs 40.3 percent. The demographic variables and comorbidities associated with AF were: age (OR per year 1.073, CI95% 1.042–1.105, p = 0.001) and body mass index (OR per kg/m² = 0.921, CI95% 0.887–0.956, p = 0.001). The laboratory values and instrumental tests related to AF were: ankle-brachial index (OR per 0.1 = 1.426, CI95% 1.103–1.843, p = 0.007), high-density lipoproteins (OR per 0.1 mmol/L = 1.096, CI95% 1.007–1.194, p = 0.034), glucose (OR per mmol/L = 1.296, CI95% 1.088–1.544, p = 0.004) and sodium (OR per mmol/L = 1.117, CI95% 1.099–1.237, p = 0.033).

Conclusions: AF in patients with mildly decreased GFR can be predicted by various markers. The most potent predictors were age and ankle-brachial index. These markers should be further studied prospectively in the context of AF and renal function.
Objective: The objectives of this study are to estimate the prevalence of cardiovascular risk factors in the working population in the North Alentejo region, namely the prevalence of metabolic syndrome, hypertension, dyslipidemia, obesity, smoking, alcoholic and sedentary lifestyle.

Design and method: Obtaining the sample for the study will be done by consecutive demonstration. The selection of the sample will include those patients older than 18 years who work in DELTA coffee industry and exclude patients with concomitant serious diseases that may cause alterations in nutritional status. All sample members will be required to sign an informed consent for inclusion in the study. An anamnesis will be conducted to investigate smoking, alcoholic, exercise habits, personal history of cardiovascular diseases. Both SBP and DBP will be evaluated with a digital sphygmomanometer validated in three serial determinations, after which the arithmetic mean will be discovered. The following anthropometric measures will be determined: weight, height, abdominal perimeter, bitrocantheter perimeter, body mass index, wrist circumference, abdominal mass index, waist size index, relation abdominal perimeter BMI, waist circumference index.

Results: The mean age of individuals was 37 years. 39% were smokers and 14% were alcoholics. Regarding the determination of blood pressure in the sample, there was a statistically significant difference between the sexes and age (p = 0.000). Those over 50 years weigh more 4.88 kilos, measure about three centimeters less and their wrists, waists and hips are greater. BMI has no statistically significant difference. Regarding the remaining indices, for the waist-hip ratio, there were significant differences between men and women, being higher in men. The same is not the case with waist-height index and waist-Wrist-index for which there are no differences by sex. An analytical evaluation was carried out with hemogram, biochemistry, PCR for the study of several analytical parameters that complement the study of the prevalence of cardiovascular risk factors.

Conclusions: There is a significant rate of cardiovascular risk factors in an active population, requiring a close medical action to reduce metabolic risk and cardiovascular risk, reducing personnel social, family and economic costs.

**Conclusions:**

**PP01.35 ROLE OF SYSTOLIC ARTERIAL PRESSURE AS PREDICTOR OF ADVERSE OUTCOME IN PATIENTS PRESENTING WITH MAJOR BLEEDING TO THE EMERGENCY DEPARTMENT. AD-INTERIM RESULTS OF A MULTICENTER POPULATION BASED STUDY**

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**Objective:** Bleeding events at the Emergency Department (ED) are still under investigation. Aim of the present study was to analyze baseline characteristics which could be associated with any treatment strategies and outcomes.

**Design and method:** Visits to the ED were considered during a 2016 three-month survey. Inclusion-exclusion criteria were as follows: presence of any bleeding event and age < 18. Clinical parameters, major-minor bleeding, site of bleeding, treatments, need of reversal treatment/transfusion and adverse outcomes were prospectively collected. Primary endpoint was the presence of major bleeding. Secondary were the composite of admission-death and the need of reversal treatment-transfusion.

**Results:** Out of 155,320 visits, 2,592 patients were enrolled (mean age 64.9 ± 20.3 year). Major bleedings account for 26%. Mean systolic arterial pressure was 138 ± 28 mmHg, heart rate 81 ± 15 b/min, haemoglobin 12.1 ± 2.5 g/dL, creatinine 1.07 ± 0.75 mg/dL. Patients who were given antiplatelets or anticoagulants (393, 15%); 275, 11% more likely presented with major bleeding (171, 44%; 127, 46%; p < 0.001). Overall, 117 patients received reversal treatment (108, 4%), transfusions (86, 3%), VitK(30, 1%); 59(22%) patients were given anticoagulants (p < 0.001) and 43(11%) antiplatelets (p = 0.049); 193(7%) need observation and 503(19%) admission. In-hospital death accounts for 30(1.2%) patients. Receiver Operator Characteristics analysis for major bleeding showed higher values of area (area 0.62, CI 0.59–0.66), creatinine (0.55, 0.52–0.59), systolic arterial pressure (0.53, 0.49–0.56) over antiplatelets (0.50, 0.48–0.54) and anticoagulants (0.51, 0.48–0.55). Age>65 (Odds Ratio, OR 6), major bleeding (OR 9), systolic arterial pressure (OR 1.10), antiplatelets (OR 2) were predictors of death at the univariate analysis; Age > 65 (OR 2), major bleeding (OR 101), anticoagulants (OR 2) and female gender (OR 0.69) of the composite endpoint of death-admission. Age > 65 (OR 1.04), major bleeding(OR 68), anticoagulants (OR 4), warfarin (OR 5) were predictors of reversal treatment-transfusion at the univariate analysis.

**Conclusions:** Up to 2% of population presents with bleeding events to the ED. Older age was predictor of death; older age, major bleeding and female gender predict the primary endpoint; while major bleeding, use of warfarin the composite of reversal treatment-transfusion. Older age, creatinine, systolic arterial pressure were associate with major bleeding.
POSTER SESSION

POSTERS’ SESSION P502:
PHARMACOLOGICAL TREATMENT

PP.02.01
SIX-YEAR TRENDS IN ANTYHYPERTENSIVE MONOTHERAPY AND BLOOD PRESSURE CONTROL IN PATIENTS REFERRED TO SPECIALIZED CARDIiological CENTRE

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Objective: Hypertension monotherapy is considered to be effective in 10–20% of patients with mild or mild-to-moderate hypertension (HTN). However latest evidence suggest sometimes a dramatic difference in efficacy and even safety of different members of an antihypertensive drug (AD) class. These may have an impact on response rate, blood pressure control, adherence and physician preferences concerning choice of precise AD for monotherapy. The main objective of this study was to describe trends in choice of antihypertensive monotherapy and blood pressure control in adult hypertensive patients referred to specialized cardiology clinic during the six-year period.

Design and method: We extracted 13691 monotherapy data from 68276 electronic medical records of patients referred to specialized cardiology clinic due to uncontrolled or therapy-naive HTN during the period of January 2010–December 2015. Descriptive statistics were used to estimate the means, linear regression was employed to determine the yearly trends.

Results: Overall, ACE inhibitors (ACEi) and angiotensin II receptors antagonists (ARA) remained the most commonly used antihypertensive drug classes [4326 patients (31.6%) and 4504 patients (32.9%), respectively] without significant 6-year trends. Approximately 16.6% of hypertensive adults were taking beta-blockers (2273 patients) and 11.8% (1616 patients) calcium channel blockers (CCBs), the use of these classes remained relatively constant during the survey period. Interestingly, diuretics were the least commonly used drug class without significant changes during 6-year period (7.1%, 972 patients). Perindopril (41.6%) and Enalapril (20.7%) were the most commonly used ACEi during studied period. Among other classes the leaders were Metoprolol (57.5%) and Bisoprolol (20.7%) for beta-blockers; Losartan (52.9%) and Valsartan (37.5%) for ARA; Amlodipine (88.5%) and Nifedipine (6.6%) for CCB and Indapamide (85.3%) and Hydrochlorothiazide (6.6%) for diuretics without significant six-year trends. Blood pressure control rate on monotherapy was approximately 31% during studied period without significant 6-year trends. However monotherapy with ACEi and ARA provided better blood pressure control up to 35% compared to 27% on diuretics.

Conclusions: RAAS blockers are the most frequently used and effective classes for monotherapy of HTN. The choice of a precise member of an antihypertensive drug may have an impact on monotherapy success rate.

PP.02.03
EFFICAC Y AND TOLERABILIT Y OF NIFEDIPINE GASTROINTESTINAL THERAPEUTIC SYTEM 60MG IN CHINESE PATIENTS WITH UNCONTROLLED HYPERTENSION

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Objective: Efficacy and tolerability of nifedipine gastrointestinal therapeutic system (GITS) 60 mg once daily (QD) in uncontrolled blood pressure (BP) is not completely explored in China. Therefore, we studied the efficacy and tolerability of nifedipine GITS 60 mg in Chinese hypertensive patients inadequately controlled with prior monotherapy.

Design and method: This single-arm phase-4 study (NCT02413515) enrolled 278 hypertensive adults from 13 centers in China, in whom BP was uncontrolled after 4-weeks of antihypertensive monotherapy. The patients received oral nifedipine GITS 60 mg QD for 8-consecutive weeks. Primary endpoint was mean sitting systolic control rate (MSDBP < 130 mmHg for subjects with diabetes (DM) and < 140 mmHg for others) at 8-weeks. Secondary endpoints included change in MSSBP and mean sitting diastolic BP (MSDBP), 24-h SBP and DBP reduction measured by 24 hour ABPM, and safety of nifedipine GITS 60 mg.

Results: A total of 269 patients (mean age 55 ± 8.21 years, 62.8% males, 28.3% with DM) were included for efficacy and 278 for safety analysis. At week 8, overall MSSBP control rate was 64.7%. From baseline to 8-weeks, decrease in MSSBP and MSDBP was −15.2 ± 11.37 mmHg (147.9 ± 6.87 mmHg to 132.7 ± 11.82 mmHg) and −6.4 ± 7.87 mmHg (89.1 ± 7.13 mm Hg to 82.7 ± 8.04), respectively (Table 1). The control rate was lower in patients with DM From baseline to 8-weeks, mean 24-h SBP was decreased from 138.5 ± 12.78 mmHg to 131.6 ± 12.29 mmHg (diff. −6.9 ± 11.30 mmHg, 95% CI = −8.29, −5.56) and mean 24-h DBP was decreased from 86.4 ± 9.32 mmHg to 82.5 ± 9.12 mmHg (diff. −3.9 ± 7.63 mmHg, 95% CI = −9.47, −6.42). Fifty (18%) cases of adverse events (AEs) and 25 (9%) cases of peripheral edema were reported. No drug related serious AEs and deaths occurred during the study.

Conclusions: Nifedipine GITS 60 mg QD further improved control rate of MSBP and MSDBP and was well tolerated in Chinese patients previously treated with standard dosage of antihypertensive monotherapy.

PP.02.04
TRANSCRIPTIONAL INTERFERENCE OF ACROLEIN AND THEIR MODULATION BY PPAR GAMMA LIGAND, ROSIGLITAZONE

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Objective: Long term exposure to aldehydes can increase risk for development of cardiovascular problems and that makes understanding mechanism involved in this process important. Acrolein, an α,β-unsaturated aldehyde, has been classified as a major environmental pollutant. Oxidative stress and increased inflammatory responses have been proposed as main players in aldehydes toxicity. Peroxisome proliferator-activated receptor gamma (PPARγ) has been implicated in pathology of diseases involving inflammation and anti-inflammatory effects of rosiglitazone, a PPARγ ligand, has been investigated. In this study we investigated the pathways that might be involved in rosiglitazone’s protection against acrolein.

Design and method: Wild type mice (male, 20–25 g) were exposed to acrolein (2.5 mg/kg/day, gavage, 7 days) or acrolein and rosiglitazone (10 mg/kg/day, gavage, 10 days). Animals were sacrificed and liver was used to determine biochemical parameters.

Results: Acrolein increased and NADPH oxidase activity (42%) and generation of free radicals (33%−0.22 pg/mg protein) compared to control mice (p < 0.05). Treatment with rosiglitazone reduced both free radical generation (38%) and NADPH oxidase activity (22%). Activity and protein expression of Xanthine oxidase was not changed significantly by acrolein and rosiglitazone. Cyclooxygenase-2 (COX-2) activity and protein expression was increased by acrolein (25% and 35%) and rosiglitazone did not have a significant effect on expression of Egr-1. Expression of serum response factor (SRF) protein was increased by acrolein (2-fold and 35% respectively) and improved when mice were treated with rosiglitazone (1.5 fold and 29% respectively). Expression of catalase expression was reduced by 30% and rosiglitazone. Activity and protein expression of Xanthine oxidase was not changed significantly by acrolein and rosiglitazone. Cyclooxygenase-2 (COX-2) activity and protein expression was increased by acrolein (25% and 35%) and rosiglitazone did not have a significant effect on expression of Egr-1.

Conclusions: These findings suggest that rosiglitazone treatment provides protection against acrolein toxicity through reduction of NADPH oxidase derived superoxide production which might be SRF dependent but not Egr-1 dependent.
**PP.02.05**

**EFFECTS OF XANTHINE OXIDASE INHIBITORS ON BLOOD PRESSURE, BA PW, CAROTID ARTERIAL IMT AND ELASTIC MODULUS IN HYPERTENSIVE PATIENTS WITH HYPERURICEMIA**

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**Objective:** We investigated the effects of xanthine oxidase inhibitors on blood pressure, baPWV, carotid arterial IMT and elastic modulus in hypertensive patients with hyperuricemia.

**Design and method:** The fifty-two patients with hypertension and hyperuricemia (average age: 59 years old, BMI26 kg/m2) were treated with xanthine oxidase inhibitors (febuxostat or topiroxostat) for 12 months. Serum markers, office and central blood pressures and brachial-ankle pulse wave velocity (baPWV) were examined. The intima-media thickness (IMT) and elastic modulus in the circumferential direction (E) were simultaneously measured by the high-resolution Doppler technique, “Phased Tracking Method”.

**Results:** The basal values of uric acid (UA), eGFR, office blood pressure (BP), pulse pressure, baPWV, central SBP (cSBP), IMP, E, P were the following: 7.7 ± 1.0 mg/dL, 65.7 ± 18.3 ml/min/1.73m2, 131.7 ± 14.8/70.7 ± 10.1 mmHg, 51.0 ± 9.4 mmHg, 1528.0 ± 250.5 cm/sec, 133.4 ± 20.9 mmHg, 14.1 ± 0.57 mmHg, 419.6 ± 125.0 kPa. After 12 months of administration of xanthine oxidase inhibitors, UA (-28%), systolic BP (-2%), baPWV (-6%) and cSBP (-2%) decreased significantly (p < 0.05). No changes were seen in eGFR (-1%) and heart rate (p > 0.05). The drugs also decreased IMP (-14%) and E (%) (14%) significantly. The histogram analysis of the E data revealed both of the drugs decreased harder components of the elasticity distribution, suggesting improvement of endothelial dysfunction.

**Conclusions:** Our results indicate that xanthine oxidase inhibitors may have effects on UA, blood pressure, IMP and E and baPWV to inhibit excessive activation of xanthine oxidase in hypertensive patients with hyperuricemia. The measurement of the carotid elastic modulus may be useful to evaluate the efficacy of drugs for improving regional atherosclerotic changes.

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**PP.02.06**

**BETROOFT JUICE LOWERS CENTRAL SYSTOLIC BLOOD PRESSURE - A DOUBLE-BLIND CROSSOVER PLACEBO CONTROLLED PILOT TRIAL**

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**Objective:** Dietary inorganic nitrate, originating from beetroot juice, has been shown to lower brachial blood pressure via bioconversion in the enterosalivary circulation. It effects on central systolic blood pressure (cSBP) are largely unknown.

**Design and method:** 13 healthy young adults received 180 ml Fit Rabbit (FR) juice, containing 11.2 mmol nitrate, or matched placebo (P), at 8:00 AM in a non-fasting state (but free from coffee). Brachial and central BP was measured with a validated, oscillographic system (mobilograph, Stolberg, Germany) and a transfer function, with a measurement interval of 20 minutes during the day, at baseline (B), following FR and P. Primary endpoint was the change in averaged cSBP between the time interval 7.15–8.30 and 09.00–12.30.

**Results:** From the first to the second time interval, central SBP dropped by 3.3 mm Hg (FR) and 0.2 mm Hg (B) and increased by 1.6 mm Hg (P). The changes in the whole group were statistically significant (p < 0.005), as was the change following FR (p = 0.0003) and the difference between B and FR (p = 0.05). In contrast, we observed only minor changes in brachial SBP at B (~0.3 mm Hg) and following FR (~0.2 mm Hg) and P (~1.2 mm Hg) from the first to the second time interval. The BP changes were accompanied by changes in heart rate (HR): + 4.6 (RF), + 3.4 (B) and + 2.6 (P) beats per minute, respectively. The changes in the whole group were statistically significant (p = 0.02), as was the change following FR (p = 0.02) and the difference between B and FR (p = 0.01). In exploratory analysis, the results were comparable, when alternative time windows for the second interval were chosen (09.11–11.00 or 11.00–12.30, respectively).

**Conclusions:** Our results show that the effects of beetroot juice on systolic blood pressure may be more pronounced on central rather than on brachial blood pressure.

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**PP.02.07**

**SIMPLIFICATION OF ANTIHYPERTENSIVE THERAPY IMPROVES BLOOD PRESSURE CONTROL IN RESISTANT ARTERIAL HYPERTENSION**

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**Objective:** Partial or total non-adherence to antihypertensive medications is a frequent cause of inadequate blood pressure (BP) control. Fixed combinations were shown to improve medication adherence and BP control, but their effect in resistant hypertension is not known. The aim of our study was to assess the effects of simplification of the antihypertensive treatment using fixed combinations in patients with resistant arterial hypertension.

**Design and method:** We analyzed medical records of patients with resistant arterial hypertension, who had antihypertensive medication adjusted and simplified using fixed combinations during an outpatient visit at our department between November 2009 and June 2015. Office blood pressure and antihypertensive medications were recorded and compared between baseline and the next outpatient clinical visit. Standard descriptive statistical methods were applied, statistical significance of BP and medication changes was calculated using Wilcoxon Rank test.

**Results:** We enrolled 194 patients of mean age 60 years, 65% were men. Mean baseline office BP was 153.7/87.5 mmHg and patients were using mean 4.8 different antihypertensive drug classes, representing mean 5.2 antihypertensive tablets used daily. Effect of the simplification of medication was assessed on next clinical visit on average 12 weeks later. Number of antihypertensive drug classes was reduced by 0.4 to 4.4, and the number of daily used antihypertensive tablets was reduced by 1.9 to 3.3 (P < 0.001 for both). Office blood pressure at the next clinical visit decreased by a mean 19.8/9.9 mmHg to 133.9/77.6 mmHg (P < 0.001 for both).

**Conclusions:** Simplification of medication using fixed combinations markedly improved BP control in patients with resistant hypertension while significantly decreasing their medication burden.

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**PP.02.08**

**INfiltration of the sphenopalatine ganglion decreases blood pressure in newly diagnosed and never treated patients with essential hypertension**

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**Objective:** Background: Sphenopalatine ganglion (SPG) is connected with the central nervous system through sympathetic and parasympathetic nerves. We hypothesized that SPG block through sympathetic nerves anesthesia might decrease blood pressure (BP) in recently diagnosed and newly treated middle-aged hypertensive patients.

**Design and method:** Methods: We performed SBG block in 27 hypertensive patients (mean age 47–12 years, 19 men). All patients have been subjected to 24 hour ambulatory blood pressure monitoring prior the procedure and in a period of 21–30 days after the SBG block in order to estimate differences in 24 h average systolic (24 h SBP) and diastolic blood pressure (24 h DBP), daytime, nighttime, pre-awake and early morning SBP and DBP as well as BP load and BP variability (STD).

**Results:** Results: We found that 24 h SBP (p < 0.003) and DBP (p < 0.001), daytime SBP (p = 0.003) and DBP (p < 0.001) as well as daytime SBP and DBP load (p = 0.007 and p < 0.001, respectively) were decreased in total population at 21–30 days after SPG block. In 12/27 responders (24 h SBP decrease > 5 mmHg), SBP and DBP were reduced during overall 24 h (p < 0.001), daytime (p < 0.001) and nighttime periods (p = 0.005 and p = 0.03, respectively) while only SBP was decreased during 2 hours pre-awake and 2 h after awake periods (p < 0.05). Additionally, daytime SBP and DBP (p < 0.001) and nighttime SBP load (p = 0.002) were also decreased.

**Conclusions:** Conclusions: SBG block might be a promising, non invasive, safe, painless and easy to perform therapeutic option of BP decrease. As with renal deactivation, SBG should be effective in those hypertensive patients with an activated SNS, so a period of patient selection should precede the application of this procedure.

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**PP.02.09**

**The arterial stiffness dynamics under the effect of rosuvastatin added to fixed combination of lisinopril and hydrochlorothiazide**

A. Torunova1, K. Protasov1, O. Fedorishina1, V. Pervuhina2, I. Denisova3. 1SNS, so a period of patient selection should precede the application of this procedure.
Objective: The aim of our study was to assess the influence of rosvustatin added to a fixed combination of lisinopril and hydrochlorothiazide on peripheral and central BP, pulse wave velocity (PWV) in patients with uncontrolled hypertension.

Design and method: 49 patients (26 men and 23 women aged 51.2 ± 8.7) with uncontrolled hypertension were randomized into two groups. Group 1 included 26 patients who received a fixed combination of 10 or 20 mg/day lisinopril and 12.5 mg/day hydrochlorothiazide. Group 2 consisted of 23 patients who followed the same regimen of therapy with addition of rosvustatin 20 mg/day. The office and ambulatory peripheral BP, central (aortic) BP, augmentation index (AIx), carotid-femoral and carotid-radial were evaluated before and after a 24-week follow-up period.

Results: The office systolic/diastolic BP decreased in both groups from 166.2 ± 19.8/103.5 ± 11.4 to 139.2 ± 14.3/87.2 ± 9.4 mmHg (p < 0.001) in the 1st group and from 168.6 ± 23.6/103.6 ± 15.6 to 135.6 ± 15.1/87.3 ± 11.5 mmHg (p < 0.001) in the 2nd one. The extent of office BP decline did not differ. The ambulatory BP also decreased in both groups from 136.8 ± 9.4/84.2 ± 8.2 to 123.6 ± 9.4/75.7 ± 7.3 mmHg (p < 0.001) in the 1st group and from 141.9 ± 13.8/88.3 ± 11.4 to 120.3 ± 10.4/75.0 ± 9.0 mmHg (p < 0.001) in the 2nd one. The degree of systolic BP reduction was more pronounced in the 2nd group (-18.0 vs -26.7 mmHg, p < 0.024). Central aortic BP also decreased in both groups from 142.9 ± 15.6/93.6 ± 10.2 to 126.4 ± 15.8/82.5 ± 8.4 mmHg (p < 0.001) in the 1st group and from 151.1 ± 19.7/98.9 ± 13.7 ± 123.5 ± 15.5/84.6 ± 11.8 mmHg (p < 0.001) in the other. The extent of central systolic BP reduction was only more pronounced in the 2nd group (-11.0 vs -27.7 mmHg, p = 0.035). AIx decreased in the 2nd group from 35.9 ± 8.9 to 29.2 ± 11.2% (p < 0.006). Mean carotid-femoral PWV decreased statistically in the 1st group from 9.0 ± 1.8 to 8.2 ± 1.5 m/s (p = 0.02) and from 8.8 ± 1.7 to 8.0 ± 1.3 m/s in the second one (p = 0.028). The carotid-radial PWV did not change in both groups.

Conclusions: Addition of rosvustatin to a fixed lisinopril/hydrochlorothiazide combination in patients with uncontrolled hypertension resulted in further decline of ambulatory and central BP and augmentation index, but was beneficial neither for decrease of office BP and carotid-femoral pulse wave velocity.

**PP.02.10**

EFFECTIVENESS OF DIFFERENT TYPES OF COMBINED THERAPY ON CENTRAL BP AND ARTERIAL STIFFNESS IN PATIENTS WITH MODERATE TO SEVERE AH: RESULTS OF A PROSPECTIVE RANDOMIZED OPEN LABEL TRIAL

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Objective: It is well known that the effectiveness of medications prescribed alone or as a combination may be different. The purpose of this study was to compare the effectiveness of therapy based on a combination of highly selective beta-blocker bisoprolol or ARB losartan and hydrochlorothiazide (Liz+HCTZ) or ARB losartan and hydrochlorothiazide (Los+HCTZ).

**Design and method:** In this 6-month trial we included 91 patients with AH (mean systolic cSBP/diastolic cDBP) BP 168±4.1/99±6.1 mmHg). 32 in lisatar 100 mg + hydrochlorothiazide 25 mg (Los + HCTZ), 32 in losinopril 40 mg + hydrochlorothiazide 25 mg (Liz + HCTZ) and 27 in bisoprolol 10mg+hydrochlorothiazide 25 mg (B+HCTZ). All patients at baseline and during follow-up underwent: (office) cSBP, cDBP and HR measurement, ABPM, noninvasive central SBP (cSBP) measurement and evaluation of carotid-femoral (cPWV) and carotid-radial (crPWV) pulse wave velocity, biochemical blood tests. If blood pressure after 1 month of treatment was higher than 140/90 mmHg amlopidine 5 mg was added, if it was insufficient the dose of amlopidine was increased to 10 mg after 2 months. After 3 months, if necessary, doxazosin 2–4 mg was added.

**Results:** Decrease of cSBP/DDBP was similar in Los+HCTZ, Liz+HCTZ and B+HCTZ groups (44.7 ± 0.9/18.4 ± 1.1 mmHg, 44.5 ± 1.9/19.0 ± 2.1 and 42.4 ± 2.1/18.5 ± 2.5 mmHg in each group respectively, P = NS for difference between groups). The percentage of patients achieved target BP were 96.9% in Los+HCTZ, 93.8% in Liz+HCTZ and 92.6% in B+HCTZ groups. 24SBP/24DBP decreased by 24.6 ± 1.3/17.6 ± 1.1 mmHg in Los+HCTZ, 19.0 ± 3.3/19.3 ± 2.8 mmHg in Liz+HCTZ group and by 24 ± 1.8/16.9 ± 1.2 mmHg in B+HCTZ group, in addition, we observed a significant reduction in average HR in this group. Dynamics of cSBP, AxP and PWV are illustrated on the picture. Reduction of cSBP in Los+HCTZ and in Liz+HCTZ groups was significantly higher than in group of bisoprolol-based combination.

**Conclusions:** Despite of the almost equivalent brachial BP decrease according to office measurement and according to ABPM data, therapy based on combinations of Los+HCTZ/Liz+HCTZ significantly better decreased cSBP.

**PP.02.11**

A DISINTEGRIN AND METALLOPROTEINASE WITH THROMBOSPONDIN TYPE 1 MOTIF (ADAMTS1) CAUSES RENAL FIBROSIS IN DEOXYCORTICOSTEROANE ACETATE-SALT HYPERTENSIVE RATS


Objective: The extracellular matrix (ECM) not only provides structural support in many tissues but also plays important biological roles. ECM accumulation and/or imbalance of ECM components implicate various pathological states such as excessive fibrosis. A disintegrin and metallopeptinase with thrombospondin type 1 motif (ADAMTS1) have been indicated to facilitate collagen deposition via transforming growth factor-β (TGF-β) activation in some tissues. This study investigated the role of ADAMTS1 in renal fibrosis in deoxycorticosterone acetate (DOCA)-salt hypertensive rats.

**Design and method:** Unnephrectomized rats were treated with DOCA (40 mg/kg/week, s.c.) and 1% NaCl in drinking water for 0, 1, 2, or 3 weeks (n = 5–6/group). Blood pressure, urinary protein excretion, and plasma creatinine were measured. Renal sections were stained with Masson’s trichrome to detect collagen fibers. The protein expression of collagen I, TGF-β, and ADAMTS1 was examined by Western blotting. The angiotensin converting enzyme (ACE) activity was also measured.

**Results:** Blood pressure showed time-dependent increases from 2 weeks, and the levels of proteinuria and plasma creatinine increased from 2 weeks. Masson’s trichrome-positive collagen content increased from 2 weeks with an additional increase in 3 weeks. On the other hand, Western blot analysis demonstrated that the collagen I protein levels equally increased in 1-, 2-, and 3-week groups, indicating that the blood pressure elevation may accelerate post-translational collagen processing but not collagen I production. The expression of ADAMTS1 (both 110kDa latent and 57kDa active forms) as well as that of TGF-β increased in 2 and 3 weeks, suggesting a potential role of ADAMTS1 as an inducer of collagen processing and deposition. The ACE activity was increased in 2 and 3 weeks. Since the renin-angiotensin system is reported to increase ADAMTS1 expression, the activation of ACE might relate to ADAMTS1 upregulation in DOCA-salt rat kidney.

**Conclusions:** ADAMTS1, which is reported to induce fibrosis in other tissues, may be an important inducer of renal fibrosis in hypertensive rats. Further investigation to show that ADAMTS1 production and activation are placed in the upstream of collagen accumulation and downstream of ACE will strengthen our hypothesis.
100 mg + amlodipine 5 mg, 10 mg) for the 46 hypertensive patients changed other antihypertensive drugs.

**Design and method:** 46 patients (average age 67.5 ± 11.9 years old, male 39, female 7). Before amnius administration, ARB treated patients 19, CCB treated patients 19, no treatment 8. They were treated by Irbesartan/Amlodipine Bésilate for 12 weeks.

**Results:** 12 weeks after treatment, Systolic blood pressure was from 157 ± 20 to 146 ± 17mmHg and diastolic BP was from 96 ± 10 to 88 ± 9mmHg (P < 0.001) in all 46 patients. In 19 Amiklinus HDS, SBP was from 159 ± 18 to 146 ± 17 mmHg (P = 0.005), DBP was 96 ± 8 to 88 ± 8 mmHg (P < 0.001). In 27 LD, SBP was from 159 ± 21 to 147 ± 18 mmHg (P = 0.027) and from 96 ± 11 to 86 ± 9 mmHg (P = 0.002).

The clinical data was shown, LDL cholesterol (n = 42) 112 ± 32 to 105 ± 27 mg/dl (P = 0.006), HDL cholesterol (n = 42) 22 to 61 mg/dl (P = 0.002), FbAIC(n = 17) 6.6 ± 0.6 to 6.4 ± 0.5 % (P = 0.005), Blood glucose 118 ± 25 mg/dl to 117 ± 26, eGHR (n = 41) from 59 ± 2 to 59 ± 2 ml/min.

**Conclusions:** Combination drug (Irbesartan and amlodipine) was significantly lowered high blood pressure before treatment without any side effect for lipid and glucose metabolism and renal function.

**PP.02.14 ANTIHYPERTENSIVE EFFECT OF LOSARTAN – ONE-YEAR FOLLOW-UP STUDY**

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**Objective:** The aim was to assess the efficiency and safety of losartan therapy in patients with stage I and stage II hypertension during a one-year follow-up period.

**Design and method:** A cross-sectional study comprised 199 patients (100 men and 99 women) with stage I or stage II arterial hypertension, aged 60.9 ± 10.5 years. All patients were treated with a single daily dose of 50 mg losartan per os; the dose was increased to 5 mg after two weeks in persons who failed to decrease blood pressure adequately; the dose was increased to 100 mg if blood pressure was not regulated. Patients were followed up for one year. Blood pressure (BP) was measured by an oscillometric device at the beginning of the study, hemodynamic monitoring was performed using a thoracic bioelectric impedance method (Task Force monitor), and ambulatory blood pressure monitoring was performed by Space Labs 90202 device in all patients. The differences in selected parameters before and after losartan therapy were tested with Student’s t-test for paired samples.

**Results:** Mean systolic blood pressure (SBP) at the beginning of the study was 163.8 ± 11 mmHg; mean diastolic blood pressure (DBP) was 101.8 ± 6 mmHg; mean heart rate was 74 beats/min. After therapy, mean SBP was significantly reduced to 137.1 ± 11 mmHg (p < 0.001), DBP was significantly reduced to 89.9 mmHg (p < 0.001), and heart rate was 72 beats/min. At the beginning, mean % of vasoconstriction was 75 ± 15 among men, and 62 ± 13 among women. After one month of losartan therapy, mean % of vasoconstriction was 38 ± 11 in men, and 34 ± 12 in women. At the end of the losartan treatment, mean % of vasoconstriction was 10 ± 9 in men, and 9 ± 9 in women. The differences are highly statistically significant (all p < 0.001). At the end, 71% remained treated with 50 mg losartan, and only 29% of patients were treated with 100 mg losartan.

**Conclusions:** One-year therapy with losartan is highly efficient in the regulation of blood pressure and in decreasing vasoconstriction in hypertensive patients.

**PP.02.15 EFFICIENCY OF BISOPROLOL IN THE TREATMENT OF STAGE I HYPERTENSION “BIPREZ” STUDY**

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**Objective:** The aim was to assess the efficiency and safety of bisoprolol therapy in patients with Stage I hypertension in three doses; 2.5 mg, 5 mg, and 10 mg.

**Design and method:** A cross-sectional study comprised 9060 patients (65% women and 35% men) with stage I arterial hypertension, aged 61.6 ± 11.5 years. Blood pressure (BP) was measured by an oscillometric device at the beginning of the study and after three months of therapy. The treatment initiated with 2.5 mg bisoprolol; the dose was increased to 5 mg after two weeks in persons who failed to decrease blood pressure adequately; the dose was increased to 10 mg after further 4 weeks in persons whose blood pressure remained increased. Patients were followed up for 8 weeks in total. Blood glucose, total cholesterol, and triglycerides were measured with standard biochemical procedures. The differences in blood pressure values after eight-week therapy in comparison to the baseline were tested with Student’s t-test for paired samples.

**Results:** Mean systolic blood pressure (SBP) at the beginning of the study was 141.1 ± 11 mmHg; mean diastolic blood pressure (DBP) was 90.5 ± 7 mmHg. After eight weeks of therapy, mean SBP was significantly reduced to 128.9 mmHg (p < 0.01), and DBP was significantly reduced to 79.0 mmHg (p < 0.01). At the end of the eight-week treatment, 27.8% of the patients had normal blood pressure, 51.5% had prehypertension, and 20.7% still had stage I hypertension. The therapy lead to significant decrease of heart rate from 82.2 beats/min to 71 beats/min (p < 0.01), as well as to decrease of the following biochemical parameters: glucose (from 6.05 mmol/l to 5.83 mmol/l), total cholesterol (from 5.97 mmol/l to 5.73 mmol/l), LDL-cholesterol (from 3.65 mmol/l to 3.46 mmol/l) and triglycerides (from 1.96 mmol/l to 1.82 mmol/l) (all p < 0.01).

**Conclusions:** Eight-week therapy with bisoprolol not only reduces blood pressure and heart rate in hypertensive men, but decreases glucose, cholesterol and triglyceride levels, and is metabolically neutral as well.
monitored by physical exams, blood pressure measurements, 12-lead ECG and clinical safety laboratory parameters. Potential adverse effects were documented.

**Results:** C21 was rapidly absorbed with median T<sub>max</sub> at 40 min. C21 exposure increased proportionally to dose, with Cmax increasing from 1.8 to 604 ng/mL and AUC(0-24) from 2.2 to 2648 h·ng/ml. T<sub>1/2</sub> was 5.4 h on average at the 100 mg dose level. C21 was generally well tolerated with no serious or severe adverse events being recorded and no major abnormalities in the laboratory safety parameters related to drug intake. In one subject's ECG, transient PR prolongation was noted 1 hour after intake of 3 mg of C21. PR prolongation did not occur at higher doses.

**Conclusions:** From these data it can be concluded that orally applied C21 at doses from 0.3 to 100 mg is safe and well-tolerated and has favorable pharmacokinetic properties for further clinical development of this first-in-class AT2-receptor agonist in a multiple ascending dose study. Trial registration: EuDraCT 2015-005718-32

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**PP.02.18**

**AZILSARTAN MEDOXOMIL DECREASES 24-H CENTRAL BP AND ARTERIAL STIFFNESS IN PATIENTS WITH ARTERIAL HYPERTENSION AND TYPE 2 DIABETES MELLITUS**

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**Objective:** Achievement of target blood pressure (BP) is the main strategy of the prevention of cardio-vascular (CV) events in patients with type 2 diabetes mellitus (T2DM). Central aortic systolic blood pressure (SBP) is a better predictor for CVD and a better guide for anti-hypertensive treatment compared to brachial SBP. Azilsartan medoxomil (AZM) has shown greater antihypertensive efficacy compared to other angiotensin receptor blockers (ARB). The aim of the study was to evaluate changes in office and 24-h central BP (CBP) and parameters of arterial stiffness in patients with AH and T2DM receiving ineffective free dual combination after replacement of renin-angiotensin-aldosterone inhibitor (RAAS) by AZM.

**Design and method:** 30 patients with AH and T2DM with uncontrolled blood pressure (>140/85 mmHg on dual AHT were included (53% females, mean age 60.4 ± 7.6 years (M ± SD), 40% smokers). 65% received ACE inhibitors, 37% other ARB. The other drug was thiazide diuretic in 57%, CCB in 30% and BB in 13%. RAAS inhibitor was replaced by 40 mg of AZM with uptitration up to 80 mg after 6 weeks in case of uncontrolled AH. Study duration was 12 weeks. BP was measured with a validated oscillographic device (OMRON 705CP-II). Arterial stiffness was measured by application tonometry (Sphygmocor, AtCor). 24-h peripheral and central BP monitoring was performed (BP Lab Vasotens, "Petru Telegin"). P < 0.05 was significant.

**Results:** After 12 weeks target BP was achieved in 25 (83%) patients. Up titration of AZM was performed in 11 (37%) patients. Office CBP significantly decreased from 144 ± 118/4 ± 44 mmHg to 115 ± 9.6 ± 5 mmHg respectively, p < 0.05. Baseline and achieved 24-h CBP levels were as follows: 136 ± 18/2.9 ± 9 and 118 ± 11/6.5 ± 5 mmHg for daytime; 129 ± 21/74 ± 11 and 110 ± 8/6.4 ± 5 mmHg for night-time; 134 ± 17/80 ± 11 and 114 ± 9/6.6 ± 5 mmHg for 24-h, respectively p < 0.05 for trend. There were also significant changes in the parameters of arterial stiffness: pulse wave velocity decreased from 10.2 ± 3.2 to 9.5 ± 2.2 m/s; AIx@75 from 25 ± 9 ± 13 ± 7%, p < 0.05. No changes in PP amplification were observed.

**Conclusions:** Replacement of RAAS inhibitor by AZM results in significant decrease of office and 24-h central BP and improvement of parameters of AS in patients with T2DM and uncontrolled AH.

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**PP.02.21**

**VASCULAR CALCIFICATION AND CELLULAR SENESEENCE OF SMOOTH MUSCLE CELLS IS INDUCED BY DOXORUBICIN**


**Objective:** Cardiovascular disease are the leading cause of death. Changes within the vascular wall as mineralization of vascular smooth muscle cells is one pathophysiology of cardiovascular alterations. Increased oxidative stress and cellular senescence of vascular cells are main factors in the pathogenesis. The cytostatic drug doxorubicin (DOX) induces the production of reactive oxygen species (ROS), activates cell apoptosis mechanisms and promote cellular senescence. The aim of this study is to investigate the effect of DOX on vascular smooth muscle cell mineralization.

**Design and method:** Vascular smooth muscle cells of rats (rVSMC) were used for in vitro experiments and aortic rings of rats for ex vivo experiments. Calcification of cells was induced using a high phosphate medium. Calcium content was quantified spectrophotometrically via o-cresolphthalein complexon/mineralization of p53, p21, p16, osteocalcin (OPN) and core binding factor-α (cbfa1) was measured using real-time PCR. ALP activity was quantified using the p-nitro-phenol assay.

**Results:** Gene expression of senescence markers as p21 and p53 dose-dependently increase upon DOX stimulation for 24 h, 48 h and 72 h. Gene expression of ALP OPN and cbfa1 also increase dose-dependently upon DOX stimulation for 24 to 72 h. ALP enzyme activity is significantly induced by DOX stimulation during 14 days of stimulation. Long-term treatment of rVSMC with DOX for 14 days significantly increased the mineralization of the cells as quantified by the extracellular calcium content. Ex vivo experiments with aortic rings from rats confirmed the findings. Here, DOX stimulation for 14 days induces mineralization that could be found located within the media of the vessel wall by histological staining with Alizarin Red and van Kossa.

**Conclusions:** DOX is a robust inducer of cellular senescence and mineralization of smooth muscle cells. The data let suggest that side effects of cyclosporine treatment with DOX may contribute to the high cardiovascular risk of patients by vascular aging and stiffening.

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**PP.02.22**

**ASSESSMENT OF SUITABLE ANTIHYPERTENSIVE THERAPIES: COMBINATION WITH HIGH DOSE AMLODIPINE/IRBESARTAN VS. TRIPLE COMBINATION WITH AMLODIPINE/IRBESARTAN/INDAPAMIDE (ASAHI AI STUDY)**

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**Objective:** Angiotensin receptor blockers (ARBs) plus calcium channel blockers (CCBs) is a widely used combination therapy for hypertensive patients. This study aimed to determine which combination was better as the next step therapy: a combination with high dose CCBs or triple combination with diuretics.

**Design and method:** We conducted a prospective, randomized, open-label trial. Hypertensive outpatients who did not achieve their target blood pressure (BP < 140/90mmHg) with usual dosages of ARBs and amlodipine 5 mg were randomly assigned to switch treatment to lisinopril 100 mg/amlodipine 10 mg (group ARB+C: n = 25, aged 64 ± 14 years) or indapamide 1 mg in addition to ARBs+ amlodipine 5 mg (group ARB+C+D: n = 22, aged 69 ± 9 years). The primary endpoint was changes in the systolic blood pressure (SBP) and diastolic blood pressure (DBP) after the 3-month treatment period, while secondary endpoints were BP changes after the 6-month treatment period, and laboratory values.

**Results:** At three months, the SBP/DBP significantly (p < 0.01) decreased from 151.8/8.13 mmHg to 130.7/13.11 mmHg in group ARB+C and 152.8/11.13 mmHg to 127.4/16.12 mmHg in group ARB+C+D, and the efficacy in reducing the BP was similar between the two groups. Similarly, at six months, the SBP/DBP significantly decreased to 131.7/12.10 mmHg in the ARB+C group, and to 127.3/12.12 mmHg in the ARB+C+D group. The serum potassium tended to decrease and the creatinine and uric acid levels tended to increase in the ARB+C+D group (At three months, the potassium, creatinine, and uric acid were 4.2mg/dL, 0.78 mg/dL, and 5.1 mg/dL in the ARB+C group and 4.0 mg/dL, 0.87 mg/dL, and 5.9 mg/dL in the ARB+C+D group respectively). Although there were two withdrawal cases (one case for hypokalemia and one for hyperuricemia in the ARB+C+D group), both combination therapies were safe and tolerable throughout the trial.

**Conclusions:** High dose CCBs combined with ARBs and a triple combination with diuretics combined with CCB/ARBs produced a similar efficacy in reducing the BP. No significant adverse events were observed in either group, however, the change in the laboratory data seemed advantageous in the ARB+C group. The results from the ASAHI AI trial will provide new evidence for selecting optimal combination therapies for uncontrolled hypertensive patients.

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**PP.02.23**

**NATURAL ANTIoxidANT ICE-CREAM ACUTELY REDUCES BLOOD PRESSURE AND IMPROVES VASCULAR FUNCTION IN PATIENTS WITH METABOLIC SYNDROME**

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**Objective:** Epidemiological investigations revealed an inverse correlation between the intake of polyphenols-containing foods and coronary artery disease mortality. A large number of studies has investigated the possible blood pressure (BP) lowering effect of different dietary supplements. We hypothesized that a natural antioxidant ice cream with a selected blend of cocoa, hazelnut and other ingredients from organic farming, could improve vascular function and decrease blood pressure in sample of patients with metabolic syndrome via an oxidative stress-mediated mechanism.

**Design and method:** We performed a single blind crossover study in which we measured the acute effect of natural antioxidant ice cream, on vascular function and blood pressure
in a population of patient with metabolic syndrome. 10 subjects (5 male, 5 female), mean age 56 years, were randomly allocated to a treatment sequence with 100 mg of antioxidant ice cream or milk ice cream in a cross-over, single-blind design. Total polyphenol content (mg/100 g) was significantly higher in antioxidant ice cream compared to milk ice cream. There was at least 1 week washout between the 2 phases of the study. Oxidative stress (assessed by measuring plasma hydroperoxides, analytic method d-ROMs, Nitric oxide (NO) bioavailability (NOx), vascular function (flow mediated dilatation, FMD), and blood pressure were assessed at baseline, after a 24 hours abstinence from food rich in polyphenols, and 2 hours after ingestion of ice cream.

Results: Serum polyphenols (139.28 ± 28.32 vs 288.57 ± 58.12, p < 0.001), NOx (23.34 ± 5.24 vs 48.24 ± 8.66, p < 0.001), FMD (2.34 ± 1.46 vs 6.43 ± 1.86, p < 0.001) increased significantly, oxidative stress (D-Roms 426.27 ± 49.03 vs 378.85 ± 38.12, p < 0.01), and systolic (7.17 ± 4.67 mm/Hg, p < 0.001) and diastolic (5.48 ± 3.92 mm/Hg, p < 0.001) blood pressure decreased only after antioxidant ice cream ingestion. No changes were found after control ice cream ingestion.

Conclusions: For the first time, a natural antioxidant ice cream rich in polyphenols was demonstrated to acutely improve vascular function and decrease blood pressure in patients with metabolic syndrome through a reduction of oxidative stress and increase of NO bioavailability. This may be a novel valuable strategy for BP lowering in the high-normal range in which current hypertension management guidelines do not recommend drug treatment.

**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 life 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 unmedicated polyneuropathy patients’ life quality and recovery of symptoms.

**Design and method:** 60 patients admitted to the Cukurova University Faculty of Medicine, Nephrology and Endocrinology Out patient Clinics between 2010 – 2012 who had been diagnosed peripheric 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 decretments in systolic and diastolic blood pressures before and after therapy by using continuously blood pressure recorders and using parameters including VAS, LANNS and NHP scalas.

**Conclusions:** In our study, the symptoms of painful polyneuropathy patients are improved with Transcutaneous 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 approach modality.
**Design and method:** 20 DM patients with peripheric neuropathies on lower limbs with severe tinglings, burnings, pains, numbnness, sleeping disturbances, general or local sensing abnormalities (7 parameters), 20 CKD and 10 PH patients with same symptoms included into study. Patients had severe medical treatments including analgesics, antidepressives, anxiotechnics, vit B complex, gabapentin like drug therapy, several types of physical therapies recently. HMTE device, HiTop 181-H (GBO Medizintechnik) applied to groups as three times a week for one hour during one month. Before and after treatments, SBP, DBP, MAP, HR with Mobil-O-Graph NG automated continuously BP recorder (APC Cardiovascular), EMG-ENG detections, HbA1c, albumin, CRP values, for sympathetic nervous system NE, E, Dopamin, PRA, aldosteron, AII levels determined. Results before and after compared according to universal criteria. Decriments in physical symptoms categorized in a scale as from 10 to 1 degree decrementally or from 1 to 10 gradually.

**Results:** All three categories faced miraculous decrements at least 2 or 3 scales in peripheral symptoms on lower limbs for 7 parameters. Working and walking capacities improved dramatically and psychological behaviours changed, felt themselves like never before. SBP, DBP, MAP, HR were significantly decreased as expected at least 20% (Figure 1 and 2). We expect hormonal values to be in accordance with dramatical clinical improvements as well.

**Conclusions:** New treatment modality appears to have miraculous effects to be accepted officially and privately in state and private treatment centers. If we consider prevalences of 5% for DM, 8% for CKD and at least 27% for PH in world presently we believe those patients have rights to be treated in reasonable fashion with this novel modality. This is a sine qua non humanitarian task.

**Objective:** Dosing time-dependent differences in efficacy of combination antihypertensive treatment have reported contradictory outcomes and circadian system could be responsible. The aim of our study was to study changes in expression of circadian regulatory genes affected by morning and evening dosing with combination treatment in short term and long term settings.

**Design and method:** Spontaneously hypertensive rats aged between 8–10 weeks were treated with fixed combination of valsartan (10 mg/kg) and amlodipine (4 mg/kg), either in the morning (07:00) or in the evening (19:00) with treatment duration 1 and 6 weeks and with placebo group running in parallel for every treatment group. Body and cardiac characteristics were quantified by gravimetric and haemodynamic measurements, respectively. Relative expressions of selected genes were analyzed using qRT-PCR method in samples from left ventricles, right ventricles, aortas and kidneys.

**Results:** After short term experiment, only morning treatment group demonstrated significantly better outcomes (p < 0.05) in terms of blood pressure control and heart rate decrease when compared to placebo, but after long term experiment this effect applied to both treatment groups, no significant difference was seen between morning and evening treatment. Effect of therapy was confirmed by significant >43% decrease in gene expression of atrial natriuretic peptide (Anp) in left ventricles, and >58% increase of renin (Ren) in kidneys of treatment groups except the evening groups in 1-week experiment (p < 0.05). Circadian regulatory genes expression (Per2, Bmal1) in left ventricles, right ventricles and aortas showed antiphase rhythmic pattern in both experiments and significant changes were observed in all treated evening groups by >63% increase of Per2 and >52% decrease of Bmal1 compared to placebo groups, while morning groups remained unchanged (p < 0.05).

**Conclusions:** In summary, circadian regulatory genes showed enhanced gene expression in evening groups compared to placebo groups in both short and long term settings with morning groups unaffected by combination therapy. Although in evening groups of short term settings therapeutic effect is not yet seen, circadian genes are changing the same way they do in long term settings.
POSTER SESSION

POSTERS’ SESSION PS03:

AGEING

PP.03.04 VICTORIA STUDY: SCREENING FOR EARLY VASCULAR AGING BY ARTERIAL STIFFNESS AND CENTRAL HEMODYNAMICS PARAMETERS IN PHYSICIANS

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Objective: to analyzed parameters of central hemodynamics, arterial stiffness and vascular age, to compare passport and vascular ages in physician’s population.

Design and method: Observational multicenter screening study of doctor’s health assessment in 12 Russian cities. Demographics; smoking status; anamnesis of arterial hypertension with/without therapy, established CV, renal diseases, diabetes mellitus; cholesterol level were registered. Peripheral BP, central BP, pulse wave velocity (PWV), aortic and peripheral augmentation index (AI), reflected wave transit time (RWTT) were assessed by oscillometric device BPlab Vasotens Office (OOO “Pett Telegin”).

Results: 464 individuals were included (247 normotensives (mean age 44 yrs) and 237 with arterial hypertension (AH) (mean age 58 yrs)). Central BP, PWV, and AI were significantly higher in the hypertensive group comparing to normotensive group (134.1 vs 112.1 mm Hg for systolic BP, 83.1 vs 77.4 mm Hg for diastolic BP, 12.2 vs 10.9 m/sec for aortic PWV, -8.1 vs -29.3% for peripheral AI, and 22.3 vs 12.1% for aortic AI), RWTT was significantly lower in hypertensive patients (118.7 versus 132.9 ms). After adjusting for confounding factors significant intergroup difference was presented for central BP, RWTT, and peripheral AI. PWV 10/m/s had 68% subjects without AH and 92% pts with AH, elevation of pulse pressure >60 mm Hg had 11% subjects without AH and 43% pts with AH. The most pts with AH (82%) and 31% of normotensives had increased vascular age comparing to passport one. The same passport and vascular age were observed in 10% pts with AH and 12% without it. Vascular age was lower than passport one in 55% of normotensives and 8% of hypertensive pts.

Conclusions: Prevalence of PWVao elevation is high in observed population and noninvasive cuff-based device could be implemented for every day practice for arterial stiffness and central hemodynamics evaluation. Early vascular aging was typical in hypertensive group. Vascular age evaluation could be useful instrument in treatment motivation improving strategy.

PP.03.05 ANTIHYPERTENSIVE THERAPY AMONG ELDERLY OUTPATIENTS IN MOSCOW

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Objective: to analyzed parameters of central hemodynamics, arterial stiffness and vascular age, to compare passport and vascular ages in physician’s population.

Design and method: Methods: The study includes 356 patients 65–93 years old. Average age was 74.8 ± 6.1 years old, 80.4% women, 54.8% of them with higher education and 9% still continue to work. Research was conducted in Moscow policlinic from November 2014 to May 2015. Anamnesis of arterial hypertension, cardiovascular diseases and antihypertensive therapy was evaluated among 2 groups of seniors: 65–79 years old (n = 277) and > 80 years old (n = 79).

Results: Antihypertensive therapy was reported by 91.6% (n = 326) patients. Thirty-four percent of the patients (n = 98) received monotherapy. Combination of two-drugs were taken by 36.8% (n = 105) of the patients. Three and four drugs combination were taken by 22.5% (n = 64) and 6.1% (n = 18) of the patients, respectively. The study revealed ACE inhibitors and beta-blockers as most frequent drugs (53.7% and 50.5% of patients, respectively). The distribution of another groups of antihypertensive pills is following: angiotensin receptor blocker - 23.9%, diuretic - 38.6%, calcium channel blocker - 34% patients. Myocardial infarction or heart failure was registered by 24% of the patients under BB therapy. Average consumption of antihypertensive drugs of the patients in the age of 65–79 years old is 1.6 ± 1.2 and 1.8 ± 1.2 in age group of > 80 years old. Patients in the age group of 65 - 79 years old took beta-blockers more often, than patients >80 year old (41.2% vs 38%, p = 0.7). However patients group of 65–79 years old took an ACE inhibitors (40.8% vs 50.6 %, p = 0.12) or calcium channel blocker (24.5% vs 36.7%, p = 0.04) rarely, than >80 years old patients. Reception frequency of angiotensin receptor blocker and diuretics were similar among above-mentioned groups (respectively,19.5% vs 17.7%, and 29.6% vs 35.4%).

Conclusions: Most hypertensive patients > 65 years old receive combination antihypertensive therapy. Combinations of ACE inhibitors + beta-blockers or ACE inhibitors + diuretic are among the most common.

PP.03.07 INFLUENCE OF ANAESTHESIA ON THE CYTOKINE’S LEVEL IN ELDERLY WITH CONCOMITANT CARDIOVASCULAR DISEASES

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Objective: Increase in the number of elderly patients is a serious problem for anesthesiology. The incidence of systemic inflammation in elderly is 20 to 30%, depending on the severity of the patient and other factors [Nearman H. et al., 2014]. In 40% of patients with SIRS promotes postoperative multiple organ dysfunction. This increases the number of postoperative complications and mortality increases to 50% [Menyar A. et al., 2012]. The goal of our study was to examine and evaluate markers of Inflammatory Response in elderly after general anesthesia.

Design and method: We examined 105 patients aged 60 to 82 years for abdominal surgery with total intravenous anesthesia. There were representative of the age, gender, ASA, BMI, Euroscore. Preoperative patients with CVD managed in accordance with ESC Guidelines (2014). IL-1, TNF, IL-6, IL-10 in EDTA-plasma determined by enzyme immunoassay (set Biomedica). Data are presented as M ± m, statistically significant value of p < 0.05.

Results: The severity of the patients corresponded to 48% of ASA II, 52% - ASA III. We compared the levels of IL-1, TNF, IL-6, IL-10 in elderly preoperatively, after anesthesia and to 5 days postanesthesia. Preoperatively the level of proinflammatory IL-6 exceeded the norm by 64.2%, TNF - on 61.5%. The level of anti-inflammatory IL-10 exceeded the norm by 58.4% (p = 0.000001). The inflammatory activity index (IL 6/IL 10) was normal. After anesthesia the level of IL 1 increased by 35.9% (p = 0.04). The level of IL6 increased output value to 2651% (p = 0.002). The concentration of IL 10 not statistically different from the norm and output levels. IL 6 level higher than the initial value by 2971% (p = 0.002). Not found significant changes in the level of TNF. The index IL 6/IL 10 was 4125 % (p = 0.000001) above normal.

Conclusions: Elderly patients preoperative showed a non-specific activation of the inflammatory response that manifested as high in pro-inflammatory and anti-inflammatory cytokines. After anesthesia in elderly we detected the inflammatory activation, which was confirmed by the increasing levels of cytokines and value index IL 6/IL 10.

PP.03.08 THE HAEMODYNAMIC MECHANISM OF THE AGE-RELATED INCREASE IN PULSE PRESSURE IN WOMEN

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Objective: An age-related increase in pulse pressure is the major cause of morbidity and mortality in the ageing population and is more marked in women than in men. The haemodynamic determinants of increased pulse pressure remain incompletely understood. The aim of this study is to examine the contribution of venricular dynamics, large artery stiffness, and pressure wave reflection to central pulse pressure.

Design and method: A total of 2162 women aged 18 to 91 years (mean ± SD, age 57 ± 13 years) from the Twins UK cohort were studied. Non-invasive aortic flow velocity and blood pressure were measured by Doppler sonography and carotid tonometry system respectively. Carotid-femoral PWV was measured using the SphygmoCor system. Reflection index (the ratio of the peak of the backward pressure wave over that of the forward pressure wave) was computed from the pressure and flow waves.
Objective: To evaluate vascular age in patients aged 45 to 65 years with grade 1–2 essential arterial hypertension without concomitant cardiovascular diseases.

Design and method: Case-control study. We examined 60 naive patients with uncomplicated essential arterial hypertension grade 1–2 (mean age 53.6 ± 0.8 years; 31 men; mean body mass index [BMI] 31.0 ± 0.5 kg/m²; 36.7% smokers, mean office systolic blood pressure [SBP] 151.2 ± 1.8 mmHg; mean office diastolic blood pressure 96.3 ± 0.8 mmHg) and 44 healthy control individuals (mean age 51.5 ± 1.0 years; 21 men; mean BMI 26.5 ± 0.6 kg/m²; 18.2% smokers). Serum total cholesterol (TC), low- and high-density lipoprotein cholesterol (HDL-C), triglycerides, glucose and creatinine level analysis were performed. Vascular age was calculated by two techniques. First method was based on Framingham Heart Study risk tables using age, SBP, TC and HDL-C levels, and taking into account gender, smoking and diabetetic history. Second method was based on SCORE project scales using age, gender, SBP, TC and smoking status.

Results: Vascular age was significantly (p < 0.001) higher in hypertensive patients compared to controls: according to Framingham Heart Study risk tables it was 70.6 ± 1.4 years and 55.3 ± 1.8 years, respectively; according to SCORE project scales – 59.1 ± 1.5 and 51.2 ± 1.3 years, respectively. In hypertensive patients vascular age was greater than chronological age, as when it was calculated by Framingham Heart Study risk tables (delta 17.0 ± 1.1 years) and by SCORE project scales (delta 6.3 ± 1.0 years). In controls, vascular age was greater than chronological age (delta 3.9 ± 1.5 years) and lower (delta -0.4 ± 0.5 years) than chronological age when it was calculated by SCORE project scales.

Conclusions: Vascular age was higher in naive middle-aged hypertensive patients compared to controls. Both in hypertensive patients and in control group the highest values of vascular age were obtained using a Framingham Heart Study risk tables, which takes into account the largest amount of clinical and laboratory data.

PP.03.09 VASCULAR AGE IN HYPERTENSIVE PATIENTS
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Objective: Estimation of mortality predictors among elderly residents of long-term care facilities during one year follow-up.

Design and method: Study population consisted of elderly residents of 3 LTC facilities (two residential homes and one nursing home). Medical documentation was analyzed and blood pressure (BP) measurements. Abreviated Mental Test Score (AMTS), Barthel’s Index (BI) were performed in all study participants at the beginning of the study. Main outcome measure was all-cause mortality during one year follow-up. Study population was analyzed in two groups: residents who were alive (group I) and deceased subjects (group II) during follow-up period. Results obtained in two analyzed groups were compared using U Mann-Whitney and Chi square tests. Univariate and multivariate logistic regression models were used for investigating the risk factors for mortality.

Results: The cohort consisted of 168 elderly LTC residents. Group I (n = 147) and group II (n = 21) showed similar age (78.6 ± 8.4 vs 79.5 ± 8.95 years), number of diagnosed diseases (4.2 ± 1.8 vs 4.1 ± 1.8), number of used drugs (6.4 ± 3.5 vs 8.0 ± 3.6), and BP values (129 ± 19.7/22.1 ± 11.2 vs 122 ± 12.4/71 ± 9.5 mmHg). However, group II revealed significantly (p < 0.001) lower physical function (BI:19.7 ± 24.8 vs 51.4 ± 38.0), and worse mental status (AMTS score: 4.45 ± 3.47 vs 6.88 ± 2.81). Lower mortality risk was observed among those with higher BI [OR = 0.97; CI(0.95; 0.989)], higher AMTS score [OR = 0.79; CI(0.68; 0.91)] and diagnosis of hypertension [OR = 0.21; CI(0.07; 0.61)]. However, diagnosis of diabetes [OR = 4.5; CI(1.72; 11.76)] and dementia [OR = 2.84; CI(1.11; 7.25)] and heart failure [OR = 7.34; CI(1.99; 25.06)] were associated with higher mortality risk. Diagnosis of hypertension [OR = 0.09; CI (0.03; 0.35)], diabetes [OR = 9.45; CI (2.89; 30.880)] and dementia [OR = 4.85; CI(1.57; 14.98)] significantly influenced on mortality risk in multivariate regression.

Conclusions: Diagnosis of diabetes and dementia increase risk of mortality in institutionalized geriatric subjects, while the presence of hypertension exerts a protective effect.

PP.03.11 INFLUENCE OF AGE ON THE RELATIONSHIP OF RENAL FUNCTION IMPAIRMENT WITH SYSTEMIC VASCULAR DAMAGE IN HYPERTENSION
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Objective: Aging is a strong predictor of cardiovascular events. Several studies showed that aging increased risk through progressive development of morpho-functional vascular changes. Moreover, renal impairment related to aging has also been suggested to explain the increased cardiovascular risk in elderly. Vascular impairment and kidney damage have been strongly associated each other, but they have different dynamics of progression over time, and it is not known if age changes the abovementioned relationship. The aim of this study is to evaluate, in hypertensive patients, the influence of age on the association between renal damage (glomerular filtration rate, albuminuria and renal resistance index (RRI)) with subclinical vascular damage (carotid intima-media thickness (cIMT) and aortic pulse wave velocity (aPWV)).

Design and method: We enrolled 476 hypertensive subjects (30–90 years). The population was divided into 2 groups: subjects > 65 years (elderly hypertensives; n = 126) (EH) and subjects < 65 years (not elderly hypertensives; n = 350) (NEH). A Duplex ultrasonographic examination of both carotid and renal vasculature was performed in all patients. aPWV was assessed through oscillometric device.

Results: EH had lower eGFR and higher albuminuria, cIMT and aPWV compared to NEH (all p < 0.001). Age significantly correlated with eGFR, albuminuria, cIMT and aPWV in the study population (p < 0.001) and in the two subgroups divided by age. In EH group, as well as in NEH group, cIMT was strongly associated with eGFR and RRI (p < 0.01), but not with albuminuria. In contrast, aPWV significantly correlated with all indices of renal damage (eGFR and albuminuria: p < 0.001; RRI: p < 0.01) in NEH, whereas it showed significant association only with eGFR in EH (p < 0.001). The cIMT independently correlated with RRI and eGFR in NEH, whereas it was significantly related only to RRI in EH. aPWV was independently associated with albuminuria in NEH, whereas it did not independently correlate with any indices of renal damage in EH.

Conclusions: Age is an important modifier of the relationships between renal damage (eGFR, albuminuria and RRI) subclinical vascular involvement (cIMT and aPWV).

PP.03.12 SIGNIFICANT INTER-ARM DIFFERENCE IN BLOOD PRESSURE IS ASSOCIATED WITH INCREASED ARTERIAL STIFFNESS AND ABDOMINAL OBESITY IN VERY ELDERLY HYPERTENSIVES
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Objective: Inter-arm difference in blood pressure (BP) and orthostatic BP response have important prognostic significance in hypertensive patients. However, data on prevalence, predictors and clinical associations of those phenomena are controversial. The aim was to investigate inter-arm difference, orthostatic response and to establish their clinical associations in very elderly hypertensives.

Design and method: 67 hypertensive subjects older than 80 years (mean age 84.1 ± 3.1 years, 25.5% male, mean clinic brachial SBP 134.8 ± 23.2 mm Hg) were included in cross-sectional study. Simultaneous bilateral brachial BP measurements were performed using oscillometric validated cuff-based device in supine position and then after 2 minutes of standing. Central pulse waveform characteristics and arterial stiffness parameters were estimated by BlLab Vasotens system.

Results: The median of inter-arm difference in SBP (IADSBP) was 4.00 (2.5; 9.0) mm Hg. 25.4% participants had IADSBP of 10 mmHg and more. Compared to others, those with IADSBP of 10 mmHg and more had significantly higher body mass index (31.4 ± 5.7 vs 28.5 ± 4.1 kg/m²; p < 0.05), waist circumference (116.3 ± 13.6 vs 107.7 ± 11.2 cm, p < 0.05) and pulse wave velocity in aorta
HEART RATE VARIABILITY IN ELDERLY HYPERTENSIVE PATIENTS UNDERGOING CORONARY STENTING ON THE BACKGROUND OF ACUTE CORONARY SYNDROME

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Objective: To evaluate heart rate variability (HRV) in elderly patients with systolic-diastolic arterial hypertension (AH) after acute coronary syndrome (ACS), undergone coronary angioplasty and stenting.

Design and method: The study included 65 elderly patients (mean age = 68.9 ± 6.3 years, men = 38 (58.5%) with systolic-diastolic AH 1–3 degree and developed ACS requested a coronary angioplasty and stenting during the first 6 hours after the onset of chest pain. ACS with ST-segment elevation was observed in 35 (53.8%) patients, and ACS without ST elevation = 30 (46.2%). Patients received on the background of the use of anticoagulants and antiplatelet agents also a standard anti-ischemic and antihypertensive therapy. All patients in the hospital stage after coronary stenting performed 24 h ECG monitoring with the assessment of HRV.

Results: All patients showed positive dynamics in the form of the disappearance of the chest pain, the most of them reached the target blood pressure values. The time-depend analysis had no differences between patients with ST-segment elevation, and without it, showing a decline of HRV in both groups (65,71% vs 76,67%). In contrast, the spectral analysis of HRV in patients with ST-segment elevation showed a statistically significant effect of the predominance of parasympathetic, autonomic nervous system (HF = 40,3 ± 14,0% vs 34,0 ± 14,0%, p = 0,048; LF / HF = 1,1 ± 1,0 c.u., vs 1,4 ± 1,2, p = 0,048), ACS without ST-segment elevation was accompanied by a significant prevalence of the power of very low frequency waves (VLF = 33,0 ± 16,2% vs 26,3 ± 13,1%, p = 0,032), which indicates to a high role of humoral-metabolic mechanisms of the heart rate regulation.

Conclusions: The predominance of low HRV in early hospital period, even during the adequate conservative therapy, was found in elderly patients with systolic-diastolic AH after coronary angioplasty with stenting due to the ACS. ACS without ST-segment elevation was accompanied by a significant predominance of humoral-metabolic effects on HRV, it requires an intensification of the therapy with angiotensin-converting enzyme inhibitors / angiotensin receptor blockers in these patients, which based on blood pressure values.

PROGNOSTIC SIGNIFICANCE OF CLINIC AND AMBULATORY BP LEVELS IN SUBJECTS 80 YEARS OR MORE

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Objective: It is not established to what extent clinic and ambulatory BP is lowered in subjects 80 yrs or more.

Design and method: We performed this study whether clinic and ambulatory BP (ABP) monitoring were associated with future events in subjects 80 yrs or more. Clinic and ABP monitoring were performed in 520 subjects and tested the differences in clinic SBP, clinic DBP, and ambulatory SBP and DBP levels in subjects with and without hypertension in the afternoon (usually >160 mmHg systolic) associated with hypertension in the afternoon. Ambulatory ABP recordings showed normotension in the morning and a periodic daily BP rise after midnight, but the abnormal BP rise persisted also under amlodipine and hydrochlorothiazide but the abnormal BP rise persisted also under amlodipine.

Results: The mean age was 83.2 ± 3.2 yrs, and 44% were male. In Kaplan-Meyer analysis, clinic SBP < 140, 140–150, and >150 mmHg at baseline and 12-month later had similar cardiovascular event rates (log-rank test, p = 0.25 and 0.58 respectively). For ambulatory daytime SBP, daytime SBP < 135, 135–150, and >150 mmHg had similar event rates, whereas for ambulatory sleep SBP, sleep SBP >135 mmHg tended to have higher event rate followed by subjects with 120–135 and <120 mmHg. In multivariable analysis adjusting for covariates, sleep SBP >135 mmHg was significantly associated with higher event rates [HR 1.46, 0.56–3.79, p = 0.44]. On the other hand, clinic and awake SBP was not the risk of incident events.

Conclusions: In a large cohort sample in subjects 80 yrs or more, only sleep SBP >135 mmHg compared to <120 mmHg, but not clinic or ambulatory awake BP was a risk of combined outcomes.

HYPERTENSION AND COGNITIVE FUNCTION IN THE ELDERLY: PRELIMINARY RESULTS OF A SCREENING STUDY

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Objective: Hypertension is very common in older patients and is considered to be a risk factor for cognitive decline; the 2013 ESH/ESC Guidelines for the management of arterial hypertension suggest the use of cognitive evaluation tests in the clinical assessment of elderly hypertensive patients. Nonetheless, there is still controversy over which screening test is more appropriate and cognitive impairment is usually under-diagnosed in these patients. Our study evaluates the application of a first-line screening to assess cognitive function in old hypertensive patients without a previous diagnosis of cognitive impairment.

Design and method: In this observational study we enrolled 80 consecutive hypertensive patients referred to our Centre for Hypertension in the Elderly and aged 65 years or more. All patients underwent a first-line cognitive evaluation with the Mini-Cog test, including three-item repetition and recall and clock drawing. If the Mini-Cog was suggestive for cognitive impairment, the patient was further evaluated with the Mini Mental State Examination (MMSE); in case of a MMSE score inferior to 28, a Neuropsychological Evaluation (NPE) was performed.

Results: The mean age of our population was 75.7 ± 5.5 (range 66–90); the 27.5% was octogenarian. The mean number of drugs of patients’ daily therapy was 6.5 ± 2.8, including 2.8 ± 1.2 anti-hypertensive drugs. For what concerns blood pressure (BP) control, all patients had both clinic and out-of-office BP values in the target range. Mean systolic and diastolic BP values were similar in patients with normal and abnormal Mini-Cog Test results. A Mini-Cog Test suggestive for cognitive impairment was observed in the 20% of our study population (16/80); 5 of these patients had a MMSE score inferior to 28. After the NPE, a diagnosis of cognitive decline was confirmed in 2 patients (2.5% of the population). The 39.1% of patients with a normal Mini-Cog Test performed an abnormal Clock Drawing Test (CDT), therefore the 51.3% of our study population had a deficit in clock drawing.

Conclusions: According to our results, the Mini-Cog cannot be suggested as a screening test for the evaluation of cognitive function in old hypertensive patients.

AN UNUSUAL CASE OF CIRCADIAN HYPERTENSION ASSOCIATED WITH POLYDIPSIA

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Objective: Under normal conditions, the kidneys handle a large variability of daily Na and volume intake without notable changes of blood pressure (BP). To increase the awareness of rare etiological factors during the workup of hypertension, we review the case of a patient with abnormal volume handling and reversible circadian hypertension due to chronic polydipsia.

Design and method: A critical analysis case discussion with analysis of the literature was performed.

Results: A 76 year old female patient was evaluated for resistant hypertension. BP recordings showed normotension in the morning and a periodic daily BP rise with hypertension in the afternoon (usually >160 mmHg systolic) associated with chronic daytime polydipsia. The abnormal circadian BP oscillations disappeared when daily drinking volume was reduced to normal. She began voluntary polydipsia 12 years ago after an episode of painful urethralis and advise to keep her daily drinking volume high for prevention. Four years earlier she had had an ischemic stroke in the vertebrobasilar territory. She received low dose perindopril and hydrochlorothiazide but the abnormal BP rise persisted also under amlodipine. Her clinical workshop revealed a residual neurologic syndrome after stroke, mild renal insufficiency, and hypertensive heart disease with normal systolic function. Kidney ultrasound excluded renal artery stenosis. She showed normal serum electrolytes and a normal plasma aldosterone/renin ratio when untreated. During
extensive laboratory investigations, no other etiologic factor could be detected. The rapid BP rise suggested sympathetic nervous system activation. Polydipsia is frequently associated with electrolyte disturbances but pathologic BP oscillations are exceptional. Based on a review of the literature, we discuss abnormal renal volume control and an impaired central BP regulation and baroreflex function after brain stem infarction to explain the association of polydipsia with recurrent diurnal hypertension.

Conclusions: Chronic polydipsia may be rare. However, it may occasionally represent a modifiable cause of BP elevations and treatment resistance in elderly patients particularly when volume handling is impaired by comorbidity.

**Objective:** Short telomere length (TL) in leukocytes is associated with atherosclerotic cardiovascular disease (ACVD). It is unknown whether this relationship is due to a shorter leukocyte TL (LTL) at birth or, alternatively, to a faster LTL attrition thereafter, before or during ACVD manifestation. To assess the temporal relation to a shorter leukocyte TL (LTL) at birth or, alternatively, to a faster LTL attrition across individuals, but at birth TLs are similar across the individual’s somatic tissues. Consequently, skeletal muscle (M), a minimally proliferative tissue, displays a longer TL than LTL, which represents the highly proliferative hematopoietic system. Accordingly, the difference between LTL and MTL and the ratio of (LTL-ML)/MTL provides additional information on LTL attrition since early life.

**Design and method:** We studied 271 individuals (82 women/189 men) aged 63 ± 14 years (mean ± SD), undergoing surgery. Their TL in leukocytes and in muscle biopsies (obtained during surgery) was measured by Southern blots. We tested the following variables for association with ACVD: LTL, MTL adjusted for muscle biopsy site (MTLA), LTL-MTLA and (LTL-MTLA)/MTLA.

**Results:** In all subjects, MTLA was longer than LTL and LTL-MTLA difference became wider with age similarly in ACVD patients (15.9 ± 0.5 bp/year; mean ± SE) and controls (14.4 ± 0.3 bp/year). Age- and sex-adjusted LTL (P = 0.005), but not MTLA (P = 0.68), was shorter in patients with ACVD than controls. LTL-MTLA (~272 ± 73 bp) and (LTL-MTLA)/MTLA (~3.2 ± 0.8 %) were wider in ACVD than in controls (P = 0.0003 and 0.0001, respectively). Both composite variables that combined LTL and MTL yielded better fitting models than either LTL or MTLA by themselves, and (LTL-MTLA)/MTLA explained ACVD slightly better than LTL-MLTA.

**Conclusions:** This first study applying the “blood-and-muscle” TL model in patients with ACVD shows more pronounced TL attrition in ACVD patients than controls. The difference in attrition rates was not modified by age during adulthood indicating that accelerated attrition in early life is likely to be a major explanation of the shorter LTL in ACVD patients.
**PP.04.01 LEFT ATRIUM FUNCTION IN SYSTEMIC ARTERIAL HYPERTENSION**

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**Objective:** Assessment of left atrium (LA) mechanics by 2-Dimensional Speckle tracking Imaging (STI) recently has been discussed as useful method for LA function estimation. The purpose of this study was to assess the relationship between LA function (particularly reservoir function) and LA structural remodeling in patients with systemic arterial hypertension. LA evaluation was made using conventional echocardiography, tissue Doppler, and 2-Dimensional STI.

**Design and method:** 48 hypertensive patients without left ventricular hypertrophy and 36 healthy controls (age and gender matched), underwent routine thoracic echocardiography and speckle tracking echocardiography of the left atrium. LA volume was calculated by the biplane Simpson’s method. Peak early diastolic transmural flow velocity, peak early diastolic mitral annular motion velocity (E/E’) and peak systolic LA strain were measured.

**Results:** LV Mass was 132.7 ± 16.5 gms in control and 180.2 ± 60.4 gms in the hypertensive patients. Left atrium volume indexed to body surface area was 19.4 ± 5.4 versus 29.4 ± 4.3 m³/m² in controls and hypertensive subjects respectively (p < 0.001). There were also significant differences between the measurements of transmitral flow velocities (E, A), and E/E’ and E/A ratios in both groups. Left atrium anteroposterior diameter was higher in the hypertensive group 4.20 ± 0.58 versus 3.4 ± 0.28 cm in the controls (p < 0.001). Left atrial longitudinal strain was 24.05 ± 3.18 in hypertensive patients and 32.7 ± 2.8 among controls (p < 0.001).

**Conclusions:** Speckle tracking imaging might be assumed as method for early detection of LA function impairment in arterial hypertension.

**PP.04.05 COMPATIBILITY OF LEFT VENTRICULAR HYPERTROPHY DIAGNOSED BY ELECTROCARDIOGRAPHY AND BY ECHOCARDIOGRAPHY: THE NORTHERN SHANGHAI STUDY**

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**Objective:** To investigate the compatibility of left ventricular hypertrophy (LVH) diagnosed by electrocardiography and by echocardiography.

Design and method: Echocardiography and electrocardiography were applied to define LVH in 1599 elderly Chinese aged >65 years old in communities located at the northern Shanghai. Echocardiographic LVH (ECHO-LVH) was defined by left ventricular mass indexed for Body Surface Area (LVM/BSA) or indexed for height2.7 (LVM/height2.7). Electrocardiographic LVH (ECG-LVH) was defined by Sokolow-Lyon (SL), Cornell and Cornell Product (CP) criteria. LVH was defined by LVM/BSA > 125 g/m² in males, >110 g/m² in females (LVH1); LVM/BSA > 115 g/m² in males, > 95 g/m² in females (LVH2); and LVM/height2.7 > 51 g/m² in males, > 47 g/m² in females (LVH3).

**Results:** In the correlation analysis, CP had the greatest correlation coefficient compared with SL and Cornell, in males (0.22 vs. 0.20 & 0.19 for LVM/BSA and 0.21 vs. 0.18 & 0.19 for LVM/height2.7), in females (0.16 vs. 0.08 & 0.15 for LVM/BSA and 0.18 vs. 0.05 & 0.17 for LVM/height2.7) and in total population (0.19 vs. 0.14 & 0.17 for LVM/BSA and 0.16 vs. 0.08 & 0.16 for LVM/height2.7). In Chi-square analysis, only LVH diagnosed by SL was significantly associated with LVH diagnosed by echocardiography. Moreover, CP criterion had the greatest area under curve of ROC than Cornell criterion and the SL index (0.62 vs. 0.58 & 0.54 in LVH1, 0.62 vs. 0.55 & 0.51 in LVH2 and 0.62 vs. 0.57 & 0.51 in LVH3).

**Conclusions:** In ECG LVH criteria, CP criterion complies better than SL index and Cornell criterion in assessing cardiac hypertrophy.

**PP.04.06 LEFT VENTRICULAR-ARTERIAL UNCOUPLING INDEPENDENTLY PREDICTS ADVERSE CARDIAC REMODELING IN PATIENTS WITH MYOCARDIAL INFARCTION**

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**Objective:** Left ventricular (LV) remodeling is the precursor to developing heart failure and an important prognostic factor after myocardial infarction (MI). The value of modern non-invasive indices of LV and arterial system function in contemporarily treated patients with MI is not established. The aim of the study was to determine the relationship of adverse remodeling with the left ventricular-arterial coupling (VAC) in patients with MI treated with percutaneous coronary intervention (PCI).

**Design and method:** In 112 patients with MI (64 (57.2%) with STEMI) and PCI (68% male, age 61.1 ± 9.5 years (M ± SD), smokers 35%, diabetes 7%, arterial hypertension 83%) 2-dimentional echocardiography was performed to assess arterial elastance (Ea) and end-systolic LV elastance (Ees) on admission and in 4 weeks and 6 months. VAC was assessed as the ratio Ea/Ees. Cardiac adverse remodeling was defined by ratio [follow up - initial L V end diastolic volume (L V2); and L VM/height 2.7 > 51 g/m 2.7 in males, > 47 g/m 2.7 in females (LVH3)].

**Results:** Baseline LV ejection fraction (L VEF) was 48.2 ± 4.6%, Ea 1.7 ± 0.3 mmHg/ml/m², Ees 2.1 ± 0.3 mmHg/ml/m², VAC 0.88 ± 0.2. At baseline all patients had LVEF >40% and VAC in optimal (0.5–1.2) range. In 4 weeks after PCI VAC >1.2 was revealed in 24 (29%) patients (33% STEMI), adverse LV remodeling - in 12 (10%) patients, all of them with VAC >1.2. After 6 months VAC >1.2 was found in 67 (75%) patients (68% STEMI), adverse LV remodeling - in 81 (90%) patients (71.6% with VAC >1.2). Achieved VAC >1.2 was associated with adverse cardiac remodeling (odds ratio 6.16; 95% confidence interval 2.47–15.37; p < 0.0005). In patients with achieved VAC >1.2 Ees significantly decreased (from 1.9 ± 0.3 to 1.3 ± 0.2 mmHg/ml/m², p < 0.001) and Ea significantly increased (1.7 ± 0.3 to 2.1 ± 0.5 mmHg/ml/m², p < 0.001).

**Conclusions:** In patients with MI treated with PCI impairment of functioning of cardio-vascular system assessed by increased value of VAC >1.2 was revealed 75% of patients in 6 months. Increase of VAC was associated with decrease of Ees and increase of Ea. Increased VAC index >1.2 indicating LV-arterial uncoupling may be considered as early marker of adverse LV remodeling.

**PP.04.08 IMPACT OF ARTERIAL HYPERTENSION ON CLINICAL DEVELOPMENT OF AORTIC STENOSIS**

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**Objective:** To evaluate influence of arterial hypertension on clinical development of aortic stenosis before and after valve replacement.
Design and methods: 72 patients (mean (SD) age 63.9 ± 11.8 years) with aortic stenosis who underwent aortic valve replacement. 50 were males, 22 were females. 37 patients (group 1) has arterial hypertension (AH), 35 patients (group 2) has not AH. Before and 12 months after valve replacement patients underwent transthoracic echocardiography.

Results: Mean (SD) age in group 1 was 67.9 ± 8.5 year, in group 2 – 59.3 ± 13.5 years. But the time from diagnosis to surgery was higher in group 2 – 22.6 ± 13.5 years vs 14.8 ± 8.6 years in group 1. As shown in table 1 patients with hypertension more often had degenerative valve lesion (60% vs 37%), while in group 2 more frequently observed bicuspid valve 16% vs 40% (p < 0.05). Also, in group 1 patients more often had CAD 43% vs 9% (p < 0.05) and permanent atrial fibrillation 26% vs 6% (p < 0.05). Despite this, the severity of heart failure was not in the first group higher than the second. At baseline the size of the left chambers and thickness of left ventricular wall had not significant difference between groups (Table 2). At 12 months after surgery in patients without AH there was a significant decrease in the size of the left ventricle (LVEDD) and in the wall thickness (IVST and LVPWT). Also ejection fraction increased in the 2 group (p < 0.05). In the first group all echocardiography parametres were unchanged during the 12 months period.

Conclusions: Patients with arterial hypertension and aortic stenosis have greater comorbidity, but this does not affect the degree of heart failure. It was not observed significant difference in remodeling the left ventricle in normotensive and hypertensive patients with aortic stenosis before surgery. The absence of arterial hypertension positively affects on parameters of cardiac remodeling at patients with aortic stenosis 12 months after valve replacement.
**Objective:** Atrial fibrillation (AF) is a common complication in hypertensive patients. It also complicates thyroid disease. In common practice there is a fear of using adequate thyroid replacement therapy due to the risk of atrial fibrillation. We aimed to investigate the association between atrial fibrillation and treated hypothyroidism in a cohort of hypertensive patients.

**Design and method:** We studied a group of 61 hypertensive patients with treated hypothyroidism, aged 69 ± 10 years. Patients were evaluated according to standard of care, including blood tests, resting ECG and transthoracic echocardiography. Data were collected and analysed using SPSS 19.0.

**Results:** Atrial fibrillation was diagnosed in 21 out of 61 patients (34%). Mean age in patients with AF was 6 years higher than in patients in sinus rhythm (p = 0.032). There was a slight difference in left ventricular ejection fraction in favor of patients in sinus rhythm (57 ± 4% versus 54 ± 10%, p = 0.049). Plasma levels of NTproBNP were significantly higher in patients with AF (3996 ± 3633 pg/ml as compared to 719 ± 653 in sinus rhythm, p = 0.001). Plasma levels of TSH, freeT4 and freeT3 did not differ significantly between groups. The average dose of thyroid replacement therapy was similar in patients with AF and patients in sinus rhythm (64 ± 43 mcg and 69 ± 36 mcg, respectively, p = 0.647). Presence of AF was significantly correlated with echocardiographic parameters: left atrial diameter and volume, left ventricular septal thickness, left ventricular ejection fraction, right atrial and right ventricular dimensions, pulmonary artery systolic pressure (all p < 0.05). Patients with AF had significantly lower glomerular filtration rates estimated by MDRD formula than patients in sinus rhythm (58 ± 19 versus 82 ± 25 ml/min/1.73 m², p < 0.001). There was an inverse correlation between presence of AF and glomerular filtration rate (r = -0.447, p < 0.001).

**Conclusions:** Atrial fibrillation is a common finding in patients with arterial hypertension and hypothyroidism. It is related to ageing, lower glomerular filtration rate and cardiac remodeling. We concluded that we can safely give thyroid replacement therapy in these patients without increasing the risk of atrial fibrillation.
Conclusions: In this study VAC did not correlate with any of indicators of target organ vessel damage. Perhaps VAC evaluation methodologies should be checked and possibly reviewed.

**PP.04.17 ADDITIONAL FACTORS THAT MAY HELP IN LV DIASTOLIC FUNCTION ASSESSMENT**


Objective: Increased arterial stiffness may cause increased LV stiffness that may influence LV diastolic function (DF) and could be used also for LF DF assessment.

**Design and method:** We included 61 patients with moderate to severe AH. We performed office BP (oBP) and heart rate (HR) measurements, ambulatory BP monitoring, central systolic BP (cSBP), augmentation index (AIx@75) and PWV measurement, CAVI index and ankle-brachial index (ABI) measurements. Echocardiography was performed according to local protocol with measurements of peak E velocity, peak A, the E/A ratio, peak E' and E/E' ratio, deceleration time (Dt), isovolumetric relaxation time (IVRT), LV myocardium mass index (LVMMI) evaluated with the ASE formula, ventricle-arterial coupling (VAC) was evaluated according to standard method. To find interactions we used Spearman correlation analysis.

**Results:** Mean characteristics: BMI 29.6 ± 0.7 km/m², mean age 53.6 ± 1.9 years, men/women 53/47%, cSBP 158.8 ± 3.4 mmHg, cDBP 93.5 ± 2.2 mmHg, oBP 61.3 ± 2.9 mmHg, HR 79.1 ± 2.5 beats/min, 24hSBP 146.0 ± 2.3 mmHg, 24hDBP 89.5 ± 1.8 mmHg, cCAVIM 130.4 ± 3.7 mm²/m², PWV 87.2 ± 2.0 mmHg, cPP 44.2 ± 2.8 mmHg, LV mass 11.8 ± 0.5 m/m², LVMMI 8.5 ± 0.3, CAVI 8.4 ± 0.3, LVM (mm) 91.9 ± 8.6 (86.7 ± 1.9 / 97.7 ± 1.6) g/m², E/A 1.2 ± 0.2, E/E' 7.7 ± 4.4, Dt 253.2 ± 13.4 ms, IVRT 90.7 ± 5.5 ms. E/A correlated with age (r = -0.308), cPP (r = -0.44), augmentation pressure (r = -0.513), AIx@75 (r = -0.517), CAVI (r = -0.575), CAs (r = -0.558), EF (r = -0.398), LVMMI (r = -0.43), oBP (r = -0.335), p < 0.05 for all. E/E' correlated with ejection duration (r = -0.56), cDBP (r = 0.477), cPP (r = 0.409), SEVR 0.468, cPP (r = 0.6), LVM (mm), CAVI (r = 0.41), CAs (r = 0.406), p < 0.05 for all. Dt correlated with end-diastolic volume (r = 0.346), cDBP (r = -0.31), ABI (r = 0.616) and IVRT correlated with ABI (r = 0.346), p < 0.05 for all.

**Conclusions:** Indicators of LF DF significantly associated with indicators of pulse wave analysis and arterial stiffness that could be used in routine clinical practice for the earliest diagnosis of early progression of diastolic dysfunction.

**PP.04.18 COMPARISON AMONG DIFFERENT ELECTROCARDIOGRAPHIC CRITERIA FOR LEFT VENTRICULAR HYPERTROPHY: RETROSPECTIVE ANALYSIS OF A LARGE COHORT OF ADULT OUTPATIENTS WITH HYPERTENSION**

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Objective: Conventional 12-lead electrocardiogram (ECG) should be performed in all patients with hypertension (HT) in order to evaluate the presence of cardiac organ damage (OD), namely left ventricular hypertrophy (LVH), although different criteria are available.

**Design and method:** Aim: To evaluate LVH prevalence according to conventional and new ECG criteria in a large cohort of adult hypertensive outpatients. Methods: All patients underwent conventional 12-lead ECG, BP assessment and comprehensive evaluation of individual global cardiovascular risk profile according to 2013 ESH/ESC guidelines. The following ECG criteria for LVH were applied: 1) Sokolow–Lyon index: >35 mm; 2) Cornell voltage index: men>40, women>2.0 mmV. In addition, positive/negative amplitude of all ECG leads was calculated in all included outpatients. Study population was stratified into three groups: 1) treated controlled HT; 2) treated uncontrolled HT; 3) resistant HT.

**Results:** From an overall population sample of 1,979 adult individuals, we selected 1,566 hypertensive outpatients, among whom 560 (35.8%) were treated controlled, 613 (39.1%) were treated uncontrolled, and 393 (25.1%) had resistant HT. No significant difference was found for LVH prevalence according to Sokolow–Lyon criterion, whereas its prevalence increased from controlled (7.7%) to uncontrolled (9.4%) towards resistant (14.5%) HT according to Cornell Voltage criterion (P < 0.040). Cornell Voltage and Product showed a trend toward increase from the first to the latter group. Among various ECG leads, only aVL amplitude showed a progressive and significant increase from controlled (5.7 ± 3.8 mV) to uncontrolled (6.0 ± 3.4 mV) towards resistant (6.7 ± 3.7 mV) HT, as well as positive correlation with clinical systolic BP (Pearson r=0.158; P<0.001), 24-hour systolic BP (r = 0.133; P = 0.007), LVMI (r = 0.206; P = 0.001), and LVMi/Th² (r = 0.239; P = 0.001).

**Conclusions:** Measurements aVL amplitude might represent a simple, easy and cost-effectiveness way to assess the presence of cardiac OD in adult outpatients with different degree of hypertension.

**PP.04.19 LEFT ATRIUM VOLUME INDEX AND RISK PROFILE IN HYPERTENSIVE PATIENTS WITH ACUTE MYOCARDIAL INFARCTION**

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Objective: The left atrium volume index (LAVI) is a recognized prognostic marker in conditions as heart failure, myocardial infarction and atrial fibrillation. Dilatation of left atrium (LAVI) in the absence of chronic atrhythmia, mitral valve disease or heart transplantation, is marker of chronic elevation of left atrium pressure. Numerous epidemiological studies have shown that the presence of arterial hypertension increases the risk of coronary heart disease especially in at risk populations. LA enlargement in hypertensive patients is related to overweight, diabetes and metabolic syndrome. Aim of the study was to find the presence of risk factors among the hypertensive patients with acute myocardial infarction (AMI) and the correlation with LAVI.

**Design and method:** A number of 98 hypertensive patients (56 males and 42 females), aged 41–85 years, admitted with ST-segment elevation AMI were evaluated during the first week of hospitalization before discharge by: clinical and laboratory examination, 12 lead standard ECG. LAVI echocardiographic measurement was made using disk summation algorithm, tracing endocardial borders in apical four and two chamber view and indexing by body surface area; cut off value was 34 ml/m².

**Results:** 1. In lot of study 57,14% were males (78.57% LAVI) and 42.86% females (73.82% LAVI). 2. Most of patients were aged 60–69 years: 34 patients (67.83% LAVI). 3. Looking for age and sex distribution of patients, in all groups males sex was dominant: highest incidence between 50–59 years group: 71.42%, followed by 60–69 years group age: 55.88%. 4. Most of patients: 56.12% were stage 3 of hypertension (81.81% LAVI) 5.63% of patients were diabetics (74.62% LAVI), obesity was found in 68.36% of hypertensive patients with AMI (73.13% % LAVI). 7. Dyslipidemia was found in 77.55% of patients (66.31% LAVI). Smoking was present in 53,06% of patients. (76.92% LAVI when patients associated supplementary this risk factor)

**Conclusions:** 1. We found an association between risk factors as: male sex, age, obesity,dyslipidemia, the level of blood pressure, diabetes, and smoking and the incidence of AMI in hypertensive patients. 2. In hypertensive patients with AMI a correlation between and risk factors and left atrium enlargement was present.

**PP.04.20 HEMODYNAMIC PROFILE IN CONTROLLED AND UNCONTROLLED HYPERTENSIVE PATIENTS. INSIGHTS FROM THE SEPHAR III STUDY**

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Objective: Difficulties in hypertension control may depend, among other factors, on a mismatch between choice of antihypertensive drugs and patient’s hemodynamic profile. Aim of this study was to evaluate the hemodynamic (HD) profile of a sample of the adult Romanian hypertensive population through impedance cardiography and to explore its possible implication for hypertension control in the frame of the nation-wide SEPHAR III survey.
Design and method: Impedance cardiography with the HOTMAN system was performed in 889 adult hypertensive subjects, randomly selected in the frame of the SEPHAR III survey, at the second study visit, for 5–10 minutes in supine position. 771 of them had valid non-invasive hemodynamic measurements data, with estimates of volemia, vasoreactivity, inotropism and hemodynamic state. Blood pressure was measured with the auscultatory technique in seated position twice, according to ESH guidelines.

Results: Analysis of impedance cardiography recordings showed the presence of 22 different HD profiles, 9 of them including hypervolemia. The frequency of any alteration in HD modulators was significantly higher in uncontrolled hypertensives (office BP greater than 140/90 mm Hg) than in controlled ones. Regression analysis revealed a positive association between the number of altered HD modulators and the lack of BP control: 1 altered HD modulator: OR 2.57, 95%CI for OR (1.03–6.45); 2 altered HD modulators: OR 2.89, 95%CI for OR (1.16–7.20); 3 altered HD modulators: OR 1.67, 95%CI for OR (0.67–4.33); 4 altered HD modulators: OR 2.54, 95%CI for OR (1.04–6.25). Only 20.5% of hypertensive patients with a hyperinotropism pattern were treated with beta-blockers, only 41.4% of hypertensive patients with a vasoconstriction pattern were receiving vasodilator drugs and only 1.4% of hypervolemic hypertensives were receiving diuretics.

Conclusions: Hypertensive patients have a multitude of different HD profile patterns, which emphasizes the need of assessing their HD characteristics before choosing the more appropriate antihypertensive drug. Currently, antihypertensive treatment targets are unrelated to the HD profile. This may lead to hemodynamic imbalance and lack of optimal BP control due to choice of drugs unable to match the individual patient’s HD profile.

IMPACT OF CARDIOPULMONARY EXERCISE TEST IN PULMONARY ARTERIAL HYPERTENSION PATIENTS RISK STRATIFICATION

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Objective: Incremental cardiopulmonary exercise testing (CPET) is recommended to evaluate severity, prognosis and responses to therapy in patients with pulmonary hypertension. We aimed to evaluate the impact of CPET in pulmonary arterial hypertension (PAH) patients risk stratification.

Design and method: 45 patients with PAH (mean age 43.1±11.0 years) underwent exercise on cycle ergometry. Oxygen uptake (VO2), carbon dioxide output (VCO2), expiratory gas concentrations and minute ventilation (VE) were measured breath-by-breath. Peak VO2 was defined as highest average of VO2 in the last minute of exercise.

Results: The majority of patients (n = 16) had III functional class (World Health Organization (WHO) classification). The mean values of QTd can identify coronary patients who are at high risk of cardiac death and sudden cardiac death. According to the CPET we got the results, showing that an additional 7 patients, who had been earlier in the intermediate risk group, had a high risk of mortality during 1 year. 9 patients were belonged to the low risk group, that was also confirmed by CPET data. A significant negative correlation between the functional class (WHO) and VO2 peak in patients with PAH was found (r = −0.78; p < 0.0001).

Conclusions: Risk stratification is crucial for the development of an appropriate treatment strategy. Patients who achieve the therapy goals, no matter which specific therapy or approach is used, seem to have a better prognosis than those who do not. The CPET is necessary for pathogenic therapy effectiveness assessment and for making decision of therapy escalation in patients with PAH.
according to the Bruce protocol and echocardiographic examination were performed and from standard ECG corrected QT dispersion (QTdc) and QTd was calculated.

Results: Patients with angina pectoris and hypertension had significantly higher values of QTd (55.1 ± 17.1 vs 42.8 ± 19.5 ms; p < 0.01) and QTdc (59.2 ± 20.0 vs 45.5 ± 18.1 ms; p < 0.001) compared to those without arterial hypertension. Also, patients with angina pectoris and hypertension had significantly higher values of the thickness of the interventricular septum (12.1 ± 2.1 vs 10.8 ± 1.7 mm; p < 0.005), left ventricle posterior wall thickness (10.9 ± 1.5 vs 9.2 ± 1.4 mm; p < 0.001) and left atrium diameter (40.9 ± 4.8 vs 37.3 ± 5.4 mm; p < 0.005) compared to those without hypertension. Patients with angina pectoris and arterial hypertension have higher values of the left ventricular end-diastolic diameter (54.1 ± 5.8 vs 53.7 ± 7.1 mm; p<NS), and left ventricular end-systolic diameter (36.6 ± 6.1 vs 35.8 ± 6.9 mm; p<NS) and lower values of left ventricular ejection fraction (60.9 ± 12.6 vs 63.6 ± 11.9%; p<NS), but the differences were not statistically significant.

Conclusions: The study demonstrated that patients with angina pectoris and hypertension have significantly higher values of QT dispersion parameters, thickness of the left ventricle walls and left atrium diameter in comparison to those without hypertension.

INCIDENCE AND PREDICTORS OF COMBINED CARDIOHEPATIC AND CARDIORENAL SYNDROMES IN DECOMPENSATED HEART FAILURE

A. Soloveva, S. Villevalde, Z. Kobalava.

Objective: Similar factors such as venous congestion and hyperperfusion are thought to underlie both renal and liver dysfunction in decompensated heart failure (DHF). The aim of this study was to assess the prevalence of cardiohepatic syndrome (CHS) and cardiorenal syndrome (CRS) and predictors of simultaneous CHS and CRS in DHF.

Design and method: In 322 patients with DHF (190 male, 69.5 ± 10.6 years (M ± SD), arterial hypertension 87%, myocardial infarction 57%, atrial fibrillation 42%, chronic kidney disease 20%, chronic anemia 16%, left ventricular (LV) ejection fraction (EF) 37.6 ± 12.6%; EF < 35% 39.1%) left ventricular function tests (LFTs) were measured on admission. CHS was considered when at least one of LFTs level exceeded upper normal limit. CRS was diagnosed as community-acquired acute kidney injury based on KDIGO 2012 Guidelines. Simultaneous CHS and CRS were considered as cardiohepatic syndrome (CRHS). Mann-Whitney test and multivariate logistic regression analysis were performed. P < 0.05 was considered statistically significant.

Results: CHS occurred in 274 (85.1%) of patients. CRS was diagnosed in 60 (18.6%) patients. Isolated CHS, isolated CRS and CRHS occurred in 78.4, 1.5 and 20.1% patients respectively. Patients with versus without CRHS had lower systolic blood pressure (SBP) (129 ± 18 vs 138 ± 19 mm Hg; p < 0.01), EF (32 ± 10 vs 38 ± 13U/ml; p < 0.01), pulse pressure (63 ± 91 vs 30 ± 28 mm Hg; p < 0.01), higher LV mass index (200 ± 50 vs 178 ± 52 g/m²; p < 0.01), LV end diastolic volume (62 ± 6 15 ± 9 mm; p < 0.01), higher prevalence of severe mitral regurgitation (43.6 ± 3.96%; p < 0.001), signs of congestion – jugular venous distension (57.1 vs 39.6%, p < 0.05), hepatomegaly (85.7 ± 70.3%, p < 0.05), echo-hydropericardium (46.4 ± 22.5%, p < 0.001). The independent predictors of CRHS were baseline GFR < 45 ml/min/1.73 m² (odds ratio (OR) 1.95, 95% confidential interval (CI) 1.25–2.71, p < 0.01), anamnesis of chronic HF (OR 3.78, CI 1.30–10.96, p < 0.05), SBP < 110 mm Hg on admission (OR 3.51, CI 1.15–7.94, p < 0.05), echo-hydropericardium (OR 2.98, CI 1.62–5.50, p < 0.01) and EF < 35% (OR 2.96, CI 1.61–5.44, p < 0.05).

Conclusions: Isolated CHS, isolated CRS and CRHS occurred in 78.4, 1.5 and 20.1% patients. The independent predictors of CRHS were baseline GFR < 45 ml/min/1.73 m², anamnesis of chronic HF, SBP < 110 mm Hg on admission, echo-hydropericardium and EF < 35%.

SERUM URIC ACID LEVEL COULD BE A PREDICTOR OF ATRIAL FIBRILLATION IN WOMEN BUT NOT IN MEN WITH METABOLIC SYNDROME

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Objective: Uric acid (UA) is a cardiovascular risk marker associated with oxidative stress and inflammation. Several studies showed the association of high levels of serum UA with atrial fibrillation (AF) in metabolic syndrome (MetS). The objective of this observational study was to investigate the gender differences of serum UA levels in patients with MetS and AF.

Design and method: We evaluated 100 patients with MetS and AF (group A) and 50 patients with MetS without AF (group B), mean age 69.28 ± 8.8, respectively 59.52 ± 9.62 years, 68%AF. We excluded subjects with coronary artery disease, congestive heart failure, valvular heart disease, congenital heart disease, cardio-myopathy, renal failure, inflammatory conditions, thyroid dysfunction, respiratory diseases, and those who were taking drugs that affect UA metabolism (apart from diuretics).

Results: AF significantly correlated with older age (p < 0.001), decreased creatinine clearance (70.39 ± 25.89 vs. 88.42 ± 23.32 ml/min/1.73 m², p < 0.001), serum UA levels (6.47 ± 1.69 vs. 5.49 ± 1.80 mg/dl, p < 0.01), LA diameter (44.3 ± 6.33 vs. 39.03 ± 5.14 mm, p < 0.001) and LA volume (79.31 ± 23.68 vs 57.78 ± 15.95 ml, p < 0.001). After multivariate logistic regression analysis, the independent predictors of AF were age and LA dimensions for both men and women. The serum UA was an independent predictor of AF only in women with MetS. The area under the receiver operating characteristic curve of serum UA for accuracy to detect atrial fibrillation in women was 0.87% (95% confidence interval 0.82–0.95). The cut-off point of 6.7 mg/dl had a sensitivity of 87% and a specificity of 79% to predict AF in women.

Conclusions: Serum UA level was an independent predictor of AF in women but not in men with metabolic syndrome.
Results: The patient’s age was 7.4 ± 3.2 years and they underwent the aortic arch repair at 0.08 ± 0.03 years. The systolic blood pressure was 103.1 ± 13.3 mmHg at AAo and 108.7 ± 16.4 mmHg at DAo. The peak dp/dt was 572.1 ± 100.1 mmHg/sec at AAo and 489.3 ± 75.2 mmHg/sec at DAo. The difference of peak dp/dt between DAo and AAo (peak dp/dt at DAo minus peak dp/dt at AAo) was -52.8 ± 69.0 mmHg/sec. In the control subjects, the peak dp/dt was 543.3 ± 110.2 mmHg/sec at AAo and 579.4 ± 106.0 mmHg/sec at DAo. The difference of peak dp/dt between DAo and AAo in control subjects was 36.1 ± 29.7 mmHg/sec. In normal aorta, the peak dp/dt in DAo is higher than that in AAo, but in repaired aorta, the peak dp/dt in DAo is lower than that in AAo. The difference of peak dp/dt between DAo and AAo in the arch repaired patients was significantly lower than that in the control subjects (t = -6.133, p < 0.0001).

Conclusions: Peak dp/dt in DAo is decreased in patients after aortic arch repair. The surgical repaired site generates the new PWV and would lead to a change in the central aortic pressure waveform, which could place extra load on their left ventricles.

**PP.04.31**

**ASSOCIATION BETWEEN IN-HOSPITAL MORTALITY AND ANTI-HYPERTENSION THERAPY IN A POPULATION OF HOSPITALIZED VERY ELDERLY HYPERTENSIVES WITH UNDERLYING UNDIAGNOSED HEART FAILURE**


Objective: The diagnosis of heart failure (HF) in the very elderly is difficult also because of many comorbidities that may mask HF symptoms and signs. Our aim was to assess the prevalence of HF and its association with in-hospital mortality in relation with anti-hypertensive drugs taken before hospitalization, in a population of very elderly hypertensives.

Results and discussion: Prospective observational study on 265 very elderly hypertensives consecutively admitted to our Internal Medicine and Geriatrics Department. The other inclusion criteria were an admission diagnosis different from HF, a negative history for HF and the presence of at least one symptom/ sign compatible with HF. HF diagnosis was based on NT-proBNP values at admission, with a validated age-adjusted cut-off (1800 pg/ml). The main comorbidities, laboratory parameters and drugs taken before the admission were also considered.

Results: Mean age 87.7 ± 4.9 years. Males: 113 (42.6%). Values of NT-proBNP > = 1800 pg/ml were present in 55.8% of patients. Regarding the admission diagnosis, patients with atrial fibrillation or acute renal impairment had increased risk of HF (OR = 2.26; p = 0.006 and OR = 2.18; p = 0.016, respectively). Values of NT-proBNP > > 1800 pg/ml were associated with a greater in-hospital mortality, regardless the admission diagnosis (OR = 2.63; p = 0.002). Analyzing the pharmacological therapy taken before admission, those who were already treated with ACE inhibitors or angiotensin receptor blockers had a lower in-hospital mortality, even after adjusting for covariates (OR = 0.41; p = 0.038): age, chronic, bedridden, white blood cells count and glycaemia.

Conclusions: An underlying HF is very common in very elderly hypertensives hospitalized patients, regardless the medical causes of admission. Those who were already taking ACE inhibitors and angiotensin receptor blockers, confirmed cornerstones of hypertension treatment, showed a lower in-hospital mortality indicating the importance of these drugs in the management of very elderly hypertensives.

**Table 1:** Phosphorus levels in the study and control groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>Phosphorus level (mg/dL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study</td>
<td>3.6 ± 0.4</td>
</tr>
<tr>
<td>Control</td>
<td>3.8 ± 0.3</td>
</tr>
</tbody>
</table>

**PP.04.32**

**PHOSPHORUS DEFICIENCY IN MASSRY’S PHOSPHATE DEPLETION SYNDROME CAN BE ONE OF THE CAUSE OF ACUTE LEFT HEART FAILURE**

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Objective: In this study we investigated serum phosphorus levels in patients with acute left heart failure.

Results: 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 present study. The mean age was 52.6 years. Demographic characteristics of participants were not significantly different between the groups. Mean EF levels of groups were 40.8 versus 60.0 respectively. The difference was statistically significant (P < 0.001). Mean phosphorus levels were 3.01 versus 4.27 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 phosphofuate deficiency. In addition to these, mitochondrial and myofibrillar creatine phosphokinase activities also reduces. 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 treatment.

**Objective:** Little is known about the prevalence and covariates of abnormal left ventricular (LV) geometry in younger ischemic stroke patients.

**Design and method:** We used clinical and echocardiographic data from 276 patients aged 15–60 years included in the Norwegian Stroke in the Young Study. LV hypertrophy (LVH) was defined as LV mass index >46.7 g/m².7 in women and >49.2 g/m².7 in men. Concentric remodeling was considered present if posterior wall thickness/LV internal diameter ratio was ≥ 0.43 in the absence of LVH. Arterial damage was assessed by mean common carotid intima-media thickness (IMT) and carotid-femoral pulse wave velocity (PWV).

**Results:** Abnormal LV geometry was found in 37% of patients. Concentric remodeling was the most common abnormal LV geometry, found in 21%, while LVH was found in 16% (Table 1). In multivariable logistic regression analyses, LVH was associated with high for age PWV, higher body mass index, creatinine, and presence of diabetes and hypertension (all p < 0.05). Concentric remodeling was associated with higher mean carotid IMT, older age and absence of obesity (all p < 0.05).

**Conclusions:** In ischemic stroke survivors < 60 years of age, abnormal LV geometry was common. Concentric remodeling was found in 21% and associated with higher age and mean carotid IMT. LVH was found in 16% and associated with higher arterial stiffness, hypertension and diabetes.

**Conclusions:** TG significantly underestimates CO in hemodynamically unstable patients. This finding could in part be explained by the significantly lower BP readings obtained with TG. In addition, Bland-Altman analysis revealed a linear relationship between CO values and divergence of TG CO from reference measurement (figure). A correction factor could potentially alleviate CO underestimation with TG, and thus make this noninvasive easy method of CO determination more reliable.

**Objective:** To assess feasibility and accuracy of oscillometric cardiac output (CO) calculation.

**Design and method:** A prospective comparison of oscillometric CO determinations and reference thermodilution CO measurements was performed in 38 intensive care unit patients (June 2015 to June 2016). Thermodilution CO was obtained using transpulmonary technique (PiCCO®, Pulsion Medical Systems, Feldkirchen, Germany), and oscillometric CO was calculated using the Tel-O-GRAPH® (TG) non-invasive blood pressure measurement and hemodynamic assessment device (EM, Stolberg, Germany). CO was indexed to body surface area and is referred to as cardiac index (CI). Bland Altman analysis was employed to assess differences between oscillometric and reference CI as well as non-invasive (TG) and invasive (PiCCO®) blood pressure (BP) measurements.

**Results:** Two-thirds of the study population was male (68.4%), mean age was 68 years. Almost all patients were mechanically ventilated (95%) at study entry, and vasopressor therapy was required in 76%. Oscillometric CI determination yielded significantly lower results than the reference method (3.8 ± 1.22 l/min·m² vs. 2.73 ± 0.50 l/min·m², p = 0.0001) with a bias of 1.08 l/min·m² and limits of agreement of ±2.23 l/min·m² (percentage error 62%). With TG, both measured brachial (117.5 ± 16.0 mmHg) and estimated aortic (107.2 ± 15.6) systolic BP were significantly lower than invasive PiCCO® femoral BP (123.6 ± 17.4 mmHg, p = 0.005 and p = 0.0001) with a bias of 3.9 mmHg and 16.1 mmHg, respectively, and limits of agreement of ±23.46 mmHg and ±23.79 mmHg.

**Conclusions:** TG as measured by echocardiography has low prevalence in our general population, but the estimates may be higher in specific subgroups. Analysis of the registry data could be an instrument for quality control and might help identify weak points in assessment and treatment of these patients.
POSTER SESSION

POSTERS' SESSION PS05:
LIFESTYLE, HYPERTENSION MANAGEMENT AND RESISTANT HYPERTENSION

**PP.00.01** EFFECT OF LONG-TERM ENRICHED POTASSIUM SALT INTAKE ON SALT REDUCTION IN CHINESE LIVING IN NURSING HOUSES

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Objective: To explore whether long-term enriched potassium salt intake (KCL/NACL = 1:1 by weight) can achieve the purpose of salt reduction in Chinese living in nursing houses.

**Design and method:** Participants were recruited from 28 nursing houses in 4 Northwestern provinces and Beijing City in 2012. The nursing houses were then randomized into 2 groups: normal salt (control group) and enriched potassium salt (intervention group). Health education about the benefits of salt restriction were provided for all participants. The follow-up visits including questionnaire and spot urine collection were carried out in 24–31 month and 48 month. The contents of questionnaire included the consumption of various high salt materials and number of dinners in the last month, the average salt intake per person per day at baseline and follow-up visits were calculated according to food composition table. The results of spot urine electrolytes and the salt consumption at baseline and follow-ups were used for data analysis.

**Results:** Totally 2779 participants (intervention group 1336, control group 1443) were included in this study. The average salt intake per person per day for intervention group and control group at baseline were 12.86 ± 4.80 g and 12.58 ± 2.85 g respectively p = 0.05. No difference were found between average salt intake of two follow-up visits of control group with that at baseline (p = 0.69 and p = 0.59). But, the salt consumption were decreased in intervention group to 6.89 ± 1.78 g (24–31 month follow-up), 8.75 ± 3.34 g (48 month follow-up), p < 0.001 compared with baseline. Urinary sodium potassium ratio (UNA/K) between control and intervention groups at baseline were 7.86 vs. 8.22, p = 0.12. While, at 48th month follow-up, the UNA/K of intervention group was significantly lower than control group 2.46 ± 1.71 vs. 4.21 ± 2.27, p < 0.001.

**Conclusions:** Our study demonstrated that long-term enriched potassium salt intake can reduce dietary salt consumption and urine sodium potassium ratio. It might be an effective way for dietary salt restriction. Present data were from the cafeteria staff self-report and spot urine, further verification by 24 hours urine specimens were necessary.

**PP.00.02** TELEHEALTH AND REMOTE MEASUREMENT TECHNOLOGIES TO IMPROVE THE MANAGEMENT OF OVERALL CARDIOVASCULAR RISK (TELE-REMETY STUDY)

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Objective: Telemedicine system for chronic disease management is being proposed in many countries since many years. These systems impact the patient behaviour, medication-taking, and important physician behaviours: promoting medication regimen adherence in patients and appropriately modifying therapy when existing therapy results in inadequate therapeutic effect. We recently launched a multicentre, prospective, cross-sectional study, aimed to evaluate whether a home telehealth system that allows the patient to monitor blood pressure (BP) and blood glucose (BG), with remote educational support and feedback to the general practitioner, can improve BP control and other risk factors, metabolic control, overall cardiovascular risk and medication adherence in hypertensive individuals, as compared to usual practice.

**Design and method:** 300 patients with uncontrolled hypertension and who are followed by primary care physicians will be randomized to either a “usual care group” or a “telemedicine group”. Participants will receive validated electronic BP and BG measuring device connected through GPDRS (FORA DUO ultima D40 g). They will self-test BP, BG and results will be uploaded and transmitted directly via a home telehealth system to a central database. Transferred data are integrated in the patient’s file in “e-CareLab system” and will be available to the center team. Abnormal 1 week adjustable mean values for BP and BG will be notified and relevant abnormalities will trigger an alarm which will be sent to the investigator by SMS or e-mail. A virtual visit (phone call or video) will take place at least every 2 weeks, according to the alert trigger and objective deviation in the group receiving the pharmacological treatment with Telehealth Solution. Clinical examination, biological assessment and 24 hour Ambulatory BP Monitoring (BP-Lab® or Mobilograph®) will be done at baseline and during the follow-up period (6 months).

**Results:** Results are expected to be available by 2018.

**Conclusions:** We hypothesize that more subjects in the telemedicine group will achieve BP and BG goals than in the control group. This will occur through increases in knowledge, self-management, shared decision-making, and improved doctor-patient interaction. We believe that telemedicine can facilitate patient care and in a cost effective manner.

**PP.00.03** EVALUATION OF DRUG CONTROL EFFICACY OF ARTERIAL HYPERTENSION IN THE PRIMARY HEALTHCARE SYSTEM OF YEREVAN

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Objective: Aim of the presented study was an evaluation of drug control efficacy of arterial hypertension (AH) in the Primary Health Care (PHC) system of Yerevan city (Armenia).

**Design and method:** Cohort of 1532 patients with AH, which had been followed up by PHC system medical practitioners and received regular antihypertensive medications (monotherapy or combined treatment), without target blood pressure (BP) level achievement. Patients were defined as uncontrolled AH, when systolic (SBP) and diastolic BP (DBP) levels exceeded 140 and 90 mmHg, respectively, in a result of three different visits. Statistical analyzes were conducted with IBM SPSS v22 software. P value of <0.05 was considered as statistically significant.

**Results:** 507 men and 1025 women with 64.2 ± 10.6 and 64.5 ± 9.7 years mean ages, without gender differences (p = 0.54), were analyzed. A number of 80y and more aged patients were 86 (5.6%; 95% CI 4.6, 6.9%) among examined individuals. Mean levels of SBP for men and women were 166.9 ± 17.4 mmHg and 167.0 ± 16.1 mmHg accordingly, without gender differences (p = 0.92). In addition, there wasn’t observed any statistical difference for mean values of DBP 97.6 ± 10.4 mmHg and 97.6 ± 9.9 mmHg accordingly (p = 0.96). Distribution of uncontrolled AH according to the age groups stated that 60–79 aged individuals prevailed in a group of patients having uncontrolled AH. Number of such individuals was 947 (61.8%; 95% CI 59.4, 64.2%), without gender differences (p = 0.35). Antihypertensive treatment analysis showed that angiotensin converting enzyme (ACE) inhibitors were assigned in more than 80% of cases of mono-therapy equally for both men and women, meanwhile the most frequent antihypertensive drug combination was ACE inhibitors and thiazide like diuretics (more than 30% of cases for all combinations), which amounted 20.5% of the cohort.

**Conclusions:** Drug control efficacy of AH still remains incompletely realized in the primary healthcare system of Yerevan as there is a huge prevalence of patients with uncontrolled AH. This testifies that up to now PHC system medical practitioners insufficiently use rational combinations of antihypertensive drugs.
Objectives: The aim of our study was to estimate a gap between self-assessment and screening survey results among Armenian population with uncontrolled arterial hypertension (HT).

Design and method: Cross-sectional survey conducted in Yerevan and 10 regions of Armenia. A multistage stratified random cluster sampling was used to include the individuals. Totally, 1561 individuals were included in the study. Previously trained general practitioners implemented a standardized questionnaire including demographic data and risk factor information. Physical examinations included blood pressure (BP) and anthropometric measurements. HT was defined as systolic and diastolic BP (SBP, DBP) levels equal or more 140/90 mmHg, or self-reported treatment with antihypertensive medication.

Results: According to the self-assessment data, the antihypertensive treatment resulted in decrease of BP to target levels in 236(77.6%) individuals, 6(4.9%) were undecided and only 53(17.4%) reported about the failure of the own BP control. Only 69(22.7%) and 109(35.9%) respondents with supposed controlling HT had controlled SBP and DBP levels accordingly. The controlled DBP indicators have been significantly higher than SBP ones in 16.9% and 11.9% of cases accordingly. There is a significant gap between BP regulation self-assessment and SBP, DBP screening indicators accordingly 41.5 and 32.1% among women receiving treatment. Among regularly treated patients a gap between BP regulation self-assessment and BP screening indicators was observed only in 50-64 age group with 26.4% systolic and 18.5% diastolic HT. There is a significant difference only in actual values of systolic (41.5%) and diastolic (26.7%) HT and self-evaluation divergence among respondents with obesity. A gap between self-assessment of respondents and higher levels of uncontrolled systolic and diastolic HT was obvious according to gender monitoring, meanwhile the mentioned indicators were significantly higher among women 42.6% vs. 12.7% and 23.1% vs. 8.4% accordingly. There was a 4.4% gap only for systolic HT among smokers. Alcohol abuse and excessive dietary salt consumption weren’t been determinants for evaluation of differences between the studied indicators.

Conclusions: There is an obvious gap between indicators of self-reported and really screened cases for uncontrolled HT, which can be the basic and serious reason for ineffective control of BP in Armenian population.

Design and method: This is a follow-up of the 8 patients treated with RDN - radiofrequency ablation (Symplicity Spyral) of the left and right renal arteries in a single center in Eastern Europe. All of the patients were with difficult to treat hypertension. The hypertension history of all was more than 10 years. Secondary causes were excluded. They were followed with office-, home- and ambulatory blood pressure monitoring on the 1-st, 6-th and 12-th month with no major change of the therapy until the 12-th month. The mean age was 62.37 ± 9.85 years. 4 (50%) were males. The mean number of medication used was 5 (4 medications), at least one diuretic. The mean home measured blood pressure values on inclusion were 175.00 ± 7.56 mmHg for the systolic and 96.25 ± 5.17 mmHg for the diastolic. Laboratory testing, echocardiography, 24-hour ECG monitoring, ABI, coronary angiography and carotids ultrasound were also conducted. 4 (50%) of the patients had non-severe renal artery stenosis.

Results: There was a hyperacute response with a profound blood pressure reduction to below 140/90 mmHg and even less in the first 24 hours after the procedure with a gradual return to the pretreatment values in the next 24 hours. The mean follow-up was 8.5 months (min. 5 months, 5 of the patients 12 months). There was a significant reduction in the mean home measured blood pressure values to 153.12 ± 24.34 mmHg for the systolic and 85.62 ± 9.80 mmHg for the diastolic (p < 0.0001). Two of the patients needed reduction of their antihypertensive therapy on the long-term. Two of the patients were non-responders. The common between them was BMI > 30 kg/m² and longer hypertension history.

Conclusions: Renal denervation may still be effective in properly selected patients. Larger samples are needed to properly define responders to treatment.
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Objective: To explore the effect of catheter based renal sympathetic denervation on renin-angiotension-aldosterone system (RAAS) and blood pressure reduction in patients with resistant hypertension, and assess the validity and security of the treatment.

Design and method: Ten patients with resistant hypertension from June 2011 to December 2011 were retrospectively reviewed, and then all of ten patients screened for eligibility were allocated to renal denervation. Primary endpoints were changes of office blood pressure at 1 week, 1.3 and 6 months after procedure. We assessed the effectiveness of renal sympathetic denervation with heart rate (HR), renin activity (PRA), angiotension II (Ang II), aldosterone (Ald), and ccretin (Cr) before and 2 weeks after procedure.

Results: Office blood pressure after catheter-based renal denervation decreased by 22.8/9.1mmHg (1mmHg = 0.133kPa), 34.8/14.7mmHg, 42.6/20.7mmHg, respectively.

Conclusions: Catheter-based renal sympathetic denervation can reduce the level of renin activity, angiotension II and aldosterone, and causes substantial and sustained blood-pressure reduction.

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Objective: To explore the effect of catheter based renal sympathetic denervation on renin-angiotension-aldosterone system (RAAS) and blood pressure reduction in patients with resistant hypertension, and assess the validity and security of the treatment.

Design and method: Ten patients with resistant hypertension from June 2011 to December 2011 were retrospectively reviewed, and then all of ten patients screened for eligibility were allocated to renal denervation. Primary endpoints were changes of office blood pressure at 1 week, 1,3 and 6 months after procedure. We assessed the effectiveness of renal sympathetic denervation with heart rate (HR), renin activity (PRA), angiotension II (Ang II), aldosterone (Ald), and ccretin (Cr) before and 2 weeks after procedure.

Results: Office blood pressure after catheter-based renal denervation decreased by 22.8/9.1mmHg (1mmHg = 0.133kPa), 34.8/14.7mmHg, 42.6/20.7mmHg, respectively.

Conclusions: Catheter-based renal sympathetic denervation can reduce the level of renin activity, angiotension II and aldosterone, and causes substantial and sustained blood-pressure reduction.
Objective: Resistant hypertension is defined as high blood pressure despite treatment with at least 3 different classes of antihypertensive drugs at best tolerated doses. One of the antihypertensive drugs has to be diuretic by definition. Resistant hypertension is a common clinical problem, the exact prevalence is not known. Pseudo resistance (poor medical adherence, white coat hypertension) must be excluded. As a subgroup, resistant hypertensive patients have not been studied widely. The present study has investigated if the resistant hypertension in elderly is a clinical presentation of HFrEF.

Design and method: The outpatient data of 661 patients <65 years and 254 patients >65 years, who applied between 1-30th of April 2015 to the cardiology clinic of the Kemalpasa state hospital, is reviewed. The patients with pseudo resistant hypertension (i.e. poor adherence to medical therapy, inadequate dosage, white coat hypertension), secondary hypertension (i.e. chronic renal or cardiovascular disease), heart failure reduced EF are excluded. All the resistant hypertensive patients have had an echocardiogram, renal Doppler exam, NT-proBNP level, routine biochemistry and urine exam. 58 patients are identified as true resistant hypertensive and have had EF<50, no moderate to severe valvular disease, no renal dysfunction. The present study has investigated if the NT-proBNP levels in the resistant hypertension differs with age.

Results: The mean age was 63±11 years. 49 of patients were younger and 9 were older than 75 years. The cut-off levels for NT-proBNP were accepted as <300 pg/ml for patients younger than 75 years and <600 pg/ml for patients older than 75 years. The median NT-proBNP level was significantly higher in the older group (p <0.05) whereas the median NT-proBNP level was within normal limits in younger group.

Conclusions: Resistant hypertension could be the clinical manifestation of various diseases with different etiology. Resistant hypertension in older patients can be a clinical presentation of HFrEF and should be investigated and treated accordingly. Because of one-center results and limited number of patients, further studies are needed.
and follow up of patients with arterial hypertension by GP’s. The main source of information about their status and therapy was the personal medical file.

**Results:** I. Investigations (laboratory and instrumental techniques): No one patient had evaluation of microalbuminuria as marker of early cardiovascular damage; 85% of patients had normal carotid ultrasonography; 15% of patients had serum uric acid; 18% of patients had fasting plasma glucose above 5.8 mmol/L without further tests to determine presence/absence of diabetes; only 38% of patients had blood pressure below 140/90 mm Hg; 80% of patients had lipid profile; 80% of patients had echocardiography II. Cardiovascular risk evaluation: 80% did not have cardiovascular risk evaluation. III. Lifestyle changes: 50 patients used step-counters and only 10 of them performed on the average over 6000 steps daily. IV. Pharmacological therapy: over 50% patients were treated with a combination of Beta-blocker and Diuretic as first choice without precise indications; approximately 50% of patients used fixed combinations – mainly ACEI/Diuretic and ARB/Diuretic, very often not as a first choice.

**Conclusions:** 1. The control of blood pressure in hypertensive patients is insufficient in spite of recommendations of NHIF. 2. Cardiovascular risk evaluation has not become integral part of routine care in outpatient settings. 3. Evaluation of glucose tolerance as first step of diagnosis of Diabetes mellitus is often neglected. 4. The role of uric acid is neglected in the assessment of cardiovascular risk. 5. Beta-blockers combined with diuretics are still leading as first choice of medicines to treat arterial hypertension. 6. General practitioners prefer to use expensive and sophisticated tests as echocardiography rather than cheap and also informative tests as microalbuminuria.

**PP.05.20**

**INFLUENCE OF A PROGRAM OF THERAPEUTIC EXERCISE IN DIFFERENT CLINICAL INDICATORS RELATED TO DYSLIPIDEMIA IN ADULT SUBJECTS FROM 26 TO 73 YEARS WITH A CARDIOVASCULAR RISK FACTOR**

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**Objective:** to assess the influence of a program of therapeutic exercise in different clinical indicators related to dyslipidemia (cholesterol, HDL and LDL) among sedentary subjects with a cardiovascular risk factor.

**Design and method:** The sample was composed of 340 patients (132 men and 208 women) coming from two primary care centers in the town of Molina de Segura (Murcia), who participated in a 30 weeks exercise program combining strength and cardiorespiratory training organized in a circuit training mode. As for the clinical indicators, the health professionals registered in the patient medical record those health indicators related to the biological evolution of the process by which the subjects had started the exercise program.

**Results:** Statistical analyses show significant improvement (p < 0.005) in the indicator of LDL and a nonsignificant improvement in indicators of total cholesterol and HDL after ending of a 3-month program of physical exercise with a frequency of 3 weekly sessions.

**Conclusions:** Therefore, prescribing exercise in dyslipidemic subjects from primary care centers should be considered as a resource for improving own clinical indicators of disease.

**PP.05.21**

**RATE OF CLINICAL FACILITY VISITORS AMONG THOSE WHO WERE SUGGESTED TO HAVE TREATMENT OR DETAILED HEALTH EXAMINATION**

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**Objective:** The Occupational Safety and Health Law in Japan stipulates that employers provide routine health examination (mostly once a year) to their employees. Theoretically such opportunity is valuable for early detection of health problems. The efficacy is however seldom evaluated in practice. It is the purpose of this study to examine how the examinees take advantage of the examination results for their own health care.

**Design and method:** Health examination reports on fasting blood glucose (FBG), blood pressure (BP) and serum LDL-C (LDL) were collected for 140,000 routine health examination examinees (at the ages of 30 to 50 s; men and women combined). Indications on health problems were informed to the individuals with due privacy protection.

**PP.05.22**

**PHYSICAL ACTIVITY IN MEN WITH ARTERIAL HYPERTENSION FROM THE WARMIA NAD MAZURY REGION IN POLAND**

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**Objective:** To investigate relationships between regular physical activity (ACT), arterial blood pressure and selected biochemical parameters in the men of the Warmia and Mazury region in Poland.

**Design and method:** Data were collected from 308 men aged between 21–77 (46.3 ± 11.9) years between Dec. 2014 and Dec. 2015. Health questionnaire was completed for 304 subjects. Blood pressure was measured according to the ESH/ESC guidelines. Lab tests (serum glucose, triglycerides, HDL- and LDL- cholesterol, serum creatinine) were measured in a certified laboratory. Analyses were performed separately for three groups depending on ACT: ACT+ (subjects that do sports at least 3 times a week, go walking or do gymnastics every day for at least 30 minutes, i.e. who met the WHO physical activity criteria; WHO+), ACT- (do sport/gymnastics or go walking occasionally or never) and ACT+/- (moderate activity, i.e. between ACT+ and ACT-). Three age groups were defined: < 40, 40–60, >60. The SPSS V.23 Software was used for statistical analyses.

**Results:** 28.9% of men meet the activity level recommended by the WHO. Regarding to age groups: < 40, 40–60, >60 in ACT+ it was 25.0%, 28.7% and 31.7% of men. In < 40 age group PP in ACT+ was significantly higher in comparison to ACT- (49.7 ± 11.0 vs 43.9 ± 5.7mmHg, p = 0.02), due to the trend to lower DBP values in ACT+ group (82.1 ± 8.7 vs 86.0 ± 8.7 mmHg, p = 0.063). No significant difference was found in systolic, diastolic and mean arterial pressure between ACT+ and ACT- in all age groups. BMI and lab test results of the group >60 indicated significant difference between ACT+ and ACT-: BMI 27.9 ± 2.9 vs 31.2 ± 4.4 kg/m², p = 0.03; HDL 60.1 ± 9.2 vs 47.8 ± 7.9 mg/dl, p = 0.01; Creatinine 0.9 ± 0.1 vs 1.1 ± 0.2 mg/dl, p = 0.02. No significant effect of ACT was found in laboratory parameters in men aged < 60.

**Conclusions:** The percentage of ACT+ men in Warmia and Mazury region in Poland was lower than average in Europe (29% vs 42%). The results may suggest beneficial effect of ACT on BMI, HDL and creatinine values in older age group.
Impact of Short-term Exercise Training and Beta Blockers on Arterial Blood Pressure and QT Dispersion in Patients After Coronary Artery By-pass Graft Surgery With Hyperkinetic State

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Objective: The aim of this study was to establish the influence of short-term exercise training and beta blockers (BB) on arterial blood pressure (BP), double product (DP) and QT dispersion (QTD) in patients after coronary artery bypass graft surgery (CABG) with hyperkinetic state.

Design and method: The study involved 135 patients after CABG with hyperkinetic state, average age 56.7 years. Patients were randomly divided into the physical training group (TG: 109 patients) and control group (non-training group: 26 patients). In all subjects exercise test on treadmill according to Bruce protocol were performed. TG patients increased doses of beta blockers and are involved 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. From standard ECG corrected QT dispersion (QTDc) was calculated.

Results: After three days, we have found significant reduction of heart rate from 87.1 ± 5.8 to 75.9 ± 5.5 beats/min (p < 0.001), of systolic BP from 148.5 ± 12.7 to 142.2 ± 9.3 mmHg (p < 0.001), of diastolic BP from 90.3 ± 6.9 to 85.7 ± 4.9 mmHg (p < 0.001) and of DP from 13102.3 ± 797.8 to 12257.6 ± 633.6 beat/min x mmHg (p < 0.001) in the TG. After three weeks, we have found significant reduction of QTDc from 54.5 ± 16.5 to 47.14 ± 17.4 ms (p < 0.001) in the TG. Also, in the TG, we have found significant reduction of heart rate from 87.1 ± 5.8 to 69.9 ± 4.9 beats/min (p < 0.001), of systolic BP from 148.5 ± 12.7 to 136.3 ± 6.7 mmHg (p < 0.001), of diastolic BP from 90.3 ± 6.9 to 82.7 ± 3.8 mmHg (p < 0.001) and of DP from 13102.3 ± 797.8 to 10912.2 ± 602.4 beat/min x mmHg (p < 0.001). In contrast, the non-training group showed no significant changes.

Conclusions: The study showed that short-term exercise training and BB have favourable effects on arterial BP, DP and QTD in patients after CABG with hyperkinetic state. Beta blockers are enabled to properly implement and improve the program of physical training in study patients.

A Systematic Review of Telemonitoring Assessment for Patients With Heart Failure

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Objective: Telemonitoring (TLM) can improve heart failure (HF) management but there is no standardized evaluation framework to comprehensively evaluate the various impacts of TLM. Our objectives were to list the criteria used in published evaluation of HF TLM projects, to describe how these criteria are used in the evaluation process and criteria. A systematic review of TLM evaluation frameworks should cover all of the six dimensions, approaching the study of TLM from different perspectives.

Design and method: Articles were obtained through the Medline, Web of Science and Embase from 1990 to August 2015. Articles were eligible if they were original reports of a HF TLM evaluation study in English language. Studies of implantable TLM devices were excluded. Each selected article was screened to select the description of the TLM project, and of the process evaluation criteria. A qualitative synthesis was performed.

Results: Overall, 121 articles were selected and reviewed, leading to 52 evaluation frameworks that were based on the student’s T-test, U Mann-Whitney and Chi2. To examine the relationship between selected parameters we used Pearson and Spearman correlations.

Magnesium Supplementation in Patients With Hypertension

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Objective: European Society of Hypertension (ESH/ESC) and Polish Society of Hypertension (PTHT) guidelines don’t recommend magnesium supplementation as an adjunctive therapy in patients with arterial hypertension. Nevertheless, Polish Institute of Food and Nutrition suggests increased supplementation of magnesium ions among hypertensive patients in everyday diet.

Design and method: The aim of the study was to assess a frequency of using magnesium supplements by hypertensive patients including demographic and clinical characteristics of the study group. From October 2015 to January 2016 data of 309 hypertensive patients from Outpatient Clinic were collected and analyzed. We assessed: demographic and medical therapy data, results of office blood pressure and heart rate measurements.

Results: We collected data of 309 patients aged between 19 and 84 (mean age 59.91±2 years) who were diagnosed with hypertension (HA). Mean time from diagnosis of HA was 12.8 ± 9.9 years. The study group was represented in majority by subjects with secondary school level (40.8%) and university education (31.7%), retired (38.5%) or white-collars (26.9%). The proportion of patients using magnesium supplementation was 47.9% in the study group. Women more common than men were using magnesium supplements (68.2%, p = 0.0001). Subjects preferred organic forms of magnesium supplements (85.1%) rather than manganic (11.5%) or chelate (3.4%). There were no significant differences in SBP (142 vs 140 mmHg; p = 0.93), DBP (80 vs 82 mmHg; p = 0.42) and HR (71.5 vs 70.0 per min.; p = 0.21) in group with and without magnesium supplementation. Pharmacological treatment and the proportion of patients that reach BP target (BP < 140/90 mmHg) were comparable in subgroup’s analysis.

Conclusions: Nearly half of hypertensive patients, especially women, use magnesium supplements regularly. Organic forms are preferable. Supplemental doses of magnesium ions did not associate with SBP, DBP and HR values and reaching BP target in hypertensive patients.

Relationship Between Urocortin 2 Concentration and Metabolic Profile in Healthy Subjects

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Objective: The aim of this study was to assess the relationship between the serum concentration of urocortin 2 (UCN 2) and metabolic parameters in healthy individuals.

Design and method: We examined 37 middle age healthy subjects. Evaluation included anthropometric measurements (body mass index-BMI, waist to hip ratio-WHR) and ambulatory blood pressure monitoring (ABPM) using SpaceLabs 92007, 90217. Moreover we evaluated metabolic parameters in blood serum after ten hours of fasting: glucose, total cholesterol, low density cholesterol (LDL), high density cholesterol (HDL), triglycerides (TG), HbA1c, insulin, hsCRP, NT-proBNP Glomerular filtration rate was estimated using the MDRD equation. For the analysis of UCN 2 concentration in blood of enrolled individuals we use ELISA Kit for UCN 2 (Cloud-Clone, USA).

We divided the surveyed subjects into two groups according to the urocortin’s median value (9.12 ng/ml). The comparative analyses between the independent groups were based on the student’s T-test, U Mann-Whitney and Chi2. To examine the relationships between selected parameters we used Pearson and Spearman correlations.

Table 1

<table>
<thead>
<tr>
<th>Group &lt; 9.12ng/ml</th>
<th>Group ≥ 9.12ng/ml</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y)</td>
<td>57 (55, 59)</td>
<td>54 (52, 56)</td>
</tr>
<tr>
<td>Male n (%)</td>
<td>58 (33, 33)</td>
<td>7 (66, 8)</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>25.245</td>
<td>25.039 ± 5.6</td>
</tr>
<tr>
<td>WHR</td>
<td>0.81 ± 0.11</td>
<td>0.81 ± 0.09</td>
</tr>
<tr>
<td>Glucose (mmol/L)</td>
<td>4.94 ± 0.48</td>
<td>4.31 ± 0.33</td>
</tr>
<tr>
<td>Total cholesterol (mmol/L)</td>
<td>5.72 ± 0.91</td>
<td>4.74 ± 0.78</td>
</tr>
<tr>
<td>HDL (mmol/L)</td>
<td>1.3 ± 0.51</td>
<td>1.40 ± 0.36</td>
</tr>
<tr>
<td>LDL (mmol/L)</td>
<td>3.4 ± 0.82</td>
<td>2.75 ± 0.78</td>
</tr>
<tr>
<td>TG (mmol/L)</td>
<td>1.18 [0.71-1.6]</td>
<td>1.05 [0.81-1.62]</td>
</tr>
<tr>
<td>Insulin (mmol/L)</td>
<td>7.82 [6.76-10.6]</td>
<td>7.90 [6.15-10.13]</td>
</tr>
<tr>
<td>HbA1C (%)</td>
<td>5.43 ± 0.28</td>
<td>5.41 ± 0.25</td>
</tr>
<tr>
<td>Creactive protein (mg/dL)</td>
<td>21.05 ± 0.71</td>
<td>17.50 ± 0.56</td>
</tr>
<tr>
<td>SBP (mmHg)</td>
<td>115 ± 7.7</td>
<td>116 ± 6.47</td>
</tr>
<tr>
<td>DBP (mmHg)</td>
<td>72 ± 24.5</td>
<td>73 ± 5.845</td>
</tr>
</tbody>
</table>

Stat. (n%) | (15, 6) | (5, 5) | 0.74 |
Results: Mean age of the subjects was 45 ± 9.2, about 35% were male. Median of UCN 2 concentration was 9.1±0.5 ng/ml (IQR: 7.23–15.05). There were no significant differences between examined groups in age, sex, BMI, WHR, values of blood pressure and biochemical parameters like: glucose, HbA1c, insulin, creatinine, eGFR, hsCRP, NTproBNP cortisol (details are presented in table I). We observed significant differences between the groups in total cholesterol, LDL and HDL. These groups did not differ in terms of smokers intake. We observed an inverse relationship between UCN 2 levels and lipid values (total cholesterol r = −0.04, p = 0.05 LDL r = −0.06, p = 0.04). We did not observed such associations with other metabolic parameters.

Conclusions: Subjects with higher level of UCN 2 have lower concentration of total cholesterol, HDL and LDL, however changes in UCN 2 concentration were not associated with other metabolic parameters.

PP.05.29 CIRCADIAN RHYTHM OF BLOOD PRESSURE AND TARGET ORGAN DAMAGE IN PATIENTS WITH RESISTANT HYPERTENSION

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Objective: To investigate characteristics of circadian blood pressure rhythm, frequency and character of hypertensive damage of heart, kidney and carotid arteries in patients (pts.) with true resistant arterial hypertension (RAH).

Design and method: 43 essential hypertensive pts. were included in the study. According to office and ambulatory BP measurement after 2 month of treatment with fixed dose combination perindopril/indapamide/amlopidine 10/2.5/10 they were divided into two groups: the 1-st - 22 pts. with confirmed RAH and the 2-d with 21 pts. were underwent ambulatory blood pressure monitoring (ABPM), ultrasonography of heart and carotid arteries, laboratory tests (serum creatinine and 24-hour albuminuria).

Results: Two groups were comparable in age (51.4 ± 2.6 vs.54.2 ± 1.9y, p = 0.63), body mass index (32.2 ± 0.9 vs. 33.4 ± 1.1 kg/m², p = 0.03) and office systolic (174.4 ± 4.1 vs. 175.5 ± 4.5 mmHg, p = 0.78) and diastolic (97.3 ± 4.4 vs. 102.4 ± 2.4 mmHg) BP. But pts. with RAH had higher level of ambulatory systolic BP (SBP), than patients of comparing group; average diurnal SBP 169.2 ± 2.8 vs.159.0 ± 2.8 mmHg (p = 0.03), average daytime SBP 173.3 ± 2.9 vs. 166.4 ± 2.4 mmHg (p = 0.04) and average nighttime SBP 161.9 ± 3.4 vs. 148.6 ± 4.2 mmHg (p = 0.02). Ambulatory diastolic BP doesn’t differ between two groups: average diurnal DBP 96.2 ± 3.3 vs. 89.5 ± 2.3 mmHg (p = 0.27), average daytime DBP 100.4 ± 3.5 vs. 94.0 ± 2.4 mmHg (p = 0.24) and average nighttime DBP 88.5 ± 3.2 vs. 80.6 ± 2.4 mmHg (p = 0.19). Diurnal systolic and diastolic BP index was significantly lower in RAH patients – 6.7 ± 1.2 vs. 10.1 ± 1.4 % and 11.6 ± 1.1 vs. 15.0 ± 1.3 % respectively. Disturbances of circadian BP rhythm was detected in 72.7% RAH pts. in compare with 43.0% pts. with controlled AH. LVH (concentric type in all cases) was diagnosed at 100% RAH pts. and in 90% pts. in comparing group (concentric type in 61.5% of cases). Frequency of carotid atherosclerosis (68.8% vs. 46.6%) and intima-media thickness (1.49 ± 0.07 vs. 1.17 ± 0.06 mm, p = 0.003) were significantly higher at RAH than at controlled AH pts. Glomerular filtration rate was equal in comparing groups when albuminuria was greater in RAH pts. – 18.4 ± 3.3 vs. 15.2 ± 2.1 mg/l (p = 0.03).

Conclusions: RAH pts. characterizes by higher level of ambulatory SBP and more frequent disturbances of BP circadian rhythm in comparing with controlled AH pts. These peculiarities of ambulatory BP is accompanied with concentric LVH, atherosclerotic and hypertensive damage of carotid arteries and signs of kidney injury.

PP.05.30 NEUROHUMORAL AND ENDOTHELIAL RESPONSES TO HEATED WATER-BASED EXERCISE IN RESISTANT HYPERTENSIVE PATIENTS THE NEUROHUMORAL AND ENDOTHELIAL RESPONSES TO THE BLOOD PRESSURE (BP) LOWER

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Objective: The neurohumoral and endothelial responses to the blood pressure (BP) lowering effects of heated water-based exercise (HEx) in resistant hypertension (HT) patients remain undefined.

Design and method: We investigated these in 44 true resistant HT patients (age 53.3 ± 0.9 years, mean ± SEM). They were randomized and allocated to 2 groups, 28 to a HEx training protocol, which consisted of calisthenic exercises and walking in a heated pool for 1 h, three times weekly for 12 weeks and 16 patients to a control group maintaining their habitual activities. Measurements made before and after 12 weeks of HEx included clinic and 24-h BP, plasma levels of nitric oxide, endothelin-1, aldosterone, renin, norepinephrine and epinephrine, as well as peak VO2, and endothelial function (reactive hyperemia).

Results: After 12 weeks of HEx patients showed a significant decrease in clinic and 24-h systolic and diastolic BPs. Concomitantly, nitric oxide increased significantly (from 25 ± 6 to 75 ± 24 nmol/L, p < 0.01), while endothelin-1 (from 41 ± 5 to 26 ± 3 pg/mL, renin (from 35 ± 4 to 3.4 ± 1 ng/mL/h), and norepinephrine (from 720 ± 54 to 306 ± 35 pg/mL) decreased significantly (p < 0.01). Plasma aldosterone also tended to decrease, although not significantly (from 101 ± 9 to 76 ± 4 pg/mL, p = NS). Peak VO2 increased significantly after HEx (p < 0.01), while endothelial function was unchanged. No significant change was detected in the control group.

Conclusions: The BP-lowering effects of HEx in resistant HT patients were accompanied by a significant reduction in the marked neurohumoral activation characterizing this clinical condition.

PP.05.32 PROFOUND SYMPATHETIC NERVOUS SYSTEM ACTIVATION IN PATIENTS WITH RESISTANT HYPERTENSION

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Objective: Sympathetic nervous system activation is established as a major contributor to the development of human arterial hypertension. The relevance of neural mechanisms in resistant hypertension has not yet been investigated in detail. We therefore aimed to assess the degree of regional sympathetic activation in patients with resistant hypertension.

Design and method: We combined microneurographic assessment of central sympathetic outflow with renal noradrenaline kinetics using radio tracer dilution methodology to comprehensively assess the level and pattern of sympathetic activation in 49 patients with resistant hypertension (RH). Matching data from patients with essential hypertension (EH: n = 70) and normotensive control subjects (NT: n = 40) were analyzed for comparison.

Results: Systolic and diastolic office blood pressure levels were highest in patients with RH. Both muscle sympathetic nerve activity and renal noradrenaline spillover (NT: 73 ± 52 vs EH: 132 ± 87 vs RH: 245 ± 187 nm/g; p < 0.01) were substantially elevated in RH. Compared to patients with essential hypertension the level of renal sympathetic nerve activity was almost double (p < 0.01) and more than three-fold higher in RH compared to normotensive control subjects.

Conclusions: Our results provide unequivocal evidence for a profound activation of the sympathetic nervous system in patients with resistant hypertension. While these findings cannot necessarily establish a cause-effect relationship, they substantiate the notion that specific targeting of renal sympathetic nerves is an attractive and well-founded therapeutic approach to improve blood pressure control, particularly in patients with resistant hypertension.

PP.05.33 IMMEDIATE REDUCTION OF PULSE WAVE VELOCITY AS A MARKER OF EFFICACY OF RENAL DENERVATION THERAPY IN HEMODIALYSIS PATIENTS WITH RESISTANT HYPERTENSION

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Objective: Aim of the study is to evaluate the acute variations of Pulse Wave Velocity (PWV) after trans-catheter renal denervation (RDT), as index of arterial stiffness variation, in hemodialysis patients affected by resistant hypertension (RH). The hypothesis was that interruption of the nervous fibers that run along renal arteries, might directly and reflexly reduce systemic sympathetic tone with a more profound and more than three-fold higher in RH compared to normotensive control subjects.

Design and method: We enrolled 5 consecutive patients affected by RH (4 men, 1 woman, mean age 50 years). The entire cohort underwent bilateral RDT procedure with the EnligHTN System (St. Jude Medical). Invasive measurement of PWV were obtained before and after the procedure using a dedicated catheter FS-Stiffness (Fiducial Vascular, Italy). Measurements included systolic blood pressure (SBP), diastolic (D) BP mean (M) BP and Heart rate (HR).
Results: PWV was reduced from 14.12 to 11.89 m/sec (change 2.23 m/sec; p-value 0.01)) by RDT which was also accompanied by a reduction of SBP (from 162.6 to 130.4 mmHg, p-value 0.02). DBP (from 97.4 to 83.6 mmHg, p-value 0.04) and MBP (from 119.3 to 99.2 mmHg, p-value 0.03) with no significant change in HR (from 78 to 72 bpm, p-value 0.74). Calculation of the percent differences showed the magnitude of the PWV reduction (23.7%) to be greater than that of SBP, DBP and MBP (18.7%, 13.8% and 16.1%, respectively). The Pearson’s correlation analysis did not demonstrate significant correlations between the change in PWV and changes in HR (r = 0.335, p = 0.345), SBP (r = 0.176, p = 0.626), DBP (r = 0.178, p = 0.623) or MBP (r = 0.192, p = 0.596).

Conclusions: Bilateral RDT procedure produced an acute significant decrease in PWV. There was also an acute significant reduction of SBP, DBP and MBP which, however did not show a significant relationship with the PWV changes. This suggests that improvement of arterial stiffness by RDT maybe at least in part BP independent possibly in relation to the reduction of the stiffening effect of the sympathetic activity on the arterial wall. If so, the acute decrease in PWV by RDT might represent a marker of the efficacy of the RDT procedure.

**PP.05.34**

**METABOLIC SYNDROME-RELATED FEATURES IN CONTROLLED AND RESISTANT HYPERTENSIVE SUBJECTS**

A. Santa Catharina
R. Modolo
A. Ritter
A. Sabbatini
N. Correa
V. Brunelli
N. Fracaro
A. Almeida
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Objective: The purpose of this study was to evaluate the prevalence of metabolic syndrome (MetS) and the clinical features associated with it in resistant and mild to moderate hypertensives.

Design and method: This cross-sectional study included 236 patients. (i) 129 mild to moderate hypertensive patients and (ii) 107 patients with resistant hypertension (RHTN). We determined blood pressure measurements, bioimpedance parameters and adipokines levels. Target organ damages such as microalbuminuria (MA), cardiac hypertrophy and arterial stiffness were also assessed.

Results: We found a prevalence of 73% in resistant and 60% in mild-to-moderate hypertensive patients. The patients with MetS showed a higher prevalence of MA equal or higher than 30 mg/g compared to their counterparts (20% vs. 4%). Adiponectin levels were significantly lower in patients with MetS (5.30 vs. 7.50 mg/mL), while leptin demonstrated to be increased in hypertensive patients. Indeed, LAR may be useful as a reliable biomarker for MetS tend to develop early signs of end-organ damage with hormonal changes parameters and adipokines levels. Target organ damages such as microalbuminuria (MA), cardiac hypertrophy and arterial stiffness were also assessed.

Conclusions: Our findings suggest that the metabolic derangements present in MetS tend to develop early signs of end-organ damage with hormonal changes in hypertensive patients. Indeed, LAR may be useful as a reliable biomarker for identifying those who are at risk for developing MetS.

**PP.05.35**

**RENA L DENERVATION IN COMPARISON TO INTENSIFIED PHARMACOTHERAPY IN TRUE RESISTANT HYPERTENSION. TWO-YE A R OUTCOMES OF RANDOMISED PRAGUE-15 STUDY**

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Objective: This randomised multicentre study compared the efficacy of renal denervation (RDN) versus spironolactone addition in patients with true resistant hypertension. We present the 24-month data.

Conclusions: In the settings of true resistant hypertension, spironolactone addition (if tolerated) seems to be of better efficacy than RDN in blood pressure reduction over a period of 24 months. However, by contrast to the 12-month results, blood pressure changes are not significantly greater.

**PP.05.37**

**LONG-TERM OBSERVATIONS OF KIDNEY BLOOD FLOW AFTER RENAL SYMPATHETIC DENERVATION IN PATIENTS WITH RESISTANT HYPERTENSION**

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Objective: We studied the renal blood flow and the dynamics of renal function (serum creatinine) by significant reduction in blood pressure after endovascular renal sympathetic denervation (RSD) in long-term observations.

Design and method: Single-institution study was initiated in essentially hypertensive patients with BP > 160/100 mm Hg despite three or more antihypertensive drugs. All participants of research have given the informed agreement.
efficacy endpoints: changes of renal function at 1 (n = 37), 2 (n = 32) and 3 (n = 11) years after RSD, secondary – changes in renal blood flow (ultrasound dopplerography velocity (V) and resistive index (RI)) during 1st years, at 24 and 36 months after RSD. RSD was done bilaterally using transversal access (4-8 ablation points, temperature control mode, target t = 50 °C, power limit = 8 watt, duration = 2 min). The patients were instructed to maintain pharmacotherapy unchanged during the study.

Results: RSD was performed in patients 52.2 ± 9.1 old years of remaining 12 month of follow-up. Two treated patients refused to continue in the study, 1 patient moved and was lost to follow-up. No immediate damage of renal arteries was detected in all cases by intraoperative rational control angiography. Serum creatinine did not change significant through follow up: start 82.7 ± 19.6, after 1Y 86.2 ± 23.8 p = 0.11 and 2Y 86.7 ± 20.7 p = 0.07 and 3Y 79.6 ± 16.0 p = 0.21. No significant changes in renal blood flow were found initially and during 1/ 2 / 3 years of follow-up: Vrunc 80.0 ± 20.0 and 83.0 ± 20.7/90.3 = 18.7/89.2 ± 17.6 ± cm/s p = 0.34/0.18/0.26; Vsgm 43.5 ± 9.2 and 44.1 ± 9.4/20.2 ± 10.2/48.3 ± 7.9 cm/s p = 0.64/0.09/0.16. But the RI in the segmental arteries was significantly decreased after RSD 0.65 ± 0.09 and 0.59 ± 0.06/0. 62 ± 0.06/0.59 ± 0.08 p = 0.002/0.014/0.045.

Conclusions: Kidney blood flow and serum creatinine did not change significantly, but a significant and prolonged reduced peripheral vascular resistance after renal sympathetic denervation in patients with resistant hypertension by long-term observations of after the RSD.

PP.05.38 EFFICIENCY OF RENAL DENervation IN PATIENTS WITH RESISTANT HYPERTENSION AND OBESITY

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Objective: The aim of our study was a compare of efficiency of renal denervation (RDN) in patients with resistant hypertension (RH) and the normal body weight and obesity.

Design and method: 92 patients with RH included, the average age – 52 [9; 68]. All patients underwent RDN. Patients divided into 4 groups. 1 group - the non-obese (body mass index (BMI)) less than 29.9 kg/m2), group 2 - obesity I (BMI = 30–34.9 kg/m2), group 3 - obesity II (BMI = 35–39.9 kg/m2), group 4 - obesity III (BMI = 40 kg/m2). RDN performed by an experienced electrophysiologist at the renal arteries (RA) using specialized electrode Symplicity. Office systolic blood pressure (SBP) and diastolic blood pressure (DBP), 24-hour ambulatory blood pressure monitoring (ABPM) measured before and at 3, 6 and 12 months of follow-up. These data analyzed separately for each group.

Results: The values of office BP and ambulatory BP were significantly different in 4 groups at all-time points of observation. On visits at 6 and 12 months after the RDN office SBP reduction was more in patients with obesity III Degree. There was a significant difference in the reduction of office SBP at 6 months by average 14.4 mm Hg in the group obesity III versus with obesity I (p = 0.025). Best decrease of ambulatory 24-hour was also observed in the group with obesity III. The reduction of ambulatory 24-hour SBP was significantly higher at average 25.8 mm Hg in the group obesity III versus with obesity I (p = 0.025). Best decrease of ambulatory 24-hour DBP of 6 months and ambulatory 24-hour DBP at 12 months was found (Spearman, r = 0.22, p = 0.05; Spearman, r = 0.25, p = 0.05 respectively).

Conclusions: A significant positive correlation between baseline body mass index of patients and reduction of office SBP of 6 months and ambulatory 24-hour SBP at 12 months was found. The patients with obesity III degree have the greatest reduction in office SBP and ambulatory 24-hour SBP.

PP.05.39 TWENTY-FOUR HOUR AMBULATORY BLOOD PRESSURE LEVEL IS CORRELATED WITH ALTERED PSYCHOLOGICAL PROFILES IN PATIENTS WITH APPARENTLY TREATMENT-RESISTANT HYPERTENSION

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Objective: Clinicians following patients with apparently treatment-resistant hypertension (aTRH) agree that a substantial proportion of these patients have a peculiar psychological profile. The latter may adversely affect blood pressure (BP) control, either by impacting drug adherence, or through other, poorly explored psycho-physiological mechanisms. The aims of this pilot study were to explore the psychological profile of patients with aTRH using validated questionnaires and to look for its relation with BP control and drug adherence.

Design and method: Psychological profile was evaluated using the Emotion Regulation Questionnaire (ERQ), the Toronto Alexithymia Scale (TAS 20), the Cognitive Emotion Regulation Questionnaire (CERQ), the Brief Symptom Inventory (BSI) and the Post Traumatic Diagnostic Scale (PDS). Adherence status was assessed by urine drugs quantification using liquid chromatography-mass spectrometry assays.

Results: The analysis included 35 consecutive outpatients with aTRH (mean age: 51 years, 54% females, office BP: 180/105 mmHg, 24-hour ambulatory BP: 160/100 mmHg, mean number of antihypertensive drugs: 4). Twenty-four hour systolic BP level adjusted for the number of antihypertensive drugs significantly (p < 0.05) correlated with alexithymia (TAS 20; r = 0.50), in particular difficulty to identify and describe feelings (r = 0.47 and 0.45); with self-blame (r = 0.66), rumination (r = 0.59), dramatization (r = 0.63), blame of others (r = 0.46) and more generally non-adaptive strategies in the cognitive regulation of emotions (r = 0.72) assessed by CERQ; with anxiety (r = 0.51), depression (r = 0.46) obsession (r = 0.47), hostility (r = 0.51) and paranoia (r = 0.63) evaluated with BSI. A significant correlation with alexithymia (TAS 20; r = 0.69) assessed by PDS. Despite a high proportion of partly adherent (40%) or non-adherent (31%) patients, these correlations remained unaffected after adjustment for adherence. Adherence level was not associated with BP level, the number of antihypertensive drugs or the aforementioned psychological characteristics.

Conclusions: While poor drug adherence is common in patients with aTRH, it does not entirely explain poor BP control. Our results suggest that, in patients with aTRH, resistance to drug treatment is influenced by a deleterious constellation of psychological characteristics, irrespective of drug adherence. More research is needed to confirm these results, explore the underlying mechanisms and define the best strategies to improve BP control in this challenging subset of patients.

PP.05.40 CONTINUATION OF A RANDOMIZED DOUBLE-BLIND CONTROLLED TRIAL OF DISTAL RENAL DENERVATION VERSUS CONVENTIONAL MODE OF THE INTERVENTION FOR TREATMENT OF RESISTANT HYPERTENSION

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Objective: Recently we demonstrated in a double-blind, randomized, controlled study (ClinicalTrials.gov NCT02667912) that “distal” renal denervation in segmental branches of renal artery is more effective for treatment of resistant hypertension than “conventional” mode of the therapy in main trunk only. Then we continued the study to increase our experience with distal renal denervation.

Design and method: Patients with true drug-resistant essential hypertension were randomized either to “conventional” treatment restricted to the main renal artery or to “distal” treatment applied mainly in segmental branches of the artery beyond the bifurcation. Computer-based treatment assignment was performed in the catheterization laboratory at the time of the procedure by the interventional radiologist and remained unknown to patients, investigators, and other outcomes assessors for the entire study period. Baseline antihypertensive pharmacotherapy was maintained as strictly as possible during the follow up.

Results: A total of 55 patients were finally enrolled and 51 patient completed 6 months follow-up. Per protocol analysis again showed a significantly greater decrease of 24-hour mean systolic BP (primary outcome) in the distal therapy group (n = 27) as compared to the group of conventional renal denervation (n = 24): −21.1 ± 19.3 vs −10.3 ± 17.8 mmHg; P < 0.05. No major safety issues were observed in either group. No significant change of blood flow in segmental branches of renal artery was detected by Doppler flowmetry.

Conclusions: These data continue to show that distal renal denervation in segmental branches of renal artery is significantly more effective for treatment of resistant hypertension than the conventional intervention in main trunk only.
Objective: Decrease of heart rate variability (HRV) (decrease of SDANN < 100 ms) and left ventricular (LV) hypertrophy can be independent risk factors for future cardiovascular complications. The purpose of this study was to determine relation between humoral factors (plasma renin activity -PRA, plasma aldosterone – pALD, 24 hour urinary metanephrines – uMET), myocardial remodeling and HRV in resistant hypertensive (RH) patients (pts).

Design and method: 24 h Holter ECG monitoring has been recorded in 20 true RH pts (20pts by mean age 51.0 ± 2.8yrs) using Meditech EC-GO System. The analysis of HRV included time parameters (SDNN, SDANN, SDNN-I, pNN50%, RMSSD). Echocardiography of all patients has been carried out. The level of PRA, pALD, uMET has been determined by standard methods.

Results: The analysis of HRV in 20 RH pts showed initial state HRV – SDNN - 105.5 ± 4.2 mc, SDANN - 97.5 ± 5.03 mc, SDNN-I - 38.6 ± 3.04 mc, RMSSD - 42.9 ± 6.7 mc, pNN50% - 8.8 ± 1.4. The significant linear relation was found between level of uMET and time parameters of HRV (SDNN-I, RMSSD): with SDNN-I r = 0.564, p < 0.05, RMSSD r = 0.502, p < 0.05 in these pts. No significant difference was established between parameters of myocardial remodeling (PWT, IVST, RWT, LVID, LVMI) in pts with SDANN < 100mc and pts with SDANN>100mc. In comparison, pts with SDANN < 100mc showed positive correlation of time parameter SDNN with PWT (r = 0.652, p < 0.05), IVST (r = 0.651, p < 0.05), LVMII (r = 0.661, p < 0.05), and time parameter RMSSD with IVST and LVMII and its absence in pts with SDANN>100mc and in the general group of pts. The analysis of humoral factors in pts with SDANN>100mc showed linear relation between level of uMET and SDNN (r = 0.727, p < 0.05). In comparison, in pts with SDANN < 100mc inverse relation between level of uMET and SDANN (r = −0.729, p < 0.05) and linear relation with SDNN-I (r = 0.750, p < 0.05) were revealed.

Conclusions: These findings indicate that decrease of heart rate variability in resistant hypertensive pts is closely associated with left ventricular hypertrophy and level metanephrines.
Conclusions: In our study, regular BP control at home and lack of obesity were associated with better hypertensive control in octogenarians. The results indicate on non-pharmaceutical management of HT and self BP control to be as important in the very elderly as in younger patients.
Objective: Patients with rheumatoid arthritis (RA) have increased cardiovascular risk. Arterial hypertension (AH) is highly prevalent, and seems to be under diagnosed and under-treated among patients with RA. Data on ABPM profile in patients with rheumatoid arthritis are lacking.

The aim of the study was to evaluate ABPM parameters and characterize phenotypes of blood pressure (BP) in patients with RA.

Design and method: 58 patients with RA (EULAR 2010) without known cardiovascular disease were examined (76% females, age 55.9 ± 15.8 (M ± SD) years, 10% smokers, 56% with AH, 34% with dyslipidemia). Median duration of RA was 8.5 years (IQR 3–16). Seropositive RA was diagnosed in 69% of patients. All patients received disease-modifying antirheumatic drugs (DMARDs). 22% (35%) - biological treatment. Median duration of AH was 4.0 years (IQR 0–12 years). All patients with AH achieved antihypertensive treatment. 24-hour peripheral and central BP monitoring was performed (BPLab Vasotens, «Petrel Telemed»). P < 0.05 was considered significant.

Results: Mean office BP was 126 ± 19/78 ± 11 mmHg (peripheral) and 118 ± 20/80 ± 11 mmHg (central). 10 (17%) patients had elevated office BP (>140/90 mmHg). Mean BP values for peripheral and central BP were as follows: 125 ± 13/73 ± 9 and 116 ± 13/75 ± 9 mmHg for 24-h BP; 127 ± 14/79 ± 9 and 117 ± 13/77 ± 9 mmHg for daytime BP; 119 ± 13/69 ± 10 and 112 ± 14/71 ± 10 mmHg for nighttime BP; AH according to daytime BP was found in 14 (24,1%) pts, nighttime BP – in 28 (48,3%) pts, 24-h BP - in 9 (31,0%) pts. Phenotypes of BP were as follows: sustained normotension – in 36 (62,1%), masked hypertension – in 8 (13,8%), white-coat hypertension in 2 (3,4%) patients. AH for office BP was observed in 12 (20,7%) pts. 10 (17%) patients had isolated elevated central BP. 20 (34,5%) pts had elevated central SBP according to individual reference values; all patients with high office BP had elevated central BP.

Conclusions: High prevalence of AH is observed in patients with RA free of CVD and most of patients have satisfactory control of office BP. Relatively high prevalence of masked and isolated nocturnal hypertension despite antihypertensive treatment are observed in this population. These findings may help to optimize hypertension treatment in patients with RA.

PP.06.08 PREVALENCE AND CLINICAL OUTCOMES OF WHITE-COAT AND MASKED HYPERTENSION COMPARED TO NORMOTENSION AND SUSTAINED HYPERTENSION

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Conclusions: Data on ABPM profile in and most of patients have satisfactory control of offi ce BP . Relatively high prev-

Conclusions: Relatively high prevalence of AH is observed in patients with RA free of CVD and most of patients have satisfactory control of office BP. Relatively high prevalence of masked and isolated nocturnal hypertension despite antihypertensive treatment are observed in this population. These findings may help to optimize hypertension treatment in patients with RA.

PP.06.09 POTENTIAL IMPACT OF STATIN USE ON DAY-TIME AND NIGHT-TIME BLOOD PRESSURE LEVELS: A RETROSPECTIVE ANALYSIS OF A LARGE DATABASE OF 24-HOUR AMBULATORY BLOOD PRESSURE MONITORING

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Objective: Assumption of drugs inhibiting the hydroxy-methyl-glutaril-coa (or statins) is recommended at bed-time and evidence demonstrated a strong and in-

Conclusions: To evaluate the effects of statins on night-time BP levels. We analysed data derived from a large cohort of adult individuals, who consecu-

Conclusions: Statin use was associated to a significantly lower diastolic BP lev-

Conclusions: If the strongest and independent factor associated with 24-hour [OR(95% CI): 1.513(1.295–1.767); P < 0.001] and night-time [OR(95% CI): 1.357(1.161–1.587); P < 0.001] BP control, even after adjusting for age, BMI, number of antihypertensive drugs and diabetes.

Conclusions: Statin use was associated to a significantly lower diastolic BP lev-

Conclusions: These effects were independently observed, even after correction for major cardiovascular risk factors and comorbidities, as well as number and type of anti-

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Objective: The prognostic significance of white-coat (WCHT) and masked hy-

Objective: The importance of white-coat (WCHT) and masked hypertension (MHT) is still debated.

Objective: The prognostic significance of white-coat (WCHT) and masked hyp-

Objective: To evaluate prevalence and long-term clinical outcomes of NT, WHCT, MHT and SHT.

Design and method: We analysed home, clinic and 24-hour ambulatory blood

Results: We included an overall sample of 5,634 adult individuals (female 48.9%,

Results: Mean office BP was 126 ± 19/78 ± 11 mmHg (peripheral) and

Results: Among a total study sample of 2,209 adult untreated individuals, 377 (17.1%) had NT, 351 (15.9%) WCHT, 149 (6.7%) MHT, and 1,332 (60.3%) SHT.

Aim: To evaluate prevalence and long-term clinical outcomes of NT, WHCT,

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Conclusions: Our findings support a complex relationship between SBPV and TOD in hypertension. Specifically, SBPV is more closely related to markers of ventricular and vascular compliance than other markers of TOD in hypertension.

**PP.06.11** ASSOCIATION BETWEEN AMBULATORY ARTERIAL STIFFNESS INDEX, MARKERS OF BLOOD PRESSURE VARIABILITY AND INDICES OF SUBCLINICAL VASCULAR DAMAGE IN OBESE CHILDREN

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Objective: Ambulatory Arterial Stiffness Index (AASI) and symmetric AASI (sAASI) have been proposed as indices of arterial stiffness easily obtained by 24-hour ambulatory blood pressure monitoring (ABPM). Moreover, ABPM allows the analysis of indices of BP variability such as day and night SD, nocturnal BP dipping, weighted 24-h SD (wSD), average real variability (AR V). The relationship between these indices and other markers of vascular subclinical damage has seldom been evaluated in children. Aim of the present study was to address this issue in a sample of obese children.

Design and method: 45 obese children (27 males, 18 females), were included. Children underwent vascular measurements, including: (i) office and 24-hour ambulatory BP, (ii) brachial flow-mediated dilatation (FMD), carotid intima media thickness (cIMT), and distensibility (cDC) measured using ultrasound; and (iii) systemic arterial stiffness (SIDVP) measured using digital volume pulse analysis. From ABPM (if at least 70% of the programmed BP measurements were correctly recorded), we calculate AASI, sAASI, AR V, SD, SYST, and diastolic dippping and wSD.

Results: AR V showed a significant correlation with SIDVP (r = 0.379; p = 0.023), index of systemic stiffness. AASI but not sAASI correlated with FMD (r = 0.361; p = 0.031), marker of endothelial function. In the population divided in hypertensive (n = 11) and normotensive (n = 34), on the basis of office BP values above 95th percentile according to sex and age, AR V was associated with SIDVP only in normotensive (r = 0.446; p = 0.015) but not in hypertensive children (r = 0.000; p = 1). In normotensive, z-score-BMI was correlated with both sAASI and wSD (respectively 0.340; p = 0.049 and 0.423; p = 0.014), wSD correlated with FMD (r = 0.384; p = 0.048); in hypertensive children, AR V correlated with FMD (r = 0.828; p = 0.011; rspearman = 0.738; p = 0.037). No indices of BP variability correlated with cMFT or cDC.

Conclusions: BP variability, in particular AR V, shows a correlation with systemic but not local vascular stiffness in a sample of obese children, suggesting a relation between daily BP variability and arterial elastic properties. Some other relations between BP variability and endothelial function, were detectable only in the subgroups of children divided according to hypertensive status. Further studies, especially perspective ones, are needed to clarify the pathophysiological significance of these relations.

**PP.06.12** B-TYPE NATRIURETIC PEPTIDE IS A DETERMINANT OF THE NOCTURNAL INCREASE IN BLOOD PRESSURE INDEPENDENTLY OF ARTERIAL HYPERTROPHY AND HYPOXIA

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Objective: Loss of the nocturnal blood pressure (BP) drop is a risk factor for cardiovascular outcomes. However, clinical parameters that predispose to changes in nocturnal BP are currently uncertain. Given the possible involvement of salt sensitivity in nocturnal BP levels, we investigated a hypothesized association between plasma B-type natriuretic peptide (BNP) levels, a marker of body fluid retention, and nocturnal BP in a general population.

Design and method: Study subjects were 1,020 general individuals. Subjects were divided into four groups (riser, non-dipper, dipper, and extreme dipper) by their percent changes in nocturnal systolic BP measured using an ambulatory BP monitor.

Results: Plasma BNP levels were positively associated with circadian BP change (β = 0.162, P < 0.001) independently of carotid hypertrophy (β = 0.133, P < 0.001), and awake heart rate (β = 0.102, P = 0.001) and systolic BP (β = 0.246, P < 0.001). Risers showed 1.6 times higher BNP levels than dippers, while oxygen desaturation during sleep was frequently observed in non-dippers. Results of multinomial logistic regression analysis indicated that BNP level was a significant determinant for the riser pattern (odds ratio = 1.27 (BNP 10 pg/ml), P < 0.001), while oxygen desaturation was specifically associated with the non-dipping pattern (odds ratio = 1.04, P = 0.001). When subjects were subdivided by BNP level, risers were more frequent in the high BNP subgroup (19.5%) than in the low BNP subgroup (6.7%) (odds ratio = 3.39, P = 0.001).

Conclusions: A slight increase in plasma BNP level was independently associated with rising nocturnal BP. Our results may help to understand the pathophysiology of circadian BP variation, and be a clue to identify individuals who require careful BP monitoring.

**PP.06.13** ANXIETY AS A PERSONALITY TRAIT CORRELATES WITH SHORT-TERM SYSTOLIC BLOOD PRESSURE VARIABILITY

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Objective: Systolic blood pressure variability (SBPV) was found to increase cardiovascular risk independent of basal BP values. We studied the relationship between anxiety, which is one of risk factors for hypertension, and short-term SBPV in a group of subjects referred for 24-hr ambulatory BP monitoring (ABPM) because of “labile” hypertension.

Design and method: Nineteen subjects without any concomitant diseases and not taking any centrally acting drugs (9/10 males/females, age 52.9 ± 15.8 yrs., range: 23–76) were examined.

Their office SBP and daytime SBP were 138 ± 10 mm Hg (range: 116–155 mmHg) and 126 ± 12 mmHg (range: 105–153 mm Hg), respectively. Anxiety was measured as a current symptom and a personality trait using State-Trait Anxiety Inventory (STAI). Short-term SBPV was calculated as a standard deviation (SD) and coefficient of variation (CV) of systolic BP (SBP).

Results: SBPV expressed as SD was 14.4 ± 3.7 mmHg (range: 9.0–24.4 mmHg), 12.8 ± 3.7 mmHg (range: 8.6–23.7 mmHg) and 11.4 ± 3.0 mm Hg (range: 7.8–18.0 mm Hg) and expressed as CV was 12.1 ± 11 % (range: 8–22 %), 10 ± 3 % (range: 7–19 %), 10 ± 3 % (range: 7–14 %) for daily, daytime and nighttime measurements, respectively. On the STAI-trait and STAI-state subscales the average scores were, respectively, 43.2 ± 9.4 (range: 22–60) and 37.1 ± 10.6 (range: 25–62). There was no correlation between daily and nighttime SBP and STAI scores on both subscales. However, STAI-trait correlated significantly with SBP daytime SBPV - SD (r = 0.56, p = 0.013) and CV (r = 0.58, p = 0.0086) and STAI-state with office SBP (r = 0.49, p = 0.0218) and CV of daytime SBP (r = 0.46, p = 0.0498).

Conclusions: In a small group of subjects, anxiety assessed as a personality trait correlated with daytime variability of SBP. Further studies are needed to evaluate relationship between anxiety and cardiovascular risk related to BP variability.

**PP.06.15** DETERMINANTS OF WHITE-COAT AND MASKED HYPERTENSION IN THE GENERAL POPULATION: THE DIDIMA STUDY

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Objective: White-coat (WC) and masked hypertension (MH) are common phenotypes between normotension and hypertension. This cross-sectional study investigated the clinical profile associated with increased likelihood for these phenomena.

Design and method: Office (1 visit, 3 measurements) and home (3 days, 12 readings) blood pressure (BP) measurements were obtained in a general population study at Didima, Argolida, Greece. Average office and home BP were used to define WCH and MH. Participants’ characteristics (age, gender, BMI, diabetes and cardiovascular disease history, smoking, antihypertensive treatment) were assessed as potential determinants of WCH and MH.

Results: 665 adults (age 54.4 ± 17.7 years, 42% men, 14.1% treated, 28.1% with office hypertension) were analyzed. The overall prevalence of WCH and MH was 8.7% and 7.5%, respectively (8.8% and 6.3% in untreated subjects, respectively). In multivariate logistic regression analysis, younger age (p = 0.004), untreated status (p = 0.044) and lower office BP (p = 0.01 for stage I versus stage II hypertension) were independent predictors of WCH among participants with office hypertension. For MH independent predictors were male gender (p = 0.034), age (p < 0.001), obesity (p < 0.001), antihypertensive treatment (p = 0.03) and high-normal office BP (p = 0.01) among participants with office normotension. In sensitivity analysis performed in untreated subjects with office hypertension, only female gender...
Conclusions: In this general population study, age, gender, antihypertensive treat-
ment and office BP level consistently predicted WCH and MH.

Objective: Accumulating evidence suggests that central (aortic) blood pressure (BP) may refl ect the hemodynamic stress on target organs more accurately than
brachial BP. However, the optimal method for the calibration of the brachial pres-
sure waveform for the accurate assessment of the central BP is debatable. This
study investigated the impact of the calibration mode (either with systolic and dia-
tolic [C1] or the mean and diastolic brachial BP [C2]) on the association between
ambulatory central BP and target-organ damage in young individuals.

Design and method: Apparently healthy adolescents and young adults (age 12–25
years) referred for elevated BP and healthy volunteers were subjected to: (i) 24-hour
ambulatory peripheral and central BP monitoring using a noninvasive brachial cuff-
based oscillometric device (Mobil-O-Graph 24 h PWA); (ii) determination of left
ventricular mass index (LVMI) and of the carotid intima-media thickness (cIMT).

Results: Data from 99 subjects were analyzed (mean age 18.4 ± 4.5 years, 80
males, body mass index [BMI] 24.9 ± 5.2 kg/m², 24 subjects with 24-hour brachial
BP > = 95th percentile for adolescents or > = 130/80 mmHg for adults). 24-
hour central C2 systolic/diastolic BP was higher than C1 (131.3 ± 13.7/7.3 ± 7.8 vs.
110.2 ± 9.5/7.2 ± 7.9 mmHg respectively, p < 0.05 for systolic/diastolic). Hyper-
tensive compared to normotensive subjects presented higher values of both 24-hour
central BP C2 (143.6 ± 12.5/8.2 ± 7.1 vs. 127.4 ± 11.7/7.0 ± 5.1 mmHg) and C1
(122.6 ± 7.9/8.2 ± 6.9 vs. 106.3 ± 5.8/6.9 ± 3.2 ± 5.2 mmHg) (all p < 0.05). 24-hour cen-
tral C2 vs. C1 systolic BP was more strongly associated with cIMT (r = 0.48 vs. 0.29
respectively, p < 0.05 for comparison), whereas no difference was observed in LVMI
(r = 0.30 vs. 0.34 respectively, p < NS). In multivariate regression analyses (with age,
gender, BMI and 24-hour central systolic BP as independent variables), the variation
of cIMT was better determined when 24-hour central systolic BP C2 was included in
the models as compared to C1 (improvement in the models R² from 0.26 to 0.33).

Conclusions: These data suggest that in young individuals the method selected
for the calibration of the peripheral pressure waveform in 24-hour monitoring is
important and affects the relationship between central BP and cIMT.

Objective: This study compared home (HBP), ambulatory (ABP) and clinic
(CBP) blood pressure (BP) in terms of their association with preclinical organ
damage in children and adolescents.

Design and method: Apparently healthy children and adolescents referred for
elevated BP and healthy volunteers (age range 6–18 years) were subjected to:
(i) CBP (2–3 visits, triplicate measurements, mercury sphygmomanometer), HBP
(6–7 days, duplicate morning and evening measurements, validated oscillometric
device with automated memory) and ABP (24-hours, 20 min-intervals, validated
oscillometric device) measurements, (ii) echocardiographic determina-
tion of left ventricular mass index (LVMI); (iii) measurement (ultrasonography)
of the common carotid intima-media thickness (IMT).

Results: A total of 158 young individuals (mean age 12.9 ± 2.6 years, age
range: 6–18, 108 males) were analyzed (143 had measurements of LVMI and 80
IMT). Average CBP was 119.1 ± 13.5/69 ± 8.9 mmHg and 24-hour ABP 119.4 ± 10.2/66.8 ± 5.4 mmHg.
Office hypertension was diagnosed in 25% of subjects, ambulatory hypertension in
23% and home hypertension in 25%. Signifi cant agreement was observed between
HBP and ABP in detecting hypertension (85% agreement, kappa = 0.58). LVMI was
correlated with pulse pressure (coefficient r = 0.25/0.26/0.21 for 24-hour/daytime/
nighttime ABP; p < 0.05). IMT was correlated with pulse pressure (coefficient r = 0.30/0.28/0.30 for 24-hour/daytime/nighttime
ABP; 0.39 for HBP and 0.25 for CBP, p < 0.05). In multivariate stepwise regression
analysis (with age, gender, body mass index, and CBP, HBP; 24-hour/daytime/
nighttime pulse pressures as independent variables; each BP parameter introduced
once at a time in each model), the variation of LVMI was best determined (R² = 0.20
by awake ABP pulse pressure and IMT (R² = 0.22) by home pulse pressure.

Conclusions: In young individuals, HBP and ABP measurements appear to be
similar in terms of their association with preclinical organ damage and superior to
the conventional CBP measurements.

PP.06.16 HOME VERSUS AMBULATORY BLOOD PRESSURE AND
TARGET-ORGAN DAMAGE IN CHILDREN AND
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Objective: This study compared home (HBP), ambulatory (ABP) and clinic
(CBP) blood pressure (BP) in terms of their association with preclinical organ
damage in children and adolescents.

Design and method: Apparently healthy children and adolescents referred for
elevated BP and healthy volunteers (age range 6–18 years) were subjected to:
(i) CBP (2–3 visits, triplicate measurements, mercury sphygmomanometer), HBP
(6–7 days, duplicate morning and evening measurements, validated oscillometric
device with automated memory) and ABP (24-hours, 20 min-intervals, validated
oscillometric device) measurements, (ii) echocardiographic determina-
tion of left ventricular mass index (LVMI); (iii) measurement (ultrasonography)
of the common carotid intima-media thickness (IMT).

Results: A total of 158 young individuals (mean age 12.9 ± 2.6 years, age
range: 6–18, 108 males) were analyzed (143 had measurements of LVMI and 80
IMT). Average CBP was 119.1 ± 13.5/69 ± 8.9 mmHg and 24-hour ABP 119.4 ± 10.2/66.8 ± 5.4 mmHg.
Office hypertension was diagnosed in 25% of subjects, ambulatory hypertension in
23% and home hypertension in 25%. Signifi cant agreement was observed between
HBP and ABP in detecting hypertension (85% agreement, kappa = 0.58). LVMI was
correlated with pulse pressure (coefficient r = 0.25/0.26/0.21 for 24-hour/daytime/
nighttime ABP; p < 0.05). IMT was correlated with pulse pressure (coefficient r = 0.30/0.28/0.30 for 24-hour/daytime/nighttime
ABP; 0.39 for HBP and 0.25 for CBP, p < 0.05). In multivariate stepwise regression
analysis (with age, gender, body mass index, and CBP, HBP; 24-hour/daytime/
nighttime pulse pressures as independent variables; each BP parameter introduced
once at a time in each model), the variation of LVMI was best determined (R² = 0.20
by awake ABP pulse pressure and IMT (R² = 0.22) by home pulse pressure.

Conclusions: In young individuals, HBP and ABP measurements appear to be
similar in terms of their association with preclinical organ damage and superior to
the conventional CBP measurements.

PP.06.17 EFFECT OF CALIBRATION METHOD ON THE
ASSOCIATION BETWEEN 24-HOUR CENTRAL
BLOOD PRESSURE AND TARGET-ORGAN DAMAGE
IN YOUNG INDIVIDUALS
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Objective: Many investigators supposed that seasonal blood pressure (BP) chang-
es are one of the reasons of fatal and nonfatal cardiovascular events. These studies
included mainly the patients with arterial hypertension and the division of patients
into groups with high normal (HNBP) or normotensive and optimal BP was not done.
The aim of study was to estimate the seasonal differences in clinical (CBP) and
ambulatory BP (ABP) in patients with HNBP and normal and optimal BP.

Design and method: The ambulatory patients from the ABP monitoring database
(>2000 patients) were selected according to the following criteria: absence of any
antihypertensive treatment, availability of CBP and ABPM records in winter or
summer, CBP < 140 and 90 mmHg. Standard statistical methods were used.

Results: The preliminary data of the on-going study are demonstrated. We se-
lected 355 patients; 206 with HNBP and 149 with normal and optimal BP. The
main characteristics of groups and seasonal BP changes are presented in Table. In
patients with HNBP only systolic CBP was significantly higher in winter than in
summer. We found similar tendency for ABP data in these patients despite rela-
tively small differences. In patients with normal and optimal BP only diastolic
ABP was higher in winter; in contrast, nighttime systolic CBP was higher in sum-
mer. At the same time, average values of CBP and ABP in the normal and optimal
BP group did not exceed threshold limits.

PP.06.18 SEASONAL BLOOD PRESSURE CHANGES
IN HIGH NORMAL, NORMAL AND OPTIMAL
BLOOD PRESSURE PATIENTS WITHOUT
ANTIHYPERTENSIVE MEDICATION
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Objective: These data suggest that in young individuals the method selected
for the calibration of the peripheral pressure waveform in 24-hour monitoring is
important and affects the relationship between central BP and cIMT.
Conclusions: Some of the ABP parameters in patients with HNBP without antihypertensive medication are increased in winter and exceed normal values. This factor may contribute to the increase of cardiovascular events incidence in winter. The problem should be studied in prospective investigations.

PP.06.19  
MASKED HYPERTENSION IN UNTREATED PATIENTS WITH HIGH NORMAL, NORMAL AND OPTIMAL BLOOD PRESSURE

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Objective: The high normal blood pressure (HNP) is associated with masked hypertension (MH) according to some studies. Moreover, there exists some evidence that HNP may be considered as abnormal BP level and is associated with increased risk of cardiovascular events. The aim of our study was to estimate the MH prevalence in ambulatory patient’s groups with HNP, normal and optimal BP.

Design and method: The patients from the ambulatory BP monitoring (ABPM) database (>2000 patients) were selected according to the following criteria: absence of any antihypertensive treatment, availability of clinical (CBP) and ABPM records, CBP < 140 and 90 mm Hg. The standard statistical methods were used.

Results: The total number of the patients was 206 with HNP and 149 with normal and optimal BP. The main characteristics of groups are presented in the Table. The MH prevalence in patients with HNP was 85.0%; in the normal and optimal BP group it was 59.1%, despite normal average ABP parameters in this group.

Conclusions: The MH prevalence in patients with HNP was very high but the MH prevalence in patients with normal and optimal BP was also unexpectedly high. Further research is needed, including the assessment of cardiovascular prognosis in these patient’s groups.

PP.06.21  
VOLUME-COMPRESSIVE OSCILLOMETRY IN NONINVASIVE ASSESSMENT OF HEMODYNAMIC PARAMETERS IN HYPERTENSIVE PATIENTS

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Objective: To evaluate hemodynamic parameters in patients with arterial hypertension (AH) before and during antihypertensive treatment using volume-compressive oscillometry (VCO) - new cuff-based device. The main advantages of VCO comparing to other oscillometry technique of BP registration is formation and recording of the curve automatically in synchronism with the cuff inflation and recording the artery response by changing the cuff volume throughout the all period of cuff compression. VCO diagram could considered as indicator of aortic stiffness.

Design and method: 45 untreated patients hospitalized with AH without acute coronary syndrome, severe valve problems, secondary hypertension, advanced chronic heart failure were enrolled. Mean age 55 ± 11.8 yrs, 51% male, mean BMI - 28.9 ± 6.7 kg/m². Antihypertensive treatment included combination of amloidine 5 mg/fosinopril 10 mg per day. The pulse wave velocity (PWV), brachial blood pressure (BP), cardiac index, stroke index and systemic vascular resistance were measured twice (at admission and discharging) by VCO (EDTV, Russia).

Results: The mean systolic BP by VCO at admission was 147.7 ± 14.8 mm Hg (by Korotkoff method 161 ± 9.8 mm Hg), diastolic 83.1 ± 14.1 mm Hg (by Korotkoff method 99 ± 11.3 mm Hg) and mean pulse pressure 64 ± 9.5 mm Hg. Mean heart rate was 70.4 ± 14.5 bpm. Mean cardiac index was 3.08 ± 0.44 l/(min*m²), stroke index - 45.7 ± 11.7 ml/m² and systemic vascular resistance (SVR) was 1373 ± 236 dyn*s/cm⁵. Mean PWV in these population was 7.6 ± 1.1 m/sec. After treatment with mean duration of hospitalization 6.3 ± 2.5 days, systolic and diastolic BP by VCO were reduced to 123.3 ± 10.8 mm Hg and 57.5 ± 13.3 mm Hg respectively (p < 0.05). Mean pulse pressure increased to 65.9 ± 11.8 mm Hg nonsignificantly. Mean stroke index increased to 49.7 ± 16.7 ml/m² and SVR decreased to 1169 ± 374 dyn*s/cm². We found no significant changes in cardiac index, heart rate and PWV.

Conclusions: Systolic and diastolic BP by VCO is significantly lower comparing to Korotkoff method. Next studies are needed to determine the feasibility of VCO in noninvasive assessment of central hemodynamics.

PP.06.22  
CENTRAL HOME AND OFFICE BLOOD PRESSURE MEASUREMENT TO EVALUATE CHANGES ASSOCIATED WITH DIET SALT REDUCTION


Objective: There are several different methods available for the measurement of blood pressure (BP). Therefore, it is essential to understand the differences between them in the wide range of different clinical settings. Single-blind clinical trial that aims to study and analyses sensitivity of some BP measurement methods to evaluate BP reductions after an intervention to reduce salt intake in normotensive, pre-hypertensive and normotensive groups.

Design and method: 55 public educational institution servers. Average age of 45.5 years (±10.6), 58.2% of the sample were male. BP measurements were performed after the intervention to reduce the intake of diet adding salt to 4 g/day. The following methods were performed: office BP measurement; home blood pressure measurement (HBPM) and central blood BP measurement by tonometry. Participants were classified by office BP measurement as normotensive (18), pre-hypertensive (15), and hypertensive (22). Blood pressure measurements were performed according to the latest Brazilian guidelines of hypertension. All of the participants signed a consent form.

Results: No differences were noticed regarding the age or gender distribution between the groups. In normotensive group office BP showed decreases of the systolic blood pressure (SBP) of 2.5 mmHg, and diastolic blood pressure (DBP) of 1.4 mmHg, neither of them had statistical significance. HBPM showed no significant decrease both in SBP as DBP and central BP measurement revealed a significant decreased of the SBP (3.6 mmHg) and a reduction of DBP (1.6 mmHg) without significance. Among pre-hypertensives participants, SBP and DBP had significant changes neither in office, nor in HBPM. Central blood pressure measurement reveal significant SBP reduction of 4.8 mmHg and non significant DBP reduction of 2.2 mmHg. BP reduction in all hypertensive group was 4.4 mmHg for SBP and 4.1 mmHg for DBP. HBPM reduction was of 1.6 mmHg for SBP and 0.6 mmHg for DBP. Concerning central blood pressure measurement in this group there was significant reduction both for SBP (5.5 mmHg) and DBP (5.1 mmHg).

Conclusions: Central Blood Pressure Measurement was the method that better identified reductions of SBP in all of the group. Evidences of significant DBP reduction was found only in the hypertensive group.

PP.06.24  
THE EVOLUTION OF HYPERTENSION - FROM THE WHITE COAT (WCH) TO THE SUSTAINED HYPERTENSION (SH)

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Objective: Several studies demonstrated that both WCH were independently associated with increased target organs lesions and incident cardiovascular events. The goal of this study was to evaluate the evolution of patients with WCH over a 12-year period and to look for predictive risk markers of evolution for SH.

Design and method: Patients initially with WCH were followed for a period 12 years and had clinical, laboratory, electrocardiogram and ambulatory blood pressure evaluations every six months. We considered 4 groups. G1: WCH at the end of 12 years; G2: conversion to SH before 6 and 9 years; G3: conversion to MH between 3 and 6 years; G4: conversion to MH before 3 years. The model was ANOVA, with p < 0.01 (two-tailed).

Results: The study comprised 130 patients, 55 men; 75 women, with an initial age of 57.5 ± 9.3 years and a body mass index of 28.4 ± 4.3 kg/m². Twenty patients were lost in follow-up. Groups 1, 2, 3 and 4 have respectively 13, 16, 14 and 41 patients. analysing the initial parameters, the values of systolic and diastolic blood pressure in the clinic and ambulatory monitoring did not present significant differences, as the laboratory parameters, except for microalbuminuria (mg / 24h) (G1: 32.8 ± 18.3, G2: 23, G3: 12.3 ± 8.9, G4: 7.2 ± 8.2, p < 0.01), the plasma viscosity index (mPa.A) (G1: 1.32 ± 0.1, G3: 1.18 ± 0.07, p < 0.01) and the amino-terminal peptide of procollagen type III (G1: 15.3 ± 0.87, G2: 14.3 ± 0.75, G3: 12.1 ± 0.84, G4: 10.0 ± 0.75, p < 0.01).

Conclusions: The evolution of hypertension - from the white coat (WCH) to the sustained hypertension (SH)
PP.06.25

BETA-BLOCKERS ARE THE ONLY ANTIHYPERTENSIVE DRUGS THAT BLUNT THE DURATION OF WHITE-COAT EFFECT ESTIMATED WITH AMBULATORY BLOOD PRESSURE MONITORING

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Objective: The presence of white-coat effect (WCE) on ambulatory blood pressure monitoring (ABPM) can increase mean blood pressure (BP) values determining an overestimation of the diagnosis of arterial hypertension. We previously found that WCE duration (WCEd) is longer in females than in males and significantly blunted by beta-blockers in males; however the influence of the other antihypertensive drugs was not established.

Design and method: We analysed 281 ABPM (M/F 101/180) in which the first systolic value was 10 mmHg higher than mean diurnal systolic BP (mDSBP). WCE was evaluated during the first two hours of recording as the mean value of systolic BP (WCE magnitude, WCEm) and as WCEd i.e. the sum of the time intervals in minutes (min) following a systolic BP value of at least 10 mmHg higher than mDSBP. The relation between WCE and drug classes (angiotensin-converting enzyme/angiotensin receptor blockers, beta-blockers, calcium channel blockers, thiazide diuretics, alpha-blockers, central alpha-agonists and anti-aldosterone) was evaluated with a multivariate regression analysis with a p-value <0.01 considered as statistically significant.

Results: Mean age was 65 ± 1 years (M/F 66 ± 1.64 ± 1 years, n.s.) and overall mDSBP was 138 ± 1 mmHg without differences between genders. Mean WCEm and WCEd were respectively 151 ± 1 mmHg (M/F 149 ± 2/152 ± 1, n.s.) and 63 ± 1.5 mmHg (M/F 59 ± 2/66 ± 2, p < 0.02). The multivariate regression analysis showed that WCEm was correlated only with beta-blockers and male gender (table), whereas there were no relationship of WCEm with any drugs.

Conclusions: WCEd is shorter in men than in women regardless of drug therapy and beta-blockers are the only antihypertensive drugs that seem to reduce WCEd estimated with ABPM, whereas they do not affect WCEm.

PP.06.26

EFFECT OF STANDARDIZED ALGORITHMIC TREATMENT ON HOME BLOOD PRESSURE VARIABILITY: GENDER DIFFERENCES IN LONGITUDINAL REAL-LIFE STUDY

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Objective: Home blood pressure (BP) variability (HBPV) is a significant predictor of cardiovascular events, but gender differences in the drug treatment effect on HBPV remains uncertain. Our purpose was to compare the effect of 6 month (M) standardized algorithmic treatment on HBPV in men and women <75 years with uncomplicated hypertension (UH).

Design and method: To PERFECT-BP prospective observational study (ISRCTN75706523) subanalysis were included 209 newly diagnosed (14.4%) or treated but uncontrolled (BP >200/120mmHg) UH patients (pts) aged 59 ± 5, 89(42.6%) male, 120(57.4%) female, 27(12.9%) diabetics. Home BP monitoring (HBPm) was performed by standardized automatic Microlife BP3AG1 device with individually selected cuff, thrice in the morning and in the evening, for 7 consecutive days before each visit at day 7, M1, 2, 3, 6. At visit 1 pts were prescribed or switched to perindopril/amlopidine fixed-dose combination (FDC). Step 2 was FDC uptitration, step 3 – indapamide SR, step 4 – spiranolactone, step 5 – moxonidine or doxazosin. HBPV was defined as the standard deviation (SD) and the coefficient of variation (CV) of the daily BP average of 6 readings of 7 consecutive days (42 BP readings).

Results: By M 6, target office BP was attained in 71(79.8%) men vs 103(85.8%; p < 0.05) women, home BP >135/85 mmHg – in 51(57.3%) vs 87(72.2%; p < 0.03) and both – in 47(52.8%) vs 80(66.7%; p < 0.03). Home systolic BP (SBP) in men and women reduced from 148.8 ± 179 and 147.5 ± 16.8 mmHg (p < 0.05) to 134.7 ± 12.2 and 129.4 ± 10.8 mmHg (p < 0.01), diastolic (DBP) – from 78.3 ± 10.5 and 83.6 ± 9.8 mmHg (p < 0.05) to 79.5 ± 7.9 and 77.4 ± 5.7 mmHg (p < 0.05); home SBP SD – from 8.2 ± 3.5 and 8.8 ± 4.6 mmHg (p < 0.05) to 4.9 ± 2.4 and 6.2 ± 3.7 mmHg (p < 0.001), SBP CV – from 5.2 ± 2.2 and 5.7 ± 2.6% (p < 0.05) to 3.8 ± 1.5 and 4.5 ± 2% (p < 0.01); home DBP SD – from 5.7 ± 3 and 6.1 ± 3 mmHg (p < 0.05) to 3.6 ± 2 and 4.9 ± 3 mmHg (p < 0.01), CV – from 6.1 ± 3.6 and 6.9 ± 3% (p < 0.05) to 4.7 ± 2 and 5.9 ± 3% (p < 0.01).

Conclusions: Better home BP control in women compared to men is associated with higher rates of home SBP and DBP variability after 6 M of standardized algorithmic treatment based on FDC in real life setting.

PP.06.27

THE EFFECT OF NIGHTTIME AIRCRAFT NOISE EXPOSURE ON CIRCADIAN BLOOD PRESSURE PROFILE

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Objective: Nocturnal aircraft noise as environmental stressor causes activation of autonomic and endocrine systems. That might result in changes in sleep structure and increases in blood pressure and heart rate. Aim of the study was to investigate effects of nighttime exposure to aviation noise on quality of sleep, and hemodynamic parameters-heart rate and blood pressure profile.

Design and method: Study group was randomly recruited among inhabitants of area exposed to high nighttime aircraft noise levels, exceeding 50dB(A). Control group was recruited accordingly in the area of low nighttime aircraft noise exposure, below 45dB(A). Inclusion criteria involved age (40–65yrs) and time of residence in given area (min 3 yrs). Sites were selected based upon acoustic maps. Anthropometric and demographic data, information on habits and sleep quality were collected via questionnaire. In both groups 24 h ambulatory blood pressure monitoring (ABPM) was performed in order to determine 24 h, day and night BP and heart rate. Based on ABPM results, participants were assigned to the dipper, non-dipper, reverse dipper and extreme dipper group. The relation between noise exposure, sleep pattern, BP and HR was determined.

Results: Study group (n = 101pts) and control group (n = 100 pts) were of equal age (53.5 ± 5.8 yrs) and equal weight (BMI 27.2 ± 27.7 kg/m2) and gender ratio (65% vs 71% women). Neither 24 h BPs nor daytime BPs did not statistically differ between groups. Nighttime BPs analysis detected difference between groups in DBP (66.6 ± 63.6 mmHg, p < 0.05) and MAP (81.6 ± 79.1 mmHg) but no in SBP and PNN. Heart rate was higher in study group (73.1 ± 70.3 bpm). In BP profile analysis we found physiological night BP drop disturbance in study group (4% vs 34% dippers vs 54% dippers). Sleep quality survey revealed sleep deterioration in study group-89% suffered from poor sleep quality (difficult falling asleep, waking up at night, early waking) and consequently presented impaired daytime performance; in comparison-42% of control reported similar disorders.

Conclusions: Long-term exposure to nighttime aircraft noise is associated with sleep disturbance and physiological circadian blood pressure profile alterations. The effect might be partially masked by habituation to noise. However, biologic adaptation is often incomplete and requires physiological resources therefore putting strain on organism as whole.

PP.06.28

RELATIONSHIPS OF BLOOD PRESSURE AND CIRCADIAN RHYTHM WITH VASCULAR REACTIVITY FOR HYPERTENSIVE PATIENTS

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Objective: We studied relationships of blood pressure and circadian rhythm with cerebrovascular reactivity (CVR) for hypertensive patients.

Design and method: All participants of research have given the informed agreement. We used ultrasonography of transcranial Doppler’s method in the middle cerebral arteries from temporal window. We studied the measurement of blood pressure (BP), FmV in period of recovery (rec) and the changes of MCA flow velocity mean (Vm) starting, during hypercapnia (inhaled 2 min 4% mixture of carbonic gas (MCG) with air or hyperoxia 100% oxygen and FmV in period of recovery (rec), air-inhalation 2 min of 124 patients with essentially hypertensive (BP > 140/90 mm Hg was defined as the standard deviation (SD) and the coefficient of variation (CV) of the daily BP average of 6 readings of 7 consecutive days (42 BP readings).
without antihypertensive drugs), age 55.2 ± 12.3 years. High-resolution annular array scanners was determined - a nominal axial resolution of 0.2 mm and 30 frames per second's acquisition rate with a 2.5–4 MHz sectorized array transducer in the quiet, dark, warm room. We used Indexes of FVm: IFVm = (Vmnt-Vm)/Vmnt*100, Speed Modification of FVm: SM = (Vm-Vmnt)/120, Index of Recovery of FVm: IR = Vmnt/Vmnrec: Vmn0, BP are starting and Vm, BP are the parameters at period of inhalation, Vmrec is Vmn after 120 sec.-time of inhalation.

Results: BP was higher in patients with the opposite reaction in the state of hyperoxia: average daily BP=142.2 ± 12.6/87.4 ± 10.1mmHg, and the daily index SBP below 6.0 ± 1.2% than in patients with impaired only hyperoxic reaction: average daily BP=136.2 ± 7.6/83.4 ± 10.3mmHg, p = 0.011/0.016 and day/night index 14.2 ± 2.6% p = 0.000. Patients had statistically significant difference CVR settings when comparing groups with impaired circadian rhythm of blood pressure by the type of non-dipper and night-picker and with high temporal index in the night compared to patients with a dipper-type. These were the parameters: the rate of change of blood flow velocity, deceleration test speed under hyperoxia and hypercapnia, decreased blood flow at the time of the index hypercapnia.

Conclusions: Patients with the opposite reaction during hyperoxia had higher level of office BP and ABPM at the control. Disturbance of the circadian rhythm of BP by the type of non-dipper and night-picker met 3 times more often in patients with opposite reactions CVR, compared with patients who had a normal type of CVR

PP.06.31 MISSED ARTERIAL HYPERTENSION BY OFFICE BLOOD PRESSURE MEASURED ACCORDING TO THE NICE 2013 GUIDELINES – RESULTS FROM THE IPARR TRIAL
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Objective: Standard operating procedures (SOP) for office blood pressure measurement (OPBM) vary highly between different guidelines. The NICE 2013 guidelines for arterial hypertension (AH) SOP recommends a first blood pressure measurement (BP) after 5 minutes rest and a second BP if blood pressure (BP) is > 139 mmHg systolic (s139) or >89 mmHg diastolic (d89). We aimed to study how many probably hypertensive patients may be missed by this approach due to short term masked hypertension (STMH).

Design and method: In this cross-sectional, single-centre trial, 1000 adult subjects were recruited. Seven sequential BP were measured by an operator after five minutes rest in a quiet room and in sitting position. The BP were taken using a standard device (Omron HBP-1300 professional BP monitor, appropriate cuff size), alternating with a tested smartphone app. Standard BP were spaced 2 minutes apart. Overall, 4 standard and 3 smartphone BP were taken, however, only standard BP were used for this study. Additional information about cardiovascular risk factors, concomitant disease, and medication were collected. We compared the first BP out of four to the three following BPs. STMH was defined as first BP >s140 and <d90 mmHg and one of the consecutive BPs >s139 or >d89 mmHg.

Results: Complete measurements were available in 802 subjects. We identified 528 (65.8%) subjects with a BP <s140 and <d90 mmHg in the first measurement. In 61/528 (11.6%) subjects at least one consecutive BP was >s139 or >d89 mmHg and in 18/528 (3.4%) the mean of 2nd-4th measurement was >s139 or >d89 mmHg. 412/802 (51.4%) subjects had no history of AH and normal first BP. In this group STMH was present in 45/412 (10.9%). Subjects with STMH showed no differences in clinical parameters in comparison to subjects with normal BP over all measurements.

Conclusions: By applying the SOP for OBPM suggested by NICE we found short term masked hypertension in more than 10% of all apparently normotensive subjects and especially in 11% of apparently normotensive subjects without known AH. Therefore by this SOP a significant proportion of patients may be missed for further evaluation.

PP.06.29 DAY-TO-DAY VARIABILITY OF THE MEAN SYSTOLIC AND DIASTOLIC PRESSURE IN AMBULANT BLOOD PRESSURE MONITORING
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Objective: To assess day-to-day variability of the mean blood pressure values obtained during the ambulant blood pressure monitoring (ABPM)

Design and method: We included 27 patients from our ambulatory hypertension unit between March and October 2016. All patients were treated with antihypertensive medication and were on stable drug regimen at least four weeks. ABPM readings were performed with Ultralite 90207 (Spacelabs Healthcare, Snoqualmie, Washington, USA). Day-to-day variability of mean daytime systolic (SBP) and diastolic blood pressure (DBP) was determined.

Results: 64 ABDM readings were performed. Half of the study population was male (51.8%) and mean age of the patients was 57.9 ± 12.8 years. Mean SBP was 127.9 ± 15.9 mmHg and mean DBP was 75.7 ± 11.2 mmHg. Mean SBP and DBP of male (51.8%) and mean age of the patients was 57.9 ± 12.8 years. Mean SBP was 127.9 ± 15.9 mmHg and mean DBP was 75.7 ± 11.2 mmHg. Mean SBP and DBP of male (51.8%) and mean age of the patients was 57.9 ± 12.8 years. Mean SBP was 127.9 ± 15.9 mmHg

Conclusions: Though the changes in the mean SBP and DBP in our study collective, we observed clinically important day-to-day variability of the mean SBP and DBP despite unchanged medical regimen. Current expert recommendation is to consider decrease of mean SBP of at least 5 mmHg in ABPM as significant effect of antihypertensive drug or intervention. The observed variability of mean SBP in the ABPM in our study exceeds the recommended cut-off. Study results point out that the currently recommended cut-off value might probably not always be able to show real intervention effect, which should be considered in the design of future studies.

PP.06.32 VISIT-TO-VISIT BLOOD PRESSURE VARIABILITY AND ITS CORRELATION WITH DECLINE IN KIDNEY FUNCTION IN PATIENTS WITH TYPE 2 DIABETES MELLITUS
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Objective: Blood pressure variability (BPV) is associated with poorer outcomes in patients with diabetes. Research on the characteristics of visit-to-visit BPV and its prognostic implications is limited. This study aimed to determine the value of BPV, associated factors of systolic BPV and its correlation with decline in kidney function in patients with type 2 diabetes mellitus (T2DM).

Design and method: This was a 7-year retrospective cohort study of 333 patients with T2DM at a primary care clinic. Blood pressure (BP) at each follow up visit from 2005 to 2014 were captured. BPV was defined as the standard deviation of the BP readings. Decline in kidney function was expressed as the annual rate of decline in estimated glomerular filtration rate (eGFR). Factors associated with visit-to-visit systolic BPV was determined using Pearson’s correlation coefficient and independent t-test. Independent association of decline in annual eGFR rate was determined using multivariate linear regression analysis.

Results: This study involved 112 male patients (33.6%) and 221 female patients (66.4%). The mean age of patients at baseline was 57.8 ± 9.5 years old. By the end of study period, the mean duration of years of diabetes was 15.9 ± 6.2 years and 298 (89.5%) of patients had co-morbid hypertension. The mean visit-to-visit systolic BPV was 12.7 ± 3.1 mmHg. Higher systolic BPV was found in patients who were older, females, with co-morbid hypertension, more frequent clinic visits, higher mean systolic BP, higher mean total cholesterol and users of antihypertensive medications. The mean annual decline in eGFR rate in this study was -0.78 ± 1.60 ml/min/1.73m2. Independent factors associated with decline in kidney function were systolic BPV, longer duration of diabetes and use of diuretics.

Conclusions: The visit-to-visit standard deviation of BPV in patients with T2DM is 12.7 mmHg. Systolic BPV is an independent risk factor associated with decline in kidney function. Hence visit-to-visit BPV is an important additional target to reduce decline in kidney function in patients with T2DM.
POSTER SESSION

POSTERS’ SESSION PS07:

KIDNEY AND RAAS

**PP.07.04**

Eff ect of Angiotsensin-Conv erting Enzyme Inhibitors on Plasma Mogen Activator
Inhibitor – 1 Level in Hypertensive Patients with IgA Nephropathy

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Objective: ACE inhibitors have a central role in the treatment of IgA nephropathy and especially on its evolution. IgA nephropathy is characterized by accumulation of extracellular matrix (ECM) in the kidney. PAI-1 plays a critical role in ECM remodeling in the kidney. In the present study we examined the effects of ACE inhibitors on PAI-1, a downstream mediator of angiotensin II.

Design and method: 61 patients (37/24 M/F, 65.1 ± 13.4 years) with IgA nephropathy were included in our study. Patients were treated with chronic ACE inhibitors, classified in 4 stages of chronic kidney disease (CKD) stages 3–5 and other form of nephropathy were excluded. All antihypertensive medications were discontinued for 2 weeks. At the end of this period, in all patients were measured albumin excretion rate (AER), plasma renin activity, aldosterone, plasma level of PAI-1, fibrinogen (base line measurement), IL-6, CRP. Patients were then treated with perindopril 5 mg/day in a single dose. Plasma levels of renin, aldosterone, PAI-1, fibrinogen, IL-6, CRP were measured again at a 4 and 8 weeks period.

Results: The effect on blood pressure (systolic, diastolic) of perindopril was of statistical significance. Base line levels of PAI-1 were 53.3 ± 12.3 ng/ml. PAI-1 levels at the 4th week were decreased significantly (29.9 ± 5.4 ng/ml post treatment vs 53.3 ± 12.3 ng/ml pre treatment, p < 0.05). At the 8th week, levels of PAI-1 were reduced, but not significantly in comparison with the end of the 4th week (27.7 ± 6.9 ng/ml vs 29.5 ± 5.4 ng/ml, p<0.05).

Conclusions: Our data suggest that ACE inhibitors decrease plasma levels of PAI-1 in patients with IgA nephropathy, especially during the first four weeks of treatment. These drugs may influence the progression of IgA nephropathy by reducing renal matrix expansion, a process that central role has PAI-1.

**PP.07.05**

Oral Paricalcitol Therapy Reduces Arterial Stiffness in Hypertensive Patients with Chronic Kidney Disease and Secondary Hyperparathyroidism: Data from a 1-Year Follow-Up Study

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Objective: Arterial stiffness is linked to the progression of atherosclerosis, while activation of vitamin D receptor exerts favorable cardiovascular effects in patients with renal insufficiency. In this study we investigated the effects of oral treatment with paricalcitol, a potent vitamin D receptor activator on arterial stiffness and osteopontin, a marker of atherosclerosis, in hypertensive patients with chronic kidney disease (CKD) and secondary hyperparathyroidism.

Design and method: We followed up 29 treated hypertensive patients (mean age 74.1 years, 19 males, mean blood pressure = 132/85 mmHg) with CKD stages 3–5 (mean glomerular filtration rate (GFR) = 19.4 ml/min/1.73 m²), who were on therapy with oral paricalcitol for 1 year. All patients at baseline underwent a complete physical examination, while venous blood samples were drawn for estimation of metabolic profile, levels of intact parathormone, phosphorus and calcium and osteopontin. Arterial stiffness was estimated based on carotid-femoral pulse wave velocity (PWV) measured with an automated device.

Results: After 1 year of treatment with paricalcitol compared to baseline there was no statistical difference in levels of GFR (19.5 ± 4.5 ml/min/1.73m² vs 18.0 ± 2.3 ml/min/1.73m², p = 0.318) and calcium (9.1 ± 2.3 vs 8.98 ± 2.2 mg/dl, p = 0.344). Regarding the metabolic profile of patients, levels of glucose, lipids or uric acid did not differ, while the product of calcium x phosphorus exhibited no pathological values. Additionally, carotid-femoral PWV was reduced after 1 year treatment with oral paricalcitol from 11.8 ± 2.6 m/sec to 11.2 ± 2.4 m/sec (p = 0.05), while blood pressure values and osteopontin levels 1 year after therapy compared to baseline values had no statistical difference (p = NS).

Conclusions: Treatment with oral paricalcitol in hypertensive subjects suffering from CKD stages 3–5 and secondary hyperparathyroidism is accompanied by amelioration of arterial stiffness as reflected by the reduction of carotid-femoral PWV. These findings suggest that paricalcitol exerts pleiotropic favorable effects on the vascular system, thus improving cardiovascular prognosis in high risk hypertensive patients.

**PP.07.06**

Effect of Moxonidine on the Aldosterone/ Renin Ratio Calculated by Both Plasma Renin Activity and Direct Renin Concentration in Healthy Male Volunteers

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Objective: The most popular screening test for primary aldosteronism (PA) is the plasma aldosterone/renin ratio (ARR). Medications, dietary sodium, posture and time of day all affect renin and aldosterone levels, and can result in false negative or positive ARRs if not controlled. Most antihypertensive medications affect the ARR and can interfere with interpretation of results. To our knowledge, no study has been undertaken to evaluate the effects of moxonidine on the ARR.

Design and method: Normotensive, non-medicated male volunteers (n = 20) underwent measurement (seated, midmorning) of plasma aldosterone by HPLC-tandem mass spectrometry, direct renin concentration (DRC), renin activity (PRA), cortisol, electrolytes and creatinine and urinary aldosterone, cortisol, electrolytes and creatinine at baseline, and after one week of moxonidine at 0.2 mg/d and a further five weeks at 0.4 mg/d.

Results: Compared with baseline, despite the expected significant falls in both systolic and diastolic blood pressure levels, plasma aldosterone [median 134 (90–535) pmol/L, DRC [20 (10–37) mU/L], PRA [2.2 (1.0–3.8) ng/mL/h] and ARR using either DRC [8.0 (4.4–14.4)] or PRA [73 (36–218)] were not significantly changed after either one [135 (98–550) pmol/L, 20 (11–35) mU/L, 2.0 (1.2–4.1) ng/mL/h, 8.8 (4.2–15.9) and 73 (32–194) respectively] or six weeks 130 (90–500) pmol/L, 22 (8–40) mU/L, 2.1 (1.0–3.2) ng/mL/h, 7.7 (4.3–22.4) and 84 (32–192) respectively] or six weeks 130 (90–500) pmol/L, 22 (8–40) mU/L, 2.1 (1.0–3.2) ng/mL/h, 7.7 (4.3–22.4) and 84 (32–192) respectively].

Conclusions: Moxonidine was associated with no significant change in the ARR and may therefore be a good option for maintaining control of hypertension when screening for PA.

**PP.07.07**

Use of Betablockers Associated with Less Orthostatic Response in Dialysis Patients: Should We Be More Careful About It?

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Objective: 1-Analyze the prevalence of orthostatic hypotension in patients on dialysis. 2-To establish if orthostatic hypotension is associated with specific hemodynamic changes in supine position and standing. 3-Determine independent predictors of orthostatic hypotension.

Design and method: Within a cardiovascular evaluation program for patients in ESRD (PRECADIA), 68 patients attended the interdialysis day to undergo a hemodynamic evaluation. BP (Microlife® AFIB200) and hemodynamics was determined with impedance cardiography in supine position and after the third minute of standing. Following variables were analyzed: Systolic blood pressure (SBP), Diastolic blood pressure (DBP),
heart rate (HR), stroke volume (SV), systemic vascular resistance index (SVRI) and thoracic fluid content (TFC). Patients were classified into 2 groups according to the presence (HIPOT) or not (EST) of orthostatic hypotension defined as a drop of 20 mmHg or more of SBP and/or 10 mmHg or more of DBP when standing. Hemodynamic variables were analyzed according to: 1-baseline conditions and 2-differences (Delta: standing-lying) between the two groups (t-test and Mann-Whitney U test). Independent predictors of orthostatic hypotension were determined adjusting for age, sex, BMI, time on dialysis, diabetes prevalence and CV events between both groups. 92,31% of the HIPOT group received BB, the EST group only reached 50% (p = 0.0303). In supine position, there were no hemodynamic differences between the two groups. By standing the HIPOT group showed lower Delta-SVRI (p = 0.026), Delta-DBP (p < 0.001) and Delta-SBP (p < 0.0001). There were no significant differences in Delta-TFC. In logistic regression, the use of BB was an independent variable for orthostatic hypotension.

Conclusions: The use of BB was a determinant factor to attenuate or to nullify the compensatory increase of the vascular resistances by standing, and consequently to favor the development of hypotension when standing. It should be evaluated whether or not this phenomenon is associated with a higher rate of events, and if this measurement adds value when deciding whether to use BB in this population.
Design and method: Design: Systematic review and meta-analysis of randomized trials.
Intervention: Angiotensin receptor blocker (ARB) plus angiotensin converting enzyme inhibitors (ACEi) or aliskiren plus ARB or ACEi.
Outcomes: Death, cardiovascular (CV) death or HF hospitalization and adverse events.

Results: Of 4,608 non-duplicate records screened, 3 randomized trials were included, totaling 13,650 patients. The meta-analysis for death showed a Hazard ratio (HR) of 0.92 (0.84–1.01) p = 0.07. However, meta-analysis showed a significantly reduced CV death or HF hospitalization (HR 0.89–0.83–0.99, p = 0.0006) favor to dual blockade of RAS, without difference between the groups with and without RD (test for difference Chi² = 0.59, df = 1 (P = 0.44); P = 0%). For adverse events combined therapy exhibited a 29% increase in risk for renal impairment, 35% increase for hyperkalemia, and 28% increase for hypotension.

Limitations: Only a few studies published the data of patients with heart failure and renal dysfunction. We could not analyze patients with proteinuria and normal renal function due to lack of data.

Conclusions: This meta-analysis demonstrated that dual-blockade of RAS reduces the risk of CV death and HF hospitalization by 11%. Additionally, the protection was similar between patients with and without RD. Since the renal impairment, hypotension and hyperkalemia are monitored by daily basis exams, the recommendation for the use should not be categorically contraindicated. It is recommended to evaluate the cost-benefit ratio of each patient.

**PP.07.12 HEMATOMOCRIT UREA AND GENDER (H.U.G.E) FORMULA AND THE CKD PROGNOSIS CONSORTIUM EQUATION: CORRELATION WITH KDIGO RISK TABLE IN SPANISH POPULATION**

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**Objective:** To compare, in the HERMEXIT survey sample, the results of the use of the CKD Prognosis Consortium equation to calculate the risk of end-stage renal disease with the results of the KDIGO Progression Risk Table and the HUGE formula.

**Design and method:** From a sample of 2,813 subjects, 113 ones have an estimated glomerular filtration rate < 60 ml/min. Hematoctrit, urea, creatinine and micro-albuminuria were analyzed and then they were estimated the risk of progression to end-stage renal disease using the CKD Progression Consortium on line (http://www.kidneyfailurerisk.com), the risk of progression from the KDIGO Risk Table and the HUGE formula score.

**Results:** Using the KDIGO Risk Table 83 (73.5%) of subjects were at medium risk, 23 (20.4%) ones at high risk and 7 (6.19%) patients at very high risk of progression of chronic kidney disease. Using the estimation from the CKD Consortium equation that calculate the risk of progression to end-stage renal failure 108 (95.6%) subjects were at low risk of progression, 2 (1.7%) ones had a medium risk and the three left (2.6%) had a high risk. Compared with KDIGO Risk Table, the sensitivity was 0.23 (95%CI 0.10–0.43) and the specificity was 1.0 (95%CI 0.94–1.00). The positive predictive value was 1.00 (95%CI 0.56–1.00) and the negative predictive value was 0.78 (95%CI 0.69–0.85). From the HUGE formula score only 33 (29.2%) patients had renal failure of them five have risk of progression to end-stage renal disease. The sensitivity was 1.00 (95%CI 0.46–1.00) and the specificity 0.74 (95%CI 0.65–0.82). The positive predictive value was 0.15 (95%CI 0.06–0.33) and the negative predictive value was 0.85 (95%CI 0.67–0.94). When H.U.GE formula results were compared with KDIGO Risk Table outcomes the sensitivity was 1.00 (95%CI 0.86–1.00) and the specificity was 0.96 (95%CI 0.89–0.99).

**Conclusions:** There was no a good correlation between the KDIGO progression Risk Table and the equation to estimate end-stage renal disease risk. The KDIGO table must be used for nephrologist’s referral. Contrariwise, the HUGE formula got a good correlation with the KDIGO table.
**Conclusions:** Fructose overload was associated to an L-dopa/DA index increase and DIR expression decrease since week 4 of treatment. The renal dopaminergic system dysfunction was accompanied by an increase in blood pressure levels and renal inflammatory markers in all experimental periods studied. Alteration of L-dopa/DA index could be an earlier marker of renal dysfunction than the structural damage evidenced by microalbuminuria and decreased nephrin expression in week 12 of fructose treatment.

**Objective:** The general aim of IBERICAN study is to know the prevalence and incidence of cardiovascular risk factors and cardiovascular and renal disease in Spain. The aim of this abstract is to know the prevalence of microalbuminuria and its relation with cardiovascular risk factors (CVRF), target organ damage (TOD) and cardiovascular-renal disease (CVD) in the IBERICAN Study.

**Design and method:** The IBERICAN Study is a longitudinal, observational, multicentric study with subjects between 18 to 85 years of age, recruited in Primary Care and who will be follow up at least 5 years. The final sample size is estimated in 7,000 patients. We show the baseline characteristics of the patients in the first visit (n = 3,042). We analyzed patients with microalbuminuria and we analyzed their association with the presence of CVRF, TOD (left ventricular hypertrophy (LVH), ankle/brachial index < 0.9, glomerular filtration < 60 ml/min) and with CVD. Microalbuminuria was defined: albumin/creatinine ratio between 30 and 300 μg/min/1.73 m².

**Results:** 3,042 subject including. 2,202 subject with albumin/creatinine ratio de-
Results: Mean values of HbA1c and HOMA-IR were 5.9% and 3.4, respectively. In univariate analysis, eGFR was related to age, male gender, smoking, total cholesterol, hs-CRP, fasting glucose, HbA1c (r = -0.23, p < 0.001) and HOMA-IR (r = -0.09, p = 0.04). Accordingly, ACR was related to age, smoking, BMI, waist-to-hip ratio, mean arterial pressure, hs-CRP, fasting glucose, HbA1c (r = 0.37, p < 0.001) and HOMA-IR (r = 0.22, p < 0.001). In linear regression analysis, after adjustment for several confounders, an independent association was demonstrated between eGFR and HbA1c (b = -0.38, p < 0.004), whereas the association of eGFR with HOMA-IR became non significant (b = -0.02, p = NS). Similar pattern was also evident for ACR since a strong association with HbA1c (b = 0.58, p = 0.001) was established, whereas no relationship between ACR and HOMA-IR was observed (b = 0.06, p = NS).

Conclusions: In hypertensive patients with MS, HbA1c is a strong determinant of kidney function independently of insulin resistance or other components of MS. It might be suggested that the impaired kidney function and microalbuminuria, associated with abnormal glucose regulation, may mediate part of the increased cardiovascular risk related to MS. Thus, measurement of HbA1c may add in risk stratification and may serve as a treatment target in hypertensive patients with MS.

PP.07.18 CHRONIC KIDNEY DISEASE, END STAGE RENAL DISEASE, AND KIDNEY TRANSPLANTATION IN SURINAME

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Objective: The high hypertension and diabetes burden in low and middle income countries is expected to lead to an increase in chronic kidney disease (CKD) and the need of renal replacement therapy. We aimed to estimate the prevalence of CKD and end stage renal disease (ESRD), and assess the availability of kidney transplantation in Suriname, a middle income country with a current population size of nearly 574.000 persons of mainly South Asian and African descent. Our previous studies showed that around 80% of the adult population is prehypertensive or hypertensive, and around 26% has prediabetes or diabetes.

Design and method: We analysed data of the Healthy Life in Suriname (HELSUR) study, a random population sample, to estimate the number of patients with CKD (eGFR < 60 ml/min/1.73m²) and ESRD (eGFR < 15 ml/min/1.73m²); and analysed data of dialysis centers to assess the number of patients on renal replacement therapy.

Results: We found that around 2% of the adult population had CKD (est. n = 11.500). Of these, 63% had an eGFR of 30–59, 28% of 15–29, and 9% of < 15 ml/min/1.73 m² (est. n = 1035). The number of patients on hemodialysis has starkly increased in the past years. In 2014, 516 patients were on maintenance hemodialysis, which underwent 24-h ABPM, 24-h albumin excretion rate (AER) measurement and GFR estimation, using the CKD-EPI equation. The Max Slope BP was calculated as the first derivative of the curve obtained by fitting partial Fourier series to raw BP data recorded by discontinuous 24-h ABPM.

Results: The Max Slope of systolic BP (SBP) was higher in subjects with SRD (n = 117) than in those without SRD (n = 272) (figure) and showed significant correlations with AER (r = 0.215; p < 0.001) and with eGFR (r = -0.153; p = 0.002). Only the former of these correlations remained significant (b = 0.18; p < 0.001), after adjustment for age, gender, 24-h average SBP and other potential confounders in multiple linear regression analyses. Moreover, multiple logistic regression analysis showed that the probability of having SRD was independently associated with Max Slope SBP (OR: 1.54; p = 0.001).

Conclusions: Our results seem to suggest that in essential hypertension, the speed of BP fluctuations are associated with SRD and in particular with microalbuminuria. It is likely that these associations may contribute to explain the increased cardiovascular risk conferred by SRD.

PP.07.21 KIDNEY INJURY, VASCULAR REACTIVITY AND STIFFNESS IN GENDER SUBGROUPS OF HYPERTENSIVE PATIENTS

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Objective: Chronic renal disease and hypertension are strongly associated with vascular damage, endothelial dysfunction (ED) and increased vascular stiffness. We hypothesized that several novel, potentially more sensitive biomarkers of kidney damage may be differently related to vascular stiffness and reactivity in male and female patients with different severity of hypertension.

Design and method: Urine levels of neutrophil gelatinase-associated lipocalin (NGAL), kidney injury molecule-1 (KIM-1), liver fatty-acid binding protein (L-FABP) and serum levels of Cystatin C (sCys) and serum creatinine (sCr) were measured by quantitative enzyme immunoassay in 92 hypertensive patients. 46 males (mean age 46.3 ± 13.4 years) and 46 females (mean age 55.2 ± 8.9 years). Renal function (GFR) was analyzed using MDRD and the CKD Epidemiology Collaboration (EPI) sCr equation and CKD-EPI sCr equation. Instrumental examination was performed after 5 days of discontinuation of antihypertensive medications including amlodipine, carvedilol, hydrochlorothiazide, losartan, metoprolol, perindopril, perindopril/torsemide, quinapril and ramipril.

Conclusions: This study suggests that the hypertensive patient’s prognosis may depend not only on average BP level but also on the degree and rate of BP variation. Little is known about the associations between early renal abnormalities and the rate of BP changes assessed by intermittent 24-h ambulatory BP monitoring (ABPM).

Our study was aimed to analyse the relationships between subclinical renal damage (SRD), defined as the presence of microalbuminuria or an estimated glomerular filtration rate (eGFR) between 30–60 ml/min/1.73 m² and the maximum speed of BP rise (Max Slope BP) during a 24-h BP recording.

Results: The Max Slope of systolic BP (SBP) was higher in subjects with SRD (n = 117) than in those without SRD (n = 272) (figure) and showed significant correlations with AER (r = 0.215; p < 0.001) and with eGFR (r = -0.153; p = 0.002). Only the former of these correlations remained significant (b = 0.18; p < 0.001), after adjustment for age, gender, 24-h average SBP and other potential confounders in multiple linear regression analyses. Moreover, multiple logistic regression analysis showed that the probability of having SRD was independently associated with Max Slope SBP (OR: 1.54; p = 0.001).

Conclusions: Our results seem to suggest that in essential hypertension, the speed of BP fluctuations are associated with SRD and in particular with microalbuminuria. It is likely that these associations may contribute to explain the increased cardiovascular risk conferred by SRD.

PP.07.19 ASSOCIATION OF MAXIMUM SPEED OF BLOOD PRESSURE RISE DURING 24-H ABPM WITH SUBCLINICAL RENAL DAMAGE IN ESSENTIAL HYPERTENSION

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Objective: Experimental studies documented that the mechanical injury of intravascular pressure on the vessel wall, which results in vascular remodelling and atherosclerosis, may be more closely associated to oscillatory than to steady laminar shear stress. This suggests that the hypertensive patient’s prognosis may depend not only on average BP level but also on the degree and rate of BP variation. Little is known about the relationships between early renal abnormalities and the rate of BP changes assessed by intermittent 24-h ambulatory BP monitoring (ABPM).

Our study was aimed to analyse the relationships between subclinical renal damage (SRD), defined as the presence of microalbuminuria or an estimated glomerular filtration rate (eGFR) between 30–60 ml/min/1.73 m² and the maximum speed of BP rise (Max Slope BP) during a 24-h BP recording.

Design and method: The study population consisted of 589 untreated essential hypertensives (mean age: 49 ± 13 years; males 58%); which underwent 24-h ABPM, 24-h albumin excretion rate (AER) measurement and GFR estimation, using the CKD-EPI equation. The Max Slope BP was calculated as the first derivative of the curve obtained by fitting partial Fourier series to raw BP data recorded by discontinuous 24-h ABPM.

Results: The Max Slope of systolic BP (SBP) was higher in subjects with SRD (n = 117) than in those without SRD (n = 272) (figure) and showed significant correlations with AER (r = 0.215; p < 0.001) and with eGFR (r = -0.153; p = 0.002). Only the former of these correlations remained significant (b = 0.18; p < 0.001), after adjustment for age, gender, 24-h average SBP and other potential confounders in multiple linear regression analyses. Moreover, multiple logistic regression analysis showed that the probability of having SRD was independently associated with Max Slope SBP (OR: 1.54; p = 0.001).

Conclusions: Our results seem to suggest that in essential hypertension, the speed of BP fluctuations are associated with SRD and in particular with microalbuminuria. It is likely that these associations may contribute to explain the increased cardiovascular risk conferred by SRD.
Results: Female patients were characterized by higher NGAL (16.6 +/- 12.8 versus 6.0 +/- 4.3 ng/ml, respectively; p = 0.0001) and lower sCys-estimated GFR (88.0 +/- 14.1 mL/min/1.73m² versus 95.6 +/- 19.1; p = 0.04), while there were no differences in sCr-estimated GFR, KIM-1, L-FABP and Cystatin C levels. There were also no differences in RHI and PWV levels between groups. In females novel biomarkers levels were associated with increased arterial stiffness (PWV=10 mmHg/1): sCys-estimated GFR (r = 0.351, p = 0.02), Cystatin C and L- FABP (r = 0.285, p = 0.06; r = 0.405, p = 0.01, respectively). In males patients Cystatin C and L-FABP levels were associated with lower RHI (r = -0.704, p = 0.005; r = -0.651, p = 0.03, respectively). KIM-1 levels were associated with increased PWV (r = 0.612, p = 0.06) only in patients with severe and resistant hypertension.

Conclusions: Cystatin C and L-FABP seem to be associated with increased arterial stiffness in hypertensive females and vascular reactivity in severe, resistant to treatment hypertensive males. Arterial stiffness in males is linked mostly to KIM-1 levels.

**PP.07.22 BIOMARKERS OF KIDNEY INJURY IN GENDER SUBGROUPS OF HYPERTENSIVE PATIENTS**
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Objective: Hypertension still remains one of the leading causes of end-stage renal disease, and early detection of kidney injury may affect treatment strategy and patient’s prognosis. Serum creatinine with following estimation of glomerular filtration rate (eGFR) are the most commonly used markers of renal function, though they are frequently delayed and influenced by multiple non-renal factors, including gender. The aim of the present study was to compare conventional and novel, potentially more sensitive biomarkers of kidney injury in hypertensive patients of different gender.

Design and method: Urine levels of neutrophil gelatinase-associated lipocalin (NGAL), kidney injury molecule-1 (KIM-1), liver fatty-acid binding protein (L-FABP) and serum levels of Cystatin C (sCys) and creatinine (sCr) were measured by quantitative enzyme immunoassay in 92 hypertensive patients, 46 males (mean age 46.3 +/- 13.4years) and 46 females (mean age 55.2 +/- 8.9 years). Renal function was analyzed using MDRD and the CKD Epidemiology Collaboration (EPI) sCr equation and CKD-EPI sCr equation. Instrumental examination was performed after 5 days of discontinuation of antihypertensive medications including ambulatory blood pressure monitoring (ABPM, SpaceLabs 90207), applanation tonometry (SphygmoCor, Artcor Medical) with the calculation of central aortic pressure.

Results: Female patients were characterized by higher NGAL (16.6 +/- 12.8 versus 6.0 +/- 4.3 ng/ml, respectively; p = 0.0001) and lower sCys-estimated GFR (88.0 +/- 14.1 mL/min/1.73m² versus 95.6 +/- 19.1; p = 0.04), while there were no differences in sCr-estimated GFR, KIM-1, L-FABP and Cystatin C levels between gender subgroups. Higher NGAL concentrations in females were associated with mean 24-hours blood pressure (BP) level (r = 0.269, p = 0.06), sCys-estimated GFR - with mean night systolic BP and central systolic BP (r = -0.356, p = 0.05; r = -0.302, p = 0.05, respectively).

Conclusions: NGAL and sCys-estimated GFR seemed to be potentially earlier and more sensitive biomarkers of kidney injury compared to conventional serum creatinine level and sCr-estimated GFR and are associated with blood pressure levels in hypertensive females.

**PP.07.23 SERELAXIN ATTENUATES THE PRESSOR RESPONSE TO ANGIOTENSIN II IN AGING FEMALES VIA AN ANGIOTENSIN TYPE 2 RECEPTOR MEDIATED PATHWAY**
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Objective: Protection against cardiovascular disease (CVD) is lost post-menopause and this is chiefly attributed to ovarian steroid deficiency. However, estrogen/progestin replacement does not confer cardio-protection and may increase CVD risk. We, and others, have demonstrated that the angiotsin type 2 receptor (AT2R) plays a greater role in the regulation of arterial pressure and renal function in adult females than males, and that these effects wane with age. Recently it was discovered that the vasodilatory and anti-fibrotic effects of relaxin are mediated via heterodimers formed between the cognate relaxin family receptor 1 (RXFP1) and the AT2R. The aim in the present study was to determine if targeting the RXFP1-AT2R axis confers cardiovascular protection in aging mice.

Design and method: Mean arterial pressure (MAP) was measured via radiotelemetry in aged (16–18 month old) FVB/N male and female mice at baseline and during infusion of vehicle, recombinant human relaxin (RLX, 20.8 ug/kg/h s.c.) or RLX plus the AT2R antagonist, PD123319 (125 ug/kg/h s.c.) for 3 days. Thereafter, MAP was measured for 21 days during angiotensin II (AngII, 36 ug/kg/h s.c.) or vehicle infusion. At the end of the study, aortic vascular reactivity, cardiac and renal fibrosis, and cardiac and renal expression of the angiotensin receptors and RXFP1 were determined.

Results: Basal MAP was higher in aged male than female mice (101 +/- 1 and 94 +/- 1 mmHg, respectively). The pressor response to AngII was similar in vehicle treated male and females (34 +/- 3 and 35 +/- 5 mmHg, respectively on day 21 of AngII infusion). RLX attenuated the pressor response to AngII in aged female mice by ~40%, an effect that was reversed by AT2R blockade. Furthermore, AngII-induced endothelial dysfunction and tissue fibrosis was reduced in RLX-treated aged female mice. RLX did not attenuate pressor responsiveness to AngII in aged male mice.

Conclusions: Our results support the novel interaction between the RXFP1 and the AT2R and demonstrate that the AT2R is integral to the cardio-protective properties of RLX in females. Further understanding of these pathways will provide novel therapeutic targets for the treatment of CVD in both men and women.

**PP.07.24 PLATELET-DERIVED GROWTH FACTOR B: A NOVEL DETERMINANT OF JUXTAGLOMERULAR CELL PHENOTYPIC PLASTICITY?**
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Objective: Renin, a key component in the regulation of blood pressure, is produced by the highly specialized renal juxtaglomerular (JG) cells. These cells may be derived from vascular smooth muscle cells (VSMC) and they can reversibly differentiate in response to certain stimuli. Because these cells rapidly differentiate when removed from the kidney, the biochemical mechanism responsible for this phenotypic plasticity is currently unknown. To overcome this limitation, we quantified gene expression in human renin-producing tumors (reninomas) and subsequently studied the effect of the most promising ligands on renin synthesis in (pro)renin-producing As4.1 cells, which are derived from a mouse JG cell-targeted tumor.

Design and method: Transcriptome analysis was performed on four reninomas. The most highly expressed genes common in all reninomas were subsequently used for in situ hybridization in the mouse kidney. This approach yielded 43 genes, from which 12 ligands were selected. As4.1 cells were incubated for 48 hours with conditioned medium derived from human embryonic kidney (HEK) 293 cells transfected for 48 hours with the mouse cDNA encoding these ligands. Subsequently, As4.1 medium and cell lysates or RNA were collected, and (pro)renin was measured in these samples by enzyme-kinetic assay.

Results: Under control conditions, As4.1 cell medium contained predominantly (+95%) prorenin. In contrast, cell lysates contained renin only, at levels corresponding to <1% of the total amount of (pro)renin in the medium (i.e., 161 +/- 61 mg angiotensin I/ml/hr, mean +/- SEM). Among the tested ligands, only platelet-derived growth factor B (PDGF-B) affected the medium and cellular (pro)renin levels, as well as As4.1 renin gene expression, inducing parallel decreases of 64 +/- 5%, 53 +/- 10% and 84 +/- 5%, respectively. Additionally, PDGF-B-exposed As4.1 cells displayed a more elongated, more angio-like shape with no apparent alteration in their viability. This was accompanied by a downregulated expression of a smooth muscle actin (P < 0.001), and an upregulated expression of interleukin-6 (P < 0.0001), suggesting a phenotypic shift from myo-endothelial to inflammatory. No significant changes in the JG cell marker aldo-keto reductase 1B7 (Akr1b7) were observed.

Conclusions: PDGF-B might be one of the factors involved in JG cell phenotypic plasticity.
Objective: Previous studies have demonstrated a significant link between the circadian rhythm of blood pressure (BP) and cardiovascular events, namely that the absence of a nocturnal fall in BP and an exaggerated morning BP surge are associated with more severe target organ damage and increased cardiovascular risk in chronic kidney disease (CKD) patients. Aim of our study was to investigate the reproducibility of circadian BP variations in CKD patients.

Design and method: A total of 35 CKD patients underwent 24-h ambulatory BP monitoring at baseline and 1 month. Morning BP surge was defined as the sleep-trough surge, calculated by subtracting the morning BP (mean of 4 readings over 2 hours just after wake-up) from the lowest nocturnal BP (mean of 3 readings centered around the lowest nighttime BP) and as the prewakening surge (morning BP minus the 4 readings over 2 hours before waking). The degree of nocturnal BP dipping (%) was calculated as 100[1 – nighttime BP/daytime BP] for both systolic and diastolic BP. Dippers were defined as subjects with nocturnal BP fall >10% and non-dippers as patients with nocturnal BP fall <10%. Nocturnal hypertension was defined as nighttime SBP > = 120 mmHg and/or DBP > = 70 mmHg. Statistical analysis was performed by means of reliability analysis (intraclass correlation coefficient (ICC)) for continuous variables and kappa agreement coefficient for categorical variables.

Results: The ICC for sleep-trough surge was 0.360 (p = 0.097) and for prewakening surge was 0.541 (p = 0.012). As far as systolic and diastolic dipping are concerned, the ICC values were 0.674 (p = 0.001) and 0.371 (p = 0.087), respectively. The kappa agreement coefficient for systolic non-dippers was 0.517 (p = 0.002), for diastolic non-dippers was 0.157 (p = 0.332), and for nocturnal hypertensives was 0.208 (p = 0.215).

Conclusions: Prewakening morning BP surge is more reproducible than sleep-trough surge in CKD patients. Systolic BP dipping demonstrates greater reproducibility than diastolic BP dipping and nocturnal hypertension in CKD patients.

ASSOCIATION OF NOCTURNAL HYPERTENSION AND NON-DIPPING PATTERN WITH CAROTID ARTERY INTIMA-MEDIA THICKNESS IN CHRONIC KIDNEY DISEASE PATIENTS

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Objective: Recent studies have demonstrated that nocturnal hypertension is better associated with target organ damage development and cardiovascular morbidity and mortality than non-dipping pattern in hypertensive patients. However, the role of nocturnal hypertension and non-dipping pattern, in terms of target organ damage involvement, in chronic kidney disease (CKD) patients is unclear. Aim of our study was to evaluate the impact of nocturnal hypertension and non-dipping pattern on common carotid artery intima-media thickness (CCA-IMT) in CKD patients.

Design and method: A total 69 CKD patients, referred for evaluation at the Hypertension Unit of our department, underwent 24-h ambulatory blood pressure (BP) monitoring and CCA-IMT ultrasonographic measurements. The degree of nocturnal BP (BP dipping) (%) was calculated as 100[1 – nighttime SBP/daytime SBP]. Dippers were defined as subjects with nocturnal BP fall >10% and non-dippers as patients with nocturnal BP fall <10%. Nocturnal hypertension was defined as nighttime SBP > = 120 mmHg and/or DBP > = 70 mmHg. Statistical analysis was performed by means of independent-samples T test and ANCOVA.

Results: The percentages of nocturnal hypertensives, systolic non-dippers and diastolic non-dippers were 68%, 65% and 50%, respectively. Systolic (r = 0.289, p = 0.019) and diastolic dipping (r = 0.352, p = 0.004), as continuous variables, significantly correlated with CCA-IMT. However, CCA-IMT did not differ significantly between systolic non-dippers (1.025 mm) and dippers (0.949 mm). In contrast, diastolic non-dippers (1.067 mm, p = 0.011) and nocturnal hypertensives (1.045 mm, p = 0.010) presented significantly higher CCA-IMT values than diastolic dippers (0.929 mm) and subjects with nocturnal normotension (0.898 mm), respectively, even after adjustment for demographic characteristics and baseline risk factors.

Conclusions: Nocturnal hypertension and diastolic non-dipping pattern are associated with increased CCA-IMT values in CKD patients.

BLOOD PRESSURE VARIABILITY IS INCREASING FROM THE FIRST TO THE SECOND DAY OF THE INTERDIALYTIC INTERVAL IN HEMODIALYSIS PATIENTS

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Objective: Patients with end-stage renal disease under hemodialysis have increased cardiovascular risk and experience severe BP fluctuations during the dialysis session and the subsequent interdialytic interval. BP variability (BPV) may be an additional risk factor for cardiovascular events and preliminary data suggest increased BPV with advancing stages of CKD. This is the first study to examine BPV during the whole intra- and interdialytic period in hemodialysis patients with ambulatory blood pressure monitoring (ABPM).

Design and method: A total of 160 patients receiving maintenance hemodialysis had 48-hour ABPM with the Mobil-O-Graph device during a regular dialysis session and the subsequent interdialytic interval. Brachial and aortic BPV were calculated with validated formulas and were compared between Day 1 and Day 2 of the interdialytic period (44-hours), Day 1 and Day 2 of the total 48-hour interval (including the dialysis session), and between the two respective daytime periods and nighttime periods.

Results: All brachial systolic BPV indices [standard deviation (SD): 14.75 ± 4.38 vs 15.91 ± 4.41, p = 0.001; weighted standard deviation (wSD): 13.80 ± 4.00 vs 14.89 ± 3.90, p < 0.001; coefficient of variation (CV): 11.34 ± 2.91 vs 11.93 ± 2.94, p = 0.011; average real variability (ARV): 11.8 ± ± 3.44 vs 12.32 ± 3.65, p = 0.001] were increasing from Day 1 to Day 2 of the 44-hour interdialytic period. Similarly, all indexes of diastolic BPV variability were significantly increased in Day 2, with the exception of CV. Aortic systolic and diastolic BPV indices displayed a similar pattern. Further, all studied brachial systolic and diastolic BPV indexes were also lower during daytime 1 than daytime 2 (systolic ARV 11.56 ± 3.98 vs 12.44 ± 4.03, p = 0.002; systolic ARV was lower in nighttime 1 compared to nighttime 2 11.20 ± 5.09 vs 12.18 ± 4.66, p = 0.045). In multivariate analysis pre-dialysis SBP, age, diabetes, heart failure and use of statins were independently associated with increased SBP ARV.

Conclusions: BPV is increased in Day 2 compared to Day 1 of the interdialytic period in hemodialysis patients; this could be another mechanism involved in the complex cardiovascular pathophysiology and increased cardiovascular mortality of these individuals.
Results: During follow-up, 37 (21.8%) patients died and 46 (27.1%) had a cardiovascu lar event or died from cardiovascular causes. Cumulative survival was not different for quartiles of pre-dialysis SBP, 48-hour peripheral SBP, central SBP and central PP, but was progressively shorter with higher ambulatory PWV [95.3%, 85.7%, 61.9% and 69.8% for quartiles 1 to 4 (log rank p < 0.001)] and AIx75 [90.7%, 78.6%, 73.8% and 69.8% for quartiles 1 to 4 (log rank p = 0.013)]. Similarly, the Hazard Ratios for cardiovascular mortality, for cardiovascular death, or non-fatal MI, or non-fatal stroke, as well as the combined outcome of cardio-vascular events were similar for quartiles of predialysis SBP, 48-hour peripheral SBP and 48-hour central SBP, but were progressively increasing with higher quartiles of ambulatory PWV and ambulatory AIx75. In multivariate Cox-regression analysis 48h-ambulatory-PWV was the only vascular parameter independently associated with mortality (HR: 1.604, 95%CI: 1.141–2.255; per m increase).

Conclusions: Ambulatory PWV and ambulatory AIx75 are independently associated with the risk of cardiovascular events and mortality in this hemodialysis population, whereas office and ambulatory BP are not. These findings add to the evidence suggesting that arterial stiffness is probably the most prominent cardiovascular risk factor in hemodialysis.

IS RENAL SYSTEM FUNCTION EXAMINED WELL ENOUGH (ACCORDING TO THE RUSSIAN FEDERAL REGISTER OF ARTERIAL HYPERTENSION)
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Objective: to determine renal damage severity in the selection of patients with arterial hypertension under care and treatment in primary health care.

Design and method: The analysis carried out with the hypertension Register Method (a software with remote access, specially trained doctors made data inputs from medical records into the Register) included a selection of 29 126 patients with hypertension from 30 regions of Russia from 2010–2015: 35% were male (n = 10339), males younger than females by 4 years (61 ± 12 years and 65 ± 12 years respectively. Chronic renal disease (CRD) was studied and glomerular filtration rate was calculated (by MDRD formula) (ml/min/1.73 sq.m).

Results: creatinine data were present in the medical records of only 61% of patients with hypertension. The average level of creatinine in males was 90 ± 18 mcM/l, in females – 83 ± 16 mcM/L. In general, in the total sample CRD of I stage – 21%, II stage – 51%, III stage – 24%, IV-Y stage – 4%. In patients with high and very high risk normal renal system function was observed only in 18% of cases, II stage CRD was prevalent with 52%, moderately diminished function (IIa stage) observed in 24% and significantly diminished function (IIb stage) – in 5% of patients with hypertension. Dramatically diminished renal system function (CRD of YI stage) was observed in 0.5% and end-stage kidney failure (CRD of Y stage) – in 0.1% of cases. Analysis of blood pressure revealed 1 stage hypertension in 43% (n = 12036), II stage hypertension in 12% (n = 3461), III stage hypertension in 3% (n = 998) and BP < 140/90 mmHg in 38.1% of patients with hypertension (n = 23534) belong to the high and very high cardiovascular risk.

Conclusions: according to the hypertension Register in patients with hypertension in primary health care examination of the renal system is nonoptimal; in 30% of patients with high risk diminished renal system function is found.

HIGH PREVALENCE OF RENAL DYSFUNCTION AND ALBUMINURIA IN PATIENTS WITH ARTERIAL HYPERTENSION AND DIABETES MELLITUS IN HOSPITAL CLINICAL PRACTICE
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Objective: Chronic kidney disease (CKD) is recognized as an independent cardiovascular disease (CVD) risk state. Arterial hypertension (AH) and type 2 diabetes mellitus (T2DM) are leading risk factors for both CVD and CKD. The aim of the study was to assess the prevalence of decreased glomerular filtration rate (GFR) and high very high albuminuria in patients with AH and T2DM.

Design and method: In 319 patients with AH and T2DM admitted in city clinical hospital (37% men, age 65 ± 11 years (M ± SD), body mass index 30 ± 7 kg/m², blood pressure 135 ± 160/90 ± 110 mmHg, median AH duration 12 years (interquartile range 10;15), T2DM duration 10 years (4;15), dyslipidemia 70%, chronic heart failure 50%, anemia 28%, atrial fibrillation 20%) GFR was assessed by CKD-EPI equation and albuminuria – by albumin/creatinine ratio (ACR) in spot urine morning sample.

Results: GFR < 60 ml/min/1.73 m² was revealed in 127 (39.8%) patients, where GFR in the range of 45– < 60, 30– < 45, 15– < 30, < 15 ml/min/1.73 m² was found in 18, 17, 5 and 0.6% respectively. ACR>30 mg/g was detected in 123 (39%) of patients, wherein ACR in the range 30– < 300 and >300 mg/g was found in 29 and 10%. CKD criteria (GFR < 60 ml/min/1.73 m² and/or ACR>30 mg/g) were detected in 182 (57%) patients. Non-albuminuric CKD (GFR < 60 ml/min/1.73 m² without albuminuria) was found in 59 (18.5%) patients, isolated (without GFR decrease < 60 ml/min/1.73 m²) high/ very high albuminuria - in 55 (17%) patients, combined decreased GFR and high/very high albuminuria – in 68 (22%) patients, and isolated albuminuria were older (67.2 ± 10.8 vs 63.7 ± 17.0 years), more aware of kidney diseases (59 vs 41%), had lower level of hemoglobin (122 ± 23 vs 130 ± 21 g/l), p < 0.05 for all. Patients with vs without CKD criteria were older (67 ± 10 vs 60 ± 11 years), had higher prevalence of anemia (34 vs 10%), heart failure (55 vs 32%).

Conclusions: High prevalence (57%) of CKD criteria was revealed in hospitalized patients with AH and T2DM. GFR < 60 ml/min/1.73 m² was found in 39.8% of patients, ACR>30 mg/g – in 39%, combined decreased GFR and high/ very high albuminuria – in 22% of patients.

GENETIC VARIANT OF ANGIOTENSIN IV RECEPTOR (AT4) AND PLASMA ANGIOTENSIN II CONCENTRATION

Objective: It is well known that the renin angiotensin system (RAS) plays a pivotal role in the development of cardiovascular, renal and metabolic conditions. Angiotensin IV receptor (AT4) is a newly emerging component of the RAS. AT4 is a membrane type aminopeptidase and also designated as LNPEP. Actually AT4 converts angiotensin III to angiotensin IV and to further degraded forms of angiotensin. Thus it is thought that AT4 exerts the enzyme action for the direction of the reduction of angiotensin II. We therefore tested the hypothesis that genetic variants of AT4 could show significant effects on plasma angiotensin II concentrations.

Design and method: The required sample size of the study was calculated as about 500 cases tentatively with log-transformed plasma angiotensin II concentrations using a bilateral ANOVA with protection against type I error of 5% and 80% of power. We enrolled consecutive 692 subjects who had consulted our hospitals for life style related diseases. Genomic DNA was isolated from human leukocytes by QIAamp kit. Genotypes were assayed with genomic DNA for a C/T variant of AT4 (rs2301318) using real-time PCR system by TaqMan method. The statistical differences of plasma angiotensin II concentrations among the genetic variants were evaluated.

Results: The log-transformed concentrations (log (plasma angiotensin II)) with each genotype of AT4 were as follows: CC (260 cases) 0.98 ± 0.48, CT (325 cases) 0.83 ± 0.43, TT (107 cases) 0.78 ± 0.39 (CC vs CT, p = 0.0001; CC vs TT, p < 0.0001; CT vs TT, p < 0.25). Geometric means of these values correspond to 8.51 pg/ml, 5.82 pg/ml and 4.96 pg/ml, respectively.

Conclusions: Thus, it is found that a genetic variant of AT4 may have a significant impact on the plasma angiotensin II concentrations. Furthermore this may imply that the genetic variant has pathophysiological effects on cardiovascular, renal and metabolic conditions.

THE PROGNOSTIC ROLE OF STIFFNESS INDEX DETERMINED BY FINGER PHOTOPLETHYSMOGRAPHY IN CHRONIC KIDNEY DISEASE
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Objective: Arterial stiffness has a prognostic role in chronic cardiovascular diseases. Pulse wave velocity (PWV) determined by the carotid-femoral pulse detection is accepted as a gold standard method. Further diagnostic procedures are in use to assess the arterial stiffness including the finger photoplethysmography. The prognostic role of this method is unknown. The goal of our investigation was to determine the prognostic significance of the arterial stiffness measured by the photoplethysmographic method in a homogenous group of chronic kidney disease patients.

Design and method: One hundred and three IgA nephropathy patients with chronic kidney disease stage 1–4 were investigated and followed (67 male, 36 female, 45 ± 11 years). End stage renal disease was an exclusion criterion. The stiffness index was determined by the volume alteration of the digital artery during the cardiac cycle. This merit showed a strong correlation with the PWV investigated by other
methods in earlier studies. The average following time was 67 (6–107) months. The patients were divided into two groups according to the stiffness index; the cut-off point was 10 m/s. The combined end point was total mortality, any cardiovascular event including stroke, myocardial infarction or cardiovascular procedure and achieving the end stage renal disease including renal replacement therapy.

**Results:** The patients with increased stiffness index (>10 m/s) had significantly more end point events (19/43 vs. 10/60, $\chi^2$: 5.860, $P = 0.015$ by Mantel-Cox log-rank test). Using the Cox regression model stiffness index has been proved an independent predictor on survival among several cardiovascular risk factors (age, hypertension, diabetes, obesity, lipid disturbances and renal function) in chronic kidney disease. Every 1 m/s increase in stiffness index resulted in a 17% gain in the occurrence of the combined end point.

**Conclusions:** Stiffness index determined by finger photoplethysmography is an eligible parameter to assess the prognosis in chronic kidney disease. In IgA-nephropathy increased stiffness index seems to be a good prognostic tool for identification of highest-risk patients.
Objective: The aim of our study was to estimate the relationship between pulse wave velocity (PWV) and blood pressure (BP) profile parameters in patients with arterial hypertension (AH) and metabolic syndrome (MS).

Design and method: We investigated 180 patients with mild to moderate AH (mean age 58 ± 10 years, 102 male and 78 female). Noninvasive 24-hour BP recordings (TM-2422S, A&D) were performed with intervals of 15 min in day- and midnight. We assess the following parameters: mean values and variability parameters of 24-h, day-, night-time systolic (S), diastolic (D) and pulse (P) BP-s, SBP and DBP loads (under the curve – AUC), percentage of nocturnal fall of SBP and DBP. Differences in estimated parameters (M ± SE) between groups were tested by Student t-test. P < 0.05 was considered as statistically significant.

Results: In 82 patients from 180 with mild to moderate AH, were observed MS. In patients with MS mean values of SBP, DBP and PBP were significantly higher than in patients without MS. AUC of SBP and DBP were statistically significantly higher in patients with MS also. NF of SBP and DBP was statistically insufficient in group of patients with MS. In patients with MS were observed significantly high values of PWV in comparison with group of patients without MS. The thickness of the interventricular septum and posterior wall of left atrium had negative correlations with the duration of REM sleep and positive correlation with the proportion between S1 and S2 stages of sleep. Multiple correlation coefficient when included in the regression equation parameters REM and NREM sleep phases, was R = 0.39 (R2 = 0.16, p < 0.05), but when added to the regression equation of the «awakening index» multiple correlation coefficient increased to R = 0.44 (R2 = 0.21, p < 0.02).

Conclusions: In patients with OSAS and AH, the sleep quality is significantly correlated with the structural changes of LV. It is obvious that the disturbance of the sleep structure (disturbance of the proportions of REM, NREM sleep and «slow-wave» phase) potentiates the sympathicotonic effect of micro- and macro-awakenings, and has an additive effect on the remodeling of the left ventricle.
Results: Blood sampling was also performed to assess insulin resistance. Muscle sympathetic nerve activity (MSNA) measurements were performed to assess sympathetic nerve activity and insulin resistance in patients with metabolic syndrome at 3 months post-RDN.

Conclusions: Cardiac remodeling was more prominent in diabetic patients, while hypertensive control was achieved with more intensive treatment, including more diuretics and central sympathetic inhibitors. Dyslipidemia and statin treatment were more frequently encountered in diabetic patients, statins being prescribed in the majority of patients. Hypertensive patients with type 2 diabetes mellitus suffered more frequently from ischemic heart disease.

Conclusions: Markers of arterial stiffness in HTN patients with DM receiving effective antihypertensive treatment in 52.7% of cases are more prevalent than markers of atherosclerosis. The prevalence of arterial stiffness varies depending on the diagnostic method used. Patients with HTN and DM are characterized by early loss of stiffness gradient from aorta to peripheral arteries.

In the RDN group, office BP reduced by 16 ± 21/10 ± 11 mmHg (P = 0.01/0.007), average 24-hour BP reduced by 14 ± 65/5 ± 8 mmHg (P = 0.008/0.03), waist circumference reduced by 31.1 ± 3.6 cm (P = 0.008); and MSNA at fasting state reduced from 55 ± 9 bursts per minute/82 ± 15 bursts per 100 heart beats to 46 ± 8 bursts per minute/71 ± 15 bursts per 100 heart beats (P = 0.0008/0.006) at 3 months post-RDN. During OGTT, while blunted MSNA responses were noted at baseline throughout the 120-minute test (P = 0.05/0.05 vs. MSNA at fasting state), improved MSNA responses with burst frequency/burst incidence increased to 52 ± 8 bursts per minute/76 ± 12 bursts per 100 heart beats (P = 0.001/0.04 vs. the MSNA at fasting state, n = 13) at 30 minutes and 0.75 ± 16 bursts per minute/80 ± 14 bursts per 100 heart beats (P = 0.004/0.08 vs. the MSNA at fasting state, n = 10) at 120 minutes were observed at 3 months post-RDN. No significant improvements were observed in the 4 control group subjects at 3 months follow-up. No statistical significant change was observed in the HOMA-IR in both groups at 3 months.

Conclusions: In this pilot study of patients with metabolic syndrome and associated hypertension, RDN reduced elevated sympathetic nerve activity and restored the normal neural response to oral glucose loading. Strategies to target specifically the elevated sympathetic nerve activity may provide substantial clinical benefits in this setting.
THE RELATIONSHIP BETWEEN OBESITY AND VISIT-TO-VISIT VARIABILITY IN SYSTOLIC BLOOD PRESSURE: A 30-MONTHS PROSPECTIVE FOLLOW-UP STUDY

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Objective: The prevention of obesity and strategy for better patient compliance in efficient blood pressure control in obesity-related diseases are primary. The aim of this study was to clarify the change in parameters of obesity and systolic blood pressure (SBP) during 30-months follow-up periods after starting the antihypertensive treatment and healthy lifestyle in hypertensive patients.

Design and method: Prospective study included 300 randomly selected previously untreated hypertensive patients (148 men and 152 women, mean age 67.7 ± 9.8 years), who were divided according to body mass index (BMI more than or equal to 30 kg/m²) to groups of obese (n = 216) and non-obese examinees (n = 84). The study comprised three visits during the follow-up period of 30-months. Obesity was defined according to both BMI and waist circumference (WC). SBP for each examinee was evaluated at each visit using the standard deviation (SD) from 3 values of SBP. In order to estimate detailed evaluation of distribution SBPV quartiles of SBP-SD were formed.

Results: The prevalence of overweight/obesity was very high according to both BMI and WC at the beginning of the study, and there was significant decrease in these values at the end of the study (72%, 64%, 22%, 19% p < 0.001). SBP and SBP-SD were significantly higher in the group of obese hypertensive patients than in the group of non-obese patients (129.41 ± 8.41 vs 119.04 ± 7.32 mmHg, 9.27 ± 5.28 vs 6.50 ± 3.52; p < 0.01). There was statistically stronger correlation between SBP-SD and BMI as the parameter of total obesity compared to WC as the parameter of central obesity (0.422 vs 0.381, p < 0.01). The analysis showed statistically significant average decrease of SBP-SD for 1.9 mmHg, BP for 31.10 mmHg, BMI for 3.5 kg/m² and WC for 10 cm. The highest SBPV was recorded in the 4th quartile in obese patients (40.22 ± 7.14 mmHg).

Conclusions: During the 30-months period after starting antihypertensive medication and healthy lifestyle with titrated dose of same class of antihypertensive drugs, reduction of body weight was associated with reduction of blood pressure values, and lower value of blood pressure variability.

PREVALENCE OF ATHEROSCLEROSIS AND ARTERIAL STIFFNESS IN PATIENTS WITH ARTERIAL HYPERTENSION AND TYPE 2 DIABETES MELLITUSS

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Objective: The aim of the study was to assess the degree of atherosclerosis and arterial stiffness in patients with arterial hypertension and type 2 DM.

Design and method: The study included 55 patients with HTN and DM (19 (38%) males, mean age 61.6 ± 12.7 years, mean office BP 142.5 ± 25.5/82.7 ± 10.7 mmHg, HR 75.4 ± 10.2 beats/min), GFR 64 ± 18.4 ml/min/1.73m², LDL-C 3.4 ± 1.9 mmol/l. All participants previously received antihypertensive medications: ACEIs – 55 (100%), beta-blockers 51 (92.7%), thiazide diuretics 35 (63.6%), 4 (7.27%) patients received statins. Target BP values (=140/85 mmHg) were achieved in 29 (52.7%) patients. Carotid-femoral (CF) and carotid-radial (CR) pulse wave velocity were assessed (Sphygmocor, AtCor), cardio-ankle vascular index (CAVI) and ankle-brachial index (ABI) were evaluated (VaSera 1500, Fukuda Denshi). Increased arterial stiffness was defined as an elevation of pulse pressure (PP) > 60 mmHg, PWV >10 m/s, CAVI <2.0, ABI decrease < 0.9 was considered as a marker of subclinical atherosclerosis, ABI > 1.3 as a sign of noncompressible arteries. Stiffness gradient was assessed by CF-PWV/CR-PWV ratio, with values >1 indicating the loss of gradient.

Results: In our group mean PP values were 61.0 ± 14.3 mmHg; 10 (18.1%) patients had elevation of PP > 60 mmHg. Mean CR-PWV was 7.7 ± 1.18 m/s, mean CF-PWV – 10.3 ± 2.0 m/s, increased CF-PWV >10 m/s was noted in 15 (27.2%) patients. Mean stiffness gradient was 1.3±0.37, values of CF-PWV/CR-PWV >1 were found in 5 (92.7%) patients. Mean CAVI was 0.7 ± 1.8, with elevation > 0.90 – in 23 (49%) patients. Mean ABI was 1.03 ± 0.1, ABI decrease < 0.9 was present in 5 (9%), ABI increase >1.3 in 2 (3.6%) patients.

Conclusions: Markers of arterial stiffness in HTN patients with DM receiving effective antihypertensive treatment in 52.7% of cases are more prevalent than markers of atherosclerosis. The rate of arterial stiffness varies depending on the diagnostic method used. The highest number of patients is diagnosed with arterial stiffness by CAVI measurement, the lowest number by PP, which may reflect the greater sensitivity of PP to antihypertensive therapy. Patients with HTN and DM have an early loss of stiffness gradient from aorta to peripheral arteries.

RELATIONSHIP OF METABOLIC SYNDROME AND RISK OF DEVELOPING CARDIOVASCULAR DISEASE AND DIABETES FOR POPULATION OF KAZAKHSTAN

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Objective: Metabolic syndrome (MS) is a combination of medical disorders that increase the risk of developing cardiovascular disease and diabetes. Some studies have examined the relationship between MS and psychological risk factors such as depression, anxiety, tension, current perceived stress and anger. We researched risks of cardiovascular diseases, diabetes, the prevalence of states of anxiety and depression among Central Kazakhstan’s population with MS.

Design and method: 3683 Central Kazakhstan citizens (2829 women and 854 men) aged 18 to 65 (45 ± 12.71 (M ± Std.Dev)) were examined. 543 people were diagnosed with the metabolic syndrome which accounted for 14,74% (CI: 13.61; 15.93). SCORE, FINDRISK charts were used to evaluate risks. PHQ-9 and GAD-7 scales were used to determine levels of depression and anxiety.

Results: Most important differences were determined for the prevalence of diabetes and cardiovascular disease risks. Clearly increased risk for diabetes was found for 19.7% (CI 16.34; 23.06) of people with MS, almost 80.46% (CI 77.11; 83.81) had high risk of cardiovascular disorders. Depression states were common among people with MS - almost 25% of examined had moderate, moderately severe or severe depressions. Severe anxiety level was observed for 18.05% (CI 14.8; 21.3). Among women, diabetes risks were more pronounced, whereas for men it were cardiovascular risks. Severe anxiety was observed more frequently among women than among men (19,27% (CI 15.57; 22.97) and 12,75% (CI 6.28; 19.22) respectively). However, almost 9% of men and 5.5% of women had moderately severe and severe depressions.

Conclusions: The prevalence of metabolic syndrome in Central Kazakhstan is significantly lower than in Europe or the US. However, as is the case for other countries, high risk of development of diabetes and cardiovascular disorders are observed among people with MS. Gathered results confirm the role of anxiety and depression conditions in MS development.
age group. For 48 to 56 age group metabolic syndrome frequency increased more than twice and constituted 38.12%. A maximum number of metabolic syndrome cases was identified for ‘56 to 65’ group and amounted to 45.12%. Among men metabolic syndrome frequency totalled 11.94% and was significantly different from metabolic syndrome frequency among women (15.4%). 78.23% of women and 73.53% of men with metabolic syndrome were ‘50 or older’. Among people with metabolic syndrome for age group ‘40 and younger’ the percentage of men (10.78%) was significantly higher, than of women (4.50%). Among people with metabolic syndrome only 18.11% of cases were with higher education. More than half of all individuals with metabolic syndrome were engaged in physical labor. Percentage of widowed individuals among people with metabolic syndrome (20.93%) was significantly higher compared to percentage of widowed people without metabolic syndrome (8%).

Conclusions: Analysis of metabolic syndrome prevalence, for Kazakhstan citizens discovered that the maximum number of people with metabolic syndrome was found for ‘56 to 65’ group. Metabolic syndrome occurs more frequently among women than men. Among men, metabolic syndrome manifests itself earlier in life.

PP08.27 PREVALENCE AND CLINICAL BACKGROUND OF ATRIAL FIBRILLATION IN JAPANESE TYPE 2 DIABETES
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Objective: The atrial fibrillation (AF) is one of the most common arrhythmia in clinical practice, but little is known about its risk factors. Some studies have reported that diabetes contains a risk factor of AF. The aim of this study is to investigate the prevalence of AF in Japanese type 2 diabetes and clinical backgrounds of them.

Design and method: We conducted a retrospective observational study of 1650 patients with type 2 diabetes who were taken 12-lead electrocardiograms at their first visit to our hospital from January 2004 to December 2005. AF was diagnosed by physicians. We investigate the prevalence of AF and clinical background based on clinical records including heart disease and stroke. Then, risk factors were examined by comparing clinical backgrounds and the result of biochemical tests between the group with AF and the group without AF.

Results: The mean age was 60.13 year-old, BMI 24.8(4.3) kg/m², HbA1c 8.6 (2.3) %, and blood pressure 141(24) / 80(13) mmHg. Prevalence of AF in all type 2 diabetes was 4.4%, 5.4% in man and 2.5 % in woman, respectively. The prevalence of AF was increased 8.9% at the age of 70 to 80. As for basal heart disease, hypertension was observed 70.8%, valvular heart disease 16.7%, ischemic heart disease 13.9%, and other heart diseases 9.7%. Nine patients out of 72 patients with AF had already had stroke. Old elderly and elevated uric acid were independent factors for non valular AF in type 2 diabetes (p < 0.001, p < 0.05).

Conclusions: The high prevalence of AF was found in Japanese type 2 diabetes, especially in the age of 70 and over. Compared to the general population, the tendency to be older and higher prevalence was the same, but prevalence was high in each generation.

PP08.29 MARKED INSULIN RESISTANCE IN FAT CELLS OF SUBJECTS WITH INCREASED CARDIOVASCULAR RISK
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Objective: Adipose tissue dysfunction may be a pathophysiological factor promoting cardiovascular disease due to altered lipid metabolism in fat cells. We previously showed that impaired ability to mobilize lipids from adipocytes following catecholamine stimulation links adipose tissue to cardio-metabolic disease (J Clin Invest, 1995 and Nature, 2011). If such defects also involve effects of the major anabolic hormone insulin is unknown and was presently examined.

Design and method: Abdominal subcutaneous adipose tissue was obtained from 555 women and 167 men who were scored for cardiovascular risk factors according to ATP III criteria. Insulin-stimulated lipogenesis (lipid synthesis from glucose) and insulin-inhibited lipolysis (hydrolysis of neutral lipids) were determined in vitro in isolated fat cells. Half maximum effects (sensitivity) and maximum effects (responsiveness) for insulin were determined and related to ATPIII risk score in multivariate analysis adjusting for age, gender and either body mass index (BMI) or fat cell size.

Results: Independently of age, sex and BMI, ATPIII score was negatively correlated with sensitivity as well as responsiveness (β-values 0.13–0.30) of insulin inhibition of lipolysis and stimulation of lipogenesis. Similar results were obtained if associations were corrected for fat cell size instead of BMI. Together variations in the sensitivity and responsiveness of insulin action on fat cell lipid metabolism explained as much as 25% of the variation in ATPIII scores (adjusted r2). Variation in insulin sensitivity reflects changes in initial insulin signal events (receptor number, affinity and coupling) whereas changes in insulin responsiveness reflect distal events in hormone signaling that are beyond the receptor. Because insulin signaling to lipolysis and lipogenesis diverge after phosphoinositide 3-kinase, the results suggest that the negative association between ATPIII and insulin action is attributed to multiple changes in hormone signaling, possibly involving its receptor and/or the insulin receptor substrate proteins in addition to phosphoinositide 3-kinase.

Conclusions: Increased cardiovascular risk is strongly linked to resistance of the major metabolic actions of insulin in subcutaneous human fat cells. This is independent of age, sex, BMI and fat cell size. The mechanisms behind the resistance are currently studied and preliminary data will be reported.

PP08.30 DIABETES MELLITUS IN HYPERTENSIVE PATIENT - SYNONYM OF CARDIOVASCULAR RISK INCREASE?

Objective: Hypertension (HT) is an independent cardiovascular risk factor (CVRF), but the association with diabetes mellitus (DM) may lead to increased cardiovascular morbidity and mortality. The authors sought to study the association between HT and DM in hospitalized patients.

Design and method: Retrospective study of 1106 patients admitted to an Internal Medicine ward between January 2012 and November 2016. Patients with HT were selected and grouped according to the presence of DM: G1 - diabetic hypertensive patients; G2 - non-diabetic hypertensive patients. We defined cardiovascular events (CVE): acute myocardial infarction (AMI) and stroke, reasons for hospitalization; and considered in-hospital mortality of all causes.

Results: (1) 758 patients (68.5% of the population) were included. (2) In G1 the mean age was lower (77.7 ± 9.8 vs 79.8 ± 11.8 years, p = 0.014) and the hospital length of stay was higher (11.2 ± 10.9 vs 9.9 ± 8.5 days; p = 0.075). (3) In G1 there was a higher prevalence of heart failure (38.7±28.5%, p = 0.004) and ischemic heart disease (19.2±11.6%, p = 0.004), cerebrovascular disease (14.3±21.3%; p = 0.018), being similar in chronic kidney disease (32.8±31.5%, p = 0.816) and atrial fibrillation (25.9±24.8%, p = 0.729). (4) There is a greater association with other CVE in G1: obesity (16.2±7.3%, p < 0.01) and dyslipidemia (51.9±33.5%, p < 0.01). (5) There were no differences in CVE (4.5±5.9, p = 0.422, AMI 3.0±2.4%, p = 0.641, stroke 4.5±6.7%, p = 0.222), mortality (2.6±4.5%, p = 0.208) and in the combined CVD and mortality (10.2±12.4%, p = 0.356).

Conclusions: In this sample, the presence of DM did not confer disadvantage in hypertensive patients contrary to expectations. This may be due to a earlier and rigorous control of CVRF, in particular of hypertension, in the diabetic patient, with more effective therapeutic strategies, which cooperate for a greater prevention of CVD and better cardiovascular outcome.
**POSTER SESSION**

**POSTERS' SESSION PS09: LARGE ARTERIES AND MICROCIRCULATION**

**PP.09.01 A COMPARATIVE ANALYSIS OF LARGE ARTERIES STIFFNESS OF SYSTEMIC CIRCULATION IN PATIENTS WITH IDIOPATHIC PULMONARY ARTERIAL HYPERTENSION, WITH ARTERIAL HYPERTENSION AND HEALTHY**

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Objective: We evaluated arterial stiffness of elastic (PWVe) and muscular (PWVm) types in patients with idiopathic pulmonary arterial hypertension (IPAH) compared with patients with arterial hypertension (AH) and control group of healthy people.

Design and method: We included 70 patients: I group - 36 patients with IPAH, II group - 16 patients with AH, III control group – 18 healthy people. Follow-up measurements were performed: measurement of carotid-ankle vascular index (CAVI) (VaSera 1500N, Fukuda Densi, Japan), noninvasive central SBP (cSBP) (Sphygmocor, AtCor, Australia). We used T-test for independent samples.

Results: All groups were similar by age (42 ± 2.2; 41.4 ± 3.2; 39.1 ± 2.2 years respectively, NS). IPAH group significantly differed from AH group by lower level of SBP/DBP (113.9 ± 2.7/67.6 ± 1.6 mmHg vs 144.1 ± 4.7/89.0 ± 2.8 mmHg, p < 0.0001). Subsequently cSBP was also slightly lower in this group (98.3 ± 1.6 vs 131.3 ± 5.1 mmHg, p < 0.0001). I and III groups were similar by levels of PWVm (8.1 ± 0.3 vs 7.9 ± 0.3, respectively, NS), but I and II groups differed by it (8.1 ± 0.3 vs 9 ± 0.4, respectively, p < 0.1). Although CAVI were similar by I and II group (right 7.2 ± 0.2 vs 7.5 ± 0.3 and left 7.5 ± 0.2 vs 7.5 ± 0.3, respectively, NS) CAVI were higher in IPAH group than in the control group (right 7.2 ± 0.2 vs 6.0 ± 0.1, p < 0.0001 and left 7.5 ± 0.2 vs 6.1 ± 0.1, p < 0.0001 respectively).

Conclusions: The definition of CAVI, which does not depend on the level of systemic blood pressure, helps to identify the elastic properties impairment of the systemic circulation arteries in patients with IPAH. The stiffness of large arteries of systemic circulation is similar in patients with IPAH and with AH.

**PP.09.03 CONCORDANCE BETWEEN TWO FORMS OF ARTERIAL STIFFNESS REGISTER AND CORRELATION WITH BRACHIAL AND CENTRAL BLOOD PRESSURE**

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Objective: Carotid-femoral pulse wave velocity (cPWV) is recognized as the gold standard for the assessment of arterial stiffness. Cardio Ankle Vascular Index (CAVI), which is determined automatically has been proposed as an alternative. We aimed to assess the correlation between these two methods and their association with central and peripheral BP.

Design and method: These are an observational study in 43 essential hypertensive patients, 60% males, aged 48 ± 14 years. cPWV was determined by pulse wave analysis using the validated and calibrated Sphygmocor Xcel device (AtCor Medical, West Ryde, Australia). Brachial and central BP (transfer function) were determined using the VaSera VS-Series Vascular Screening System (Fukuda Densi, Tokyo, Japan). Agreement between the two methods was assessed by both Pearson’s and intraclass correlation coefficients. The correlation between either cPWV or CAVI and central and peripheral BP were estimated by Pearson’s correlation coefficients and possible differences evaluated by calculating z-statistics.

Results: Mean values of cPWV CAVI were respectively 7.5 ± 1.9 m/s and 8.6 ± 2.0 units. The concordance between CAVI and PWV was considered good (Pearson’s correlation coefficient 0.724 (p < 0.001) and intraclass correlation coefficient of 0.840). Correlations were all significant for both cPWV and CAVI and for both central and peripheral SBP and PP. No differences were observed between the intensity of correlation obtained by CAVI or PWV (non-significant z statistics).

Conclusions: There is a good correlation between the measurement of arterial stiffness by PWV and CAVI, and both measures are similarly correlated with BP.

**PP.09.04 REFERENCE VALUES OF CARDIO-ANKLE VASCULAR INDEX IN A RANDOM SAMPLE OF A CAUCASIAN POPULATION**

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Objective: Cardio-ankle vascular index (CAVI), a parameter of arterial stiffness, has been increasingly used for cardiovascular risk estimation. Currently used CAVI reference values are based on the Japanese population. It is not clear whether the same reference values can be used in the Caucasian population. The aim of the present study was to describe cardiovascular risk factors influencing CAVI and to establish CAVI reference values.

Design and method: In total, 2160 individuals randomly selected from the Brno city population aged 25–65 years were examined. Of these, 1,347 subjects were free from cardiovascular disease, non-diabetic and untreated by anti-hypertensive or lipid-lowering drugs, forming the reference value population. CAVI was measured using the VaSera VS-1000 device.

Results: At each blood pressure level, there was a quadratic association between CAVI and age, except for the linear association in the optimal blood pressure group. While there was no association between blood pressure and CAVI in younger subjects, there was a linear association between CAVI and blood pressure after 40 years of age. Reference values by age and gender were established. In each age group, except for the male 60–65 group, reference values in whites were lower than in the Japanese population with the difference ranging from -0.29 to 0.21 for males, and from -0.38 to -0.03 for females.

Conclusions: This is the first study providing CAVI reference values in a random sample of the Caucasian population. Our results suggest that the currently used values slightly overestimate CAVI in younger whites, which may underestimate cardiovascular risk.

**PP.09.05 THE POLISH REGISTRY FOR FIBROMUSCULAR DYSPLASIA (ARCADIA-POL STUDY) – DISTRIBUTION OF VASCULAR BED INVOLVEMENT AND COMPLICATIONS IN PATIENTS WITH FIBROMUSCULAR DYSPLASIA**


The prevalence and natural course of fibromuscular dysplasia (FMD) is not well understood, no reliable registries have yet been established. We aimed to create a population-based registry for FMD in Poland.

Design and method: The Polish Registry for FMD (ARCADIA-POL) was established in 2015 and is a part of the European FMD Registry. Aims: (1) Collect demographic and clinical data. (2) Follow patients’ course, complications and interventions. (3) Develop a Polish guideline for FMD. Results: All patients were followed up for 3 years with IQR of 3–6 months. The registry includes 10 centers. 300 patients were recruited from January 2015 to January 2016. Results: 215 patients (51% female) were included in the registry. The age distribution was 27–83 years, mean 65.9. Most frequent location was the external carotid artery (36.8%), followed by the carotid artery (25.2%), and the innominate artery (10.4%). More than 70% of patients had multiple lesions. The most frequent vascular bed involvement was the renal arteries (95.7%). Complications were limited to 3%.

Conclusions: The Polish Registry for FMD is the first national registry in Poland and one of the largest in Europe. It represents the current state of care for patients with FMD in Poland. The registry provides a valuable source of data for further research and clinical practice.

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PP.09.08  HEART STRUCTURE AND VASCULAR FUNCTION IN YOUNG PATIENTS AFTER ENDOVASCULAR REPAIR FOR BLUNT THORACIC AORTIC INJURY

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Objective: To assess the vascular bed involvement and vascular complications in patients with fibromuscular dysplasia (FMD) enrolled into ARCADIA-POL study.

Results: In our analysis we included 144 patients with confirmed FMD (112F[77.8%], 32M[22.2%], mean age:41±16.3 years. 132 patients (91.7%) were hypertensives. The mean age at the diagnosis of hypertension was 33±9±15.4 years and the FMD was diagnosed 6.8±10.6±16.3 years later with the mean age at the diagnosis of FMD 40±17±13.3 years. In the analyzed group FMD was identified in renal arteries in 127 (88.2%) patients as well as in carotid, intracranial and vertebral arteries in 24 (16.7%), 20 (13.9%) and 9 (6.3%) patients, respectively. FMD was also identified in celiac trunk and mesenteric, iliac and splenic arteries in 19(13.2%) and 11(7.6%) patients, respectively. In 56 patients (39.8%) FMD was identified in two or more vascular beds.

Arterial dissections (s) or aneurysms in various vascular beds were found in 10.4% and 33.5% of patients respectively. Aortic abnormalities coexisting with FMD lesions were found in 2 patients (2.1%). Severe FMD - defined as first onset of FMD < 30 years, affecting at least 3 vascular beds (5 pts), four in 2.1% (3 pts) and six in 0.7% (1 pt).

Conclusions: The data of ARCADIA-POL registry showed that renal FMD was the most frequent, but also cerebrovascular FMD was found in relatively large proportion of patients. Our data revealed high incidence of FMD lesions coexisting in different vascular beds as well as relatively frequent occurrence of vascular complications.
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Objective: Augmentation index (AIx) reflects aortic pressure augmentation and is independently associated with cardiovascular risk in adults. It is determined by structural and functional cardiovascular properties and increases with aging. This study examined AIx in terms of 24-hour variation, determining factors and association with indices of preclinical target-organ damage in young individuals.

Design and method: Apparently healthy children, adolescents and young adults (age 10–25 years) referred for elevated blood pressure (BP) and healthy volunteers were subjected to: (i) 24-hour ambulatory monitoring of BP, central hemodynamics (including AIx adjusted to a heart rate of 75 bpm), and pulse wave velocity (PWV), using a noninvasive brachial cuff-based oscillometric device (Mobil-O-Graph 24 h PWA), and (ii) assessment of left ventricular mass index (LVMI) and common carotid intima-media thickness (cIMT).

Results: Data from 108 untreated subjects were analyzed (mean age 17.8 ± 4.7 years, 86 males, body mass index 24.7 ± 5.1 kg/m², 28 subjects with 24-hour BP > 95th percentile for children/adolescents or > 130/80 mmHg for adults). Females had higher 24-hour AIx than males (21.7 ± 3.9 vs. 12.7 ± 5.6%, p < 0.01; adjusted for height). Hypertensive subjects tended to have higher 24-hour AIx than normotensive (58.3 ± 3.7 vs. 59.8 ± 7.9% vs. 44.1 ± 1.28 and 40.6 ± ± 2.05 years, respectively, p < 0.05). In both DA = 60 and DA = 90 hypertensive/ normotensive levels and ultrafiltration volume were similar, pBP was significantly increased and similar to hypertensive patients in DA = 60 vs DA < 60 (systolic-cBP: 154.2 ± 4.51 mmHg vs 132.5 ± 5.18 mmHg, P < 0.01 and diastolic-pBP: 90.4 ± 49 mmHg vs 78.5 ± 3.3 mmHg, P < 0.01). cBP was increased and similar to hypertensive patients in DA = 60 vs DA < 60 (systolic-cBP: 140.8 ± 8.4 mmHg vs 111.2 ± 3.6 mmHg, P < 0.001 and diastolic-cBP: 88.2 ± 3.73 mmHg vs 72.33 ± 7.88 mmHg, respectively, P < 0.05). c-PWV was similar in normotensive, hypertensives and DA > 60, whereas it was increased only in DA = 60 vs the other groups (9.6 ± 1.4 mm/s vs 9.19 ± 0.28 mm/s and 7.03 ± 0.22 mm/s vs 7.13 ± 1.4 mm/s, respectively, p > 0.05). SEVR was similar in all the groups. EF was preserved in all and similar in all the groups. E/e' was significantly increased in both groups on dialysis vs hypertensives and normotensives, however E/e' was significantly higher in DA = 60 vs DA < 60 (9.16 ± 1.14 vs 6.96 ± 0.72P < 0.01).

Conclusions: Only patients with DA = 60 presented increased aortic stiffness and diastolic dysfunction independently of calcium/phosphate levels. This was associated to higher BP. Hence chronic hemodialytic treatment, particularly after 60 months, may play a putative role for the development of cardiovascular alterations in patients with end-stage renal disease.

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Objective: The assessment of arterial distensibility is an independent predictor of cardiovascular disease. Distensibility decreases with age and increases with hypertension. The objectives of this study were to evaluate these parameters in patients with normotensive (NHC) and hypertensive chronic hepatitis c (HTHC) compared with hypertensive (HT) patients and controls (C).

Design and method: We study the influence of hepatitis C and hypertension in aortoarterial distensibility. The groups were matched by sex and age. Sphygmocor® was used for the determination of c-PWV (carotid-femoral Pulse Wave Velocity) and central Augmentation Index (%). (AIx). Blood pressure (BP), ambulatory blood pressure (ABPM), body mass index (BMI), lipid profile (LP) and serum creatinine (SC) were also evaluated. The model was two-ways ANOVA, with p < 0.01 (two-tailed).

Results: Our sample was 40 patients with hepatitis, 20 HTHC and 20 NHC, which were compared with 20 HT and 20 C. Age, sex, BMI, PL and CS did not present significant differences between the groups. Hypertensive patients presented significantly higher blood pressure values than ABPM and ABP, and the difference between those with and without hepatitis was not significant. The values of cPWV (C: 6.9 ± 1.1, HT: 10.09 ± 1.73, NHC: 8.02 ± 1.3, HTHC: 12.8 ± 2.17) showed significant statistical differences in Hypertension (p < 0.01) and liver disease (p > 0.01). The values of AIx (C: 18.0 ± 10.5, HT: 26.0 ± 9.5, NHC: 20.1 + 10.3, HTHC: 29.2 ± 10.4) significantly increased in relation to hypertensive disease (p < 0.01) and liver disease (p < 0.01).

Conclusions: This study suggests that arterial distensibility is increased in arterial hypertension, as well as in liver disease due to chronic hepatitis c, both of which function as factors that cumulatively aggravate arterial injury. We can also verify that patients with chronic hepatitis c already have parameters of arterial lesion.
Objective: The evaluation of the morphological characteristics of small resistance arteries in human beings in not easy. The gold standard is generally considered to be the evaluation of the media to lumen ratio of subcutaneous small vessels obtained by local biopsies and measured by wire or pressure micromyiography. However, non-invasive techniques for the evaluation of retinal arterioles were recently proposed, in particular two approaches seem to provide interesting information: scanning laser Doppler flowmetry and adaptive optics; both of them provide an estimation of the wall to lumen ratio (WLR) of retinal arterioles. The reproducibility of such measurements was previously stated to be acceptable (coefficient of variation < 10% for SLDF, < 4% for RTX-1), however, no direct comparison of the two techniques in the same population was previously performed.

Design and method: Therefore, we evaluated 18 subjects and patients (10 normotensives, 8 hypertensives, 7/18 severely obese). In all of them an evaluation of the WLR of retinal arterioles was made by Scanning Laser Doppler Flowmetry (SLDF, Heidelberg Engineering, Heidelberg, Germany) and adaptive optics (RTX-1, Imagine Eyes, Orsay, France). The same operator evaluated the same acquired images in two different days (intra-observer variability), and two different operators evaluated the same images in the same day (inter-observer variability).

Results: The results are reported in the Table (**p < 0.001). Variation coefficient of SLDF is much greater than that of AO.

<table>
<thead>
<tr>
<th>Intraobserver</th>
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<tr>
<td>RTX-1</td>
<td>SLDF</td>
<td>RTX-1</td>
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<tr>
<td>Variation coefficient (%)</td>
<td>1.27±1.68</td>
<td>4.39±3.59</td>
<td>3.82±2.12</td>
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Conclusions: It is clear how the reproducibility of the evaluation of the WLR with adaptive optics is far better, as compared with SLDF, since the variation coefficient are clearly lower. This may be important in terms of clinical evaluation of microvascular morphology in a clinical setting.

PP.09.18 CANRENONE DECREASES SYSTEMIC ARTERIAL STIFFNESS IN ESSENTIAL HYPERTENSIVES

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Objective: Aldosterone induces vascular fibrosis and increases arterial stiffness (AS) of conductance arteries via mineralocorticoid-receptor (MR) activation. In uncomplicated essential hypertensives (EHs) we measured systemic AS at baseline and after chronic administration of MR-antagonist Canrenone.

Results: Canrenone decreased PP (from 68.7±2.9 to 51.9±2.9 mmHg, means ±SEM, p < 0.01) without affecting SVI (33.2±1.4 vs 31.5±1.4 ml/m²) and HR (64.4±1.9 vs 65.5±2.2 bpm). Thus, AS decreased from 2.14±0.13 to 1.70±0.12 mmHg/ml/m² (Figure), the decrements induced by low and high canrenone dose being not different (-0.49±0.11 vs -0.39±0.19 mmHg/ml/m², respectively).

Conclusions: Chronic treatment with MR-antagonist Canrenone decreases systemic arterial stiffness in uncomplicated EHs; this effect may improve cardiovascular risk profile in these subjects.
with SBP (r = 0.36, p < 0.05, fig. 1, b). Both AVI and PWV were significantly related with age (r = 0.43, p < 0.05 and r = 0.42, p < 0.05, fig. 1 c and d respectively).

Conclusions: Our pilot study suggests that the AVI is a feasible estimate of arterial stiffness, with the advantage of being independent on BP. However, further study of the AVI feasibility, methods of calculation, and the role in integrated approach for evaluating aortic stiffness in relation to cardiovascular risk, are needed. AVI may be interpreted in similar way like other age-dependent indices of arterial stiffness.

PP09.21 PULSE WAVE VELOCITY WITHOUT PREVIOUS CARDIOVASCULAR EVENTS


Objective: Pulse wave velocity (PWV) is considered a marker of cardiovascular (CV) risk prognosis. The authors aimed to evaluate an hypertensive group of hypertensive patients who was submitted to PWV and to study association between this indicator and other features.

Design and method: Retrospective study of all hypertensive patients evaluated by PWV in a Portuguese average-size hospital Arterial Hypertension Consultation (n = 373). Continuous variables are expressed as mean and were compared using the unpaired Student’s t-test. Categorical variables are expressed as frequencies and percentages and were compared using the chi-squared test.

Results: Considering the 373 patients (188 men, 52.8%), the means of age (55.06 years ± 15.21), systolic blood pressure (BP) (144.20 mmHg ± 19.63), systolic BP24 hours (125.96 mmHg ± 11.54), diastolic BP24 hours (75.65 mmHg ± 5.59) and body mass index (28.38 Kg/m² ± 4.67) were calculated. Comparing the group of patients with PWV > 10 m/s with the patients with lower PWV, the first had higher age (65.08 ± 10.56 versus 50.59 ± 14.78 years), higher prevalence of male (64.00% versus 47.8%, p = 0.00), higher prevalence of previous event (18.0% versus 9%, p = 0.014), diabetes (49.5% versus 17.6%, p = 0.00) and dyslipidemia (79.3% versus 57.1%, p = 0.000). It also had higher prevalence of diastolic dysfunction (61.2% versus 25.2%, p = 0.00) and higher nocturnal blood pressure (43.3% versus 64.3%, p = 0.041). Considering the refractory blood pressure patients, in the group with higher PWV, there was a prevalence of 31.5% versus 16.3% in the lower PWV group (p = 0.001)

Conclusions: PWV may enable better recognition of high-risk populations that might benefit from more aggressive CV disease risk factor management.

PP09.22 PULSE PRESSURE AMPLIFICATION USING 24-HOUR AMBULATORY BLOOD PRESSURE

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Objective: The blood pressure wave changes as it travels from the central elastic arteries to the muscular conduit arteries. As a consequence, in healthy subjects, the amplitude (pulse pressure, PP) of the pressure wave increases gradually from the aorta to the periphery. This phenomenon, known as PP amplification (PPA). It is mathematically defined as the peripheral pulse pressure/central pulse pressure ratio. Until now the clinical PP was used in the nominator. Our study aimed in finding differences between these two indices using clinic and ambulatory BP measurements.

Design and method: We recruited 87 drug naïve (mean age = 52.2 ± 12.5) 55 females, newly diagnosed hypertensive patients that visited the hypertension clinic of a tertiary hospital. Central systolic aortic BP (CSBP), Central diastolic BP (CDBP) was assessed by applanation tonometry and PWV was measured by Sphygmocor (Atcor Medical), 24-hour SBP and 24-hour DBP were also measured (Spacelab 90217), and clinic SBP and DBP were measured according to international guidelines. The PPA ratio was defined as the peripheral pulse pressure/ central pulse pressure and PPA 24-hour, and PPA daytime and PPA nighttime were calculated accordingly.

Results: PPA was significantly correlated with PPA 24-hour (r = 0.68, p < 0.001), and PPA daytime (r = 0.67, p < 0.001) and PPA nighttime (r = 0.43, p < 0.001). However there were significant differences between the different PPA. PPA was significantly higher than all the 24-hour indices 1.24 ± 1.8 vs 1.15 ± 2.7 for PPA 24-hour, 1.17 ± 0.27 for PPA daytime and 1.08 ± 0.48, p < 0.001 for all comparisons.

Conclusions: PPA was different when ambulatory blood pressure indices were used for its calculation. PPA using 24-hour indices should be tested to investigate whether it better correlates with cardiovascular markers.

PP09.23 SMOKING ACCELERATES WAVE REFLECTIONS IN PREHYPERTENSIVE INDIVIDUALS

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Objective: Aortic stiffness and wave reflections are independent predictors of cardiovascular disease. Moreover, aortic stiffness is a major contributor to the development of arterial hypertension. Smoking is related to increased aortic stiffness and wave reflections, although with inconsistent results among the studies. Subjects with upper normal blood pressure (BP) are prone to the development of arterial hypertension and the increased aortic stiffness and wave reflections may serve as potential mechanisms towards this direction. The aim of the present study was to investigate the chronic effect of smoking on aortic stiffness and wave reflections in prehypertensive subjects.

Design and method: The study consisted of 137 middle-aged, prehypertensive adults (mean age = 49 years) with no history of cardiovascular disease. Prehypertension was defined according to the office BP values, as high normal SBP of 130–139 mmHg and/or high normal DBP of 85–89 mmHg. Aortic stiffness was assessed by measuring carotid-femoral pulse wave velocity (PWV) using the Compiloop device. Wave reflections were evaluated by pulse wave analysis using the Sphygmocor device. Heart rate-corrected augmentation index (AIx75) was used as a measure of wave reflections. High-sensitivity C-reactive protein (hsCRP) was measured as an inflammatory marker.

Results: Smokers (n = 52) had significantly increased AIx75 compared to non-smokers (21.5 ± 14.6% vs 15.2 ± 15.1%, p = 0.02). On the contrary, no difference in PWV was observed between the two groups (6.6 ± 0.9 vs 6.6 ± 1.3 m/s, p = NS). Levels of hsCRP were higher in smokers compared to non smokers (1.17 ± 0.17 vs 0.85 ± 0.78 mg/dl, p = 0.02). The difference in AIx75 between the two groups remained significant even after adjustment for age, gender, BMI, mean BP, total cholesterol, blood glucose and hsCRP (p < 0.001).

Conclusions: Smoking is associated with increased wave reflections in prehypertensive individuals. Considering that wave reflections are mainly determined by peripheral resistance, it might be assumed that, at the early stages of hypertension, smoking exerts its detrimental effects predominantly on the peripheral microcirculation and not on the large, elastic arteries. Whether quitting smoking may be associated with regression of microvascular remodeling and delay of arterial hypertension onset, is a question that warrants further investigation.

PP09.25 DEVICES FOR THE NON-INVASIVE ASSESSMENT OF AORTIC PULSE WAVE VELOCITY: EVALUATION OF SHORT-TERM REPEATABILITY

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Aortic pulse wave velocity (PWV) is a validated indicator of central arterial stiffness and cardiovascular risk. We aimed to compare the repeatability of PWV measures obtained with non-invasive devices.

**Design and method:** We evaluated the repeatability of non-invasive measures of PWV, obtained with 4 devices measuring two-points carotid-femoral PWV (Complior, PulsePen ETT, PulsePen ET, SphygmoCor), and with 2 devices estimating PWV from the oscillometric cuff-derived brachial pulsewave (BPLab, Mobil-O-Graph). 102 patients planned to undertake a cardiac catheterization (age 65 ± 13 years, 70.6% males) were enrolled. Repeated measures of PWV were obtained with all devices in a single session, 15 minutes apart. Duplicate PWV and carotid-femoral PTT measurements were compared using different indices. Coefficients of variation (CV%) and their confidence intervals (CI) are reported.

**Results:** Devices evaluating carotid-femoral PWV showed a good repeatability (CV[%] for Complior: 8.8[7.3–10.1]; PulsePen ETT: 8.0[6.2–9.5]; PulsePen ET: 5.8[4.9–6.6]; SphygmoCor: 9.5[7.7–11.0]), whereas the repeatability of PWV estimated by cuff-based devices was slightly higher (BPLab: 5.5[4.2–6.6], Mobil-O-Graph: 3.4[2.9–3.8]). A lower repeatability of carotid-femoral PWV was observed for PWV > 10 m/s: Complior 7.0[5.4–8.3] vs 10.5[8.0–12.5], PulsePen ETT 4.9[3.5–6.0] vs 6.5[5.3–7.6], SphygmoCor 8.5[7.0–10.6] vs 10.7[7.7–12.3]. No such difference was observed with cuff-based devices (BPLab 6.0[3.6–7.7] vs 5.1[3.5–6.4], Mobil-O-Graph 3.5[2.8–4.1] vs 3.2[2.6–3.7]). Differences between repeated PWV measurements were not correlated with concomitant blood pressure (R²: 0.005) or heart rate differences (R²: 0.013).

**Conclusions:** Short-term repeatability of PWV measures was good but not homogeneous among different devices. A greater repeatability was observed with cuff-based devices, compared to devices measuring carotid-femoral PWV. This is probably due for Mobil-O-Graph to the algorithm for PWV assessment, which considers age and mean blood pressure, and for BPLab to the automated editing procedure which eliminates highly variable PWV values. Repeatability of PWV is not influenced by blood pressure or heart rate concomitant changes. For carotid-femoral PWV, the repeatability of measures is lower for higher PWV values. These results could be usefuly considered when assessing PWV in a clinical setting.

**PP.09.26 RADIATION-INDUCED VASCULAR DAMAGE IN HODGKIN LYMPHOMA SURVIVORS**

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**Objective:** Aortic pulse wave velocity (PWV) is a validated indicator of central arterial stiffness and cardiovascular risk. We aimed to study the effect of different doses of atorvastatin on the parameters of central pressure in patients with acute myocardial infarction with ST segment elevation (STEMI).

**Design and method:** The study included 85 STEMI patients aged 35 to 65 years in the first 24–96 hours of the onset of the disease. The control group (C) included 46 patients treated with atorvastatin 20 mg/day. Main group (A) consisted of 39 patients treated with atorvastatin 80 mg/day. Initially 7–9 hours from the onset of the disease, and after 24 weeks, patients underwent application tonometry by SphygmoCor (ArtCorMedical, Australia). The following parameters were analyzed: aortic (DbP), DBP at the carotid artery (DbPa), and pulse pressure (PpPa). The threshold of the common carotid artery (CCA) was performed using the high-frequency RF signal on the MyLab 90 (Esato, Italy) on the following indicators: local systolic (LocPsys) and local diastolic (locPdia) pressure in the CCA.

**Results:** In the group C office SBP initially was 113.1 ± 0.4, DBP - 70 (65;75) mmHg; at week 24 -115 (110;125) (p = 0.06), and 70 (70;80) mmHg (p = 0.2). SBPao increased from 101.9 ± 4.4 to 109.1 ± 12.0 mmHg (p = 0.01), PPaao from 29.4 ± 6.2 to 34.2 ± 8.1 mmHg (p = 0.01). DBPao has not changed: initially - 71 (66;80), follow-up - 71.5 (71; 81) mmHg (p = 0.07). In group A office BP at baseline was 116.4 ± 9.5 and 75 (65;80) mmHg; 24 weeks later - 117.8 ± 10.1 (p = 0.3) and 73 (70;80) mmHg (p = 0.6). Aortic pressure parameters increased: SBPao from 103.9 ± 9.8 to 109.3 ± 9.9 mmHg (p = 0.01), PPaao from 27.0 ± 24.31 to 32.9 ± 7.5 mmHg (p ≤ 0.01). DBPao has not changed: baseline - 76 (66;86); at follow-up - 76.4 ± 9.4 mmHg (p = 0.7). In control group at baseline: LocPsys 103.4 (93,141,4); locPdia 70 (60;75) mmHg; at follow-up - 108.8 (101,7,119,5), and 70 (70;80) mmHg, respectively (p = 0.01). In group A at 7–9 day - LocPsys was 107.7 (100,9,115); locPdia - 75 (65;80) mmHg; after 24 weeks no significant dynamics has been identified: 105.7 (99,9,115.7) (p = 0.8), and 70 (70;80) mmHg (p = 0.9).

**Conclusions:** An increase of SBPao and PPaao was registered in both groups. In control group an increase in the pressure parameters in the OCA has been shown.

**PP.09.28 FEATURES OF LOCAL VASCULAR STIFFNESS IN PATIENTS WITH CORONARY HEART DISEASE AND ARTERIAL HYPERTENSION**

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**Objective:** To study the effect of high blood pressure (BP) on the parameters of the local rigidity of the common carotid artery (CCA) in patients with coronary heart disease (CHD).

**Design and method:** Study included 68 subjects. Group 1 consisted of 24 normotensive subjects. Group 2 included 25 patients with CHD. Group 3 consisted of 19 patients with CHD and arterial hypertension (AH) 1–2 degrees. Patients of group 3 had higher values of office systolic and diastolic BP. Local stiffness of CCA was evaluated using the ultrasonic device MyLab 90 (Esato, Italy) with technology of high frequency RF signal on the following parameters: QIMT - intima-media thickness, locdistensibility; distensibility coefficient, DC; compliance coefficient; CC) was also performed. CF-PWV measurement were obtained in 154 patients.

**Results:** A significant correlation between radiotherapy dose and: MeanMaxIMT (r = 0.20; p < 0.05), TmMax (r = 0.20; p < 0.05), diastensibilityt (r = 0.24; p = 0.05), DC (r = 0.24; p < 0.05) was observed. Patients were divided into 4 groups according to radiotherapy dose (Dose: 20–30, 31–36, 37–42; ≥42 Gy). An increase in TmMax (1.27 ± 0.61, 1.35 ± 0.59, 1.46 ± 0.69, 1.76 ± 1.12 mm, p < 0.05) and in the prevalence of carotid plaque(29%, 31%, 47% and 55%, p for trend < 0.05) was observed as related to dose-category. One-hundred-seventy patients received neck irradiation(67 bilateral;50 unilateral). In unilaterally irradiated patients, MeanMaxIMT was greater in the irradiated side as compared to unirradiated carotid artery and the difference reached statistical significance in the group of patients who received a high radiotherapy dose (0.97 ± 0.35 vs 0.92 ± 0.34 p < 0.05). CF-PWV was significantly greater only in patients that received high dose (≥42 Gy), as compared to all the other dose-groups (97 ± 2.3 vs 83 ± 2.2, 80 ± 1.5 and 83 ± 1.4, p < 0.05).

**Conclusions:** In this large number of Hodgkin Lymphoma survivors, carotid IMT, plaque prevalence and aortic and carotid stiffness were significantly related with radiotherapy doses. Carotid IMT and aortic stiffness were significantly higher in the irradiated carotid arteries, but only at doses >42 Gy, suggesting that there may be a dose threshold for radiotherapy-induced carotid wall damage.
of the index beta in group 1 - 7.0 (5.3;10.0), patients in group 2 - 9.1 ± 2.9; group 3 - 8.5 (11.1;14.9) (p1-2 < 0.05). Healthy subjects and CHD patients were not different on parameter Aix - 3.1 (0.5;6.1), and 2.5 ± 4.5%, correspondingly. The highest value of the parameter were registered in the group 3 - 7.0 (1.3;11.3%) (p1-2,3 < 0.05). PWV also prevailed in patients with CHD and hypertension (9.7 (8.2;10.8) m/s) compared with healthy subjects (5.9 (5.5;7.2) m/s), and patients with CHD (7.0 ± 1.2 m/s) (p1-2,3 < 0.05).

Conclusions: Patients with CHD differ from healthy individuals on a number of indicators of local arterial stiffness. Parameter QMHT prevailed in patients with CHD. In patients with CHD and hypertension an increase of local pressure, PWV, and the index beta has been revealed in contrast to the comparison group.

PP.09.29 DISTRIBUTION OF CENTRAL AORTIC PRESSURE VALUES AND HIDDEN CENTRAL HYPERTENSION IN A LARGE COHORT OF ARGENTINA

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Objective: The objective is to determine the distribution of central aortic pressure values in a large cohort of Argentina, and the distribution of elevated central aortic pressure values in normotensive and controlled hypertensives.

Design and method: From a large prospective cohort of 10300 subjects in a cardiovascular prevention programme (2015–2013), 8249 individuals were evaluated with central aortic pressure measurements (median arterial pressure calibration). Associations with cardiovascular risk factors and other hemodynamic variables were performed in a group of 1473 normotensive people with complete clinical data, and also a group of 945 controlled hypertensives (bSBP/bDBP < 140/90 mm Hg). Elevated aSBP was considered as 130 mm Hg or higher. Analysis of variables was performed with Excel 2016 and SPSS 22.

Results: More than a half (53.3 %) of the total population (54.5 ± 13.4 years; 61.2 % male; bSBP/bDBP 128.8 ± 15.9/83.4 ± 11.4 mm Hg; cSBP/cDBP 132.8 ± 18.7/83.8 ± 11.8 mm Hg) were observed with an elevated aSBP (56.3 ± 13.8 years; 67.8 % male; bSBP/bDBP 137.9 ± 14.5/87.9 ± 11.4 mm Hg; cSBP/cDBP 146.2 ± 14.5/90.1 ± 11.6 mm Hg). In normotensives (52.5 ± 11.7 years; 58.1 % male; bSBP/bDBP 123 ± 9.8/81.2 ± 9.1 mm Hg; cSBP/cDBP 126.4 ± 14/82.6 ± 9.4 mm Hg), elevated aSBP was found in a proportion of 33.9 % (53.6 ± 12.2 years; 69.8 % male; bSBP/bDBP 129.3 ± 7/84.4 ± 8.6 mm Hg; cSBP/cDBP 139.5 ± 8.5/86.5 ± 8.9 mm Hg). In controlled hypertensives (52.5 ± 11.7 years; 67.7 % male; bSBP/bDBP 123 ± 9.8/83.2 ± 9.1 mm Hg; cSBP/cDBP 126.4 ± 14/82.6 ± 9.4 mm Hg), 50 % were observed with elevated aSBP (59.6 ± 10 years; 71.9 % male; bSBP/bDBP 126.8 ± 9.1/83.6 ± 9 mm Hg; cSBP/cDBP 133.3 ± 13/85.5 ± 9.5 mm Hg).

Conclusions: A large proportion of patients with elevated aSBP was observed in this population of Argentina, both in one third of normotensive patients and half of controlled hypertensives. This data contributes to considering the so called hidden central hypertension as a frequent clinical situation for future hypertension research and management.

PP.09.30 AN EXTENDED ONE-DIMENSIONAL ARTERIAL NETWORK MODEL FOR THE SIMULATION OF PRESSURE AND FLOW IN UPPER AND LOWER LIMB EXTREMITIES

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Objective: Arterial pulse wave velocity and pulse waveform analysis have become an established component of cardiovascular research. As validation and assessment of devices is not always trivial in an in vivo setting, arterial network computer models may be useful for that purpose. It is, however, mandatory that the model includes sufficient detail, especially when analysing peripheral waveforms. To extend the existing 1D arterial network model (103 segments) of Reymond et al. to a more detailed model (143 segments) including the foot and hand circulation (Radial and Tibial arteries). The goal is to (i) extend the existing 1D arterial network model (103 segments, Reymond et al.) to a more detailed model (143 segments) including the foot and hand circulation (Radial and Tibial arteries); (ii) use the extended model as testing tool for pOPmètre® (finger – toe pulse wave velocity).

Design and method: The arterial tree dimensions and properties were taken from the literature and completed with data from patient scans. The model solves the one-dimensional form of the Navier-Stokes equations over each arterial segment. A non-linear viscoelastic constitutive law for the arterial wall was considered.

Results: Comparison of simulations with and without detailed hand and foot circulation demonstrate important differences in waveform morphology in the distal beds. The completed model predicted normal pressure and flow waveforms in the hand and foot arteries which are in good qualitative agreement with the published in vivo measurements. The agreement is especially good for the shape and wave details of the flow wave, where all features are reproduced in a rather faithful manner. The correlation between ftPWV and aPWV was good and significant (R2 = 0.95). The Bland and Altman analysis, mean difference was 0.4 m/s, classifying the ftPWV as good agreement with reference method.

Conclusions: The extended model yields realistic pressure and flow waveforms in arteries of the hand and the foot. After full validation, the extended model could be used to assess the performance of diagnostic and screening devices relying on peripheral hemodynamics signals, the pOPmètre® (finger – toe PWV), where the correlation with the reference method showed a good agreement.

PP.09.31 CALCULATION OF CENTRAL BLOOD PRESSURE BY ANALYZING THE CONTOUR OF THE PHOTOPLETHYSMOGRAPHIC PULSE MEASURED AT THE FINGER WITH THE POPMÈTRE® DEVICE

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Objective: Analysis of the contour of the peripheral pulse to assess arterial properties was first described in the nineteenth century. The reference technique to estimate central blood pressure (CBP), non-invasively, is by analyzing the radial pressure pulse acquired using a tonometer and then to establish a transfer function relating the radial pressure to the CBP. An alternative technique utilizes a volume pulse. This may conveniently be acquired optically from a finger (digital volume pulse obtained with the photodiode of the pOPmètre® device – Axilfe SAS – France).

The objective is to establish a transfer function estimating the central blood pressure (CBP), calibrated with a brachial pressure cuff and using the parameters obtained with the contour analysis of the photoplethysmographic pulse measured at the finger with the pOPmètre® system.

Design and method: We positioned the photodiode sensor on the finger, insuring that the sensor’s lens is in contact with the pulp. Brachial blood pressure measurement was performed with a cuff adapted to the arm circumference and an oscillometric device (OMRON M10–IT). The central blood pressure values measured with Sphygmocor used as the reference values, with similar calibrating pressures. Multiple regression analysis was done to establish the transfer functions. Pearson’s correlation and Bland Altman graph were performed for agreement.

Results: 69 subjects were included: 24 healthy subjects and 45 patients with essential hypertension aged 33 ± 8 years and 59 ± 17 years respectively. The correlation between the estimated central systolic pressure (CSP) and the reference one, was good and significant (R2 = 0.94; p < 0.0001). A better correlation was found in terms of central diastolic pressure (CDP) (R2 < 0.95; p < 0.0001). The Bland and Altman analysis, mean difference was 4 mmHg p < 0.0001 (CSP) versus 3 mmHg p < 0.0001 (CDP), the standard deviation of the difference was 5 mmHg (CSP) versus 4 mmHg (CDP), classifying the estimation as good agreement.

Conclusions: The estimation of the central blood pressure with the finger pulse qualifies as good agreement with the reference technique for the central systolic and diastolic pressure estimation.

PP.09.33 THE EFFECTS OF SMOKING ON CENTRAL BLOOD PRESSURE IN MIDDLE-AGED AND ELDERLY JAPANESE INDIVIDUALS

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Objective: The aim of this study was to investigate the effect of smoking habits on central blood pressure in a population-based sample of middle-aged and elderly individuals.

Design and method: A total of 406 normotensive and untreated hypertensive (stage-1) individuals (mean age; 40–70 years) with and without cardiovascular disease, renal disease and arteriosclerosis obliterans were recruited for this study. When the subject was in a comfortable seated position the peripheral
brachial pressures were measured, and then the brachial waveform was captured by a standard brachial cuff (SphygmoCor XCEL) and the central aortic pressures were estimated using a generalized transfer function. Smoking status was determined by questionnaire. Current smokers and former smokers were asked how many cigarettes they smoked per day and the number of years spent smoking. Brinkman Index (BI) values were calculated as the number of cigarettes smoked per day multiplied by the number of years of smoking.

**Results:** The subjects were divided into subgroups according to cumulative number of cigarettes smoked: never-smokers (N = 292), mild-to-moderate smokers (BI of < 800 per lifetime, N = 64), and heavy smokers (BI of > = 800 per lifetime, N = 50). Central systolic pressure was higher in both heavy smokers (123 mmHg, P < .001) and mild-to-moderate smokers (117 mmHg, P = .070) than those in never-smokers (112 ± 14 mmHg) after adjustment for sex, age, and body mass index (p for trend < .001). This dose-response increase by smoking status was not clearly demonstrated in brachial systolic pressure. A stepwise multiple regression analysis revealed that the heavy smoking (β = .192, P < .001), age (β = .231, P < .001), body mass index (β = .278, P < .001), and LDL cholesterol (β = .099, P = .028) were selected as significant determinants of central systolic pressure independent of sex.

**Conclusions:** These results suggest that smoking habits may have greater impact on central aortic pressure than peripheral brachial pressure and hence could be identified by abnormal increases in central systolic pressure and wave reflection even before clinical manifestation of hypertension.
Multiple regression analysis confirmed that age (r = 0.38), AH duration (r = 0.69) and hs-CRP (0.28), P < 0.05 for trend. Spearmen analysis revealed positive correlations of PWV with age.

PWV increase > 10 m/s was observed in 16 (37.8%) patients. Patients with PWV > 10 m/s were older (72.0 ± 8.5 vs. 53.3 ± 14.9 years), had higher BMI (30.5 ± 5.9 vs. 24.9 ± 4.5 kg/m²) and longer duration of AH (median 14 years [IQR 0–4.5]) and had higher levels of LDL-C (3.0 ± 1.0 vs. 4.1 ± 0.8 mmol/l), plasma glucose (5.6 ± 0.9 vs. 4.9 ± 0.8 mmol/l), hs-CRP (median 9 [IQR 13/78 ± 9 mmHg). They also had higher values of FMD (6.0% vs. 7.0%, P = 0.025), but there were no statistical differences for PWV (7.04 m/s vs. 7.26 m/s, P = 0.004) and their associations with inflammation activity in patients with RA.

Results:

- Median CRP was 13 mg/dl (IQR 3–24 mg/dl), median RF was 32 IU/ml (IQR 8–116 IU/ml). Median PWV was 9.4 m/s (IQR 7–11 m/s).
- PWV increase > 10 m/s was observed in 16 (37.8%) patients. Patients with PWV > 10 m/s were older (72.0 ± 8.5 vs. 53.3 ± 14.9 years), had higher BMI (30.5 ± 5.9 vs. 24.9 ± 4.5 kg/m²) and longer duration of AH (median 14 years [IQR 7.5–18] vs. 0 years [IQR 0–4.5]) and higher BP levels (143 ± 21/84 ± 9 vs. 124 ± 18/75 ± 11 mmHg).
- They also had higher levels of LDL-C (3.0 ± 1.0 vs. 4.1 ± 0.8 mmol/l), plasma glucose (5.6 ± 0.9 vs. 4.9 ± 0.8 mmol/l), hs-CRP (median 9 [IQR 2–17.1] vs. 22 [IQR 13–56.6] mg/dl) and CAVI (9.2 ± 0.5 vs. 7.2 ± 1.2), p < 0.05 for trend. Spearman analysis revealed positive correlations of PWV with age (r = 0.65), BMI (r = 0.53), SBP (r = 0.62), DBP (r = 0.41), LDL-C (r = 0.60), glucose (r = 0.38), AH duration (r = 0.69) and hs-CRP (0.28), p < 0.05 for trend. Multiple regression analysis confirmed that age (β = 0.3, p = 0.0012), AH duration (β = 0.4, p = 0.0001), SBP (β = 0.42, p < 0.0001) and hs-CRP-level (β = 0.26, p = 0.0004) were independent predictors of arterial stiffness increase.

Conclusions: Inflammatory activity as well as other traditional risk factors is a predictor of arterial stiffness increase in patients with RA receiving DMARDs.

**PP.10.03**

**ASSOCIATION BETWEEN N-TERMINAL PRO-BRAIN NATRIURETIC PEPTIDE AND MARKERS OF INFLAMMATION IN YOUNG HEALTHY ADULTS**

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**Objective:** The B type natriuretic peptide (BNP) plays an important role in regulating blood pressure, blood volume, and water and salt balance. BNP can also modulate proliferation of cells of the immune system, various cytokines and their related substances involved in the inflammatory response. Recently its association with inflammatory markers has been demonstrated during cardiovascular diseases. The role of BNP/NT-proBNP as inflammatory biomarker has not been evaluated enough in apparently healthy subjects. The aim of this study was to investigate the correlation between NT-proBNP and markers of inflammation in young apparently healthy adults.

**Design and method:** We investigated 282 healthy young adults, mean age 18.5 ± 1.7 years, 47% male. NT-proBNP, erythrocyte sedimentation rate (ESR), high sensitive C-reactive protein (hs-CRP), interleukin 6 (IL-6), fibrinogen (FBG) were measured.

**Results:** NT-proBNP level was 58, 61 ± 2.39 pg/ml (M ± m). Multivariate regression analysis showed a positive association between NT-proBNP levels and ESR (p < 0.001), hs-CRP (p = 0.016). There was no significant association between NT-proBNP and IL-6 (p = 0.445), FBG (p = 0.063).

**Conclusions:** Our results link the endocrine function of the heart to the inflammation, mainly hs-CRP and ESR. Additional clinical studies would be required to precisely ascertain the role of NT-proBNP as prognostic marker of inflammation.

**PP.10.08**

**SUBLIMINAL ATHEROSCLEROSIS AND BLOOD PRESSURE LEVELS DURING 5 YEARS OF ANTI-TNFALPHA TREATMENT IN PSORIATIC ARTHRITIS PATIENTS**

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Objective: The aim of this study was to evaluate the effect of 5 years of anti-TNFα treatment on subclinical atherosclerosis progression. Psoriatic Arthritis (PsA) is associated with accelerated atherosclerosis and increased cardiovascular mortality. Influence of anti-TNFα treatment on PsA in subclinical atherosclerosis is still unclear.

Design and method: Twenty-seven consecutive PsA patients were evaluated before TNF blockers therapy (T0), after 2 years (T1) and after 5 years (T2) of treatment. Subclinical atherosclerosis was evaluated through carotid duplex scanning, analyzing intima-media thickness (IMT) and flow-mediated dilation (FMD). IMT values were expressed as the IMT mean (cumulative mean of all the IMT mean in every analyzed carotid segment) and M-MAX (cumulative mean of all the higher IMT in every analyzed carotid segment). Response to therapy was studied by the evaluation of DAS 28 (disease activity score), and C-reactive protein (CRP).

Results: A good response to treatment was evident already at T1, with a significant decrease of DAS 28 (4.16 vs 2.30, p < 0.01) and CRP (11.25 vs 2.91, p < 0.01). The efficacy was preserved from T1 to T2 in terms of DAS 28 (2.30 vs 2.40, p = ns), CRP (2.91 vs 2.73, p = ns). From T0 to T1 there was a significant increment in both IMT-mean and M-MAX (0.72 vs 0.91 and 0.89 vs 1.06, respectively, p < 0.01). At T2 IMT-mean did not change significantly (0.91 vs 0.92, p = ns), while M-MAX worsened further (0.10 vs 1.06, p < 0.05). No significant variation in FMD values was observed during the 5-year follow-up (T0 5.40%, T1 5.37%, T2 5.40%, p = ns). Noteworthy, systolic blood pressure and BMI remained stable from T0 to T2 (152 vs 131 mmHg, p = ns, and BMI 26 vs 25, p = ns), while diastolic blood pressure decreased significantly (79 vs 74 mmHg, p = 0.001).

Conclusions: Our data revealed that in patients with PsA, despite treatment with TNF blockers, there is still a gradual, albeit slight progression of subclinical atherosclerosis assessed by ultrasonography. Other inflammatory mechanisms not related to TNF may be responsible of the progression of the atherosclerotic disease.

PP.10.09 COMPARISON OF THE DETRIMENTAL EFFECT OF PSORIASIS AND RHEUMATOID ARTHRITIS MEASURED ON CENTRAL HAEMODYNAMIC PARAMETERS IN PREVALENT OVERWEIGHT-OBESITY AND HYPERTENSIVE POPULATION

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Objective: Autoimmune chronic inflammatory conditions such as psoriasis (PS) and rheumatoid arthritis (RA) are associated with increased cardiovascular risk. People with PS was associated with increased risk of diabetes mellitus, obesity, high blood pressure, high cholesterol, stroke, and heart attack. Rapid increase in myocardial infarction risk following diagnosis of RA. The objective of this study was assessed the damage on central haemodynamic parameters (CHP) in patients with PS and RA, both gender.

Design and method: In a retrospective cross-sectional study 68 patients was enrolled in the last 6 years: female 44 (PS/AR 32/12; average age 56) and male 24 (PS/AR 21/3; average age 48). The CHP were assessed non-invasively by a SphygmoCor (Atcor, Australia), according to method's standard. The augmentation index (AIx) was evaluated in correlation to age and gender in each patient. All patients enrolled in the study had no cardiovascular, endocrine, renal and metabolic uncompensated diseases.

Results: In female/male was observed high prevalence of high blood pressure: 89%/83%, overweight-obesity: 82%/92%, and hyperlipidaemia (Ia + Iib): 64%/38%. Female in menopause: 73%. In female/male was observed smoking: 16%/33% and diabetes mellitus type 2: 18%/29%. In the groups of patients with psoriasis and rheumatoid arthritis, comparing each gender with the same gender, according to all measurements of the CHP did not found statistically significant differences, except pulse pressure (p = 0.03) in men. The measurements in PS/AR Female - PS/RA Male of Central Aortic Pressure (132.5/135.3 - 121.4/128.2), End-Systolic Pressure (120.9/123.7 - 113.2/119.3), Mean Arterial Pressure (104.9/107.2 - 101.8/112.7), and specifically the AIx (34.1/34.7 - 24.6 - 17) were higher than normal levels. The differences between the observed values and the normal values of the AIx in PS/Female - RA/Male (6.0/5.5 - 9.1/5.5) comparing each gender with the other had no statistical significance.

Conclusions: Systemic diseases as psoriasis and rheumatoid arthritis produce similar harmful effect on central haemodynamic parameters, mainly the increase of AIx, in both gender, and could be the contributing cause of endothelial dysfunction with a high probability to develop arterial hypertension and increase a risk of cardiovascular events.

PP.10.10 EARLY VASCULAR AGING SYNDROME PREVALENCE IN RUSSIAN POPULATION

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Objective: Vascular age is the apparent age of the arteries that can be affected by lifestyle risk and genetic factors. Subjects whose vascular age is older than chronological age might have higher cardiovascular risk. The aim of our study was to estimate early vascular aging (EVA) syndrome prevalence in population-based sample of Saint-Petersburg inhabitants according to pulse wave velocity (PWV) and cardio-ankle vascular index (CAVI) assessment.

Design and method: As a part of all-Russian epidemiology survey ESSE-RF random sampling of 1600 Saint-Petersburg inhabitants (25–65 years) stratified by age and sex was involved. In 452 randomly selected subjects simultaneously cardio-ankle vascular index (CAVI) was measured by VaSera VS-1500 (Fuku- da, Japan) and carotid-foemoral pulse wave velocity (cPWV) was measured by SphygmoCor (Atcor, Australia). We used 2 definitions of EVA syndrome - if vascular age calculated from pressure independent stiffness index (CAVI) exceeded the biological age: = 4 years (EVA: cPWV) and if cPWV exceeded 25D for corresponding age group (EVA:cPWV). Hypertension was considered if BP = 140/90 mmHg or antihypertensive treatment, diabetes type 2 was considered as fasting glucose > 7.0 mmol/l or treatment.

Results: EVA:cPWV prevalence is much higher, than EVA: cPWV (table 1). According to both criteria, there is an increase of EVA with age. Kappa index of criteria agreement was low – 0.09.

Table 1. EVA prevalence according to CAVI and PWV criteria

<table>
<thead>
<tr>
<th>Age (y)</th>
<th>CAVI ≤ 4 (EVA: cPWV)</th>
<th>CAVI &gt; 4 (EVA: cPWV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-39</td>
<td>117 (24.3%)</td>
<td>10 (13.5%)</td>
</tr>
<tr>
<td>40-49</td>
<td>135 (28.1%)</td>
<td>5 (7.7%)</td>
</tr>
<tr>
<td>50-59</td>
<td>140 (29.1%)</td>
<td>6 (3.4%)</td>
</tr>
<tr>
<td>≥60</td>
<td>117 (25.6%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>All (%)</td>
<td>481 (100%)</td>
<td>14 (2.9%)</td>
</tr>
</tbody>
</table>

Conclusions: Prevalence of EVA syndrome detected by applanational tonometry or volume sphygmography has low agreement. It seems that carotid-foemoral PWV criteria do not sensitive to detect EVA even in the oldest age group. At the same time, CAVI is a weak instrument to measure vascular stiffness.

PP.10.11 ENDOThELIAL (DYS)FUNCTION IN PATIENTS WITH HYPERTENSION AND RESISTANT HYPERTENSION - PROFOUNd VASOCONSTRICTION OR IMPROPER VASODILATION? PILOT RESULTS

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Objective: Endothelial dysfunction (ED), one of the first steps in the pathophysiology of hypertension, is highly complex process that is still not fully understood. The aim of the current study was to test various modalities reflecting the endothelial function or damage in newly identified hypertensive patients compared to healthy individuals and compared to patients with resistant hypertension in order to shed more light on the pathophysiology of hypertension.

Design and method: Study is conducted as prospective single-center study. 56 patients (44 males) have already been enrolled: 28 newly identified untreated hypertensive patients (group H), 18 healthy individuals (group C) and 10 patients with resistant hypertension (group RH). All the hypertensive patients underwent 24-ABPM and echocardiography followed by examination of pulse wave velocity (PWV), CAVI and augmentation index and carotid intima media thickness. Levels of vasoactive factors were determined by ELISA from the peripheral blood including nitric oxide (NO), endothelin, oxidized LDL and optostatin. Statistical analysis was performed in the STATISTICA software using appropriate statistical tests.

Results: Selected echocardiography parameters describing heart structure differed significantly between H and RH group, reflecting structural remodelling of
Conclusions: Production of NO is significantly decreased in newly identified hypertensive individuals and further decreases in patients with RHE; the levels of vasoconstrictive endothelin and other factors do not show this trend. It can be suggested that the impossibility of proper vasodilation contributes significantly to the development and progression of hypertension.

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Objective: To determine angiographic features of coronary atherosclerosis in patients with frequent COPD exacerbations

Design and method: There was 110 patients with acute coronary syndrome and COPD included in observation, 24 of which (study group) had frequent COPD exacerbations (FE). Selection criteria were: COPD diagnosis; age ≥ 40 years; smoking history ≥ 10 pack-years; acute coronary syndrome at the presentation to hospital; ≥ 1 stent implantation; ≥ 1 COPD exacerbations during last year, diagnosed accordingly to GOLD criteria. Control group had < 2 COPD exacerbations per last year, other including criteria were the same. Detailed «segment by segment» analysis was used to describe all lesions. > ≤ 50% lesions were considered as major, and > < 50% as minor. We also monitored long-term outcomes of PCI

Results: Follow-up median consist 19 months. There was no significant difference between the groups in regards of age, gender, cholesterol levels, myocardial infarction history, left ventricular ejection fraction, as well as arterial hypertension, diabetic mellitus, chronic kidneys disease. We have found more severe atherosclerotic lesions in group with FE of COPD. The row of features in atherosclerotic lesion distribution and frequency were founded: 1) patient with FE of COPD had higher total number of lesions, major lesions in main arteries and total occlusions in main and collateral arteries; 2) there was not statistically significant differences in frequency of total lesion number in left main artery, proximal, medium and distal segments in both groups, however the number of proximal and distal major lesions was significantly higher in group with FE of COPD. 4) extended (>20 mm) stenosis (no depends of localisation) are more specific for the patients with FE of COPD. The frequency of occurrence of cardiac events such as cardiac death, myocardial infarction, stroke, coronary artery bypass grafting did not differ individually. However, the frequency of MACE the differences were statistically significant (2.31 (95% CI 1.45–3.88).

Conclusions: COPD with FE determines a high risk of major cardiovascular and earlier their onset in the late period after PCI

PP.10.13 FREQUENT EXACERBATIONS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND ATHEROSCLEROSIS: WHAT RELATIONSHIP?

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Objective: Tight control of disease activity, management of traditional CV risk factors such as arterial hypertension (AH), smoking, obesity, blood lipids levels, diabetes mellitus (DM) are the most important steps in improving CV disease outcomes in Rheumatoid arthritis (RA) pts. We have studied prevalence of CV risk factors in RA pts with AH and management of risk factors.

Results: A total of 124 pts with RA on the ACR/EULAR criteria 2010 and suspected coronary artery disease (CAD) underwent clinical, laboratory and instrumental evaluation and treatment assignment. Pts were included in the study based on the clinical signs of CAD (chest pain) and CV risk factors evaluation. All pts underwent laboratory tests included blood total cholesterol (TC), LDL, HDL, TG, erythrocyte sedimentation rates (ESR), C-reactive protein (CRP), rheumatoid factor (RF), antibodies against citrullinated circular peptides (anti-CCP).

We evaluated CV risk factors (AH, dyslipidemia, smoking, obesity), inflammation markers, anti-rheumatic treatment and treatment reduces CV risk.

Conclusions: Possible pro-inflammatory and pro-thrombotic effect of UA in hypertensive patients is affected by gender, menopausal status and age.
sulphasalazine 7%, biological anti-rheumatic drugs 26%, methyldihydropyridine in 51% (n = 63). RA remission (DAS28 < 3.2 in 17%, 3.2–5.1 in 50%, >5.1 in 33%). Ps with AH had mean blood pressure 127/69 mm Hg, pts without AH 123/72 mm Hg. 64% had treated by the combination of 3 anti-hypertensive drugs. Target level of blood pressure (<140/90 mm Hg) was achieved in 82%. Target level of LDL (<1.8 mmol/l) was achieved only in 18% of high CV risk pts. Statin (Atorvastatin, mean dose 13.7 mg/d) treatment was administrated in 73%. Age, sex, smoking status, inflammation markers didn't show any significantly differences.

Conclusions: We found high prevalence of AH (77%) in RA which correlates with CV risk factors prevalence (obesity, DM, higher LDL). Ps achieved the target level of blood pressure more often than the target level of lipids.

Objective: Endothelial function is clinically important for evaluation of cardiovascular risk and its prediction, but its evaluating method is impractical for to use in the clinic. We aimed to assess the volume changes of brachial artery using calibrated pulse-volume recording with MultiLab Series II LHS (Unetixs Vascular, Inc. USA) as an alternative to evaluate endothelial function and compared with flow mediated dilation (FMD) measured by ultrasound.

Design and method: Reactive hyperemia volume index (RHVI) was calculated as (average amplitude during reactive hyperemia / average amplitude at baseline -1) x 100. There were outliers, defined as < Q1–1.5 x (Q3-Q1) or > Q3+1.5 x (Q3-Q1) by Turkey's outlier rule, three from RHVI and two from FMD and excluded from analysis. And Thirty seven subjects (mean age: 39.04 ± 10.10 years, male 5) were recruited.

Results: Mean systolic and diastolic blood pressures were 120.40 ± 15.27 and 75.22 ± 9.57 mmHg. Endothelial function (FMD) by ultrasound was 14.97 ± 6.13% and RHVI by plethysmography was 68.53 ± 64.77%, with the coefficient of 0.620 (95% confidence interval -0.080 to 0.910) with correlation coefficient of 0.3182 (p-value = 0.0229) between them. The regression equation was: RHVI = 2.744 + 0.136 × FMD.

Conclusions: We found high prevalence of AH (77%) in RA which correlates with CV risk factors prevalence (obesity, DM, higher LDL). Ps achieved the target level of blood pressure more often than the target level of lipids.

Objective: In the past several years, it has become evident that inflammation contributes to the elevation of blood pressure. Evidence from experimental models of hypertension and hypertensive patients suggests imbalance of T effector and regulatory subsets in hypertension. In our study we aimed to quantify blood T lymphocyte subsets in subjects with secondary hypertension- resistant hypertension (RHT) and primary aldosteronism (PA) characterized by increased BP levels, augmented cardiovascular risk in comparison to control subjects matched for age, sex and BMI (CG).

Design and method: In an ongoing study we included 29 patients (20 M, 9F, mean age 54.9 ± 11.5) with RHT, 26 patients with PA (14 M, 12F, mean age 54.8 ± 12.6) and 30 CG patients (15 M, 15 F, mean age 50.4 ± 11.2). T cells characteristics from peripheral blood samples were studied by multicolour flow cytometry with intracellular staining for FoxP3. The concentration of the angiotensin II in patients' blood samples was determined by radioimmunoassay method. Data were analyzed using T test with Bonferroni correction for multiple comparisons.

Results: Patients with RHT and PA were characterized by significantly higher BP values on ambulatory blood pressure monitoring as compared with CG. In comparison to CG, patients with RHT and PA had lower percentage of CD4+25%+FoxP3+ T cells (Tregs): respectively RHT 5.5 ± 3.2%; PA 5.8 ± 4.3% vs CG 9.9 ± 10.6%; p = 0.01, p = 0.084. However, the percentage of CD3+CD4+IL-17+ T cells was higher in RHT 19 ± 20% and PA 12.9 ± 16.2%, vs CG 3.7 ± 2.4%; p < 0.01, p = 0.04. In patients with PA, in comparison to CG and RHT, lower angiotensin II concentration and higher aldosterone to renin ratio was observed.

Conclusions: Our results indicate, that dysregulation of T cell activation with very significant increase of proinflammatory T cells and decrease in Tregs may play a role in the pathogenesis of RHT and PA, regardless of renin-angiotensin-aldosterone activation.

Objective: The carotid intima-media thickness (cIMT) is parameter of early atherosclerotic lesions of arterial wall, which associated with increased risk of cardiovascular complications. Galectin 3 (Gal-3) - substance with proinflammatory and proinflammatory effects on cardiovascular system. The objective of this study was to compare the level of Gal-3 in patients with metabolic syndrome (MetS) and healthy individuals and to identify the relationship between this substance, lipids and cIMT.

Design and method: 190 persons (97 female and 93 males, 52.2 ± 8.1 years old) were examined and divided into 2 groups: MetS (n = 100) with 3 or more components (IDF, 2005) and healthy control (n = 90) without metabolic disorders and cardiovascular diseases. Groups did not differ significantly by gender and age (p = 0.05). The examination included: medical history, anthropometry, lipids (Cobas Integra 400/700/800) and Gal-3 (Enzyme Immunoassay) levels in serum. The assessment of carotid intima-media thickness was performed with ultrasound scanning.

Results: Gal-3 in patients with MetS was higher than in healthy individuals (480,2 [420,1;1240,4] and 270,1 [240,3;320,4] pg/ml; p < 0.001), also as cIMT (0.93 ± 0.21 and 0.61 ± 0.12 mm; p < 0.001). The Gal-3 was positive correlated with waist circumference (r = 0.74, p < 0.001), systolic blood pressure (r = 0.66, p < 0.001), triglycerides (r = 0.54, p < 0.001) and fasting glucose (r = 0.53, p < 0.001), total cholesterol (r = 0.315, p = 0.04) and negative correlated with HDL-cholesterol (r = -0.474, p < 0.001). Strong positive correlation between Gal-3 and cIMT (r = 0.761, p < 0.001) was revealed. The multivariate regression analysis demonstrated that the Gal-3 is an independent predictor of increasing the carotid intima-media thickness more than 0.9 mm in patients with MetS (OR = 15.2, 95% CI 7.59–30.5, p = 0.001).

Conclusions: The carotid intima-media thickness and level of galectin 3 were higher in metabolic syndrome patients, than in healthy persons. We propose that proinflammatory and proinflammatory effects of galectin 3 can induce morphological changes in arterial wall, because we revealed strong significant relationship between these parameters.
**POSTER SESSION**

**LATE-BREAKERS POSTER’S SESSION LB01:**

**SESSION 1 - POSTER**

**LB.01.02 ASSESSMENT OF ANTICOAGULATION TREATMENT IN PATIENTS DIAGNOSED WITH ATRIAL FIBRILLATION IN A BASIC HEALTH AREA. ACAP STUDY**


1 Centro de Salud Isaac Peral, Cartagena, Spain, 2Hospital General Almansa, Albacete, Spain, 3Cátedra de Riesgo Cardiovascular, Universidad Católica de Murcia, Murcia, Spain.

**Objective:** Atrial fibrillation (AF) is the most common cardiac arrhythmia. It is present in 1–2% of the population. To assess the need for anticoagulation is essential for its management. Our objective was to investigate whether the indication of anticoagulation was adequate in patients diagnosed with atrial fibrillation, given the CHA2-DS2-VASc scale, measuring the International Normalized Ratio range (INR) in patients treated with anti-vitamin K drugs.

**Design and method:** This is an observational and cross sectional study. 271 patients with atrial fibrillation were included. We analyzed demographic, the CHA2-DS2-VASc and HAS-BLED variables, the treatment and INR values for 6 consecutive months. The confrontation of variables was performed using chi-square and Mantel-Haenzel tests.

**Results:** The prevalence of AF was 1.2%. The mean age was 74.9 ± 11.4, 90.4% had hypertension, 37.6% diabetes mellitus and 16.2% presented history of bleeding. The 89.3% had CHA2-DS2-VASc > 1. The 73.8% were taking anticoagulants, of which 61.3% were under antivitamin k. The 44.8% of patients taking antivitamin k, presented inadequate range of INR, although 93.3% of them followed up the monitoring properly. There was a greater prescription of anticoagulants in patients with persistent or permanent AF compared to the paroxysmal form.

**Conclusions:** The level of anticoagulation with antivitamin K was inadequate in our sample, despite a proper follow up and adherence to treatment. Patients diagnosed with paroxysmal AF were less anticoagulated than those diagnosed with persistent or permanent AF.

**LB.01.03 COMPARISON OF THE SPHYGMOCOR XCEL WITH APPLANATION TONOMETRY FOR CENTRAL PRESSURE ASSESSMENT IN CHILDREN AND ADOLESCENTS**

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1 1st Department Pediatrics, Aristotle University Thessaloniki, Thessaloniki, Greece; 2 3rd Department Medicine, Aristotle University Thessaloniki, Hypertension-24 h ABPM ESH Center Excellence, Thessaloniki, Greece.

**Objective:** Over the last few years assessment of central systolic BP (cSP) has been increasing used in adults and seems to be superior to peripheral blood pressure (pBP) to predict cardiovascular events. The gold-standard technique is tonometry, but this technique can be challenging, especially when used on children. The purpose of this study was to validate cSP assessment with novel oscillometric SphygmoCor XCEL device for use in children and adolescents.

**Design and method:** Children and adolescents aged 6–20 years were recruited subsequently and were equally distributed in two age groups (pre-adolescent children and adolescents). Central systolic BP (cSP) was measured by applanation tonometry with the “conventional” SphygmoCor device and by SphygmoCor XCEL device (cSPosc). For each participant, the average of the three recordings taken with each device was calculated. Bland-Altman plots were generated for comparison of the tonometer- to oscillometric-based method. The ANSI/AAMI/ISO 2013 criteria were used to assess the accuracy of agreement between devices.

**Results:** Five participants were excluded from the analysis due to low quality of recordings, four with tonometric technique and one with both devices. The remaining 67 participants had mean age 11.5 ± 3.7 years, were 31 (46.3%) male, and presented even distribution of sex in both age groups. cSPosc was strongly correlated with cSPton (R2 = 0.87, P < 0.001). Mean cSPton was 103.23 ± 9.43 mmHg and mean cSPosc 103.54 ± 8.87 mmHg. The mean cSP difference between the two devices was -0.30 ± 3.34 mmHg (P = NS), and fulfilled the AAMI criteria on 1 (difference < 5.0 ± 8.0 mmHg). The estimated s.d. (inter-subject variability) was 2.17 mmHg. Bland-Altman analysis showed good agreement with LoA -6.24 to 6.84. No proportional bias was detected by linear regression analysis with dependent variable the mean differences between devices and independent variable mean cSP of the two devices (B = 0.06, P = NS).

**Conclusions:** The new oscillometric SphygmoCor XCEL device provides equivalent results for cSP values to those obtained by tonometry in children and adolescents. Thus, the SphygmoCor XCEL device is appropriate for assessing cSP in the pediatric population.

**LB.01.06 INVESTIGATION OF FACTORS IMPACTING BLOOD PRESSURE ON THE SHORT TERM, BASED ON A COHORT OF USERS OF CONNECTED DEVICES**

A. Chiel, E. Roittmann, O. Bellahsen, E. Helandetz.

1 Withings - Nokia Health Division, Nokia, Paris, France; 2 Signal Processing Department, Tampere University of Technology, Tampere, Finland.

**Objective:** According to literature, blood pressure is impacted by stress, emotional state, and tiredness. The objective of this research is to analyze the short-term effect of these factors on blood pressure.

**Design and method:** A questionnaire enquiring about mood and tiredness was sent to users of Withings connected blood pressure monitors, through the Withings application. Only participants who had a blood pressure (BP) measurement in the last seven days and who declared to remember the conditions of their last measurement were eligible to the study. To analyze the effect of the studied factors on BP, questionnaire answers were associated with the difference between the last systolic blood pressure (SBP) reading and a baseline computed as the mean SBP in the six preceding months. All SBP measurements were collected automatically by the connected BP monitors.

**Results:** In total, 3,412 participants (16% women, mean age 52.0, sd 12.2 years) from 111 countries were eligible. The mean baseline SBP was 127.3 (sd 11.8) mmHg, the mean SBP at the last measurement was 125.3 (sd 13.9) mmHg, and 1389 (47%) participants declared to take medication for high blood pressure. The difference between the last measurement and the baseline was fitted to a linear model depending on the mood, and controlled for the hour of measurement. Compared to feeling neutral, feeling angry during the last measurement increased the difference to baseline by 4.0 mmHg (sd 1.2, p = 0.005), feeling stressed by 2.0 mmHg (sd 0.6, p < 0.0001), and feeling sad by 0.7 mmHg (sd 1.2, not significant with p = 0.5). Feeling happy compared to neutral decreased the difference to baseline by 1.0 mmHg (sd 0.4, p = 0.01). Lastly, being tired increased the difference to baseline by 1.1 mmHg (sd 0.3, p = 0.001) compared to not being tired.

**Conclusions:** These results indicate a short-term effect of emotional state and tiredness on blood pressure. This effect needs to be further investigated in a longitudinal study, in which several data points for mood would be collected for each participant.

**LB.01.07 ALLIANCE STUDY: EVALUATION OF THE EFFICIENCY FOR IMPLEMENTATION FIXED ANTIHYPERTENSIVE DRUG COMBINATION OF LISINOPRIL/AMLODIPINE IN PATIENTS WITH ESSENTIAL ARTERIAL HYPERTENSION**

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P. L. Shupik National Medical Academy of Postgraduate Education, Cardiology Department, Kiev, Ukraine.

**Objective:** The aim of study was to evaluate the efficiency and safety of fixed combination of lisinopril 10/20 mg + amlodipine 5/10 mg usage in patients with essential arterial hypertension.

**Design and method:** the study included male and female patients over 18 years with a new onset or previous treatment uncontrolled hypertension (blood pressure> 140/90 mm Hg). Office blood pressure (BP) was measured and biochemical blood assay was done to all patients on baseline and in the follow-up periods. At
the beginning of the study all previous antihypertensive therapy was cancelled. After randomization lisinopril/amlodipine has been administered to patients in accordance to their blood pressure levels. If the patient was newly diagnosed with blood pressure or had previously untreated hypertension and blood pressure in the range 140–179/90–109 mm Hg, lisinopril/amlodipine were administered at a dose of 5/10 mg per day. Patients who previously had an antihypertensive therapy but blood pressure kept to a level 140–179/90–109 mm Hg, lisinopril/amlodipine were administered at an initial dose of 20/10 mg per day. If blood pressure was higher than 180/110 mm Hg, betablockers, diuretics and statins were administered according to indications. The study lasted over 60 days.

Results: 6069 patients were involved to the study. According to data gained from the office of blood pressure monitoring essential reduction of blood pressure levels (from 169.3 ± 0.2/98.1 ± 0.1 mm Hg at baseline to 131.9 ± 0.1/81.1 ± 0.1 mm Hg at the end of the study) was achieved through lisinopril/amlodipine treatment. 57.1% of patients achieved targeted blood pressure levels. Patients who were treated with lisinopril/amlodipine without statins had demonstrated significant reduction in plasma cholesterol levels from 5.75 ± 0.02 mmol/l to 5.09 ± 0.1 mmol/l. In the end of study was observed a significant decrease of number of patients with proteinuria/microalbuminuria who followed lisinopril/amlodipine therapy— from 667 persons (11.0%) to 244 persons (4.0%). Lisinopril/amlodipine therapy was well tolerated by patients. Serious adverse events were not observed.

Conclusions: Results of the study proved the effectiveness of the strategy to prescribe fixed combination lisinopril + amlodipine for the patients with hypertension in daily clinical practice in Ukraine for the prevention of cardiovascular and cerebrovascular complications.

**Design and method:** Study participants were aged > 18 years old and written informed consent was obtained from each subject. The study was approved by the institutional review board. Subjects recruitment conditions (sex, arm circumference, BP readings) as long as procedures and data analysis fulfilled the requirements stated by BHS protocol and AAMI/ISO1860–2:2013 standard.

**Results:** A total of 94 participants were included, 52 females (55.3%), mean age (years ± SD) 63.1 ± 18.0, mean arm circumference (cm ± SD) 35.0 ± 9.0. The average of observers entry BPs were 146.9 ± 37.2 mmHg for systolic (SBP) and 82.2 ± 22.1 mmHg for diastolic BP (DBP). Table 1.

As for the BHS protocol, differences between standard measurement and test device within 5, 10, and 15 mmHg, for the better observer (A), were 79.4, 95.4 and 100.0 %, respectively for SBP, and 82.6, 97.2 and 100.0 % for DBP, Table 2. Figures in the low, medium and high pressure ranges are shown in Table 3. Scatter plots of differences between the test device and the better observer (A) against the average of the device and observer pressure values are shown for SBP (Figure 1) and DBP (Figure 2).

The mean difference between the readings obtained by using the test device and those obtained by the observers (AAMI/ISO1860–2:2013 standard criteria 1) were 0.3 ± 5.0 mmHg (SBP) and -0.8 ± 4.3 mmHg (DBP), and the mean differences between the average of three readings of the test device and the average of the observers, for each participant (criteria 2), were 0.3 ± 3.9 and -0.8 ± 3.5 mmHg for SBP and DBP, respectively.

**Conclusions:** The CT 40 blood pressure device achieved A/A grade of the BHS protocol and fulfilled the requirements (criteria 1 and 2) of the AAMI/ISO standard. CT 40 can be recommended for BP measurement in adults.

**Design and method:** Our study is retrospective, it includes all patients referred for diagnosis of hypertension; Before high blood pressure levels or high normal tension in whom the diagnosis is confirmed by ABPM, and the known hypertensives oriented for evaluation. A Schiller MT-300 with BR-102 plus program was used for the ABPM. 46 measures required to validate the ABPM. We studied the mean of the blood pressure over the 24 hours, the mean pressure night and day and the profile dipping in all the patients. Nocturnal hypertension and dipping profile values are those defined by ESC/ESH 2013 and AHA/ASA 2015.

**Results:** Twenty seven patients included in our series. It is 15 men (55%) and 12 women (45%). Mean age is 54 years [35–80 years]. Twenty five patients (93%) had nocturnal hypertension, Six (22%) of whom had isolated nocturnal hypertension. Patients with INH are six, they are 3 men and 3 women, mean age 50.5 years (43 - 59) years. Hypertension is systolic-diastolic in three patients, diastolic isolated in two patients and systolic isolated in one. The dipping profile in our series, it is normal in nine patients, 12 patients (44%) are non dippers, four Reverse dipping (15%) and two extrem dipping.

**Conclusions:** The prevalence of isolated nocturnal hypertension is high in our series (22% of patients) and The non dipping Blood Pressure profile is also very common (60%), together, these entities are regarded as important harbingers of poor cardiovascular prognosis. The ambulatory blood pressure monitoring(ABPM) in hypertensive patients at diagnosis and during progression is the only non-invasive way to detect nocturnal hypertension and to analyse dipping profile.

**Design and method:** Patients with a diagnosis of MI before to January 1st, 2012 were selected from the EHR of the Valencia Community which contain all drug prescriptions. In the present study, three groups of therapy usually recommended for secondary prevention or for control of main cardiovascular risk factors were selected: aspirin, SRA blockers (ACEi, ARB), beta-blockers and statins. Assessment of treatment was performed after 6.1±3.5 yr of the event.

**Results:** A total of 72784 patients (76% men, mean age 63 yr) were included. Among them, 14484 (20%) were not taking drug of the three groups, 3023 (4%) one, 9110 (13%) two and 45774 (63%) three. Concerning the kind of drugs, aspirin was present in 70%, followed by 70% SRA blockers and 68% statins. The beta-blockers were included in the treatment of 42024 (59 %) subjects. The beta-blockers when administered in more than 80% of the cases were combined with statins, aspirin or SRA blockers.

**Conclusions:** The proportion of patients taking cardiovascular preventive drugs after a MI is low in the general population. Several factors can contribute to it, but physician inertia and low patient compliance requires action in order to improve the secondary prevention.

**Valuation of the SunTech® CT40™ Blood Pressure Measurement Device by the BHS Protocol and the AAMI/ISO 8160–2:2013 Standard**

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Objective: To perform a simultaneous, independent validation of the oscillometric CT40 device for BP measurement, produced by SunTech®, according to the 1993 protocol of the British Hypertension Society (BHS) and the standard of the Association for the Advancement of Medical Instrumentation (AAMI)/the International Organization for Standardization (ISO) 8160–2:2013.

Conclusions: Results of the study proved the effectiveness of the strategy to prescribe fixed combination lisinopril +amlodipine for the patients with hypertension in yearly medical practice in Ukraine for the prevention of cardiovascular and cerebrovascular complications.

**The use of Cardiovascular Preventive Drugs in Subjects after Myocardial Infarction. A Population Based Study**

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Objective: Drug treatment for secondary prevention of cardiovascular disease is an established strategy recommended by guidelines. However, a wide gap exists between what the guidelines say and the real life in terms of number of drugs. The objective of the SATURNO study was to assess what is the gap in subjects after myocardial infarction (MI) based on Electronic Health Records (EHR).

Design and method: Patients with a diagnosis of MI before to January 1st, 2012 were selected from the EHR of the Valencia Community which contain all drug prescriptions. In the present study, three groups of therapy usually recommended for secondary prevention or for control of main cardiovascular risk factors were selected: aspirin, SRA blockers (ACEi, ARB), beta-blockers and statins. Assessment of treatment was performed after 6.1±3.5 yr of the event.

Results: A total of 72784 patients (76% men, mean age 63 yr) were included. Among them, 14484 (20%) were not taking drug of the three groups, 3023 (4%) one, 9110 (13%) two and 45774 (63%) three. Concerning the kind of drugs, aspirin was present in 70%, followed by 70% SRA blockers and 68% statins. The beta-blockers were included in the treatment of 42024 (59 %) subjects. The beta-blockers when administered in more than 80% of the cases were combined with statins, aspirin or SRA blockers.

Conclusions: The proportion of patients taking cardiovascular preventive drugs after a MI is low in the general population. Several factors can contribute to it, but physician inertia and low patient compliance requires action in order to improve the secondary prevention.
**LB.01.14**

PHYSIOLOGICAL AND MOLECULAR STUDIES OF RABBIT HEART FED ON CHOLESTEROL REACH DIET

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Objective: Hypertension and atherosclerosis are among the most common causes of death in the world.

Aim of study: To examine the direct effects of hypercholesterolemia (HC) on rabbit myocardial structure, physiology and biochemistry.

Design and method: 10 adult rabbits divided into 2 groups of 5 rabbits each-Control(C) fed on normal chow, and (HC) fed on 2% cholesterol (lard mixed with chow) for 16 weeks. After treatment, rabbits from (C) and (HC) groups were sacrificed and hearts were quickly removed and perfused with standard Krebs Henselet buffer, 10 mL/min at 37°C, pH 7.4 in Langendorf retrograde perfusion system at a constant pressure. 45 minutes ischemia was followed by 120 minutes reperfusion and parameters of cardiac function: coronary flow (HC), Heart rate (H.R.) and left ventricle developed pressure (LVDP) of hearts from (C) and (HC) groups were measured. TACS DNA ladder kit was used to assess left ventricle cardiomyocytes from group (HC) for apoptosis, also fragments of left ventricle from (HC) were processed for Electron Microscopy (EM)

Results: Evaluation of (C.F.), (H.R.) and (LVDP) in (C) and (HC) groups have pointed out a 50% reduction in (C.F.) in (HC) group versus (C) during stabilization period. In (HC) group, LVDP was depressed during the whole experiment, while in (C) group it was almost constant. Protection of myocardium against oxidative stress was significantly depressed following (HC) treatment, synthesis and utilization of GSH was limited versus (C). Cardiac hypertrophy experimentally induced with (HC) was related with a decrease in (C.F.) and LVDP associated with an increase in lipid peroxidation, in LDH and CK as markers of myocardial lesion and GGT activity in myocardial tissue. Myocyte apoptosis was present in (HC) group, pointed out by DNA laddering pattern on gel electrophoresis. (C.F.) study showed pointed out dilated arcoptalic reticulum, perinuclear edema of myocytes and swollen mitochondria.

Conclusions: High cholesterol diet in (HC) rabbits induces cardiac hypertrophy and changes in physiological parameters of heart with a negative impact upon synthesis of antioxidant enzymes as well as changes in ultrastructure of heart muscle and at the molecular level (DNA laddering is present as a sign of apoptosis in ventricular myocytes).

**LB.01.15**

DECREASE OF CARDIOVASCULAR RISK IN HYPERTENSIVE AND HYPERTENSIVE-DIABETIC PATIENTS AFTER A PROGRAM OF PHARMACEUTICAL INTERVENTION

M. Sánchez Macarro1, J.J. Martínez Díaz2, J. Abellán Huerta1, F.G. Clavel Ruiperez2, P. Ramos Ruíz2, P. Gómez Jara1, M. Léalo Hernandez1, J. Abellán Aleman1, Cátedra de Riego Cardiovascular UCAM, Murcia, Spain, 2Hospital General Universitario Santa Lucía, Cartagena, Spain, 3Hospital de Almansa, Albacete, Spain

Objective: To determine the effectiveness of a pharmaceutical care plan by reducing CVR in a sample with moderate-high or high CVR in a rural community pharmacy.

Design and method: Clinical trial with an intervention group and a control group with a previous non-probabilistic sampling of consecutive cases followed by a probabilistic one by simple randomization in 2 groups stratified by age and sex. Were included patients who came to the pharmacy office with cardiovascular prescriptions and moderate-high or high CVR. The pharmaceutical care plan includes group talk about CVR and an individual strategy through a plan of circular prescriptions and moderate-high or high CVR. The pharmaceutical care plan has a positive influence on the decrease of the CVR in the hypertension population with and without diabetes, showing a statistically significant decrease in the diabetic-hypertensive population.

Results: 45 patients had all data and met the inclusion criteria (no previous cardiovascular events, no cerebrovascular events). The calculated effect size for this population is 0.4052 (a 0.05, b 0.90). Blood tests (including beta2-microglobulin, cystatin C), cardiac femoral pulse wave velocity (cfPWV), left ventricular mass (LVM) and index, left ventricular end diastolic diameter, relative wall thickness, mean wall thickness and left ventricular ejection fraction were evaluated twice, average 1 year apart was also tested.

Conclusions: Reduction of cardiovascular risk in hypertensive and diabetic patients after a program of pharmaceutical intervention is possible in a rural community pharmacy.

**LB.01.16**

FACTORS RELATED TO LEFT VENTRICAL HYPERTROPHY IN ONE YEAR FOLLOW-UP OF HEMODIALYSIS PATIENTS

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Objective: The phenomenon of cardiac remodeling in dialysis population which leads to high prevalence of cardiovascular disease is every day burden for nephrologists. We aimed to analyze which factors could better indicate the presence of left ventricular hypertrophy in dialysis population.

Design and method: 60 stable hemodialysis patients were screened for a prospective study. 45 patients had all data and met the inclusion criteria (no previous cardiovascular events, no cerebrovascular events). The calculated effect size for this population is 0.4052 (a 0.05, b 0.90). Blood tests (including beta2-microglobulin, cystatin C), carotid femoral pulse wave velocity (cfPWV), left ventricular mass (LVM) and index, left ventricular end diastolic diameter, relative wall thickness, mean wall thickness and left ventricular ejection fraction were evaluated twice, average 1 year apart was also tested.

Conclusions: The phenomenon of cardiac remodeling in dialysis population which leads to high prevalence of cardiovascular disease is every day burden for nephrologists. We aimed to analyze which factors could better indicate the presence of left ventricular hypertrophy in dialysis population.
Results: 469 patients were selected. The main characteristics of BPPh are presented in the Table 1. The antihypertensive therapy did not differ significantly in 3 groups. The seasonal dynamics of mean AS parameters with sex and age adjustment in BPPh differed slightly. We compared AS parameters (in quintiles from min to max) between BPPh. The upper (3-5th) quintiles of the most AS indices (Dp(dt), AIX, AIXao) in MUH and UH were significantly higher than in NT (p < 0.05). But this pattern was found for the S only. The 4th quintiles of PWV were higher in UH vs. NT in W and S (p < 0.005). We found no substantial differences in AS parameters in UH vs. MUH.

Table 1

<table>
<thead>
<tr>
<th>Sex</th>
<th>NT (n=334)</th>
<th>MUH (n=274)</th>
<th>UH (n=51)</th>
</tr>
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<tr>
<td>Se%</td>
<td>42.3%</td>
<td>43.8%</td>
<td>46.2%</td>
</tr>
<tr>
<td>Age, years (MoTS0)</td>
<td>53,310.5</td>
<td>56,310.9</td>
<td>60,310.7</td>
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<tr>
<td>BMI, kg/m² (MoTS0)</td>
<td>28.924</td>
<td>28.214</td>
<td>27.953</td>
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<td>CRP, mg/L (MoTS0)</td>
<td>217.315</td>
<td>212.316</td>
<td>214.785</td>
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<tr>
<td>HR, bpm (MoTS0)</td>
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<td>71,711.6</td>
<td>72,315.1</td>
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<tr>
<td>PWV, m/s</td>
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<td>11,491,575</td>
<td>11,715.625</td>
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<tr>
<td>PWVton</td>
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<tr>
<td>AIX</td>
<td>-12,786,984</td>
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<tr>
<td>AIXao</td>
<td>-10,728,984</td>
<td>-10,728,984</td>
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</table>

* p < 0.05 (NT vs. MUH, MUH vs. UH).

Conclusions: Our study confirms seasonal changes in some of AS parameters in THP with different BPPh. The significant differences of AS parameters in NT vs. MUH and the absence of these AS differences in most of the parameters in MUH vs. UH may be one of the confirmations of the high cardiovascular risk in MH.

**PP.01.22** COMPARISON OF THE SPHYGMOCOR XCEL DEVICE WITH APPLIATION TONOMETRY FOR PULSE WAVE VELOCITY ASSESSMENT IN CHILDREN AND ADOLESCENTS

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Objective: Pulse wave velocity (PWV) is a well-recognized marker of arterial stiffness. Although the clinical value in children is not yet established its use is increasing in children and adolescents with cardiovascular risk factors. The gold-standard technique is tonometry, but this technique can be challenging, especially when used on children. The purpose of this study was to validate PWV assessment with novel oscillometric device (SphygmCor XCEL) for use in children and adolescents.

Design and method: Children and adolescents aged 5–20 years were recruited subsequently. Carotid-femoral PWV (PWVton) was measured by application tonometry with the “classic” Sphygmocor device and by SphygmCor XCEL device (PWVosc). Regression analysis and Bland-Altman plots were used for comparison of the tonometer- to oscillometric-based method. ARTERY Society guidelines criteria were used to assess the performance of the oscillometric device.

Results: Sixty-eight children and adolescents with mean age 11.5 ± 3.6 years, 32 (47.1%) male were included in the analysis. Mean pulse transit time was 81.48 ± 12.55 sec by the tonometric method, and 81.63 ± 12.24 sec by the oscillometric method (p = NS). Mean PWVton was 4.85 ± 0.81 m/sec and mean PWVosc 4.75 ± 0.81 m/sec. The mean difference between the two devices was 0.09 ± 0.47 m/sec (P > NS) and the accuracy of the oscillometric device was rated “excellent” according to the ARTERY Society guidelines (mean difference less than 0.5 m/s, SD of difference less than 0.8 m/s). Bland-Altman analysis showed good agreement with LoA ranging from -0.83 to 1.01. No proportional bias was detected by linear regression analysis with dependent variable the mean difference between devices and independent variable mean PWV of the two devices (B = 0.07, P = NS). In ANCOVA analysis, age and systolic blood pressure had no statistically significant effect on the mean difference between devices.

Conclusions: The new oscillometric SphygmCor XCEL device provides equivalent results for PWV values to those obtained by tonometry in children and adolescents. Thus, the SphygmCor XCEL device is appropriate for assessing PWV in studies in the pediatric population.
Objective: Blood pressure (BP) in patients with sickle cell disease has been reported to be lower than in the general population. Despite low BP, sickle cell disease is associated with increased risk of cardiovascular disease. The aim of the present study was to investigate the prevalence of BP phenotypes and possible differences in arterial stiffness in pediatric patients with sickle/beta thalassemia (S/b-thal) compared with matched controls.

Design and method: We included in the study 16 pediatric S/b-thal patients and 16 controls matched for age and sex. Controls were otherwise healthy children and adolescents visiting our hypertension center for suspected hypertension. All patients underwent ambulatory BP monitoring and measurement of carotid-femoral pulse wave velocity (cf-PWV).

Results: Mean age of the study population was 13.30 ± 4.63 years (34.4% boys). Despite lower office systolic BP levels (115.43 ± 10.03 vs. 123.37 ± 11.92 mmHg, S/b-thal vs. controls, \( P = 0.05 \)), there was no statistical significant difference in 24 h, daytime and nighttime BP. Twenty five % of the S/b-thal patients and 43.8% of the controls presented office hypertension (\( P = NS \)), while 18.8% of the S/b-thal patients and 25% of the controls presented hypertension by ambulatory BP levels (\( P = NS \)). All S/b-thal patients with office hypertension presented normal ambulatory BP values (white-coat hypertension). None of the S/b-thal patients had daytime hypertension, while all 18.8% presented nighttime hypertension with office normotension < 90th percentile (masked hypertension). S/b-thal patients and controls presented equal prevalence of masked hypertension (19%). S/b-thal patients presented also similar levels of cf-PWV with controls (7.12 ± 1.25 vs. 7.25 ± 1.43 m/sec, \( P = NS \)) and an 18.8% of the patients presented cf-PWV levels above the 95th pc for age and sex.

Conclusions: Children and adolescents with S/b-thal present similar prevalence of BP phenotypes and levels of cf-PWV with pediatric population referred for suspected hypertension. A significant number of children and adolescents with S/b-thal may have night-time hypertension despite normal office BP levels.

**LB.01.24**

HOME BLOOD PRESSURE NORMALCY IN NON-EUROPEAN ADOLESCENTS


Objective: Evidence on normal range of home blood pressure (BP) in adolescents relies on only one European study. This study aims to investigate the normal range of home BP in a healthy non-European population of adolescents.

Design and method: Cross-sectional study with a representative sample of secondary school students (12–17 years) from a Brazilian capital. Adolescents’ heights were classified in percentiles according to age and gender. Height percentiles were divided into ≤ 50th or >50th percentile. The home BP protocol included two day-time and two evening-time measurements over 6 days. Exams were considered valid with at least 12 measurements.

Results: A total of 1024 adolescents were included, mean age 14.68 ± 1.61 years, predominantly female (52.4%), from public schools (68.4%) and non-white (51.3%). The 50th (midpoint of distribution) and the 95th percentile (upper normal limit) for systolic and diastolic home BP in adolescents are provided by gender, age and height percentiles. There was a marked increase in the estimated 95th percentile for systolic home BP with increasing age in males for both height percentiles examined (16mmHg for ≤ 50th percentile and 14.5 mmHg for >50th percentile) and less so for diastolic home BP (1mmHg and 5mmHg, respectively). In females the 95th percentile increase with age was less significant for systolic and similar for diastolic BP when compared to males in the two height percentiles evaluated (6.2 mmHg for ≤ 50th percentile and 4.4 mmHg for >50th percentile).

Conclusions: Reference values for home BP by height percentiles for age and sex in a non-European population of adolescents are provided.

**LB.01.25**

ESTIMATION OF DIETARY SALT INTAKE BY 24-H URINE AND ITS ASSOCIATION WITH BLOOD PRESSURE IN CHINESE URBAN CHILDREN

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Objective: High salt intake is recognized as a risk factor for hypertension in children and adults. However, limited data on dietary salt intake of Chinese children were available. Hence, this study aimed to estimate the dietary salt intake of Chinese urban children aged 9–17 years by 24 h urinary sodium excretion and its association with blood pressure.

Design and method: Our study was a multi-center, cross-sectional survey. Using a multi-stage clustered sampling method, three cities in the northern region (Changchun, Beijing and Jinan) and two cities in the southern region (Shanghai and Chengdu) were selected. Our study consisted of 1 076 participants with collections of 24-h urine samples and three measurements of blood pressure. Linear regression model and binary logistic regression analysis was used to examine the association between sodium excretion and blood pressure. Prehypertension/ hypertension was diagnosed by Chinese Children Blood Pressure References, as blood pressure equal or more than 90th percentile by age and gender.

Results: The average of urinary sodium excretion of Chinese urban children was 4.7 ± 2.8 g/day, with an estimation of dietary salt intake 11.9 ± 2.8 g/day, and 86.5% of children had excessive salt intake according to WHO recommendation (equal or less than 5.0 g/day for salt intake). Boys had a slightly higher sodium excretion than that of girls (\( p = 0.011 \)). No significant difference of sodium excretion was found between the northern and southern regions. Urinary excretion of sodium was significantly correlated with systolic blood pressure (\( \beta = 0.272, p = 0.024 \)) but not with diastolic blood pressure (\( \beta = 0.125, p = 0.195 \)) after adjustment of age, gender and body mass index. Children who took in high salt had a mildly higher risk of getting prehypertension/hypertension (odds ratio = 1.108, 95% confidence interval: 1.058–1.161).

Conclusions: It is alarming that the majority of China urban children aged 9–17 years old had excessive salt intake. Sound policies must be taken to reduce the sodium content in children’s diet to decrease cardiovascular risk in the future.
Design and method: Oscillometric BP measurements were obtained from a general population, comprising 44,328 children and adolescents aged 6–17 years old from six urban cities in mainland China. Those with BP (at least 95th centile) were screened a second or third time at a month interval. In addition, BP at each screening was further classified according to BP stages (stage 1 and stage 2) and BP subtypes (isolated systolic EBP; isolated diastolic EBP; and systolic-diastolic EBP).

Results: After 3 separate consecutive visits, isolated systolic EBP and stage 1 EBP sustained to be the major type of EBP subtypes and stages. Meanwhile, there were increases in the relative proportion of isolated systolic EBP; systolic-diastolic EBP and stage 2 EBP; and concurrent decreases in isolated diastolic EBP and stage 1 EBP. In the last two visits, approximately 50% of subjects diagnosed with EBP at a former visit had their BP normalized, which was mostly found among those with isolated diastolic EBP and those with stage 1 EBP. Apart from that, subjects with isolated diastolic EBP and those with stage 2 EBP exhibited higher proportion of reclassification within EBP subtypes and stages; they were more likely to shift to isolated systolic EBP and stage 1 EBP, respectively. Compared with normotensives, subjects that changed their BP classification were younger, with higher proportion of boys and higher levels of heart rate, body mass index, and triglyceride.

Conclusions: After 3 repeated measurements, less than half of the population diagnosed with EBP at the first visit maintained their classification, which was even less in the group of isolated diastolic EBP. Repeated measurements in obese children (<12 years) may lead to more accurate classification of BP types and stages.

Outcomes: Compared to children with overweight or obesity, those with hypertension were older, had higher levels of heart rate, and were more likely to be boys.

LB.01.29 THE INFLUENCE OF ARTERIAL HYPERTENSION ON LEFT VENTRICULAR REMODELING IN PATIENTS WITH ST-ELEVATED MYOCARDIAL INFARCTION


Objective: Patients with ST-elevated myocardial infarction (STEMI) treated by primary angioplasty (pPCI) will develop postinfarctional remodeling (PIR) in one third of the cases. The purpose of this study is to determine influence of arterial hypertension (AHT) as predictor.

Design and method: 210 patients with a first acute anterior STEMI underwent echocardiography in the first 24hrs and again after 6 months, after which they were divided into: remodeling (RM, n = 55; 26%) and non-remodeling (NRM, n = 155; 74%) groups. The criteria for remodeling was increasing of left ventricular end-diastolic volume >20% after 6 months.

Results: There were no statistical significant difference in prior AHT (47.3% vs. 56.1%, p = 0.258), AHT at admission (45.5% vs. 51%, p = 0.069) or average mean arterial pressure (102.09 vs. 104.83 mmHg, p = 0.323) between groups (RM vs. NRM). Patients with prior AHT had increase LV mass (59.3% vs. 33.3%, p = 0.021), but no difference in RM vs. NRM group (56.4% vs. 50.3%, p = 0.443). Left ventricular remodeling (determined by LV mass and relative wall thickness) on early echocardiography were similar in both groups (RM vs. NRM, p = 0.447; normal (16.4% vs. 11%), concentric hypertrophy (45.5% vs. 43.2%), concentric remodeling (27.3% vs. 37.4%) and eccentric hypertrophy (10.9% vs. 8.4%). The independent early predictors were: no-reflow phenomenon after pPCI (OR = 27.7 95% CI, p < 0.0001) and at admittance Killip class 2–4 (OR = 3.4 95% CI, p = 0.003). Also, strong predictors were Wall motion score index >2 (OR 21.6 95% CI, p < 0.0001) and incomplete ST-resolution (OR 2.0 95% CI, p = 0.024). RM group had more frequent MACE during one year follow-up: repeated hospitalizations (61.8% vs. 22.6%; p < 0.0001), re-infarctions (20% vs. 7.1%; p = 0.007), repeated coronary angiography (45.5% vs. 18.1%; p < 0.0001), re-PCI (30.9% vs. 11%; p = 0.001) and mostly, re-hospitalizations due to heart failure (40% vs. 2.6%; p < 0.0001). Mortality rate in RM group was 5.5%.

Conclusions: For the patients with a first acute anterior STEMI, treated by pPCI, development of PIR is absolutely independent of arterial hypertension (AHT) as predictor.
We studied patients affected by essential hypertension and primary aldosteronism and matched-healthy subjects. The study was planned to take into account gender-related differences, while adopting advanced UHPLC-MS metabolomics analyses.

**Results:** As general results, we recognized statistically significant changes \((p < 0.05 \text{ ANOVA, } Fc>1.5)\) of metabolites involved in central carbon, energy and nitrogen metabolism, especially purine and pyrimidine nucleosides and precursors, and free amino acids. Partial least squares discriminant analysis interpretation provided strong evidence about a disease-specific metabolic pattern with dAMP, diiodothyronine and 5-methoxytryptophan as leading factors, and a sex-specific metabolic pattern, associated with orotidine 5-phosphate, N-acetylaspartine, hydroxyproline and cysteine.

**Conclusions:** Despite the exploratory nature of this study, preliminary results highlight for the first time specific urinary metabolic signatures that can discriminate gender- and PA-subtype phenotypes.

**Objective:** The purpose of this study was to assess in real practice the effect on adherence of a switch from a single- or two-pills therapy (SPT/FC) of perindopril and/or amlodipine to fixed-dose combination (FDC) of the same drugs.

**Methods:** This was a retrospective cohort study, performed in 3 Italian Local Health Units. We selected all subjects \(? 18 \text{ years, who received at least one prescription of antihypertensive drugs between 01/01/2010 and 31/12/2014. For each patient we evaluated the adherence to different schedule of perindopril/amlodipine administration schedule during the two 12-month periods preceding and following the index date. We also evaluated the rate of major CV events, the changes in concomitant treatment and the economic implications of drugs switch. Changes in adherence level had been compared in subjects who shifted to the FDC of perindopril/amlodipine after the ID as well as in patients who did not.}

**Design and method:** A total of 24,020 subjects were analyzed. Subjects treated with the free dose combination switched more frequently to FDC of to perindopril/amlodipine than subjects treated with SPT \((p < 0.001)\). Adherence to treatment was higher in the 3,597 subjects who switched to the perindopril/amlodipine FDC therapy, than in the 20,423 subjects who did not. The rate of major CV events was lower in patients with adherence > 80% who also showed a higher rate of concomitant treatment reduction (36.5% vs. 21.3%; \(p = 0.005\)). No differences have been observed in the drug costs after switch.

**Results:** Our results show that, the real-world use of perindopril/amlodipine as FDC increases the rate of stay-on-therapy, improves the antihypertensive drug schedule and reduces the rate of major CV events in subjects previously treated with the same drugs as a two pills combination or as SPT.
COMBINED MONITORING OF CARDIAC FUNCTION AND SLEEP PARAMETERS: FUTURE PERSPECTIVES

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Objective: Background. Timely verification and treatment of sleep disorders are crucial for the prevention and control of cardiovascular diseases, above all hypertension. However, specialized sleep diagnostics is accessible only for a minority of patients. The development of various diagnostic approaches and screening tools appears to be helpful. In particular, routinely used long-term electrocardiogram (ECG) and blood pressure (BP) monitoring is promising for simultaneous assessment of both cardiovascular and sleep parameters. The aim of our study was to develop an approach for the identification of sleep structure and sleep-wake cycle based on cardiorespiratory and activity parameters recorded during the long-term ECG and BP monitoring.

Design and method: We recorded simultaneously 24-h cardiovascular (12-lead ECG and BP); three axis accelerometer fixed on the right V intercostal space; impedance pneumography) monitoring (Kardiotekhika, Inkart, Russia) and nocturnal PSG (Embla N7000, Natus, USA) in 23 subjects (aged 17–75 years, 13 males). Based on PSG analysis, hypnograms (sleep structure) were verified by an experienced specialist. From ECG/BP monitoring, the data from accelerometer, ECG and respiratory pattern were obtained. Based on diurnal activity sleep and wake periods were identified (modified Koele and Knipke’s algorithm). Based on the analysis of heart rate variability and respiration variability a specified classification of sleep stages was developed (Fig.). The accuracy, sensitivity and specificity of the developed algorithms were evaluated.

Results: Our approach based on actigraphy analysis enabled classification of sleep and wakefulness with specificity of 80% and sensitivity of 86%. The combined analysis of both heart rate variability and respiratory signals allowed a 3-stage sleep classification (light, deep and rapid-eye-movement sleep) with the accuracy of 71.4% and comparatively high inter-rater agreement (Cohen’s kappa 0.58 ± 0.16). Sleep efficiency error was 6.7 ± 6.6%, total sleep time error - 33.2 ± 45.3 min, sleep onset latency error - 22.3 ± 35.8 min.

Conclusions: The implementation of the proposed combined analysis of activity, heart rate variability and respiration pattern in the ECG/BP monitoring systems is a promising alternative to specialized sleep diagnostic studies to be used in routine cardiovascular medicine practice.

URIC ACID AND NEW ONSET LEFT VENTRICULAR HYPERTROPHY: FINDINGS FROM THE PAMELA POPULATION

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Objective: The association between serum uric acid (SUA) and left ventricular hypertrophy (LVH) is controversial and the ability of SUA in predicting incident LVH remains unsettled. Thus, we evaluated the relationship of SUA with new-onset echocardiographic LVH over a 10-year period in subjects of the general population enrolled in the PAMELA study.

Conclusions: The study shows that SUA is a predictor of long-term echocardiographic changes from normal LVMI to LVH in community sample. Thus, lifestyle- and pharmacologic measures aimed to reduce SUA levels may concur to preventing LVH development in the general population.

ASSOCIATION OF INTER-ARM BLOOD PRESSURE WITHASYMPTOMATIC INTRACRANIAL AND EXTRACRANIAL ARTERIAL STENOSIS IN HYPERTENSION PATIENTS

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Objective: Intervertebral blood pressure (BP) difference has been associated with ischemic stroke. Local atherosclerosis of stroke differs among vulnerable individuals, whereas intracranial arterial stenosis (ICAS) is more frequently affected Asians, and extracranial arterial stenosis (ECAS) is more prevalent among whites.

Design and method: We hereby sought to explore the association of inter-arm BP difference with ICAS and ECAS in stroke-free hypertensive patients in Chinese population. All the 885 subjects were evaluated for the presence and severity of ICAS and ECAS through computerized tomographic angiography. Both arm BP was measured simultaneously by the Vascular profiler 1000 device.

Results: In the continuous study, ICAS was associated with age, male, average arm SBP, diabetes, anti-hypertensive treatment and inter-arm DBP difference. ECAS was associated with age, inter-arm SBP and LDL. In the categorical study,
the subjects with the top quartile of inter-arm DBP difference (>6 mmHg) showed significantly higher risk of ICAS (OR = 2.03; 95% CI, 1.347–4.177). The risk of ICAS in patients with inter-arm DBP difference > 5mmHg was 103% higher (P = 0.009). And the participants with the top quartile of inter-arm SBP difference (>6 mmHg) showed higher risk of ECAS (OR = 2.031; 95% CI, 1.195–3.452). The risk of ECAS in patients with inter-arm SBP difference > = 10 mmHg was 225% higher.

Conclusions: In conclusion, we here reported a diverse association of inter-arm SBP/DBP difference with the ICAS/ECAS. Inter-arm DBP difference might be the early symbol of ICAS in Chinese population, which need further verification in long-term cohort study.

BP.01.04 THE ROLE OF ARTERIAL HYPERTENSION IN THE DEVELOPMENT OF CHRONIC HEART FAILURE (ACCORDING TO THE RUSSIAN CHF REGISTRY)

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Objective: to study the frequency of arterial hypertension (AH) in the development of CHF and gender peculiarities in patients with AH suffering from CHF

Design and method: The analysis includes medical data for 6465 patients with CHF (average age 65 ± 7 yrs old), of which 58% (n = 3774) were m, of I-IV class NYHA undergone examination and treatment in 6 polyclinics and 5 hospitals between 2010–2015. The data was analysed using statistical software STATISTICA 10

Results: AH was observed at the time of examination in 40% of patients (n = 2164) in the selection of patients with CHF, of which 32% (n = 1734) had I stage hypertension, 6% (n = 128) – II stage and 2% (n = 102) III stage hypertension. 56% of patients with CHF (n = 3124) at the moment of examination had BP < 140/90 mmHg (average SBP was 123 ± 5.6 and DBP - 78 ± 4.7 mm Hg). Arterial hypotonia was observed in 2% (n = 136) patients with CHF. F were suffering from hypertension certainly more often – 87% (n = 2333), 6% registered stroke,TIA (n = 171), 11% (n = 291) – according to the ECG data atrial fibrillation (permanent). M had CHD among etiological factors with certainly higher registered old MI in medical history in 54% (n = 2036) and in 26% of cases for F. According to the ECG data 37% of f suffered from LVH certainly more often than the figure equal to 30% for m. According to the ECG data 30% of m (n = 1156) suffered from Q heart attack certainly more often, 21% (n = 804) suffered from non-Q heart attack with the figures equal to 10% and 3% respectively for f. F patients more often register II and III stage (45% and 39% respectively) of CKD with glomerular filtration rate calculated according to MDRD formula (ml/ min/1.73), while in patients I and II stages of CKD (30% and 55% respectively) is more often.

Conclusions: In female patients arterial hypertension is observed more often in CHF etiology; TIA, atrial fibrillation (ECG), left ventricular hypertrophy – in medical history. In male patients CHF-CHD is observed in etiology and an old MI – in medical history.

BP.01.05 IMPACT OF 24-H BLOOD PRESSURE MONITORING ON OBJECTIVE SLEEP DURATION AND FRAGMENTATION IN RESISTANT HYPERTENSIVE PATIENTS

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Objective: 24-h ambulatory blood pressure monitoring (ABPM) is crucial for diagnosis of treatment-resistant hypertension (RH). However, repetitive cuff inflations during night might induce sleep deprivation and hamper physiological nocturnal BP fall. The study was aimed at investigating the impact of the ABPM on sleep duration and fragmentation in RH patients.

Design and method: 20 RH patients and 13 healthy controls (HC) were recruited and underwent 7-day actigraphy and ABPM. The following parameters were calculated on the whole week and separately for the ABPM night: total sleep time (TSTtot and TSTABPM), wake after sleep onset (WASOtot and WASOABPM) and sleep efficiency (Stetot and SEABPM).

Results: RH patients were older (63 ± 11 vs 27 ± 4 years, p < 0.001), had higher 24-h BP (135 ± 16/78 ± 16 vs 122 ± 11/74 ± 5mmHg, p = 0.01) and nighttime BP (130 ± 17/72 ± 14 vs 106 ± 11/62 ± 7 mmHg, p < 0.001 for both) and a reduced dipping (6 ± 6 vs 18 ± 5%, p < 0.001) than HC. RH had a lower TSTtot than HC (6.4 ± 1.1 vs 7.5 ± 0.9 h, p < 0.001). TSTABPM was not reduced during the ABPM night in both groups (6.8 ± 1.3 and 7.7 ± 1.4, p = ns vs TSTtot for both). However, WASOABPM tended to be longer than WA-SOTot in RH (73 ± 34 vs 61 ± 29 min, p = 0.07; HC 30 ± 24 vs 27 ± 17 min, p = ns), and SEABPM thus tended to be reduced in RH (84.4 ± 7.2 vs 86.2 ± 7.2%, p = 0.09) but not in HC (93.7 ± 3.2 vs 93.9 ± 5.0 p = 0.88). None of the considered sleep parameters were correlated with 24h-BP in HC and RH.

Conclusions: ABPM did not significantly influence objective sleep duration and only marginally induce sleep fragmentation, thus can be safely used for diagnosis of resistant hypertension.

BP.01.06 SLEEVE GASTRECTOMY VS ROUX-EN-Y GASTRIC BYPASS. EFFECT ON METABOLIC COMORBIDITIES

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Objective: Sleeve gastrectomy (SG) and Roux-en-Y gastric bypass (RYGB) are the most commonly used operations to treat morbid obesity worldwide. The purpose of this study is to compare the effect on metabolic comorbidities of SG vs RYGBP.

Design and method: We studied 17,035 morbid obese patients (12,540 females), of median age 43 (range: 14–75) years, who had a bariatric procedure (6,413 SGs and 10,622 RYGBPs) from January 2010 till December 2015, with at least 12 months follow-up.

Results: Patients with SG were heavier pre-operatively (BMI: 43.43 vs 42.46 kg/m², p < 0.0001). However, significantly better % excess weight loss were seen following GBP in all post-operative years. Weight loss was peaked at the 18th month after surgery for both procedures. Six thousands one hundred eighty seven (36.3%) patients were hypertensives, 4,125 (24.2%) had diabetes mellitus or impair glucose tolerance, and 5,214 (30.8%) dyslipidemia. Significantly more patients have their hypertension resolved or improved following RYGBP than after SG in the first (48% vs 44%, p = 0.018) and second (55% vs 49%, p = 0.023) post-operative year. However, in the subsequent years, there were no differences in hypertension resolution following either procedure. Better glycemic control was observed in 60.1% of patients after RYGBP, as compared to 54.2% following SG, in the first post-operative year (p = 0.005). No differences were observed in glycemic control in the subsequent years following the two studied procedures. Similar results were observed for dyslipidemia. RYGBP patients showed higher remission rate during the first post-operative year (57% vs 37% p = 0.0001), although equal rate for dyslipidemia remission, with the SG patients, in the subsequent 5 post-operative years.

Conclusions: Both procedures had a considerable high remission rate of metabolic comorbidities in morbid obese patients. RYGBP had better results than SG after the first post-operative year; however after that, both procedures had equal remission rates, in the subsequent 5 post-operative years.

BP.01.07 SEVERITY OF HEMODYNAMIC AND METABOLIC DISORDERS IN PATIENTS WITH ESSENTIAL HYPERTENSION AND TYPE 2 DIABETES DEPENDING ON GENETIC POLYMORPHISM OF AGTR1 GENE

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Objective: The aim of the study was to investigate the severity of hemodynamic and metabolic disorders in patients with essential hypertension (EH) and type 2 diabetes (DM2) in A1166C polymorphism of angiotensin II receptor type 1 (AGTR1) gene in Ukrainian population.

Design and method: The main group consisted of 320 patients with EH and DM2; the comparison group consisted of 90 patients with EH without DM2; the control group consisted of 31 healthy individuals. We determined carbohydrate and lipid profiles, levels of adiponectin and leptin, conducted genotyping of A1166C polymorphism of angiotensin II receptor type 1 gene.

Results: It was established that 61.6% of patients with EH and DM2 and 57.8% with EH without DM2 had A/C and C/C genotypes of AGTR1. As to the spectrum of these genotypes the main group and the comparison group significantly differed from the control group (p < 0.01). The patients with EH and DM2 in presence of A/C and C/C genotypes of AGTR1 gene had significantly higher blood pressure (p < 0.001), higher levels of glucose, HbA1c, insulin, HOMA-IR, leptin (p < 0.01) and significantly lower levels of
high-density lipoprotein cholesterol \( (p < 0.001) \) and adiponectin \( (p < 0.01) \) as compared to A/A genotype. The difference of adipokines levels can be explained by the influence of angiotensin II activation to the change of expression of gene encoding adipokines. However in patients with EH without DM2 polymorphism of AGTR1 gene was associated with the difference blood pressure \( (p < 0.001) \), carbohydrate \( (p < 0.01) \) and lipid \( (p < 0.001) \) spectra but did not affect adipokines levels. The absence of differences adipokines levels in the comparison group depending on AGTR1 polymorphism, unlike the main group, can indicate that the association of metabolic parameters with polymorphism of AGTR1 gene is more pronounced in presence of DM2.

**Conclusions:** In Ukrainian population of patients with EH polymorphism of AGTR1 gene was associated with the severity of hemodynamic and metabolic disorders. In comorbidity of EH and DM2 A/C and C/C genotypes of AGTR1 gene were associated with more pronounced adipokines disbalance as compared to A/A genotype of AGTR1 gene.
ORAL PRESENTATIONS IN POSTER AREA BP02:
DIAGNOSIS AND TREATMENT

BP.02.01 TREATMENT WITH ESAXERENONE (CS-3150) IS ASSOCIATED WITH A SIGNIFICANT DOSE-DEPENDENT ANTIHYPERTENSIVE EFFECT IN ESSENTIAL HYPERTENSIVE PATIENTS

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Objective: To evaluate the antihypertensive effects and safety of esaxerenone (CS-3150), a novel non-steroidal mineralocorticoid receptor antagonist, to determine the optimal dose for reducing blood pressure in patients with essential hypertension.

Design and method: Four hundred subjects with essential hypertension (sitting systolic blood pressure (SBP): 140 to <180 mmHg, diastolic blood pressure (DBP): 90 to <110 mmHg, 24-h blood pressure by ABPM: >130/80 mmHg) from 19 sites in Japan were enrolled in a randomized, double-blind, placebo-controlled, open-label comparator Phase II study. Patients were assigned to one of five groups (n = 80/group), and received 1.25, 2.5, or 5 mg/day CS-3150, placebo, or 50 to 100 mg/day eplerenone. Treatment was for 12 weeks following a 4-week washout period. Efficacy was assessed by monitoring sitting SBP and DBP changes from baseline to weeks 10 and 12 of treatment, and 24-h BP from baseline to the end of treatment. Safety was assessed by monitoring serum potassium changes from baseline, and the occurrence of adverse events.

Results: A dose-dependent response in efficacy was observed, with analysis of covariance showing a significant lowering of sitting SBP and DBP in the 2.5 and 5 mg/day CS-3150 groups compared with placebo (all p < 0.001). CS-3150 1.25 mg/day significantly lowered sitting SBP (p = 0.0412). Target BP achievement was also dose dependent. Similarly, 24-h BP changes showed a clear dose relationship, and all CS-3150 doses significantly lowered 24-h BP compared with placebo (1.25 mg/day: p = 0.0038 and 0.0154 for 24-h SBP and DBP, respectively; 2.5 and 5 mg/day: all p < 0.0001). Compared with placebo, all CS-3150 doses were well tolerated. Hyperkalemia (> = 5.5 mEq/L) was briefly detected in the 2.5 and 5 mg/day groups, but it was transient and recovered without treatment.

Conclusions: A novel non-steroidal mineralocorticoid receptor antagonist CS-3150 had a dose-dependent antihypertensive effect on sitting SBP and DBP as well as 24-h BP. CS-3150 showed good efficacy and safety profiles in essential hypertensive patients.

BP.02.02 RATE OF MORNING BLOOD PRESSURE SURGE IS A BETTER PREDICTOR THAN AMPLITUDE FOR 20-YEAR ALL-CAUSE AND CARDIOVASCULAR MORTALITIES: RESULTS OF A COMMUNITY-BASED STUDY

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Objective: Morning blood pressure (BP) surge (MS) is recognized as an important predictor of cardiovascular outcomes. We compared the prognostic values of MS amplitude and rate of BP rise for predicting long-term mortality in a population-based cohort.

Design and method: We enrolled 2,025 participants (984 females, 1,041 males, aged 30–79 years) with complete demographic and 24-h ambulatory blood pressure monitoring data. During a median 19.7-year follow-up, 607 deaths (119 by cardiovascular causes) were confirmed from the National Death Registry. The amplitude of sleep-trough MS (STMS) was derived from the difference between the morning systolic blood pressure (SBP) and the lowest nighttime SBP. In addition, the rate of MS was derived as the slope of linear regression of sequential SBP measures on time intervals within the STMS period.

Results: Thresholds for high MS amplitude and rate were determined by the 95th percentiles (43.7 mmHg and 11.3 mmHg/h, respectively). Multivariable Cox models adjusting for age, sex, body mass index, smoking, alcohol consumption, low-density lipoprotein cholesterol, 24-h SBP night/day SBP ratio, and anti-hypertensive treatment revealed that a high STMS rate (HR 1.601; 95% CI 1.145–2.237) but not STMS amplitude (1.281 95% CI 0.944–1.737) as significantly associated with greater risk of mortality. Similarly, STMS rate (HR 2.287, 95% CI 1.177–4.444) but not STMS amplitude was significantly associated with the risk of cardiovascular mortality (HR 0.954, 95% CI 0.466–1.951).

Conclusions: The STMS rate may be a more sensitive and reliable predictor of mortality than the STMS amplitude. Appropriate management for a rapid STMS should be further investigated.

BP.02.03 ACCURACY OF AUTOMATED BLOOD PRESSURE MONITORS IN CHILDREN: A SYSTEMATIC REVIEW

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Objective: For the accurate diagnosis of hypertension in children current guidelines recommend the use of out-of-office blood pressure (BP) monitoring, which is based almost exclusively on automated BP monitors. This study reviewed the evidence on the accuracy of automated BP monitors in children.

Design and method: A systematic review of validation studies of electronic BP monitors in children (age 3–12 years) according to established validation protocols was performed. Medline and EMBASE databases were searched via Dialog ProQuest.

Results: The initial literature search retrieved 4,156 articles and 28 were analyzed (31 validation studies of 29 devices; n = 3,067 including 1,450 children). 13 articles (42%) were published a decade ago or longer. Sixteen studies (52%) included children and also adolescents and 5 (16%) also adults. 11 studies that included children and older subjects did not report the number of children. From the 29 devices validated, 16 (55%) were designed for professional office BP measurement, 7 (24%) for ambulatory BP monitoring and 6 (21%) for home monitoring. Fourteen studies (45%) applied validation criteria of more than one protocols. The Association for the Advancement of Medical Instrumentation and/or International Organization for Standardization protocol was used in 20 studies (65%), the British Hypertension Society protocol in 18 (58%) and the European Society of Hypertension International protocol in 6 (19%). Koreskov K5 was used for reference diastolic BP in 14 studies, K4 in one study, and 4 studies used K4 or K5 depending on the subject (not reported in 12 studies). Results from children were reported together with those of older subjects (adolescents or adolescents and adults) in 26
### THE ANTIHYPERTENSIVE EFFECT OF EMPAGLIFLOZIN IN RATS WITH NON-DIABETIC NEPHROSION

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**Objective:** The effects of sodium-glucose cotransporter-2 (SGLT2) inhibition on lowering blood pressure are well characterized in diabetic animals and humans. However, it is unclear whether SGLT2 inhibitors may have antihypertensive effects in non-diabetic kidney disease. This study was undertaken to investigate whether the hypertensive response to SGLT2 inhibition is greater in non-diabetic proteinuric kidney disease may be controlled by empagliflozin.

**Design and method:** Male Sprague-Dawley rats were randomly divided into two nephrectomized controls (NXD, n = 5), uninephrectomy plus doxorubicin-treated rats (NXDE, n = 5), and uninephrectomy plus doxorubicin/empagliflozin-coated rats (NXDE, n = 5). Doxorubicin was administered via femoral vein in a single bolus (5 mg/kg) after 7 days of right nephrectomy. Empagliflozin (20 mg/kg/d) was daily given in food slurry. After 5 weeks of empagliflozin administration, kidneys were harvested for immunoblotting of sodium transporters.

**Results:** At baseline (Day 0, immediately before doxorubicin treatment), systolic blood pressures were not different between groups: NX, 120 ± 1; NXD, 120 ± 1; and NXDE, 119 ± 3 mmHg. From Day 7 (NX, 127 ± 1; NXD, 163 ± 3; and NXDE, 155 ± 1 mmHg) through Day 35 (NX, 130 ± 1; NXD, 172 ± 1; and NXDE, 160 ± 1 mmHg), remarkable hypertension was induced by doxorubicin and significantly relieved by empagliflozin cotreatment (P < 0.01). Significant proteinuria was produced from Day 14 and increased thereafter by doxorubicin but not decreased by empagliflozin cotreatment. Systolic diuresis was evidently induced by empagliflozin administration from Day 7 (NXDE 40.7 ± 1.3 vs. NXD 21.7 ± 1.1 mosmole/d, P < 0.01) through Day 35 (NXDE 52.3 ± 4.0 vs. NXD 27.9 ± 1.7 mosmole/d, P < 0.01), in parallel with natriuresis and glycosuria. Immunoblot analysis from the kidney showed that compared with NXD, NXDE had decreased protein abundance of Na-K-2Cl cotransporter-2 (100 ± 31 vs. 40 ± 8%, P < 0.05) and Na-K-ATPase alpha1 subunit (100 ± 13 vs. 51 ± 13%, P < 0.05) but no change in Na/H exchanger-3.

**Conclusions:** In our uninephrectomized rat model, doxorubicin-induced hypertension was significantly ameliorated by empagliflozin administration. This antihypertensive effect was associated with decreased expression of renal sodium transporters and resultant increased natriuresis, but not with proteinuria reduction.

### FEASIBILITY AND EFFICACY OF RENAL DENERVATION THERAPY IN HEMODIALYSIS PATIENTS WITH RESISTANT HYPERTENSION

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**Objective:** AIM: Nephrectomy has been considered for patients with malignant hypertension on dialysis to reduce the pressor effects reflexly induced byafferent fibers originating in the renal structure and still active in nonfunctioning kidneys. Because the morbidity and mortality associated with the surgical procedures has limited its adoption, endovascular procedures that might denervate the native nonfunctioning kidney much more invasively has been proposed as an alternative therapeutic strategy.

**Design and method:** We enrolled 5 consecutive dialised patients affected by resistant hypertension (RH, 4 men, 1 woman, mean age 50 years). The average duration of dialysis was 5.4 years and the average number of antihypertensive drugs for each patient was 3.5. The renal arteries average diameter was 3.96 mm. The cohort underwent bilateral percutaneous trans-catheter renal denervation (RDT) with the EnligHTN System (St. Jude Medical, St Paul, MN, USA). Procedures included intrarterial Systolic blood pressure (SBP), diastolic (D) BP, mean (M) BP and heart rate (HR).

**Results:** The small basket device of the EnligHTN was used in all patients. RDT was performed without complications, with an average number of ablations of 33.8. SBP was reduced by the procedure from 162.7 to 130.4 mmHg (p-value 0.02) with also a reduction of DBP (from 97.6 to 83.6 mmHg, p-value 0.04) and MABP (from 119.3 to 99.2 mmHg, p-value 0.03) and no significant HR changes (from 78 to 72 bpm, p-value 0.74).

**Conclusions:** the bilateral RDT procedure in dialised patients with RH was feasible without complications and produced an acute statistically significant decrease in BP. Diseased kidneys might be the source of a persistently elevated activity of afferent signals to the central sympathetic nervous system, the interruption of which may favour BP reduction. This may be obtained by renal denervation with no need of surgical kidney removal.

### MATRIX METALLOPROTEINASE 2 AND 9 POLYMORPHISMS ARE ASSOCIATED WITH TARGET ORGAN DAMAGE IN OBESE RESISTANT HYPERTENSIVE SUBJECTS


**Objective:** The aim of this study is to analyze the influence of MMP-2 and -9 SNPs in obese hypertensive (HTN) and resistant hypertensive (RH) subjects, as well as their association with MMP-2 and 9 levels and target organ damage (TOD).

**Design and method:** Two thousand and fifty-six hypertensive subjects were divided in obese (BMI > 30 kg/m²) and non-obese (BMI lower than 30 kg/m²). Genotypes were obtained by allelic discrimination assay using real-time polymerase chain reaction. We compare clinical and laboratory characteristics according to genotypes/haplotypes for MMP-2 (rs243865, rs243866 and rs2285053) and MMP-9 SNPs (rs17577, rs17576 and rs391824) in obese HTN and RH subjects.

**Results:** No difference in allele, genotype and haplotypes frequencies for all polymorphisms between obese and non-obese HTN and RH were found. MMP-2 and MMP-9 and their TIMPs levels were similar in obese HTN and RH according to MMP-2 and MMP-9 genotypes for all SNPs assessed. The same happened for clinical and biochemical characteristics among the genotypes in obese HTN and RH subjects except for some parameters: diastolic ambulatory blood pressure (BP) monitoring was higher in AG-AA compared to GG genotype for both rs243866 and rs243865 MMP-2 SNPs and the office diastolic BP was higher in AA than AG-GG genotype for rs17577 MMP-9 polymorphism in obese HTN. However, when we compared the TOD according to genotype in obese RH we found that PWV was higher in CC genotype than CT for rs2285053 MMP-2 polymorphism [8.8 (8.1 – 11) vs 8.7 (8.6 – 8), p = 0.04]. Also, the AG-AA genotype for rs243866 and rs243865 MMP-2 polymorphisms have the same levels of LVMI and they are higher than GG genotype [116 ± 37 vs 138 ± 40, p < 0.04]. Finally the microalbuminuria level was higher in AG+GG compared to AA genotype for rs17576 MMP-9 polymorphism. A multiple linear regression showed that only rs243866 and rs243865 are an independent predictor for LVMI levels after adjusted by gender, age, office BP, aldosterone and glucose levels.

**Conclusions:** Therefore, the MMP-2 and -9 polymorphisms are associated with TOD in obese RH subjects.

### LOSARTAN/HCTZ COMBINATION THERAPY IS SAFE AND USEFUL IN CONTROLLING MORNING HYPERTENSION IN VERY ELDERLY PATIENTS

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**Objective:** Morning hypertension is an independent risk for cerebrovascular and cardiovascular events. Although the incidence of morning hypertension increases with age, treatment of morning hypertension has not been established particularly in late-elderly patients. Among various combinations, ARB combined with a small dose of diuretic is desirable because the two drugs have complimentary mechanisms of action, and effectively reduce BP. Thus, we investigated the safety and efficacy of ARB/hydrochlorothiazide (HCTZ) combination in controlling morning hypertension in the very elderly.

**Design and method:** This is a subanalysis of the Morning Hypertension and Angiotensin Receptor Blocker/Hydrochlorothiazide Combination Therapy (MAPPY) study, which compared the effects of a combination of 50 mg losartan/12.5 mg HCTZ (Combination) and 100-mg losartan (High ARB) on morning SBP levels after 3-month treatment in on-treatment hypertensive patients with morning SBP greater than 135/85 mmHg on home BP self-measurement. Patients were allocated to very elderly group (more than 75 years) and young/elderly group (below 75 years).
**Results:** Effects of 3-month Combination therapy and High ARB therapy were summarized in Table (*P < 0.05 and **P < 0.01 vs. baseline; #P < 0.05 and ##P < 0.01 vs. High ARB group). More than 98% of patients in all groups showed the adherence to medications of 80% or more. The incidence of adverse events of both treatments was similar in both groups.

**Conclusions:** In the elderly patients, ARB/HTCZ combination induced further morning SBP reduction and greater target achievement ratio of morning BP (<135/85 mmHg), than high-dose ARB, to the similar levels seen in the young/elderly patients. And, ARB/HTCZ combination was safe and tolerable in either age group.
ORAL PRESENTATIONS IN POSTER AREA BP03:
EPIDEMIOLOGY AND MANAGEMENT

BP03.01  EFFECT OF ACETYLSALICYLIC ACID ON THE MARKERS OF ENDOTHELIAL CELL DYSFUNCTION IN WOMEN WITH GESTATIONAL HYPERTENSION

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Objective: The target organ of preeclampsia (PE) is the maternal endothelium. Clinical manifestations are associated with its dysfunction. A case control study was designed to analyze markers of endothelial dysfunction in women with gestational hypertension (GH), preeclamptic women and to compare these levels to the disease state as well as investigate if acetylsalicylic acid (ASA) can influence the endothelial function in women with GH.

Design and method: 64 pregnant women with gestational hypertension (GH) (group A), 50 healthy pregnant women (group B) and 45 non-pregnant women (control group C) were enrolled. Exclusion criteria were chronic hypertension, diabetes mellitus, renal disease and antiphospholipid syndrome. Levels of vonWillebrand factor, soluble adhesion molecules-intercellular adhesion molecule-1(ICAM-1), vascular cell adhesion molecule-1(VCAM-1), were compared in all groups. Groups were matched. Low dose (80 mg q.d.) of ASA was prescribed in group A at the time of the diagnosis of GH. Levels of vWF, ICAM-1, VCAM-1 were measured 60 days after ASA began. Multivariate logistic regression models were used.

Results: ICAM-1 and VCAM-1 were significantly elevated in women with GH compared to group B and C (296 ± 86, 222 ± 79 and 219 ± 89 ng/ml; < 0.005, 633 ± 105 ± 87 and 489 ± 98 ng/ml; p = 0.02), whereas vWF was not associated. Eleven women (group A) and 3 (group B), developed preeclampsia. vWF, ICAM-1 and ICAM-1 levels were significantly higher in preeclamptic patients than in GH women (172% vs 129%, 784 ± 82 vs. 633 ± 109 ng/ml; p < 0.05 and 405 ± 67 vs. 296 ± 57 ng/ml; p < 0.05, respectively). Multivariate logistic regression model showed that levels of ICAM-1, CAM-1 and vWF have a significant influence on the occurrence of PE (p = 0.04, p = 0.05 and p = 0.006, respectively). VCAM-1, ICAM-1 were significantly lower after ASA was prescribed in group A (633 ± 101 ng/ml vs 410 ± 116; p < 0.005 and 296 ± 86 vs 188 ± 76 ng/ml; p < 0.005) but not for group B and C.

Conclusions: Our data indicate that vWF, VCAM-1 and ICAM-1 levels were significantly higher in preeclamptic patients and are correlated with the development of PE. These data suggest that these molecules may be sensitive inflammatory biomarkers for preeclampsia. The use of ASA reduces adhesion molecules levels in women with gestational hypertension.

BP03.02  ON THE ORIGIN AND DISAPPEARANCE OF sFlt-1 AND PlGF IN PREECLAMPSIA

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Objective: To assess the changes in the anti-angiogenic, PlGF-sequestering soluble receptor (sFlt-1) and the pro-angiogenic placential growth factor (PIGF) levels in preeclamptic women after delivery.

Design and method: In this exploratory study, serum sFlt-1 and PIGF levels were measured in 23 women aged 20 to 41 years with a median duration of labor of 27 weeks (range 24–32 weeks) using the automated Elecsys system. The women were randomly chosen from a big preeclampsia/HELLP cohort, and blood samples were drawn before and after delivery. Concentrations after delivery were expressed as a percentage of the concentration in the sample that was taken at the final stage of pregnancy. The half-life (t1/2) over the first week was calculated on the basis of the formula Ct = C0 x e-kt, where C0 is the concentration in the last sample taken during pregnancy, C the concentration at t1 after delivery and k = ln2/t1/2.

Results: Median sFlt-1 and PIGF concentrations of pregnancy were 10578 (4505, 85000) and 26 (6 – 237) pg/mL, respectively, and the ratio was 569 (83, 1034). sFlt-1 decreased with a half-life of 1.4 ± 0.0 days, and then stabilized at levels corresponding with < 1% of the levels before delivery. PIGF decreased with a half-life of 3.7 ± 4.3 days and then stabilized at levels corresponding with ~30% of the levels before delivery. Changes in the ratio paralleled those in sFlt-1; the half-life was 0.6 ± 0.7 days.

Conclusions: The rapid and pronounced decline of sFlt-1 values, unlike PIGF, in patients with preeclampsia/HELLP suggests that sFlt-1 almost exclusively (>99%) originates in the placenta, thus allowing a quick normalization of the sFlt-1/PIGF ratio.
Design and method: To assess CV risk and hypertension control in a sample of the Italian population, individuals participating to the 2015 “World Hypertension Day” were interviewed in 62 cities all over Italy. Blood pressure was measured with a validated auscultatory or oscillometric device and information on demography and prevalence of CVD risk factors was collected by an anonymous questionnaire. An ad-hoc modified version of the Systematic Coronary Risk Evaluation (SCORE) system was then applied.

Results: 8657 recruited individuals (43% women, aged 56.6±16 years) were subdivided into 3 age groups (40–49, 50–59, 60–69 years) for analysis. CV risk was low in 62.4%, 18.6% and 0%; moderate in 26.0%, 66.0% and 62.5%; high/very high in 11.6%, 16% and 37.4%, respectively. Smoking was mainly responsible for increased CV risk among those aged 40–49 (26%/smokers), while hypertension was the main factor in the whole sample and in subjects over 50y (36% and 42% respectively). Overall, BP control was unsatisfactory in 36% of individuals (28%, 48% and 31% of those who declared to be normotensive, hypertensive on treatment or unaware of their BP condition, respectively).

Conclusions: In this sample of the Italian population CV risk was alarmingly high, irrespectively of age, mostly due to presence of modifiable risk factors, including hypertension, which should thus be better addressed, especially in the youngest.

LONG-TERM IMPACT OF ELEVATED BLOOD PRESSURE IN CHILDHOOD ON ADULT SUBCLINICAL CARDIOVASCULAR DISEASES: EVIDENCE FROM CHINA

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Objective: Hypertension is the main risk factor for cardiovascular disease. The association between childhood elevated blood pressure and adult subclinical cardiovascular diseases has been reported in several longitudinal studies from Europe, US and Australia. We aimed to examine the long-term impact of elevated blood pressure (BP) from childhood on subclinical cardiovascular diseases and chronic kidney disease in a China population.

Design and method: Data were obtained from a school-based prospective study, which consisted of 1256 adults aged 27–42 years who had 2–10 measurements of body mass index (BMI) and blood pressure from childhood in 1987. The total area under the growth curve (AUC) and incremental AUC from childhood to adulthood were calculated to characterize the cumulative risk burden and long-term trends of BMI and BP during the follow-up duration. In the final survey (2010), we measured multiple markers of subclinical cardiovascular diseases and chronic kidney disease, including carotid intima-media thickness (cIMT), carotid-femoral pulse wave velocity (cPWV), left ventricular mass (LVM), and microalbumin (MAU) were measured.

Results: Pearson correlation analyses showed that BP in childhood and adulthood, as well as cumulative and incremental values from childhood to adulthood, were all significantly associated with adult cIMT, cPWV, LVM, and MAU in males and in females (all P < 0.05). In the multivariate logistical analyses, for both genders, childhood SBP predicted hypertension, high cIMT, high cPWV, high LVM and high MAU in adulthood. However, the associations for high cIMT, high cPWV, high LVM and high MAU were largely attenuated and became non-significant after additional adjustment for adult BP and other risk factors, except that childhood BP showed a borderline significant association with high cPWV in adulthood for males. In addition, for both genders, incremental BP from childhood to adulthood predicted high cIMT, high cPWV, high LVM and high MAU in adulthood independent of childhood values.

Conclusions: Both elevated BP from childhood and incremental BP from childhood to adulthood play important roles in the development of subclinical cardiovascular diseases and chronic kidney disease in adulthood.

THE ADDED VALUE OF THE BIOMARKERS sFt-1, PI GF AND THEIR RATIO ON PREDICTION OF PROLIFERATION OF PREGNANCY AND MATERNAL AND FOETAL COMPLICATIONS IN (SUSPECTED) PREECLAMPSIA

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Objective: To assess whether a single determination of the serum values of sFlt-1, PI GF and their ratio improves prediction of delivery and maternal and foetal complications in women with suspected or clinically confirmed preclampsia.

Design and method: In this prospective, multicentre, observational study the plasma levels of antiangiogenic soluble fms-like tyrosine kinase 1 (sFlt-1) and proangiogenic placental growth factor (PIGF) were measured in women with (suspected) preclampsia. Multivariable logistic regression analysis was used to assess the added value of sFlt-1, PIGF and their ratio to the traditional criteria, including gestational age, parity, blood pressure, proteinuria, uric acid, alanine aminotransferase and platelets, to estimate the risk of delivery and maternal and foetal complications. Models were compared using concordance (C)-statistic and R2.

Results: Six hundred twenty women (age 18 to 48 yrs., singleton pregnancies, median pregnancy duration 34 weeks (range 20–41 weeks) were included. Complications occurred in 118 (19%) of the women and in 248 (40%) of the neonates. Adding PIGF or the sFlt-1/PIGF ratio to the traditional criteria strongly predicted faster delivery, both resulting in R2 increases of 40%, whereas sFlt-1 alone increased the R2 by only 17%. The predictive value of maternal complications improved by adding sFlt-1, PIGF or the ratio to the traditional criteria, resulting in an increase of the C-statistic by respectively 0.080, 0.065 and 0.090 (from 0.746 to 0.826, 0.811 and 0.836, respectively). The incorporation of sFlt-1, PIGF and their ratio to the traditional criteria also resulted in an increase of the c-statistic for the foetal complications, by respectively 0.032, 0.053 and 0.04 (from 0.764 to 0.796, 0.817 and 0.812).

Conclusions: sFlt-1, PIGF and their ratio have additive predictive value on top of the traditional criteria for both maternal and foetal complications, while PIGF and the ratio, but not sFlt-1 alone, help to predict faster delivery.

EFFECT OF COMBINED HORMONAL REPLACEMENT THERAPY ON THE ALDOSTERONE/REIN RATIO IN POSTMENOPAUSAL WOMEN

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Objective: Plasma aldosterone/renin ratio (ARR) is the most popular screening test for primary aldosteronism (PA) is. Because both estrogen and progesterone affect aldosterone and renin levels, we studied effects of combined hormonal replacement therapy (HRT) on ARR, measuring PA as both direct renin concentration (DRC) and plasma renin activity (PRA).

Design and method: 15 normotensive, healthy postmenopausal women underwent measurement (seated, midmorning) of plasma aldosterone, DRC, PRA, electrolytes and creatinine and urinary aldosterone, cortisol, electrolytes and creatinine at baseline and after 2 weeks and six weeks treatment with combined HRT (Premia 2.5 continuous).

Results: Treatment with combined HRT was associated with significant increases in aldosterone [baseline median (range) 150 (85–600), 2 weeks 230 (129–790), 6 weeks 434 (200–1200) pmol/L (P < 0.001 Friedman Test)] and PRA [2.3 (1.2–4.3), 3.8 (1.4–7.0), 5.1 (1.4–10.8), P < 0.001]; but decreases in DRC [21 (10–31), 23 (10–39), 14 (8.0–30) mU/L, P < 0.01] leading to increases in ARR calculated by DRC [7.8 (3.6–34.8), 11.4 (5.4–48.5), 0.826, 0.817 and 0.812]. The combined oral HRT used in this study is capable of significantly increasing ARR with risk of false positive results during screening for PA, but only if DRC is used to calculate the ratio.

ENDOTHelin RECEPTOR TYPE B-DEFICIENT PREGNANT RATS HAVE EXAGGERATED PLACENTAL ISCHEMIA-INDUCED HYPERTENSION

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Objective: Preeclampsia (PE) is a pregnancy-specific disorder of new-onset hypertension. While its pathogenesis is unclear, studies have implicated placental ischemia. Indeed, reduced uterine perfusion pressure (RUPP)-induced placental ischemia in experimental animals stimulates the release of factors into the maternal circulation where they cause vascular dysfunction and hypertension. Pharmacological blockade of the vasoconstrictive endothelin type A receptor (ETA)
abolishes RUPP-induced hypertension. Although blockade of vasodilatory ETB receptors increases blood pressure during late pregnancy in rodents, and placental ischemia has been shown to reduce ETB receptor expression, the importance of the ET/ETB receptor pathway in blood pressure regulation during pregnancy or in response to placental ischemia is unclear. The hypothesis was tested that ETB deficiency results in exaggerated placental ischemia-induced hypertension.

**Design and method:** At eighteen weeks old, ETB deficient (def) and transgenic control (Tg) timed-pregnant rats were generated using Wistar Hannover males. Rats underwent RUPP or Sham surgeries at gestational day 14, with assessment of mean arterial blood pressure (MAP, carotid catheter) and fetal weights and plasma collection at day 19. This resulted in 4 groups: Sham Tg (N = 13); RUPP Tg (N = 10); Sham ETB def (N = 11); and RUPP ETB def (N = 6).

**Results:** MAP was greater in Sham ETB def over Sham Tg (109 ± 3 vs. 79 ± 3 mmHg, P < 0.05). MAP levels were increased by RUPP in both Tg (99 ± 3 mmHg, P < 0.05) and ETB def (139 ± 6 mmHg, P < 0.05), but the degree of this hypertension was exaggerated in ETB def rats (30 vs. 20 mmHg). Circulating levels of cGMP, a surrogate measure of bioavailability of the vasodilator nitric oxide (NO), were reduced in Sham ETB def compared to Sham Tg (43 ± 5 vs. 178 ± 18 pg/mL, P < 0.05), which were reduced by RUPP in Tg (18 ± 3 pg/mL), but not further reduced in RUPP ETB def (35 ± 11 pg/mL).

**Conclusions:** These data not only suggest an important role for ETB in blood pressure regulation during normal pregnancy but also in buffering the response to placental ischemia-induced hypertension.
ORAL PRESENTATIONS IN POSTER AREA B04:
MECHANISMS OF HYPERTENSION

BP.04.01  PLASMA MIR-LET7 EXPRESSION LEVEL IS POSITIVELY RELATED TO CAROTID INTIMA-MEDIA THICKNESS IN ESSENTIAL HYPERTENSION PATIENTS

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Objective: MicroRNAs (miR) play a critical role in the pathophysiology of arterial remodeling in essential hypertension, and are emerging as potential biomarkers and therapeutic targets in cardiovascular disease. The aim of this study was to assess the relationship of plasma miR-let7 expression level with subclinical atherosclerosis in untreated patients with newly diagnosed essential hypertension.

Results: There were 240 participants including 60 healthy volunteers with normal carotid intima-media thickness (nCIMT), 60 healthy volunteers with increased CIMT (iCIMT), 60 hypertension patients with nCIMT and 60 hypertension patients with iCIMT. We observed the lowest miR-let7 expression (21.70 ± 1.45 vs 31.50 ± 1.80 vs 35.49 ± 2.33; P < 0.001) in healthy controls with nCIMT, followed by healthy controls with iCIMT, then hypertension patients with nCIMT and highest expression in hypertension patients with iCIMT. MiR-let7 was independently correlated with CIMT (r = 0.587, P < 0.001).

Conclusions: Our findings present significant evidence that plasma miR-let7 represents a potential non-invasive atherosclerosis marker in essential hypertensive patients and provide new perspectives on the development of a new generation of biomarkers for the better monitoring of end-organ damage in hypertension.

Design and method: We assessed the expression level of miR-let7 in atherosclerosis patients and age-sex matched healthy individuals. All patients underwent measurements of CIMT and ambulatory blood pressure (BP) monitoring. Plasma miR-let7 expression was quantified by real-time reverse transcription polymerase chain reaction. Correlations between miR-let7 expression and BP parameters and CIMT were assessed using the Spearman correlation coefficient and multiple linear regression analysis.

Results: Tumor necrosis factor-related apoptosis-inducing ligand (TRAIL) is associated with inflammation in young adult survivors of childhood cancer

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Objective: Cancer survivors previously treated with cardiotoxic therapies (anthracycline, chest and neck radiotherapy) are at risk for early atherosclerosis secondary to inflammation and endothelial dysfunction. The aim of the study was to assess markers of inflammation and subclinical atherosclerosis in young adult survivors of childhood cancer.

Design and method: We evaluated cardiovascular risk factors and assessed biochemical markers of inflammation and intima-media thickness (IMT) in 50 five-year survivors of childhood cancer (CCS) and in 29 healthy controls.

Results: Cancer survivors (age 23.6 ± 2.8 years, 10.4 ± 4.1 years since the end of treatment, 94% with hematologic malignancies) had higher total cholesterol level (4.7 ± 1 versus 4.3 ± 0.6 mmol/L; p = 0.03) and LDL cholesterol (2.6 ± 0.9 versus 2.2 ± 0.6 mmol/L; p = 0.03) but were comparable with controls for other traditional cardiovascular risk factors. IMT was similar in both groups (0.43 ± 0.05 mm in CCS and 0.41 ± 0.05 mm in controls; p = 0.13). Inflammatory markers: hsCRP and fibrinogen were increased in CCS compared to controls (0.79 [0.33–2.42] versus 0.30 [0.17–0.57] mg/l; p = 0.006 and 2.8 [2.5–3.3] versus 2.2 [1.9–2.4] g/l; p < 0.001, respectively). Serum TRAIL levels were lower in CCS than in controls (97.6 ± 38.7 versus 127.8 ± 37.6 pg/ml; p = 0.001) and correlated negatively with PTX3 (r = −0.64; p < 0.001). IMT was not associated with inflammatory markers in CCS.

Conclusions: Young childhood cancer survivors 10 years after treatment had increased cholesterol level and inflammatory markers but no signs of subclinical atherosclerosis. Low serum TRAIL levels were significantly associated with higher PTX3. It may suggest possible role of TRAIL in the control of chronic inflammatory activation and reflect a dysregulation of apoptosis in patients previously treated for cancer.

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Design and method: We studied 347 subjects (259 men) from the HARVEST study (mean age 37.3 ± 10.1 years). Central blood pressure and Alx were evaluated with Specaway DAT system and small artery compliance (SAC) with HDI Pulse Wave device. HR was measured at baseline in the office (mean of 6 readings) and with 24 h ambulatory recording. The arterial elasticity assessment was performed after a mean of 6.7 years from baseline. In multivariate regression analyses, Alx and central systolic BP were used as dependent variables and office HR or night-time HR as predictors adjusting for age, sex, BMI, height, mean BP, smoking, alcohol, physical activity habits, SAC, and pulse wave velocity.

Results: Adjusted office HR measured at the time of arterial elasticity assessment was inversely correlated with Alx (p = 0.001) a relationship which was attenuated after physical activity (p = 0.004) and ejection duration (p = 0.015) were taken into account. In addition, office HR was inversely correlated with central BP (p = 0.039) a relationship which was no longer significant after physical activity (p = 0.14)
or ejection duration (p = 0.58) were accounted for. In contrast, in fully adjusted models baseline average nighttime HR was a significant positive predictor of Alx (p < 0.001) and central BP (p = 0.014) measured 6.7 years later. Adjusted Alx was 2.0 ± 3.0% in the top night-time HR quintile, 14.9 ± 4.3% in the 3 intermediate quintiles, and 6.5 ± 2.8% in the bottom quintile. Baseline office HR was unrelated to both Alx and central BP.

Conclusions: These data confirm that HR is negatively related to Alx when measured at the time of arterial elasticity assessment. However, HR measured with ambulatory monitoring is an independent positive long-term predictor of Alx and central BP.

## Table 1: Associations between ATP2B1 variant and EAS

<table>
<thead>
<tr>
<th>Variant</th>
<th>n</th>
<th>CTA positive</th>
<th>CTA negative</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>G/A</td>
<td>100</td>
<td>50</td>
<td>50</td>
<td>1.26</td>
<td>0.74–2.13</td>
<td>0.41</td>
</tr>
<tr>
<td>A/A</td>
<td>50</td>
<td>25</td>
<td>25</td>
<td>1.00</td>
<td>1.00–1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

### Results

There were 330 patients in ICAS group and 551 in NICAS group. Rs2854371 showed significant association with ICAS. The patients with G/A genotype had increased ICAS prevalence (OR1.59; 95% CI: 1.17–2.16) after adjusted for age, sex, BMI, antihypertensive treatment, systolic blood pressure, LDL, HDL, smoking status, and diabetes. A-allele of Rs2854371 was associated with an increased susceptibility to ICAS (OR 1.42; 95% CI: 1.06–1.91). In the subgroup analysis, G/A genotype remained significant in females (OR 2.2; 95% CI: 1.39–3.46), non-diabetics (OR 1.68; 95% CI: 1.17–2.39) and non-smokers (OR 1.55; 95% CI: 1.11–2.17, p = 0.022). Compared with the G/G carriers, patients with G/A genotype were found to have more intracranial atherosclerotic lesions (p = 0.013).

Conclusions: In conclusion, rs2854371 G/A genotype of ATP2B1 gene was associated with increased susceptibility of asymptomatic ICAS in a hypertensive Chinese population, especially in females, non-diabetics and non-smokers.
were 7.9 (95% CI = 7.4 – 9.0) and 66.5 (95% CI = 47.0 – 110.4) respectively (P = 0.001). MPCs to EMPs ratio, NYHA class, galectin-3 and NT-pro-BNP at discharge, increased NT-pro-BNP > 30% within hospitalization period were found as independent predictors of TTE rate. All these predictors were compounded into predictive Model 1. However, adding of EPMs to MPCs ratio to the Model 1 has improved the relative IDI by 17.4% for TTE rate, by 20.1% for fatal TTE, and by 18.1% for TTE-related re-admission.

Conclusions: Conclusion: We demonstrated that EMPs to MPCs ratio might considered a tremendous predictor of TTE and HF-related outcomes in post-discharged clinically stabilized HF patients.

**BP.04.07 EFFECTS OF A NOVEL INTERACTING MOLECULE WITH AT1 RECEPTOR, ATRAP, ON ANGII-INDUCED PROLIFERATIVE ACTIVITY AND OXIDATIVE STRESS IN VASCULAR SMOOTH MUSCLE CELLS**

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Objective: Superoxide anions are recognized as mediators of intracellular signaling cascades and are known to participate in cardiovascular diseases such as arteriosclerosis and hypertension. The NADPH oxidase complex in the vascular smooth muscle cells consists of p22phox, Rac1, and Nox1. We previously 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 modulates Ang II-induced proliferative activity and oxidative stress in vascular smooth muscle cells.

Design and method: We identified that the ATRAP mRNA and protein were endogenously expressed in VSMC, and found a substantial co-localization of ATRAP and AT1R in intracellular compartments in Ang II-stimulated VSMC. Overexpression of ATRAP by adenoviral gene transfer significantly inhibited Ang II-mediated increases in TGF-bmRNA expression (p < 0.05, n = 6) and TGF-b production into the medium (p < 0.05, n = 6). Furthermore, this phenomenon was accompanied by inhibition of Ang II-induced activation of BrdU incorporation (p < 0.05, n = 6).

Results: 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 may suggest a novel strategy to inhibit cardiovascular disease such as arteriosclerosis and hypertension.