

POSTER SESSION

POSTERS' SESSION PS11:

EPIDEMIOLOGY AND RISK FACTORS

THE COMBINATION OF RENAL DYSFUNCTION AND MUSCLE MASS REDUCTION IS ASSOCIATED WITH ARTERIAL STIFFNESS IN ELDERLY INDIVIDUALS

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Objective: Epidemiological studies have found that both renal dysfunction and muscle mass reduction (sarcopenia) are associated with the target organ damage and future risk of cardiovascular disease. This study aimed to examine whether the renal dysfunction, muscle mass reduction, and their combination related to arterial stiffness among elderly individuals.

Design and method: From the participants in Wakayama study, a total of 552 normotensive and untreated hypertensive elderly individuals (mean age, 69.5 ± 3.6 years) without a history of stroke, coronary heart disease and renal disease was enrolled in this study. Brachial-ankle pulse wave velocity (baPWV) was measured by a simple automatic oscillometric technique and used as index of arterial stiffness. The skeletal muscle mass (SM) of the whole body was estimated by a bioelectrical impedance analysis. The renal dysfunction was evaluated by a glomerular filtration rate (eGFR) correlated by body surface area.

Results: The eGFR and SM of subjects decreased with increase in age, and the values were significantly higher in men than women. The eGFR was positively correlated with SM in both genders. We divided the subjects into four groups according to eGFR and SM levels; namely, high-eGFR (> 60 ml/min/1.73 m²) + high SM (> age- and gender-specific median value) group (n = 228), high-eGFR + low-SM group (n = 189), low-eGFR + high-SM group (n = 58) and low-eGFR + low-SM group (n = 77). There was no significant difference in blood pressure between the four groups. The baPWV was the highest in the low-eGFR + low-SM group (1,751 cm/s), and followed by the high-eGFR + low-SM group (1,708 cm/s), the low-eGFR + high-SM group (1,687 cm/s) and the high-eGFR + high-SM group (1,610 cm/s). After adjustment for age and gender, the baPWV in the high-eGFR + low-SM group was significantly higher than that in the high-eGFR + high-SM group (p = 0.006); whereas no significant difference between the low-eGFR + high-SM group and the high-eGFR + high-SM group (p = 0.502).

Conclusions: In elderly individuals, the combination of renal dysfunction and muscle mass reduction may contribute to the acceleration of arterial stiffening relative to the condition that they exist solely.

NUTRITIONAL STATUS OF PATIENTS WITH ARTERIAL HYPERTENSION IN ACUTE HOSPITAL SETTING

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Objective: Malnutrition is a highly prevalent condition in the acute hospital setting and is associated with many adverse outcomes. Patients in hospital (acute) setting represent an important risk group for malnutrition. We conducted a study at seven internal clinic departments in University Hospital Split, aimed to assess the nutritional risk and the prevalence of malnutrition at internal clinic departments.

Design and method: Patients admitted to seven internal clinics departments during one month were included. According to the recommendation of ESPEN, Nutritional Risk Screening 2002 (NRS 2002) has been used to evaluate nutritional status of all hospitalized patients during one month. Also, for each patient body mass index (BMI), waist circumference, mid-upper arm circumference, skin fold thickness, serum albumin, creatinine, total cholesterol, glucose and C-reactive protein level were assessed. Also, data about arterial hypertension (AH) were collected by interviewing participants, as well as by reviewing participants' medical records

Results: 345 patients (aged 64.67 ± 14.50 years) were evaluated, 154 (44.6%) females and 191 (55.4%) males. Those patients with AH (N = 214, 62%) have statistically higher NRS score than those patients without AH (N = 131, 38%) (p = 0.001). Also, patient with AH have statistically higher BMI, waist circumference, mid-upper arm circumference, triceps skinfold thickness and glucose level as shown in Table 1. It is important to note that serum albumin level was statistically higher in those patients without AH (p = 0.016).

Conclusions: Our data showed that patients with AH have statistically higher anthropometric value of nutritional status but statistically lower serum albumin level and higher NRS score. These results revealed that those patients with AH in hospital (acute) setting represents an important risk group for malnutrition. Also, BMI and other anthropometric value might not be a reflection of nutritional status in this population of patients.

Table 1. Difference in nutritional status parameters and other laboratories value between patients with arterial hypertension (N=214) and those without arterial hypertension (N=131) (Student's t-test for independent data, one-tailed significance), significant correlations are marked

	Patients without arterial hypertension (N=131)	Patients with arterial hypertension (N=214)	P
	Mean ± SD	Mean ± SD	
Body mass index (kg/m ²)	25.85 ± 4.78	27.47 ± 5.02	0.002*
Waist circumference (cm)	99.31 ± 14.26	105.58 ± 12.92	<0.001*
Mid-arm circumference (cm)	28.97 ± 4.74	30.97 ± 10.35	0.019*
Triceps skinfold (mm)	32.68 ± 10.58	36.29 ± 11.68	0.002*
Albumin (g/L)	36.13 ± 7.39	34.10 ± 6.42	0.016*
Urea (mmol/L)	6.43 ± 4.17	10.96 ± 9.41	<0.001*
Creatinine (μmol/L)	100.08 ± 99.10	176.94 ± 194.77	<0.001*
Total cholesterol (mmol/L)	5.23 ± 2.23	4.92 ± 1.90	0.202
C-reactive protein (mg/L)	34.09 ± 55.01	34.01 ± 51.69	0.495
Glucose (mmol/L)	6.80 ± 2.86	7.95 ± 4.27	0.005*

*P < 0.05

ERYTHROPOIETIN THERAPY IS NOT RELATED TO NON-DIPPING PATTERN AND INCREASED CARDIOVASCULAR MORTALITY IN PATIENTS UNDERGOING CHRONIC HEMODIALYSIS

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Objective: ABPM is superior to dialysis center measurements in predicting cardiovascular (CV) events in patients undergoing chronic hemodialysis (HD). It was found that non-dipping pattern is associated with poor prognosis. There is currently no evidence linking erythropoiesis-stimulating agents (ESAs)-induced hypertension with increased CV morbidity and mortality. It was proposed that long-acting ESA may have a lower hypertensive effect than short-acting ESAs. Our aim was to analyze association of non-dipping pattern, ESA therapy and CV mortality in patients undergoing chronic HD.

Design and method: 164 patients (103 M, 61 F; averaged age 65.2), who had been on intermittent HD treatment for more than 6 months, were enrolled in (88.5% hypertensives, 28.6% diabetics, 19.5% smokers) and followed up for average 25.7 months. Patients received HD treatment 4 hr/session 3 times a week during the study period. Average number of antihypertensive drugs was 2.63 (the most prescribed were CaB followed by beta-blockers, ACEi/ARBs, diuretics, central-acting drugs, urapidil and direct vasodilators: 60.7%, 54.4%, 38.9%, 34.8%, 30.3%, 26.9% and 6.9%, respectively). There were 43.9% of patients on short-acting and 56.1% of patients on long-acting ESAs. At basal 24 h ABPM (Spacelab) was performed following the ESH/ESC guidelines on non-dialysis midweek day. Data of subjects with more than 70% successful ABPM readings were analyzed. Non-dipping was defined as nighttime BP aver

Results: Non-dipping pattern was found in 77.4% patients. No differences were found in age, dialysis parameters, comorbidity, chronic HD therapy and laboratory parameters between dippers and non-dippers. However, CV mortality was significantly higher in non-dippers (28.9% vs. 16.0%, p = 0.02). Deceased patients were significantly older, had higher serum calcium and iPTH levels and day-time mean arterial pressure levels. There were no differences in number of antihyper-

tensive drugs, proportion of patients with hypertension, diabetes or smokers. No difference was found between patients treated with short- and long-acting ESAs.

Conclusions: Observed increased CV mortality in patients undergoing chronic HD is related to non-dipping pattern and is not associated with the type of used ESAs. Mechanisms of increased non-dipping pattern and associated poor prognosis should be evaluated in larger prospective cohorts.

URIC ACID AS A RISK FACTOR FOR CARDIOVASCULAR DISEASE. A PROSPECTIVE OBSERVATIONAL STUDY

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Objective: Hyperuricaemia is associated with many traditional cardiovascular risk factors such as arterial hypertension, diabetes and dyslipidaemia. Our purpose was to investigate the relationship of Serum Uric Acid (SUA) levels with the ten – year risk of fatal cardiovascular disease.

Design and method: We prospectively enrolled 568 hypertensive patients (mean age 63 ± 10 years) presented for evaluation in the hypertension clinic. In all subjects routine blood chemistry, including SUA determination, echocardiographic examination, office and 24 h ambulatory blood pressure (BP) monitoring were obtained along with data regarding lifestyle habits (smoking, alcohol consumption and exercise). The ten – year risk of fatal cardiovascular disease was evaluated by using the SCORE chart for countries with low CVD risk based on the following risk factors: age, sex, smoking, systolic blood pressure, and total cholesterol.

Results: Mean average 24 hours systolic blood pressure (SBP) was 132 ± 15 mmHg, mean 24 hours average diastolic blood pressure (DBP) was 77 ± 10 mmHg while mean total cholesterol was 198 ± 39 mg/dl. Spearman analysis showed that SUA levels were significantly and positively associated with the average 24 hours systolic blood pressure levels ($r_s = 0.092$, $p < 0.05$ for SBP) but not with diastolic BP levels ($r_s = 0.06$, $p > 0.05$). Furthermore the kruskal Wallis analysis revealed that SUA levels were significantly associated with 10year risk of fatal cardiovascular disease ($p < 0.001$). Specifically, patients with 10year risk $< 1\%$, $1-5\%$, $> 5\%$, had SUA levels 4.8 ± 0.1 mg/dl, 5.4 ± 0.5 mg/dl and 6.0 ± 0.1 mg/dl respectively ($Z: -7.7$, $p < 0.001$).

Conclusions: Subjects with lower SUA levels presented lower BP levels as well as 10year risk of fatal cardiovascular disease and vice versa. SUA levels were significantly associated with systolic blood pressure levels and 10year risk of fatal cardiovascular disease.

DIABETES AND DYSLIPIDEMIA CONTROL IN A POPULATION OF HYPERTENSIVE PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Objective: Both diabetes and dyslipidemia are pervasive and treatable cardiovascular risk factors that combined with arterial hypertension increase the probability of ischemic cardiac disease. According to the 2016 ESC Dyslipidemia Guideline, type 2 diabetes mellitus patients associating cardiovascular disease or chronic kidney disease and those over the age of 40 with one or more additional CVD risk factors or target organ damage should maintain an LDL value of under 70 mg/dl. Moreover, a HbA1c of under 7% should be achieved with antidiabetic treatment in order to prevent chronic diabetic complications. Our aim was to evaluate whether LDL-cholesterol and glycated hemoglobin targets were achieved among patients with concurrent hypertension and type 2 diabetes mellitus.

Design and method: A retrospective study was performed on patients admitted to our clinic between January 2016 and December 2017. A total of 1078 in-patients with concurrent hypertension and type 2 diabetes mellitus - 640 females and 438 males with a mean age of 69.03 ± 9.88 years - were included in the analysis. Laboratory workup was performed according to standards of care, including lipid profile and HbA1c. All patients were over the age of 40, with type 2 diabetes and at least one additional CVD risk factor (arterial hypertension), thus the LDL-target was considered 70 mg/dl.

Results: Over 50% of patients had severe hypertension (systolic values over 180 mmHg). The distribution was: 57% of patients had grade 3 hypertension, 12% grade 2 hypertension and 31% grade 1 hypertension. The mean serum LDL-cholesterol was 91.35 ± 38.12 mg/dl, with a median of 87 mg/dl. Only 31.6% of patients achieved the 70 mg/dl target. Furthermore, mean HbA1c was $7.29\% \pm 1.5\%$ with a median of 6.9%. Only 46.5% reached the desired threshold of 7%.

Conclusions: Diabetes and dyslipidemia control is suboptimal in our population. Moreover, lifestyle and diet changes should be encouraged in the at-risk population so as to prevent development of complications. Efforts should be made in order to better achieve targets recommended by current guidelines.

DIFFERENT RESPONSE PATTERN TO AIRCRAFT NOISE EXPOSURE IN RENAL VERSUS SYSTEMIC HEMODYNAMIC

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Objective: Epidemiological studies have found a link between aircraft noise exposure and increased incidence of arterial hypertension and cardiovascular disease. The underlying pathophysiological mechanisms are not yet fully understood. The kidney acts as a long-term regulator of blood pressure. Clinical studies show that mental stress affects the systemic and renal hemodynamic.

Design and method: We analysed cardiovascular and renal effects of 30 minutes standardized aircraft noise with a maximal sound pressure level of 80 dB in a sham controlled clinical study including 80 healthy normotensive subjects and 34 patients with hypertension stage 1 or 2. Systemic hemodynamic was measured using impedance cardiography and renal hemodynamic using steady state input clearance with infusion of paraaminohippuric-acid and inulin.

Results: In the renal circulation of hypertensive patients change in renal plasma flow (30 ± 29 vs 30 ± 29 ml/min, $p = 0.92$) and glomerular filtration rate (16 ± 11 vs 18 ± 10 ml/min, $p = 0.41$) did not differ between aircraft noise exposure and sham procedure. The same was true in normotensive individuals (change in renal plasma flow: 37 ± 34 vs 32 ± 36 ml/min, $p = 0.22$, change in glomerular filtration rate: 16 ± 11 vs 15 ± 9 ml/min, $p = 0.62$). In the systemic circulation change in heart rate (-7.2 ± 5.2 vs -6.6 ± 13.2 bpm, $p = 0.79$) and stroke volume (-2.1 ± 8.9 vs 2.4 ± 8.3 ml, $p = 0.78$) 15 seconds after aircraft noise exposure did also not differ compared to sham procedure in hypertensive patients. The same was true for normotensive subjects (change in heart rate: -4.7 ± 9.0 vs -3.7 ± 6.7 bpm, $p = 0.364$, change in stroke volume: -2.8 ± 11.4 vs 3.1 ± 9.6 ml, $p = 0.83$). However, in hypertensive patients there was an increase in total peripheral resistance after aircraft noise exposure (1416 ± 388 vs 1605 ± 435 dyn·sec·cm⁻⁵, $p = 0.001$, which was not present after sham procedure (1379 ± 401 vs 1476 ± 586 dyn·sec·cm⁻⁵, $p = 0.24$). Change in total peripheral resistance in normotensive subjects was not different after aircraft noise exposure compared to sham procedure (91.4 ± 237 vs 66.1 ± 177 , $p = 0.361$).

Conclusions: In hypertensive patients we did not observe an immediate increase in heart rate or cardiac output after aircraft noise exposure, but we found a vasoconstrictive response in the systemic circulation. No changes in renal hemodynamic were observed after aircraft noise exposure.

LOW DENSITY LIPOPROTEIN CHOLESTEROL LEVEL, PULSE PRESSURE AND URIC ACID ARE ASSOCIATED WITH CAROTID INTIMA-MEDIA THICKNESS IN JAPANESE GENERAL POPULATION

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Objective: To clarify the association of triglyceride (TG), high- and low- density lipoprotein cholesterol (HDL-C and LDL-C), blood pressure, insulin sensitivity, uric acid (UA), high sensitive C-reactive protein (hsCRP), and urine albumin-to-creatinine (UACR) with carotid intima-media thickness (cIMT), which has been reported as a potential surrogate marker of early atherosclerosis, in the Japanese general populations.

Design and method: A total of 2,645 participants including 1,205 men (61.1 ± 9.9 years) and 1,440 women (61.2 ± 9.4 years) were enrolled in the present cross-sectional study. Systolic and diastolic blood pressure (SBP, DBP) were measured to obtain pulse pressure (PP). Fasting plasma glucose (FPG) and insulin were measured to calculate HOMA-IR. cIMT was measured by B-mode ultrasound machine (GM-72P00A, Panasonic, Kanagawa). Stepwise multiple regression analyses were performed in two models. Model 1 was adjusted for age, BMI, current smoking status, exercise habit, habitual alcohol consumption, and medication for hypertension, diabetes mellitus and dyslipidemia, including all indices shown above. The association of UA, hsCRP, UACR and HOMA-IR with cIMT was analyzed in model 2 adjusted for same variables in model 1 except PP, TG and cholesterol levels.

Results: Mean \pm SD of cIMT, HDL-C, LDL-C, SBP, DBP, PP and UA were 0.68 ± 0.16 (mm), 59.1 ± 15.6 (mg/dL), 118.9 ± 30.4 (mg/dL), 131.2 ± 17.1

(mmHg), 77.3 ± 10.0 (mmHg), 54.0 ± 12.2 (mmHg) and 5.8 ± 1.8 (mg/dL), respectively, in men, and 0.63 ± 0.12 (mm), 68.3 ± 15.4 (mg/L), 127.0 ± 30.6 (mg/dL), 125.4 ± 18.1 (mmHg), 72.9 ± 10.0 (mmHg), 52.5 ± 12.5 (mmHg) and 4.3 ± 1.3 (mg/dL), respectively, in women. In model 1, LDL-C and PP were significantly associated with cIMT in men and women ($P < 0.001$). In men, UA also showed significant association ($P = 0.002$), whereas HDL-C showed significant inverse association ($P = 0.001$). In model 2, UA showed significant association with cIMT in men and women ($P = 0.007$, $P = 0.002$).

Conclusions: In conclusion, our results indicate the following. First, LDL-C and PP may be potential surrogate markers of early carotid atherosclerosis in both sex. Second, in men, HDL-C and UA may be important risk of it.

OBSTRUCTIVE SLEEP APNOEA, HIGH BLOOD PRESSURE AND RENAL FUNCTION IN THE CHILEAN ADULT POPULATION

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Objective: Obstructive sleep apnea (OSA) is a prevalent and neglected chronic respiratory disease in Chile. Chronic kidney disease (CKD) is a serious health problem, which is often associated with other chronic diseases such as diabetes, hypertension and cardiovascular disease. Several studies have shown a relationship between OSA and impaired renal function. The objective is to study this association in the Chilean adult population.

OSA Risk	LOW		MEDIUM		HIGH		
	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)	P
Plasma creatinine	646	0.88 (0.12)	736	0.93 (0.44)	262	0.97 (0.42)	0.000
eGFR (MDRD)	646	108.96 (19.73)	736	98.36 (23.05)	262	90.68 (21.36)	0.000
Albumin/creatinine ratio	209	17.75 (55.38)	523	58.58 (270.65)	241	130.78 (614.52)	0.003
Women							
Plasma creatinine	1,786	0.68 (0.14)	600	0.74 (0.31)	87	0.77 (0.22)	0.000
eGFR (MDRD)	1,786	107.41 (25.15)	600	92.32 (23.89)	87	87.53 (23.15)	0.000
Albumin/creatinine ratio	653	42.53 (267.84)	497	61.00 (270.42)	80	125.18 (276.41)	0.029

Design and method: From the National Health Survey 2010 the risk level of OSA was obtained in subjects 18 years old or more, using a clinical prediction rule (CPR) based on the STOP-Bang Questionnaire. With the total score the subjects were classified as Low (<3), Medium (3–4), and High Risk (5 or more). The results were compared for plasma creatinine, estimated glomerular filtration rate (eGFR), urinary sodium in urine of 24 h, albumin/creatinine ratio in urine sample, and SBP/DBP average of 3 measurements. An ANOVA test and a $p < 0.05$ were used.

Results: Of the 5,069 subjects in the sample, 4,234 (83.5%) met the requirements of the CPR, 60% were women. There were no significant differences between men and women, except in the lower urinary sodium excretion and albumin in urine of 24 h, in women, despite similar daily salt intake.

Conclusions: There were no significant differences between men and women, except in the lower urinary sodium excretion and albumin in urine of 24 h, in women, despite similar daily salt intake.

THE DIFFERENCE CHARACTERISTIC OF RELATIONSHIP BETWEEN SARCOPENIA AND BLOOD PRESSURE ACCORDING TO GENDER IN KOREAN POPULATION

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Objective: High blood pressure (BP) has been known to the risk factor of cardiovascular disease (CVD). However, the extremely lower BP is also known to the risk factor of CVD. The sarcopenia has been highlighted in older people because lower muscle mass is associated the frailty and chronic disease. The present study aimed to uncover the association between the sarcopenia and BP in Korean population

Design and method: This study collected data from 5,045 participants (60 or more age) in the Korea National Health and Nutrition Examination Surveys (2008–2011). The sarcopenia was defined as lower appendicular skeletal muscle (ASM) adjusted by weight (Men < 29.5%, Women < 23.2%).

Results: The prevalence of sarcopenia as estimated by ASM adjusted by weight was 26.4% in men and 28.7 in women. The ratio of hypertension was 42.7% in

men and 49.3% in women. We classified all population into 8 groups according to systolic and diastolic BP.

The covariates included age, dyslipidemia medication, current smoke, regular exercise, alcohol consumption, fasting glucose. After adjusted these all covariates, the adjusted OR of the lowest systolic BP (SBP), the second lowest SBP, and the highest SBP groups were 1, 2.39, and 19.45 in men, and 1, 0.35, and 2.05 in women. The adjusted OR of the lowest diastolic BP (DBP), the second lowest DBP, and the highest DBP groups were 1, 1.10, and 1.43 in men, and 1, 0.70, and 1.149 in women. Collectively, the association between sarcopenia and blood pressure showed J-curve shape in Korean women.

Conclusions: The relationship between sarcopenia and blood pressure was different according to gender in Korean population.

THE FRENCH SOCIETY OF HYPERTENSION INITIATIVE FOR A NEW MANAGEMENT OF HYPERTENSION

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Objective: All epidemiological surveys performed in metropolitan and overseas French territories since 2007 report a plateau or even a slight decrease of treated and controlled hypertensive patients. The multiplication of changing and divergent national and international recommendations, an increased suspicious attitude of the population towards drug treatments (statins, vaccines) and an organizational weaknesses may explain these observations.

Design and method: The French Society of Hypertension has initiated a six-month working party to analyze this alarming signal and look for all kinds of actions useful to improve the quality of hypertension management all over the French territory. 37 authors (physicians, researchers, pharmacists, nurses and patients), after applying a Delphi method, have finally proposed an eighty-page document structured in sixty different actions covering ten domains of improvement.

Results: University and post-university training of health professionals on hypertensive disorders, which had never been previously financed by independent organizations, should be increased. More support should be targeted to regional organizational research and to international cooperative basic, epidemiological and clinical research studies. Improved local health pathways should be designed from GP to hypertension specialized centers and made more transparent for citizens. According to local needs, they should more closely associate nurses and pharmacists. Hypertension diagnosis and management must be improved by the reimbursement of ambulatory BP measurement and of home BP devices. Fixed dose antihypertensive combinations, at low and high doses of two to three components, should be authorized and reimbursed and dispensation on the long term of generics from the same sources guaranteed to patients. Urinary or plasma drug levels should be more widely used to encourage compliance. Innovative techniques, emerging E-health initiatives and telemonitoring practices should be validated and then extended. Specific managements are needed for frail elderly people and hypertensive pregnant women. A multifactorial prevention policy needs to be initiated earlier at school especially in the Overseas French territories.

Conclusions: This set of initiatives, with a ten- year prospective, is currently proposed to the French Ministry of Health, to central and regional administrations, to the national Health Insurance System, to others French medical societies and to the ESH.

DISTRIBUTION OF TARGET ORGAN DAMAGE IN HYPERTENSIVES. DATA FROM SEPHAR III – A POPULATION SURVEY

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Objective: The aim of our study was to find out the distribution of TOD in hypertensive subjects of SEPHAR III population survey (Study for the Evaluation of Prevalence of Hypertension and Cardiovascular Risk in Romania) in order to define the overlap and specific phenotypes for high blood pressure features of cardiovascular damage.

Design and method: Subjects selected on the base of stratified proportional sampling, with age ≥ 18 years old and consented to participate in SEPHAR III study have been evaluated for TOD during two study visits, 4 days apart. At visit 1 were measured intima-media thickness (IMT) on the far wall of the common carotid arteries during vascular ultrasound interrogation and pulse wave velocity in the aorta (PWVao) with an oscillometric device. At visit 2 were evaluated indexed left ventricular mass based on transthoracic echocardiography and microalbuminuria.

Results: The results are presented in table 1.

Table 1. Distribution of target organ damage in hypertensives

	MALES	FEMALES	p value*
NO TOD	181 (50.4%)	178 (49.6%)	NS
ONE TOD			
* LVH	33 (9.3%)	51 (14.3%)	0.024
* Increased IMT-CCA	45 (12.6%)	35 (9.8%)	0.024
* Increased PWVao	95 (26.9%)	82 (23.1%)	0.024
TWO TOD			
* LVH + IMT-CCA	7 (2.0%)	3 (0.8%)	0.024
* LVH + Increased PWVao	73 (20.5%)	73 (20.5%)	NS
* Increased IMT-CCA + Increased PWVao	8 (2.2%)	13 (3.6%)	0.002
* LVH + Increased PWVao	21 (5.9%)	33 (9.3%)	0.002
* LVH + IMT	1 (0.3%)	5 (1.4%)	0.002
* Increased IMT-CCA + Increased PWVao	32 (9.1%)	15 (4.2%)	0.002
* Increased IMT-CCA + IMT	4 (1.1%)	2 (0.6%)	0.002
* Increased PWVao + IMT	10 (2.8%)	5 (1.4%)	0.002
THREE TOD			
* LVH + Increased IMT-CCA + Increased PWVao	15 (4.2%)	13 (3.6%)	NS
* LVH + Increased IMT-CCA + IMT	12 (3.4%)	11 (3.1%)	NS
* LVH + Increased PWVao + IMT	-	1	NS
* LVH + Increased PWVao + IMT	1	-	NS
* Increased IMT-CCA + Increased PWVao + IMT	5 (1.4%)	1 (0.3%)	NS
FOUR TOD	-	1	NS

TOD - target organ damage; LVH - left ventricular hypertrophy defined by indexed left ventricular mass > 115 g/m² in males and > 95 g/m² in females; IMT - CCA - mean of intima-media thickness in the far wall of both common carotid artery situated in the 75th percentile of values recorded in the whole sample; PWVao - pulse wave velocity in aorta increased in comparison with reference values for specific age and blood pressure values; IMT - intima-media thickness. *Chi-square test; NS non-statistical significant (p > 0.05)

The general distribution of TOD was: increased PWVao - 20%, left ventricular hypertrophy (LVH) - 9.4%, increased carotid IMT - 9%, LVH+increased PWVao - 6.1%, increased IMT + increased PWVao - 5.3%, LVH+increased IMT+increased PWVao - 2.6%, all other variants < / = 2%.

In the majority of cases there was only one TOD: 39.6%. In this category, the most frequently encountered determination was increased PWVao (50.6%).

In subjects with 2 TOD the main association was of LVH with increased PWVao: 36.2%.

In the scenario of 3 TOD, which is rare, the proportion of LVH+increased IMT and increased PWVao was predominant: 82.1%.

The association of 4 TOD is negligible.

Conclusions: The single organ damage was most frequently encountered, arterial stiffness proving to be the predominant unique determination. Of those with 2 TOD the main association was represented by LVH with increased PWVao, two parameters specifically influenced by arterial hypertension and strongly correlated by pathogenic links. Very few hypertensives have 3 or 4 TOD, therefore there is no TOD that can be used as a substitute for the evaluation of all others.

RELATIONSHIP BETWEEN ALCOHOL CONSUMPTION AND METABOLIC SYNDROME ACCORDING TO FACIAL FLUSHING IN KOREAN FEMALES

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Objective: This study aimed to exam the relationships between alcohol consumption and metabolic syndrome according to facial flushing caused by drinking in Korean females.

Design and method: Among the female patients aged < 65 who visited Health Promotion Center of Chungnam National University Hospital, 1344 women were conducted. Evaluation of alcohol consumption and facial flushing was assessed via questionnaires and interviews. The criteria for metabolic syndrome were defined according to the National Cholesterol Education Program Adult Treatment Panel III criteria with a modified waist circumference cutoff value for Korean subjects. After adjusting for confounding factors such as age, body mass index, smoking, exercise and menopausal status, a multiple logistic regression analysis was performed to assess the risk of metabolic syndrome in the facial flushing and non-facial flushing groups compared with the nondrinkers.

Results: In the facial flushing group, the risk of metabolic syndrome was significantly increased in group with a weekly alcohol consumption of 1 or more drinks (1 standard drink = 14 g alcohol) (odds ratio [OR], 1.68; confidence interval [CI], 1.10 to 2.68) compared to non-drinkers. However, the risk of metabolic syndrome was significantly increased (OR, 2.20; CI, 1.07 to 4.52) in the group with a weekly alcohol consumption > 4 drinks in the non-facial flushing group compared to non-drinkers.

Table 2. Odds ratio of metabolic syndrome by alcohol consumption in nonflushers and flushers by multivariate analysis.

Drinks per week	Total (n = 1344)	Flushers (n = 334)	Non-flushers (n = 408)
Non-drinkers	1.00	1.00	1.00
≤2	1.40 (0.95-2.04)	1.68* (1.10-2.68)	1.12 (0.67-1.85)
2<, ≤4	1.47 (0.90-2.38)	2.48* (1.29-4.74)	0.96 (0.50-1.84)
4<	2.86* (1.67-4.87)	4.16* (2.08-8.30)	2.20* (1.07-4.52)

* P < 0.05, † P < 0.01, ‡ P < 0.001, adjusted for age, body mass index, smoking, exercise and menopause state.

Conclusions: Above results suggest that the weekly drinking amount required to induce metabolic syndrome is lower in the flushers than in the non-flushers.

CARDIOVASCULAR MORTALITY AND MORBIDITIES BY SYSTOLIC BLOOD PRESSURE LEVELS IN HYPERTENSIVE PATIENTS: RESULTS FROM SAMPLE COHORT OF NATIONAL HEALTH INSURANCE SERVICE

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Objective: Objective - We evaluated whether the achieved levels of systolic blood pressure (SBP) in treated hypertensive patients affect the cardiovascular disease (CVD) mortality and morbidities using the National Sample Cohort for 2002-2013 from a database of the National Health Insurance Service (NHIS).

Design and method: Methods - The primary endpoints of the study were the incidence rate of CVD outcomes including CVD and all-cause mortality, ischemic heart disease, stroke, and heart failure. We divided hypertensive patients to three groups according to exclusive levels of SBP achieved (SBP > = 140 mm Hg, 120-139 mm Hg, and < 120 mm Hg). Total 28,684 hypertensive patients aged 30 to 79 treated with hypertensive agents without type 2 diabetes were analyzed (mean age, 58.2 year, men 47.9%). We calculated the incidence rate of each primary endpoint according to SBP levels and hazard ratios (HRs) by Cox multiple regression to compare between groups.

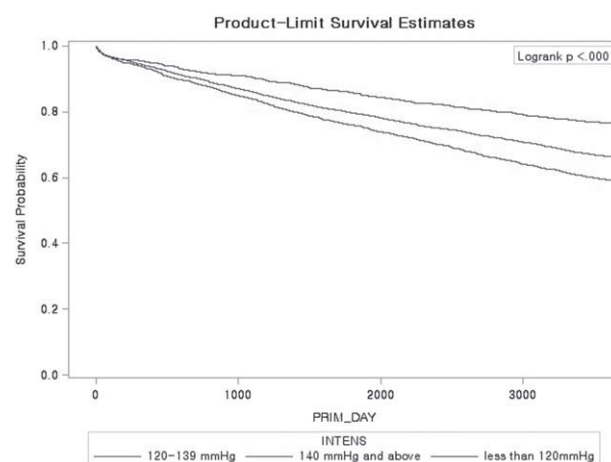


Figure. Kaplan-Meier survival probability for incident of CVD according to blood pressure level

Results: Results - The mean follow-up duration was 9.9 years. During the follow-up, CVD death and event occurred in 620 (2.5%) and 15,290 (61.9%), respectively. The incidence rates (events per 1,000 person-year) of CV events were 94.2, 110.0, and 116.0 for SBP < 120 mm Hg, 120-139 mm Hg, and > = 140 mm Hg, respectively. The mortality rate was increased in subjects with SBP > 140 mmHg. Compared to intensive control (SBP < 120 mm Hg), hazard ratios for incident CVD for those with 120-139 mm Hg and > = 140 mm Hg were 1.08 (P = 0.004) and 1.05 (P = 0.039) after adjusting for age, sex, obesity, current smoking status, and heavy

drinking, respectively. Furthermore, CVD mortality for SBP ≥ 140 mm Hg was higher than SBP < 120 mm Hg (HR = 1.30; 95% CI, 1.01–1.67).

Conclusions: Conclusion - Our study shows that intensive control of blood pressure would efficiently reduce the rate of CVD events than target of 120–139 mm Hg. Beneficial effect of intensive BP control should be confirmed in prospect outcome study or clinical trial with cost-effectiveness.

SEX DIFFERENCE IN ASSOCIATION BETWEEN DEPRESSION DISORDER AND INCIDENT HYPERTENSION IN KOREAN MIDDLE-AGED POPULATION

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Objective: Although the association between depression disorder and cardiovascular diseases has been well recognized, data on sex difference about an effect of depression for incident hypertension are scarce in Korea. We examined whether there is sex difference in association between depression disorder and hypertension incidence using the community-based cohort data.

Design and method: Data for 681 men and 690 women aged over 50 without hypertension or cardiovascular diseases between 2005 and 2006 were analyzed. Participants have three follow-up examinations during 6 years, and were followed by approximately every two years. Depression symptom was measured by Beck's depression inventory (BDI) ranged 0 to 63 and we defined depression disorder as BDI score ≥ 16 . Hypertension was defined as SBP ≥ 140 and/or DBP ≥ 90 mmHg or the use of antihypertensive medication. We calculated incidence rates (IRs) per 100 person-year for incident hypertension were calculated and incidence rate ratios (IRRs) and its 95% CIs. We evaluated the sex difference for the association between depression disorder and incident hypertension using Kaplan-Meier and log-rank test procedures.

Results: Women with depression disorder were more likely to have hypertension than those who men with depression (46.1% vs 39.7%, $P = 0.2852$ in men, 48.8% vs 35.7, $P = 0.0054$ in women). The incidence of hypertension in women with depression disorder was higher than in men with depression (IRR = 1.13; 95%CI, 0.79–1.61 in men, 1.49; 1.12–1.98 in women)(Figure). In the logistic regression analysis, the presence of depression disorder was more highly associated with incident hypertension in women than in men (OR = 1.37; 96% CI, 0.82–2.28, in men and OR = 1.55; 95% CI, 1.02–2.36, in women), independently of age, body mass index, education level, and current smoking and drinking status.

Conclusions: Depression disorder was highly associated with the incidence of hypertension among women than men in middle aged Korean population. Therefore, more intensive approach for women is needed for prevention of hypertension.

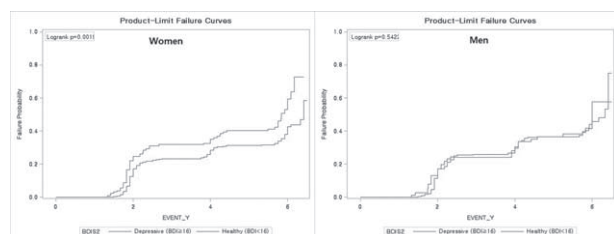


Figure. Kaplan-Meier hazard plots for incidence of hypertension by depression disorder in men (right) and women (left)

CORRELATION OF SERUM URIC ACID LEVELS WITH TRADITIONAL RISK FACTORS

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Objective: Several large studies have identified the role, of serum uric acid (SUA) concentration in predicting the risk for cardiovascular events in populations. This study had the purpose to investigate the relationship of SUA levels with the traditional risk factors: arterial hypertension, diabetes mellitus, dyslipidaemia, obesity and smoking status.

Design and method: We prospectively enrolled 568 hypertensive patients (mean age 63 ± 10 years) presented for evaluation in the Hypertension clinic. In all subjects routine blood chemistry, including SUA determination, echocardiographic examination, office and 24 h ambulatory blood pressure (BP) monitoring were

obtained. In all patients data regarding lifestyle habits (smoking, alcohol consumption and exercise) were recorded.

Results: Serum uric acid levels were significantly associated with almost all major risk factors. Specifically SUA levels were significantly higher in males (Mann-Whitney $U = 25158.500$, $p < 0.01$), in elder patients ($rs = 0.117$, $p < 0.01$), in patients with increased body mass index ($rs = 0.337$, $p < 0.01$), with diabetes (Mann-Whitney $U = 25445.500$, $p < 0.05$) and with increased systolic BP levels ($rs = 0.092$, $p < 0.05$). In contrast, smoking status and alcohol consumption were not related with SUA levels ($p = ns$). Regarding lipoproteins, only serum HDL levels were significantly associated with SUA levels ($rs = -0.216$, $p < 0.01$) but not total cholesterol and LDL plasma levels ($p = ns$).

Conclusions: Serum uric acid levels were significantly associated with almost all major risk factors. The relative importance of these associations should be further investigated with studies in order to assess the exact role of uric acid in cardiovascular continuum.

SHOULD WE CALCULATE AORTIC-BRACHIAL GRADIENT IN WOMEN? RESULTS OF A LARGE COHORT STUDY

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Objective: Gender-specific characteristics of cardiovascular disease raise awareness of the importance of arterial stiffness measurement in women. There is evidence that at some age females tend to have the decreased peripheral arterial stiffness comparing to males. Our aim was to calculate the aortic stiffness gradient and define its determinants in a high cardiovascular risk cohort of women.

Design and method: All study participants were referred by the primary health care institutions under Lithuanian High Cardiovascular Risk (LitHiR) primary prevention programme. This cohort consisted of total of 1170 women aged from 50 to 65 years. They all underwent a physical examination, risk profile analysis, personal and family patterns of cardiovascular disease, blood pressure, heart rate, weight, height, waist circumference, body mass index assessment and carotid-femoral and carotid-radial pulse wave velocity (cfPWV and crPWV) measurements. Aortic-brachial gradient was calculated dividing cfPWV by crPWV. Statistical analysis was performed using statistical tools package IBM SPSS Statistics V21 (IBM Corporation, New York).

Results: The mean value of PWV ratio was 1.02 ± 0.21 . There was significant decrease in crPWV and increase in cfPWV in these women adjusted for age. The determinants of aortic-brachial gradient were age, waist circumference, mean arterial pressure, albuminuria, high density cholesterol, presence of diabetes, hypertension and menopause duration. Significant differences in clinical and laboratory characteristics were observed when comparing PWV ratio tertiles.: the decrease in kidney function ($p = 0.002$), increase in waist circumference ($p < 0.001$), body mass index ($p < 0.001$), mean arterial pressure ($p < 0.001$), urine albumin to creatinine ratio ($p = 0.034$), increase in cfPWV ($p < 0.001$) and decrease in crPWV ($p < 0.001$).

Conclusions: We identified the clinical, laboratory and other determinants of arterial stiffness gradient in high cardiovascular risk cohort of women. This study provides an insight of possible pathways of cardiovascular disease in this specific population.

INTEGRATED CENTRAL PRESSURE-STIFFNESS SCORE, A POTENTIAL NEW TOOL FOR CARDIOVASCULAR RISK STRATIFICATION: FIRST RESULTS IN CHRONIC KIDNEY DISEASE

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Objective: To develop an integrated central pressure-stiffness (ICPS) score to predict cardiovascular events.

Design and method: One hundred chronic kidney disease (CKD) patients on conservative therapy were included in our study. Pulse wave velocity (PWV), central systolic blood pressure (cSBP) and central pulse pressure (cPP) were measured. A score was assigned to tertiles of PWV (0 to 2), cSBP (0 to 2) and cPP (0 to the first and second and 1 to the third tertile) based on each parameter's ability

to individually predict cardiovascular events. The sum of these scores (ICPS) and three ICPS risk categories as predictors were studied. Finally, we compared discrimination of the ICPS risk categories with that of the Framingham CVD score.

Results: High (ICPS 3 to 4; $n = 37$) and very high risk ICPS risk categories (ICPS 5; $n = 12$) had an increased cardiovascular risk (HR: 4.95, 95%CI: 1.97–12.42, HR: 9.73, 95%CI: 3.06–20.23, respectively) compared to the average risk group (ICPS 0 to 2; $n = 51$). The very high ICPS risk category remained an independent predictor (HR: 4.87, 95%CI: 1.81–13.08) in a model further adjusted for the Framingham CVD score (HR: 1.66, 95%CI: 1.13–2.43 per 1 SD increase). When comparing discrimination of the Framingham score (Harrell's C: 0.704, 95%CI: 0.625–0.784) and with ICPS added to the Framingham score (C: 0.729, 95%CI: 0.647–0.810), the difference was not significant probably due to the limited power of our study.

Conclusions: The ICPS score may clinically importantly improve the identification of CKD patients with elevated cardiovascular risk, but larger studies are required.

EFFECT OF SODIUM HYDROSULFIDE ON COLLAGEN-INDUCED PLATELET AGGREGATION IN PATIENTS WITH ARTERIAL HYPERTENSION AND METABOLIC DISORDERS

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Objective: The purpose of the study was to study the influence of the sodium hydrosulfide (hydrogen sulfide's donor) on platelets' aggregation in patients with arterial hypertension (AH) and metabolic disorders.

Design and method: The study included 40 patients with AH and metabolic disorders 40–65 years old. Aggregation activity of platelets was studied by turbidimetric method on a two-channel laser analyzer. Functional activity of platelets was determined by the degree and the rate of collagen-induced aggregation of platelet-rich plasma, determined by the light transmittance curves and the average aggregate size. Sodium hydrosulfide was used in concentrations of 5×10^{-6} M and 5×10^{-7} M.

Results: The present study revealed increase of the degree of platelet aggregation in patients with AH and impaired glucose tolerance compared to healthy donors. The addition of a hydrogen sulfide's donor caused further increase in the degree of aggregation, compared to aggregation without the addition of sodium hydrosulfide. In patients with AH and diabetes mellitus type 2 the degree of platelet aggregation was reduced compared to healthy donors. The addition of hydrogen sulfide's donor caused an increase in the degree of aggregation compared to the values of this parameter in the group of healthy volunteers.

Conclusions: An increase in collagen-induced platelet aggregation under the influence of the hydrogen sulfide's donor was revealed in patients with arterial hypertension and metabolic disorders which may possibly be associated with an elevated adhesive and aggregation capacity of platelets. It also may indicate to the inadequacy of antiplatelet therapy, related to the prevention of cardiovascular diseases and their complications during AH. Therefore, the effect of hydrogen sulfide on platelet aggregation in patients with AH and metabolic disorders requires to be studied in more details.

COMPREHENSIVE HEALTH SCREENING PROGRAM OF HUNGARY BETWEEN 2010–2020. RESULTS OF THE 2010–2016 PERIOD

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Objective: The primary goal was to broadcast different health screening opportunities (either questionnaires or devices) for the population. Devices were installed in a specially equipped truck which was and will be able to carry the instruments even to the smallest villages. The program is supported by 74 professional societies and companies as a part of the National Heart and Vascular Program.

Design and method: The screening program was completed inside the truck specially designed for this purpose.

Results: During the last 6 years the screening truck visited 1315 places in total, taking more than 158917 kilometers (98746 miles). A complex health screening program was completed on 159576 inhabitants and 375879 people received information about healthy life style, disease prevention and health preservation. 11616904 questions were answered and 291610 people received Informational Prevention Package. The mean age of the participants were 41.9 ± 13.4 among women and 39.8 ± 12.2 among men in 2016. More than 24% were current smokers in both gender. Based on self-declaration 50% of women and 60% of men participants had

regular physical activity. Hypertension and diabetes were present in 22% and 5.6% among women and 24% and 4.5% among men, respectively. A positive family history for myocardial infarction occurred in 22–30%, for hypertension in 60–70%, for stroke in 18–24%, for malignant cancer in 44–54% and for metabolic disorder in 39–48% of all cases. The risk of developing colon cancer and peripheral artery disease was higher in women. Body mass index was higher than normal in 46% among women and 60% among men. 68% of women and 55% of men participated in health screening programs regularly organized by general practitioners.

Conclusions: Based on the results, it was re-confirmed that Hungarian population belonged to the high risk group in several aspects. Authors also outlined solution plans for general risk reduction and disease prevention.

CARDIOVASCULAR MORTALITY OF MEDITERRANEAN POPULATION HYPERTENSIVE > 65 YEARS

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Objective: In Spain, hypertension is a health problem of the first magnitude. The importance of determining the cardiovascular risk (CVR) associated with high blood pressure is based on the evidence that most hypertensive patients have additional CVR factors that, when concurrent with hypertension, enhance each other, giving rise to a CVR total that is greater than the sum of its components. Our objective was to assess the cardiovascular mortality of this population group.

Design and method: Epidemiological, observational, longitudinal, prospective and multicentre study of the care setting, carried out in the Valencia Community with a hypertensive population over 65 years of age that went to the Health Centre or to a Hospital Unit of Hypertension (FAPRES Registry). For analysis of the data we used the program IBM - SPSS Windows version 20 with a statistical significance of $p < 0.05$.

Results: Of the 1,028-hypertensive patients basally included, 1,003 patients (97.6%) completed the follow-up after a median of 803 (721–896) days. Of these, 21 of them died from causes of non-CV origin. In the follow-up of the remaining 982 patients, 20 died of cardiovascular cause.

The deceased presented the following statistically significant differences:

- Higher percentage of male sex.
- Older middle age.
- Higher frequency of history of heart failure and/or coronary disease.
- Lower diastolic blood pressure.
- Higher percentage of anticoagulant and/or antiaggregant treatment.
- Lower levels of HDL-cholesterol.
- More prevalence of atrial fibrillation and Q wave of necrosis in the electrocardiogram.

In the multivariate analysis, the factors associated with cardiovascular mortality were age and previous coronary disease. On the contrary, the history of hypercholesterolemia, the increase in HDL-cholesterol and the performance of physical exercise were associated with lower mortality. Although no significant differences were found, a trend toward higher cardiovascular mortality was observed in anti-aggregate patients. In contrast, the decrease in mean clinical diastolic blood pressure showed a trend towards increased mortality.

Conclusions: Physical exercise and the increase of HDL-cholesterol prevent cardiovascular mortality, from which the importance of it in hypertensive patients over 65 years of age is deduced.

DYSLIPIDEMIA IN PATIENTS WITH ISCHEMIC CHRONIC HEART FAILURE

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Objective: In accordance with current guidelines elevated low-density lipoprotein cholesterol is uncommon in advanced chronic heart failure (CHF) with reduce left ventricular ejection fraction (LV EF). The purpose of our study was to check whether this is so in patients with ischemic heart failure in the Russian Federation.

Design and method: We analysed serum lipids levels in 161 ischemic CHF patients I-IV NYHA class with LV EF $< 45\%$ who were free of primary renal, endocrine, autoimmune and oncological diseases. Median (interquartile range) of age – 66.0 (58.5;72.0) years; LV EF – 30.4 (25.0;36.7)%; estimated glomerular filtration rate (GFR, CKD-EPI) – 59.6 (47.3;71.7) ml/min/1.73m²; 84% males. 96.8% of CHF pa-

tients had myocardial infarction/s (MI) in anamnesis: 60.5% - one, 28.0% - two, 7.0% - three, 1.3% - four. Time after last myocardial infarction was 4 (2; 9) years. 7.9% used statins. We observed our patients over 10 years. The patient follow-up time up to mortality or the end of the study was 26 (12; 60) months. Survival was analysed by Kaplan-Meier method, Cox's F, Cox-Mantel, Log-Rank and Gehan's Wilcoxon Tests.

Results: Median (interquartile range) of serum cholesterol was 4.76 (3.9; 6.0) mmol/l, low-density lipoprotein cholesterol (LDL) was 2.86 (2.25; 3.93) mmol/l. Elevated cholesterol (>5.2 mmol/l) was in 40.1% (95%CI 31.0; 46.5%), LPL $> \text{or} = 3.0$ mmol/l was in 43.37% (95%CI 33.6; 56.2%), LPL $> \text{or} = 1.8$ mmol/l was in 89.2% of CHF patients. Decreased high-density lipoprotein cholesterol (HDL) was in 38.3% (95% CI 27.5; 49.1%), elevated triglyceride (≥ 1.7 mmol/l) – in 17.6% (95%CI 11.4; 23.8%) of patients. During follow-up, 67.8% of CHF patients died. 42% of them died suddenly, 16% - with progressive heart failure, 5% due to pulmonary embolism, 5% due to acute myocardial infarction, 7% due to stroke, 5% due to terminal chronic renal failure, 7% due to a cancer. Survival was similar in patients with and without dyslipidemia. Stroke, acute myocardial infarction, pulmonary embolism, GFR reducing didn't relate with dyslipidemia.

Conclusions: Dyslipidemia is often in systolic chronic heart failure, but it is not a predictor of poor prognosis in chronic heart failure patients.

LISINAPRIL AND BLOOD PRESSURE REGULATION IN HYPERTENSIVE PATIENTS WITH DIABETES MELLITUS

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Objective: The aim of this study was to assess the regulation of blood pressure (BP) after three months of antihypertensive therapy in patient with type 2 diabetes mellitus.

Design and method: The study sample consisted of 398 patients with arterial hypertension and type 2 diabetes (144 men and 254 women), aged 63.9 ± 9.6 years. Hypertension was treated with 10 mg lisinopril (98 patients), 20 mg lisinopril (140 patients), and fixed combination of 20 mg lisinopril and 12.5 mg hydrochlorothiazide (160 patients). BP was measured by an oscillometric device at the beginning of the study, one month later and after three months of therapy. A well-regulated blood pressure was defined if systolic pressure (SBP)/diastolic pressure (DBP) were less than 140/90 mmHg one month and three months after the initiation of therapy. Logistic regression was used to predict good regulation of SBP and DBP after three months of therapy in relation to age, gender, smoking habits, body mass index (BMI), and regulation of blood pressure one month after the beginning of therapy.

Results: At the beginning of the study, the average SBP in patients with diabetes was 159.4 ± 12.7 mmHg, DBP 96.3 ± 8.5 mmHg. After one month, average SBP was 140.5 ± 18.6 mmHg, DBP 87.8 ± 8.1 mmHg. At that stage, SPB was well-regulated in 127 patients (31.9%), whereas DBP was well-regulated in 189 patients (47.5%). After three months of therapy, average SBP was 132.4 ± 9.0 mmHg, DBP 81.6 ± 6.0 mmHg. At that stage, SPB was well-regulated in 286 patients (71.9%), whereas DBP was well-regulated in 339 persons (85.2%). The only significant predictor for the good regulation of BP after three months of therapy was good regulation of SBP one month after the beginning of therapy (Odds Ratio = 2.44; 95% Confidence Interval = 1.44–4.13) and good regulation of DBP one month after the beginning of therapy (Odds Ratio = 0.88; 95% Confidence Interval = 3.71–17.63). These prediction models were independent from age, gender, BMI and smoking habits.

Conclusions: The regulation of systolic and diastolic pressure after three months of antihypertensive therapy with lisinopril depends significantly on the achievement of good regulation of blood pressure one month after the initiation of therapy.

FACTORS ASSOCIATED WITH ARTERIAL STIFFNESS IN TREATED HYPERTENSIVE PATIENTS WITH UNFAVORABLE BLOOD PRESSURE PHENOTYPES AND NORMOTENSION

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Objective: Some studies demonstrated that arterial stiffness is associated with cardiovascular events. The aim of our study was to estimate factors associated with arterial stiffness in normotension (NT) versus masked uncontrolled hypertension (MH) and uncontrolled hypertension (UH) phenotypes in treated hypertensive patients.

Design and method: The ambulatory patients from the ABP monitoring database (>2000 patients) were selected on the following criteria: availability of clinical blood pressure (CBP) and ambulatory blood pressure (ABPM) with 24-h arterial stiffness records, regular of antihypertensive treatment (≥ 2 weeks). The borderline for pulse wave velocity in aorta (PWVao) was selected as 10 m/s according with recommendations ESC.

Results: We selected 940 patients: 214 patients with NT and 726 (MUH+UH). The main characteristics of both groups were differ (see Table1).

The factors associated with higher PWVao are presented in Table2.

Table1. The main characteristics of patients

Characteristics	NT (n=214)	MUH+UH (n=726)	P
Sex (men), %	32%	46%	<0.001
Age (M±SD), years	54.9±10.7	56.5±10.0	0.03
Body mass index (M±SD), kg/m ²	27.2±4.4	28.6±4.4	<0.001
Mean systolic BP (M±SD), mmHg	118.1±9.9	130.6±14.2	-
Mean diastolic BP (M±SD), mmHg	70.2±7.0	78.0±9.4	-
Mean HR (M±SD), bpm	69.5±11.6	72.3±11.8	<0.001
PWVao (M±SD), m/s	11.1±1.2	11.6±1.9	<0.001

Table2. The factors associated with PWVao ≥ 10 m/s

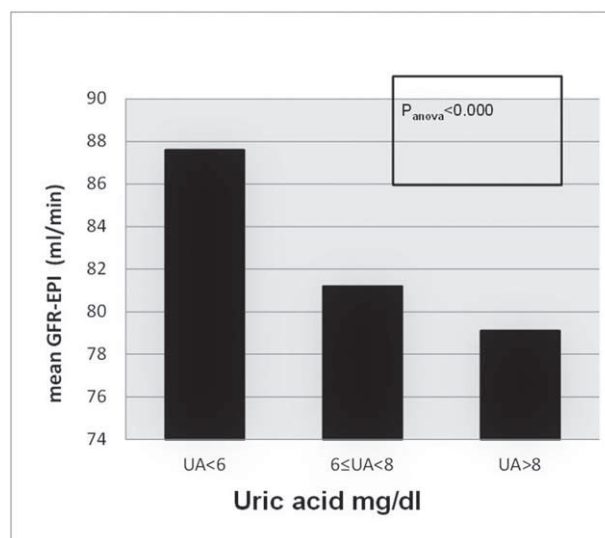
Phenotype	Factors	p
NT	Sex (men)	<0.001
	Age	ns
	Consumption of salt (more 6 g/day)	<0.001
	Anticoagulants + statins	<0.05
MUH+UH	Sex (men)	<0.001
	Age	ns
	Consumption of salt (more 6 g/day)	<0.001
	CA	<0.05
	BMI group, kg/m ² : 18-24	Reference group
	25-29	ns
	30-34	<0.01
	≥ 35	<0.05

Conclusions: The PWVao in NT lower in comparison with MUH+UH BP phenotypes. The higher level of PWVao in NT is positively associated with male gender, salt consumption (more 6 g per day) and presence of concomitant therapy in the form of anticoagulants + statins. The higher level of PWVao in MUH+UH is positively associated with male gender, salt consumption (more 6 g per day), obesity I and obesity II and presence of calcium antagonists therapy. We suppose that salt consumption, obesity might be influence not only on BP parameters, but also on arterial stiffness. However, this problem should be studied in prospective researches.

URIC ACID LEVELS AND RENAL FUNCTION IN UNTREATED HYPERTENSIVE PATIENTS

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Objective: Increased levels of uric acid are considered as contributing to the progression of renal disease. In this study we evaluated the possible correlations between uric acid levels and renal function in untreated hypertensive patients.



Design and method: We have hypothesized that elevated levels of uric acid may adversely affect renal function in untreated patients with hypertension. The study involved 446 hypertensive patients (226 men, 220 women) of 52.7 ± 12.6 years of age, who visited our Outpatient Hypertension Clinic and did not receive antihypertensive therapy.

Results: A statistically significant negative correlation between uric acid levels and serum creatinine levels ($r = -0.54$, $p < 0.001$) and glomerular filtration rate (GFR) calculated by CKD-EPI (Chronic Kidney Disease Epidemiology Collaboration Equation) ($r = -0.19$, $p < 0.01$) was observed in the study population. Separation of patients according to uric acid levels in three groups (UA < 6 , $6-8$, > 8 mg/dl), showed that patients with lower uric acid levels also had lower creatinine levels and higher GFR and vice versa.

Conclusions: Untreated hypertensive subjects with the highest serum uric acid levels exhibit higher creatinine levels and lower estimated GFR compared with hypertensive individuals with lower serum uric acid levels.

PREVALENCE AND CHARACTERISTICS OF PREVIOUS CARDIOVASCULAR DISEASE IN PATIENTS INCLUDED IN THE IBERICAN STUDY

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Objective: The general objectives of IBERICAN are to determine the prevalence and incidence of cardiovascular risk factors in Spain, as well as cardiovascular events. The specific objective of this communication is to know the characteristics of patients with cardiovascular disease included in the study.

Design and method: IBERICAN is a longitudinal, observational, and multicenter study in which patients from 18 to 85 years of age are included in Primary Care consultations in Spain, until a sample of 7,000 patients is collected, which will be followed for at least 5 years. The basal characteristics of the fifth cut are presented ($n = 6,007$). Patients were classified in secondary prevention when they presented ischemic heart disease, heart failure, stroke or peripheral arterial disease.

Results: The average age of the subjects included was 57.4 ± 15.5 years, and 54.5% were women. 16.2% of the patients had a previous cardiovascular disease. 7.1% had a history of ischemic heart disease, 4.9% had peripheral arterial disease, 3.8% had a stroke, and 3.2% had heart failure. Of the patients with heart failure, 38.5% had depressed EF. Simultaneously, the presence of kidney disease was analyzed: 8.2% presented a glomerular filtration rate (CKD-EPI) < 60 ml/min, 7.3% microalbuminuria; and other heart diseases: 5.5% presented atrial fibrillation.

Conclusions: The IBERICAN cohort includes relatively young patients, with a predominance of women, but the presence of previous cardiovascular disease in a fifth, together with the existence of kidney disease and atrial fibrillation, may suggest that a high rate of events will be observed during follow-up.

METABOLIC PROFILE OF PATIENTS WITH ISOLATED SYSTOLIC HYPERTENSION (ISH)

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Objective: Isolated Systolic Hypertension (ISH) has been shown to increase cardiovascular disease morbidity and mortality. In this study, we searched for differences in the metabolic profile between hypertensives with ISH and those without.

Design and method: We studied 882 [392 (44.4%) were men] hypertensives, who had never been treated. Their median age was 56 (range: 15–84) years. Among them, 249 (28.2%) subjects had ISH [Systolic Blood Pressure (SBP) > 140 mmHg and Diastolic Blood Pressure (DBP) < 90 mmHg]. A health questionnaire was completed for all participants, including personal history of hypertension, diabetes mellitus (DM), and smoking habits. The waist circumference and blood pressure were measured. Fasting blood samples were obtained in order to measure glucose, and a complete lipid profile.

Results: Persons with ISH were older than other hypertensives [61 (16–84) vs 54 (15–83) years, $p < 0.001$]. There was no difference in the sex distribution between the two groups [110 out of 249 (44.2%) vs 282 out of 633 (44.5%) were men, respectively]. Those with ISH had significantly greater pulse pressure (PP) (65.4 ± 17.8 vs 60.8 ± 15.8 mmHg, $p < 0.001$), and significantly smaller body mass index (BMI) (30.1 ± 5.4 vs 31.1 ± 5.4 Kg/m², $p < 0.05$), when compared with the rest hypertensives.

Subjects with ISH had statistically significantly lower total cholesterol (224.9 ± 46.9 vs 236.1 ± 43.5 mg/dl, $p < 0.001$), low density lipoprotein (LDL) (147.9 ± 46.8 vs

155.2 ± 38.6 mg/dl, $p < 0.05$), and triglycerides (141.5 ± 87.5 vs 157.1 ± 112.4 mg/dl, $p < 0.05$) serum levels than the rest hypertensives.

There were more diabetics in ISH patients than the rest hypertensives (13.7% vs 7.7%, $p < 0.01$). However, there was no significant difference in the incidence of metabolic syndrome between the two groups (58.4% vs 64.2%, respectively).

Conclusions: Our study suggests that among untreated patients with essential hypertension those with ISH were older, with lower BMI and had a more favourable lipid profile.

SWICOS (SWISS LONGITUDINAL COHORT STUDY IN RURAL SWITZERLAND): DESCRIPTIVE ANALYSIS OF INITIAL RESULTS

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Objective: Increased longevity necessitates new approaches to reduce the burden of age-related diseases to maintain optimal quality-of-life. This prospective longitudinal study aims to examine the health status and disease risk factors in a Swiss cohort to suggest innovative strategies for healthy aging

Design and method: Inhabitants of two villages in Southern Switzerland (Cama and Lostallo) were eligible. Examinations and measurements included medical history, anthropometry, cardiac and vascular health, pulmonary function, physical performance, nutritional, mental and emotional status and biochemical analyses. Between April 9, 2015 and December 31, 2017, 415 patients were included in the study. We performed a first descriptive preliminary analysis on 344 participants

Results: Sixty-three participants (19%) were hypertensive and on treatment: prevalence of hypertension increased with the age (among participants < 40 years: 0%; among 40 to 60 years old: 20% for males, 11% for females; 41% among participants > 60 years: 41% for males and females. Similar age-dependent increases were found for diabetes and hyperlipidaemia. Among participants < 40 years, 27% males and 28% females were smoking, whereas only 20% males and 9% females of participants > 60 years were currently smoking. Light physical activity (walking, gardening): among participants < 40 years, 39 minutes per day (males) and 36 minutes per day (females), whereas those > 60 years: 91 minutes per day (males) and 55 minutes per day (females). Excessive body weight is more common among males (75%) than females (30%) in subjects 40 to 60 years of age

Conclusions: Smoking and physical inactivity are more common among young participants. Excessive body weight is very common among males 40 to 60 years of age. The remaining cardiovascular risk factors were increasingly prevalent with increasing age.

HYPERTENSION PREVALENCE IN RUSSIAN POPULATION BASED ON NEW AMERICAN GUIDELINE CRITERIA

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Objective: Objective. New cut-off criteria for hypertension (HT) and classification were published in November 2017 by several American expert professional societies, what produced large resonance in and hard discussion. The present study estimates prevalence of HT in population-based sample of the Russian Federation (RF) inhabitants according to new American guidelines in order to see how new classification can increase the size of the problem in a real-world population.

Design and method: Design and Methods. Since 2013 an epidemiological survey of cardiovascular risk in regions of RF with different climatic, geographic, economic and demographic characteristics (ESSE-RF) was performed in a multi-step stratified random sample of approximately 1600 participants in 12 selected regions (Vologda, Vologda, Voronezh, Vladivostok, Ivanovo, Kemerovo, Krasnoyarsk, Orenburg, Tomsk, Tyumen, Saint-Petersburg and Northern Osetia-Alania). Totally 20652 participants aged 25–65 years were examined. All subjects signed informed consent and filled validated questionnaires regarding lifestyle, concomitant disease and medication. Anthropometry, fasting blood sampling, blood pressure (BP) measurement were performed. According to American guidelines 2017 hypertension stage 1 was determined as SBP = 130–139 mm Hg or

DBP = 80–89 mm Hg and hypertension stage 2 - as BP equal or more 140/90 mm Hg or antihypertensive treatment. Hypertension according to European guidelines 2013 was detected as BP equal or more 140/90 mm Hg or current antihypertensive treatment. Statistical analysis was performed using SPSS Statistics 20.

Results: Results. Data analysis was possible in 20607 participants (7806 males (37,9%) and 12801 females (62,1%)), results are presented in table 1.

Table 1. Prevalence of hypertension according to European Guidelines 2013 and American Guidelines 2017 depending on age and gender.

Age group	Hypertension stage 1	Hypertension stage 2	Hypertension stage 1+stage 2 according to American guidelines 2017	Hypertension according to European guidelines 2013
All, n (%)	4506 (21.9%)	10347 (50.2%)	14853 (72.1%)	10347 (50.2%)
25-34	1276 (27.4%)	876 (18.8%)	2152 (46.2%)	876 (18.8%)
35-44	1024 (28.1%)	1244 (34.1%)	2268 (62.2%)	1244 (34.1%)
45-54	1266 (22.2%)	3271 (57.4%)	4537 (79.6%)	3271 (57.4%)
55-64	940 (14.2%)	4956 (75.0%)	5896 (89.2%)	4956 (75.0%)
Males, n (%)	2072 (26.5%)	3987 (51.1%)	6059 (77.6%)	3987 (51.1%)
25-34	763 (34.7%)	580 (26.4%)	1343 (61.1%)	580 (26.4%)
35-44	490 (33.4%)	604 (41.1%)	1094 (74.5%)	604 (41.1%)
45-54	470 (23.7%)	1211 (60.9%)	1681 (84.6%)	1211 (60.9%)
55-64	349 (16.2%)	1592 (73.9%)	1941 (90.1%)	1592 (73.9%)
Females, n (%)	2434 (19.0%)	6360 (49.7%)	8794 (68.7%)	6360 (49.7%)
25-34	513 (20.8%)	296 (12.0%)	809 (32.8%)	296 (12.0%)
35-44	534 (24.5%)	640 (29.3%)	1174 (53.8%)	640 (29.3%)
45-54	796 (21.5%)	2060 (55.5%)	2856 (77.0%)	2060 (55.5%)
55-64	591 (13.3%)	3364 (75.6%)	3955 (88.9%)	3364 (75.6%)

Conclusions: Conclusions. Implementation of new criteria for hypertension can significantly increase the prevalence of illness in RF up 89% in the oldest age group. This appears to be an overestimation of the problem and can lead to millions of people who will be diagnosed to have a disease, which prognostic value it not well established

OXIDATIVE STRESS IS ASSOCIATED WITH LIFETIME CARDIOVASCULAR RISK STRATIFICATION IN YOUNG TO MIDDLE AGE INDIVIDUALS

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Objective: Most cardiovascular (CV) risk estimators have a 10-years perspective, assuming that young individuals are at low CV risk. The estimator QRISK®-Lifetime calculates the risk of suffering a CV disease across the lifespan. Many CV risk factors (RFs) are related to oxidative stress. Here we assess the global oxidative stress (RiskOxy-SCORE) in a young-middle age population and its relationship with QRISK®-Lifetime.

Design and method: Young-middle age individuals (30–50 years old) were stratified in 1) without RFs, 2) with RFs (metabolic syndrome, hypertension, diabetes, eGFR < 80 mL/min/1.73m²) and 3) with CV event (myocardial infarction, stroke). Lifetime CV risk was calculated with QRISK®-Lifetime (<https://qrisk.org/lifetime/>). Systemic oxidative damage was determined by carbonyl groups, oxidized LDL, 8-hydroxy-2'-deoxyguanosine and xanthine oxidase (XOD) activity. Antioxidant defence was determined by total antioxidant capacity (TAC), catalase activity and superoxide dismutase (SOD) activity. Indexes of oxidative damage and antioxidant defence were calculated and combined to estimate the global level of oxidative stress (RiskOxy-SCORE).

Results: Individuals with RFs double the QRISK®-Lifetime of those without RFs (41.6 ± 10.3% vs 22.5 ± 5.6%; P < 0.001). Oxidative damage markers, TAC and catalase activity are increased in individuals with RFs (P < 0.05). XOD and SOD activities remain unchanged. RiskOxy-SCORE is higher in individuals with RFs (P < 0.05). ROC analysis indicates that the RiskOxy-SCORE discriminates between individuals with and without RFs [AUC = 0.68(0.52–0.84), P = 0.04]. The oxidative damage index has a positive correlation with QRISK®-Lifetime (r = 0.54; P < 0.001) and performs better in the ROC analysis [AUC = 0.86(0.75–0.96), P < 0.001]. Interestingly, individuals with a CV event have lower levels of oxidative damage (P < 0.001) and antioxidant defence (P < 0.01) indexes than those with RFs.

Conclusions: Young-middle age individuals with RFs have more systemic oxidative stress than those without RFs or with a CV event, which correlates with their lifetime CV risk. The normal oxidative status observed in individuals with a CV event is likely due to the implementation of a healthy lifestyle and more aggressive

therapies to prevent other CV event. Awareness of the CV risk in individuals with RFs may encourage them to introduce changes in their lifestyle, leading to a reduction in the levels of oxidative stress and an improvement in their lifetime CV risk.

ETHNIC DIFFERENCES OF THE QUALITY OF LIFE OF PERSONS WITH ARTERIAL HYPERTENSION IN RURAL AREAS OF RUSSIA AND KYRGYZ REPUBLIC (BY DATA FROM STUDY INTEREPID)

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Objective: In recent years, an important place is given to the analysis quality of life (QoL) of patients with arterial hypertension (AH). In turn, it is proved that the prevalence of AH is characterized by significant racial/ethnic differences. Aim is to study the ethnic differences of the QoL of persons with hypertension depending on the status of treatment among residents of rural areas of the two countries: Russia and the Kyrgyz Republic

Design and method: This study is a cross-sectional epidemiological study of chronic non-communicable diseases and its risks of 2012–2014. Data on the representative of the rural population of the Russian Federation (n = 1050), Kyrgyz Republic (n = 1341). The share of the Russian population in Kyrgyz sample was 36,8%. All results were age-standardized. All the examinees were divided into 4 groups: 1. Persons without AH. 2. Persons with AH. 3. Persons with AH, who not taking therapy. 4. Persons with AH, who taking therapy. QoL was assessed with questionnaire EUROQOL-EQ-5D. QoL index was done with Shaw LW methods

Results: Age-standardized hypertension prevalence in Russia was 40,1%, in Kyrgyz Republic 37,1%. QoL index for EUROQOL was higher among persons without AH, comparing persons with AH, in two countries among men and women (p < 0,01). In the Kyrgyz Republic we found ethnic differences, among the patients with AH QoL index was significantly lower among the Russian population (p < 0,01). In the analysis of QoL index in each age groups, the expected decrease in QoL with age in both men and women with AH was obtained. QoL was significantly higher among people with AH not taking therapy, compared to those with AH taking therapy (p < 0,01) in two countries. In general, in women with AH QoL is worse than in men in two countries. Moderate disruption in movement was observed in 34,4% of Russian men and 25,6% in Kyrgyz men and 55,1% in Russian women and 44,1% in Kyrgyz women (p < 0,01). Moderate depression and anxiety were experienced more often by Russian women and men

Conclusions: QoL in persons with AH is lower in comparison with persons without this disease in two countries. In the Kyrgyz Republic QoL was lower among Russian population with AH. In persons with AH taking therapy QoL was lower in comparison with those with AH not taking therapy. Thus, AH in combination with drug therapy was associated with a decrease of QoL in the samples studied

BODY FAT DISTRIBUTION AND CARDIO-METABOLIC RISK FACTORS IN MIXED-ANCESTRY SOUTH AFRICAN WOMEN AND MEN

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Objective: Obesity is a well-known risk factor for CVD and metabolic diseases, but body fat distribution appears to be a more significant discriminator of risk than generalized adiposity. We investigated the relationship between body fat distribution and cardio-metabolic risk in mixed-ancestry South African (SA) men and women, and explore the effect of menopausal status on these relationships in women.

Design and method: In a cross-sectional study, 207 mixed-ancestry SA women and 46 men underwent measures of body composition using dual-energy X-ray absorptiometry (DXA), blood pressure, oral glucose tolerance, lipid profile and high sensitivity C-reactive protein (hs-CRP). Robust regression analyses were used to investigate the associations between body fat distribution and cardio-metabolic risk factors (insulin resistance, lipid levels, blood pressure and inflammatory markers), adjusting for age and sex. In addition, we explored the interactions

between sex and body composition on cardio metabolic risk factors, adjusting for age, and in women, between menopausal age and body composition.

Results: Men had less percentage fat mass (%FM, 26.5 (19.9–32.5)% vs. 44.0 (39.8–48.6)%, $p < 0.001$), but more central ($p < 0.001$) and less peripheral fat ($p < 0.001$) than the women. Post-menopausal women had greater %FM ($p < 0.001$), waist and visceral adipose tissue (VAT) (both $p < 0.004$), and less gynoid %FM ($p = 0.001$) than pre-menopausal women. After adjusting for age and sex, VAT accounted for greatest variance in insulin resistance (HOMA-IR, $R^2 = 0.19$), while trunk %FM and leg %FM accounted for greatest variance in triglyceride ($R^2 = 0.13$) and high-density lipoprotein cholesterol concentrations (HDL-C) ($R^2 = 0.14$), respectively. The association between fat mass and regional subcutaneous adipose tissue (SAT) and cardiometabolic risk factors differed by sex and menopausal status.

Conclusions: VAT was the most significant correlate of cardiometabolic risk in mixed ancestry men and women, irrespective of sex and menopausal status

EFFECTS OF ATRIAL FIBRILLATION TYPE ON THE ISCHEMIC STROKE RECOVERY PERIOD COURSE IN THE PATIENTS WITH ARTERIAL HYPERTENSION

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Objective: evaluation of the effects of atrial fibrillation (AF) type on the course of ischemic stroke (IS) recovery period in the patients with arterial hypertension (AH).

Design and method: We performed retrospective analysis in 86 patients with AH in the IS recovery period with the anamnesis of non-valvular AF (mean age 56.4 ± 7.6 years; 79% men, 21% women). Patients were of two groups: 1) with persistent/constant AF (73%); 2) patients with paroxysmal AF (27%). Rankin scale was used to determine the degree of disability; Bartel index for social adaptation degree evaluation.

Results: In group 1: 44.8% received continuous antiaggregants before index event, 5.6% - anticoagulants, 32.8% - regular antihypertensive treatment, 3.3% - statins; acute period Rankin score was 3.3 ± 0.87 , Bartel index - 54.3 ± 9.4 . Group 2: 16.3% received regular antihypertensive treatment, 2.5% - statins, 75% - antiaggregants, anticoagulants - none (Rankin score was 2.9 ± 0.87 , Bartel index 65.8 ± 8.86).

Recovery period. Group 1: 47% took oral anticoagulants, 58.0% - antihypertensive treatment, 26.0% - statins (the latter - all men). Group 2: corresponding percentage for meds classes were 0%, 80.0% and 25.0%, respectively. Comparison of functional status in groups 1 and 2: Rankin scale 2.8 ± 0.96 vs. 1.8 ± 0.83 , Barthel index 62.1 ± 12.5 vs. 72.5 ± 8.86 . The recurrent IS occurrence during the first year in groups 1 and 2: 38.5% vs. 25.0%, in 2 years - 16.7% vs. 25.0%, respectively. Group 1 showed significant reduction in adherence to treatment with anticoagulants and statins (47.0% vs. 15.4%, and 26.0% vs. 7.7%), with growing compliance to antihypertensive treatment (58.0% vs. 76.0%). Group 2: maximum reduction in compliance was for antihypertensive treatment (80.0% vs. 66.7%) and statins (25.0% vs. 0.0%).

Conclusions: Patients with AH and persistent/constant AF in IS recovery show higher degree of disability, as well as lower functional independence class vs. patients with paroxysmal AF. Patients with AH after IS regardless of AF form showed lower adherence degree to medication treatment, which is surely is one of the recurrent IS risk factor.

ASSOCIATION OF SUBCLINICAL VASCULAR DAMAGE WITH DYSLIPIDEMIA IN ST. PETERSBURG POPULATION

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Objective: Subclinical vascular damage evaluation is believed to be useful for cardiovascular risk precising in non-high risk patients. Different diagnostic tools suggested for vascular structure and function assessment, while little is known about dyslipidemia impact into its damage development. The aim of the present study was to assess the association of dyslipidemia and different markers of subclinical vascular damage.

Design and method: 1592 apparently healthy participants aged 25–65 years were randomly selected from Saint-Petersburg inhabitants (a sample from ESSE-RF epidemiology survey). All participants signed informed consent and filled in the questionnaire regarding risk factors, concomitant diseases and therapy. Fasting lipids, glucose (Abbott Architect 8000) and vital signs were obtained. 191 patients

were excluded from the risk estimation due to the presence of cardiovascular complications. Cardio-ankle vascular index (CAVI), carotid-femoral pulse wave velocity (PWV-V) with amorphous probes and ankle-brachial index (ABI) were measured by VaSera VS-1500 (Fukuda). Measurement of intima-media thickness (IMT) was performed by My Sono U6 (Samsung). The subclinical vascular damage was detected, if PWV-V was > 10 m/s, CAVI $> / = 9.0$, ABI $< / = 0.9$, IMT > 0.9 mm. Dyslipidemia was defined as cholesterol level > 4.9 mmol/l, or LDL cholesterol > 3.0 mmol/l, or medication prescribed for dyslipidemia. Statistical analysis was performed using SPSS Statistics 20.

Results: Majority of participants (955 (76.7%)) had normal values of vascular damage markers.

Table 1. Parameters of vascular function in subjects with and without according to dyslipidemia

	Dyslipidemia (+) N= 1058	Dyslipidemia (-) N=534	p
Mean CAVI	7.5 ± 1.3	7.2 ± 1.3	< 0.001
CAVI $> / = 9.0$, n (%)	102 (12.5%)	35 (9.1%)	0.09
Mean ABI	1.09 ± 0.09	1.08 ± 0.09	0.27
ABI $< / = 0.9$, n (%)	17 (2.1%)	10 (2.6%)	0.68
Mean PWV-V, m/s	8.0 ± 1.8	7.8 ± 1.7	0.2
PWV-V > 10 m/s, n (%)	77 (10.3%)	42 (11.4%)	0.61
Mean IMT, mm	0.68 ± 0.17	0.65 ± 0.15	0.001
IMT > 0.9 , n (%)	52 (8.6%)	10 (3.2%)	0.001

There was no correlation of PWV-V with lipid level, while IMT correlated with cholesterol and HDL level ($b = 0.25$, 95%CI [0.11–0.62], $p = 0.04$ and $b = -0.15$, 95%CI [-0.98–(-0.10)], $p = 0.003$ respectively).

Conclusions: Dyslipidemia seems to be associated with carotid artery atherosclerosis, but not with arterial stiffness. Early detection of carotid atherosclerosis markers should be considered in patients with lipid disorders rather than measurement of arterial stiffness.

CARDIOVASCULAR RISK OF HYPERTENSIVE ADULT POPULATION FROM AN EST-EUROPEAN COUNTRY – RESULTS FROM SEPHAR III SURVEY

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Objective: To evaluate the cardiovascular risk of the adult hypertensive population of Romania, an Est-European country, using the data from the latest epidemiologic national-representative survey: SEPHAR III

Design and method: A total number 889 adult hypertensive subjects were identified in SEPHAR III survey (mean age 55.79 ± 15.68 , 51% males, 72.2% treated hypertensives out of which 30.8% with controlled BP values).

Obesity was defined by BMI > 30 kg/m², visceral obesity by waist circumference > 94 cm (males) / > 80 cm (females), diabetes mellitus (DM) by fasting plasma glucose > 126 mg/dl and HbA1c > 6.5 or self-reported diagnosis/specific treatment, dyslipidaemia by at least one abnormal value (total cholesterol > 190 mg/dl, LDL-cholesterol > 115 mg/dl, HDL-cholesterol < 40 mg/dl in males or < 45 mg/dl in females, Triglycerides > 150 mg/dl) and/or self reported diagnosis of dyslipidaemia /antihyperlipidemic treatment.

Target organ damage (TOD) evaluation included both asymptomatic (left ventricular hypertrophy (LVH) defined by left ventricular mass index > 115 g/m² (males) / > 95 g/m² (females); aortic pulse wave velocity (PWVao) > 10 m/s, ankle-brachial index (ABI) < 0.9 , albuminuria 30–300 mg/g and eGFR 30–60 ml/min/1.72m²) and clinical-overt (coronary artery disease (CAD), peripheral artery disease (PAD), carotid plaques, stroke history, atrial fibrillation (AF), heart failure (HF), albuminuria > 300 mg/g and eGFR < 30 ml/min/1.73m²).

Total CV risk evaluation was based on 2013 ESH-ESC risk stratification chart.

Results: The prevalence of CV risk factors among hypertensives is: smoking 20.1%, sedentarism 25.3%, family history of premature CVD in 33%, obesity in 47%, visceral obesity 84.1%, dyslipidaemia 83.2% and DM 17.8%.

Subclinical TOD was recorded as follows: LVH in 31%, PWVao > 10 m/s 36.2%, ABI < 0.9 in 4.3%, IMT > 0.9 in 7.9%, albuminuria 30–300 mg/g in 4.9% and eGFR:30–60 ml/min/1.73m² in 4.6%.

Clinical-overt TOD was recorded as follows: CAD in 32,1%, HF in 15.3%, AF in 8,1%, PAD in 3,7%, carotid plaques in 22.5%, stroke in 5,1%, albuminuria > 300 mg/g in 2.2% and eGFR < 30 ml/min/1,73m² in 0,7%. By using the CV risk stratification chart can be observed that 82% of hypertensive patients are at high or very high risk.

Conclusions: The results of the SEPHAR III study reconfirms Romania as a country with a very high CV risk where primary CV prevention strategies are urgently needed.

COMPARISON OF RISK FACTORS FOR THE DEVELOPMENT OF ARTERIAL HYPERTENSION IN KAZAKHSTAN AND ALMATY

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Objective: To study and compare the prevalence of risk factors: excess body weight, high blood pressure, elevated blood levels of glucose, cholesterol in Kazakhstan and Almaty.

Design and method: 5,285 people from Kazakhstan were examined, including 1,395 men and 3,890 women (26.4% and 73.6%, respectively), and 744 people from Almaty, 157 (21%) men and 587 (79%) of women.

Results: To determine the excess body weight and obesity, the value of body mass index (BMI) was used. In Almaty 423 people-57.5%, in Kazakhstan - 3214 people, this is 63.9%. One of the most important risk factors for diseases of the circulatory system is the presence of abdominal obesity. In Almaty, 65.3% - 481 respondents had abdominal obesity, in Kazakhstan - 3347 people - 68.6%. The lipid profile of the blood was analyzed. Elevated cholesterol among respondents from Almaty is found in 43.7% of cases, respectively, 331 people, in the country in 2017 people - 40%. The reduced level of high density lipoprotein cholesterol in Almaty among 112 persons is 15.1%, in Kazakhstan in 1688 persons - 32.5%. The increased level of low density lipoprotein cholesterol in respondents from Almaty - 43.8% - 332, in Kazakhstan - 1901 people - 37.4%. The level of triglycerides was increased in Almaty in 24.5% of cases - in 186 persons, in Kazakhstan in 25.2% - 1269 persons. The increased level of glucose in Almaty was in 12 respondents - 1.6%, in Kazakhstan in 505 - 9%. One of the most important modifiable risk factors for the development of diseases of the cardiovascular system is an elevated level of arterial pressure. In Almaty, hypertension was detected in 167 persons - 22.7%, in Kazakhstan in 1583 persons - 31.7%.

Conclusions: Thus, in all regions, more than half of the surveyed persons were overweight. The smallest prevalence of overweight in relation to the country was

noted in Almaty, and there was also a lower prevalence of hyperglycemia in relation to Kazakhstan. The prevalence of abdominal obesity and hypercholesterolemia was not significantly different. In Kazakhstan, the incidence of arterial hypertension is higher than in Almaty.

NEW PREDICTIVE PROFILES IN PLASMA FOR CARDIOVASCULAR RISK STRATIFICATION IN ASYMPTOMATIC INDIVIDUALS

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Objective: The evaluation of cardiovascular (CV) risk is based on equations derived from epidemiological data useful in individuals who have advanced beyond the limits of middle age, such as the Framingham and SCORE risk assessments. On the other hand, the LifetimeRisk calculator (QRisk[®]), estimates CV risk throughout a subjects' lifetime, allowing those requiring a more aggressive and earlier intervention to be identified and offered protection from the consequences of CV and renal disease. The search for molecular profiles in asymptomatic individuals in middle age that allow a correct stratification of CV risk would be of great interest to adopt preventive therapeutic measures in individuals at high CV risk.

Design and method: To improve the selection of subjects susceptible to intervention with aged between 30–50 years, we have employed a multiple proteomic strategy to search for new markers of early CV disease or reported CV events and to evaluate their relationship with LifetimeRisk. Blood samples from 71 patients were classified into 3 groups according to their CV risk (healthy controls, subjects with CV risk factors and patients with a previously reported CV event) and they were analyzed using a high through quantitative proteomics approach.

Results: This strategy allowed three different proteomic signatures to be defined, two of which were related to CV stratification and the third one involved markers of organ damage.

Conclusions: These protein profiles could serve as new markers for the early detection of asymptomatic individuals in middle age that would be expected to have an elevated LifetimeRisk of CV disease.

POSTER SESSION

POSTERS' SESSION PS12:

PHARMALOGICAL TREATMENT

THE BENEFICIAL EFFECT OF CANAGLIFLOZIN ON NOCTURNAL HOME BLOOD PRESSURE IN TYPE 2 DIABETES MELLITUS PATIENTS: THE SHIFT-J STUDY

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Objective: We observed a greater cardiovascular risk in nocturnal-hypertensive diabetic patients versus nocturnal-normotensive diabetic patients. Others reported sodium-glucose cotransporter-2 inhibitors (SGLT-2i) reduced blood pressure (BP), probably attributable to its diuretic action and circulation volume reduction. Here we investigated beneficial effects of SGLT-2i on nocturnal BP in Type 2 diabetes mellitus (T2DM) patients with uncontrolled nocturnal hypertension.

Design and method: This 8-week prospective, multicenter, randomized, open-label clinical trial in Japan (SHIFT-J Study) is the first evaluating SGLT-2i's effects on nocturnal BP by home BP monitoring (HBPM). We randomly assigned T2DM patients with uncontrolled nocturnal-hypertension medicated by antihypertensive and glucose-lowering drugs to 8-week add-on treatment (100-mg canagliflozin, an SGLT-2i; CAN group: n = 41, 70.4 ± 9.5 years, 65.9% male) or standard glycemic control using conventional glucose-lowering drugs other than SGLT-2i (SGC group: n = 37, 67.8 ± 9.8 years, 51.4% male). The Primary endpoint was the change in nocturnal systolic BP (SBP) from baseline to the treatment period's end, secondary endpoints included the average of the morning and evening home SBPs (ME-average home SBP).

Results: There were no significant between-group differences in baseline body weight (65.1 ± 12.2 vs. 66.1 ± 15.3 kg, p = 0.751), nocturnal home SBP (133.7 ± 13.8 vs. 130.4 ± 10.5 mmHg, p = 0.237), or ME-average home SBP: 142.1 ± 13.8 vs. 142.4 ± 9.8 mmHg, p = 0.917). CAN patients' body weights declined significantly more versus the SGC group (-1.70 vs. -0.08 kg, p < 0.001). Nocturnal home SBP changes tended to be reduced in the CAN versus SGC group (-5.2 ± 1.6 vs. -1.0 ± 1.7 mmHg, p = 0.078). The ME average home SBP change was more markedly reduced in CAN versus SGC (-7.7 ± 1.6 vs. -2.7 ± 1.7 mmHg, p = 0.035). HbA1c fell significantly in both groups, but there was no significant between-group difference in the HbA1c change (-0.37 ± 0.49% vs. -0.34 ± 0.47%, p = 0.793). The N-terminal proB-type natriuretic peptide (NT-proBNP) change was markedly reduced in the CAN versus SGC group (-5.4 [-18.2, 9.2] vs. 19.5 [3.4, 38.1] %, p = 0.023).

Conclusions: SGLT2i had beyond glucose-lowering effect on home BP. SGLT2i significantly reduced home BP and serum NT-proBNP level, while the reduction of nocturnal home BP was marginal. SGLT2i effects for reduced cardiovascular events may be explained partly by the superiority of SGLT2i for controlling BP and circulation volume.

ANTIHYPERTENSIVE DRUG TREATMENT DISCONTINUATION IN PATIENTS UNDERGOING ORTHOPEDIC SURGERY. IS IT SAFE?

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Objective: High blood pressure levels represent a common reason for postponing a scheduled surgery and are usually based on in hospital blood pressure (BP) measurements. Stress and anxiety of surgery represents a significant factor that can influence BP levels.

To confront office BP levels in the perioperative clinic with ambulatory BP (ABPM) measurement as well as cortisol levels, in order to evaluate the influence of stress and anxiety on BP levels, as well as to assess the variability of BP during surgery.

Design and method: This was a prospective observational study enrolled 45 subjects underwent to a scheduled knee surgery. In all patients' office BP (1 day

before surgery), ABMP (12 hours before and 12 hours after surgery as well as plasma cortisol levels (1 hour before and 24 hours after surgery) were measured. In addition the magnitude of pain experienced before and after surgery was assessed by a questionnaire. In all patients, antihypertensive drug treatment was interrupted before surgery.

Results: Forty five patients with mean age 73.8 ± 7.3 years were assessed. Mean office systolic BP (SBP) (138 ± 18 mmHg) while SBP at ABPM measurements 4 hours before, just before, during and just after the operation were (133 ± 18 mmHg p < 0.001, 136 ± 20 mmHg p < 0.05, 129 ± 19 mmHg p < 0.005 and 126 ± 24 mmHg mmHg p < 0.05 respectively) despite antihypertensive treatment discontinuation and despite the fact that pain as assessed by pain scale was greater after than before the operation (6.95 ± 2.2 vs 6.34 ± 2 p < 0.05). In addition, cortisol levels decreased significantly postoperatively as compared with operative measures (10.3 ± 3.6 mcg/dL vs 14.0 ± 4.8 mcg/dL, p < 0.001). Interestingly, preoperative high BP levels were not associated with increased BP levels perioperatively (p = ns).

Conclusions: Preoperative discontinuation of antihypertensive drug treatment was not resulted into an increase of BP perioperatively. Stress as expressed by cortisol levels is a significant determinant of increased BP levels before the operation.

HYPERTENSION KNOWLEDGE DEGREE AND THEIR RELATIONSHIP WITH THE VALUES OF BLOOD PRESSURE AND OTHER VARIABLES

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Objective: Little is known in our country about the degree of knowledge that the general population and hypertensive have about arterial hypertension. Our objective was to assess the degree of knowledge about it and if according to this there were differences in the control of blood pressure and other variables studied.

Design and method: 340 patients, 173 women, mean age 45 ± 17 years, 37% hypertensive, 68% under hypertensive treatment, answered four written questions before entering the doctor's office. Blood pressure was measured in all patients. Chi-square test and analysis of variance were used for the statistical analysis.

Results: 65% of the patients answered correctly which is the normal BP, 10% the three target organs, 5% the three food and 49% if hypertension is cured. Women answered better than the men to the questions respecting the normal blood pressure value (p = 0.012), target organs (p = 0.011) and not recommended food (p = 0.044). The correct answers about normal blood pressure values were positively related with an older age (p = < 0.001) and being on pharmacological treatment (p = 0.005) but not with to be hypertensive (p = 0.196), nor with the values of systolic (p = 0.062) or diastolic blood pressure (p = 0.273).

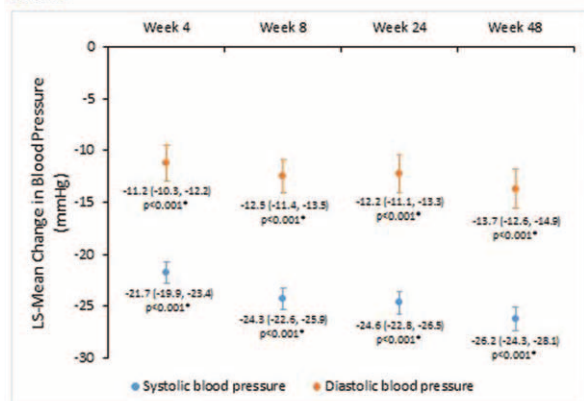
Conclusions: In our city, the most people are aware of the normal values of the blood pressure but much less about whether it can be cured, which organs are affected and which foods to eat. The level of knowledge did not correlate with arterial hypertension or the blood pressure values

REAL-LIFE EFFECTIVENESS AND SAFETY OF FIXED COMBINATION AMLODIPINE/ IRBESARTAN IN THE MANAGEMENT OF HYPERTENSION IN LATIN AMERICA: RESULTS FROM THE PARCERIA STUDY

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Objective: Prior Latin American (LA) population-based studies have shown blood pressure (BP) control rates of 40%-50% in treated patients (population control rates: 16%-20%), which are far below the targets of the Pan American Health Organization (PAHO) for 2019. Fixed-dose combinations of antihypertensives have been associated with improved adherence, better patient convenience and higher efficacy, compared with separate agents and monotherapy. This study assessed the real-life effectiveness and safety of a fixed amlodipine/irbesartan (A/I) combination in the long-term management of hypertension (HTN) in LA.

Figure 2. Repeated Measure Analysis for Change Over Time from Baseline in Blood Pressure



*Compared to baseline values based on repeated measure analysis.

Error bars represent the 95% CI of the mean change in blood pressure.

Design and method: This was a 48-week, prospective, observational, single-cohort study conducted in Argentina, Chile, Colombia, Guatemala, and Mexico. Adults with uncontrolled HTN, treated with A/I fixed combination per the treating physician's judgment, were followed in routine care. Target BP was defined as SBP/DBP < 140/90 mmHg (<130/80 mmHg for patients with diabetes or renal disease).

Results: A total of 509 patients (57.6% females) were included with a mean (SD) age of 60.6 (12.5) years and a median Framingham 10-year risk score of 8.0%, 43.2% had comorbid dyslipidemia, and 24.8% were ever-smokers (5.9% current). Over 48 weeks, 97.4% of patients reported taking greater or equal 80% of prescribed doses. Statistically significant and clinically important improvements in SBP (-25.7 mmHg; $p < 0.001$) and DBP (-13.5 mmHg; $p < 0.001$) were observed. BP control was achieved by 62.7% of patients (99%CI: 57.5%–68.6%). In multivariate analysis, country of residence ($p = 0.011$), treatment compliance (OR = 6.9; $p = 0.035$), and diabetes presence (OR = 0.3; $p < 0.001$) were significant predictors of target BP.

There were 124 Treatment Emergent Adverse Events (TEAEs) experienced by 89 (17.5%) patients, including 7 serious TEAEs by 5 (1.0%) patients. TEAEs were not related to A/I (76.6%).

Conclusions: In real life, an A/I fixed combination was effective in long-term management of patients with HTN, with BP control rates close to the PAHO target despite significant regional variability. Treatment adherence was significantly associated with BP control.

EFFECT OF HIGH DOSE FIMASARTAN ON CHANGES OF DAYTIME AND NIGHTTIME BLOOD PRESSURE COMPARED TO HIGH DOSE VALSARTAN

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Objective: Head-to-head comparison of blood pressure lowering effect of fimasartan (FMS) to other angiotensin receptor blocker (ARB) by using ambulatory blood pressure monitoring (ABPM) was never done. The aim of this randomized, double-blind, active-controlled, superiority trial was to compare BP lowering effect and variability indices of FMS with VAL at higher dose.

Design and method: Hypertensive patients who went through wash-out/run-in period for at least 2 weeks and had baseline systolic BP (SBP) over 140mmHg were randomized to FMS or VAL groups. Subjects were initially given standard starting dose of FMS, VAL (60 mg, 80 mg, respectively), then forced-titrated to double dose (120 mg, 160 mg, respectively) at week 2 and followed up to week 6. Sitting systolic and diastolic BP (SiSBP and SiDBP) were measured at baseline, 2 weeks and 6 weeks and ABPM was done at baseline and 6 weeks.

Results: Total 312 subjects were enrolled from 8 teaching hospitals in Korea (FMS, $n = 155$, 57.95 ± 8.07 years old, VAL, $n = 157$, 58.99 ± 7.06 years old). After 6 weeks of treatment, FMS demonstrated significantly higher BP reduction compared to VAL (SiSBP; 136.63 ± 15.56 vs. 140.12 ± 14.53 mmHg, SiDBP; 85.87 ± 10.51 vs. 87.71 ± 8.94 mmHg, p value 0.0298 and 0.0211, respectively). Table 1 demonstrated blood pressure measurement by ABPM and

Table 2 demonstrated variability indices. Changes of night-time SBP was higher than day-time SBP in FMS group (-14.39 ± 1.33 vs. -16.73 ± 1.39 mmHg, $p = 0.2253$), but not significant.

Conclusions: FMS showed strong BP lowering effect than VAL all day long. FMS treated group showed greater blood pressure lowering effect on both day and night-time SBP. FMS also showed more BP changes at night which suggests possibility of restoring dipping pattern in non-dipping hypertensive patients.

Table 1. Changes of day and night-time blood pressure measured by ABPM

	FMS (n=155)	VAL (n=157)	p value
SBP(24 hours)			
Baseline	150.28±12.81	149.97±12.77	
6 weeks	135.06±14.19	140.52±15.94	0.0009
ΔSBP	-15.17±1.21	-9.49±1.17	0.0009
DBP(24 hours)			
Baseline	92.05±7.65	91.18±8.11	
6 weeks	83.31±8.03	85.20±9.60	0.0125
ΔDBP	-8.59±0.71	-6.13±0.69	0.0140
Day-time SBP			
Baseline	154.95±12.56	154.68±13.02	
6 weeks	140.56±14.87	145.63±15.94	0.0174
ΔSBPd	-14.39±1.33	-9.11±1.29	0.0054
Day-time DBP			
Baseline	94.92±8.01	93.92±8.37	
6 weeks	86.19±8.57	87.69±9.34	0.2243
ΔDBPd	-8.50±0.76	-6.44±0.74	0.0535
Night-time SBP			
Baseline	140.51±17.88	140.13±16.30	
6 weeks	123.71±17.07	129.81±18.64	0.0137
ΔSBPn	-16.73±1.39	-10.38±1.35	0.0012
Night-time DBP			
Baseline	86.10±10.11	85.38±9.37	
6 weeks	77.21±10.29	79.83±11.61	0.0836
ΔDBPn	-8.75±0.90	-5.68±0.87	0.0153

TISSUE DISTRIBUTION AND REDOX STATUS COENZYME Q10 AFTER INTRAVENOUS ADMINISTRATION OF UBIQUINOL TO RAT

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Objective: The effectiveness of coenzyme Q10 (ubiquinone) as a cardioprotector has been demonstrated in experimental and clinical studies. The protective effect is realized through a reduced form - ubiquinol. The aim of the present study was to investigate coenzyme Q10 tissue distribution and redox status after intravenous administration of ubiquinol.

Design and method: The experiments were performed on adult male Wistar rats. The pharmacokinetics of ubiquinol in rat plasma and target organs was studied after single intravenous injection of 1% ubiquinol solution (solubilized form). The determination of the ubiquinol and the total concentration of coenzyme Q10 in the biomaterial collected at 0.25, 2, 8, 24, 48, 96, 192 hours after injection (5 animals per time point) was performed by HPLC with electrochemical detection.

Results: Tissue bioavailability of ubiquinol, calculated as the ratio (%) of the areas under the kinetic curves for the organ and plasma, was 15.1% for the left ventricle, 10.4% for the brain. The redox status (ubiquinol/total coenzyme Q10 ratio) was maintained relatively unchanged throughout the follow-up period: before administration, at elevated tissue levels (96 hours) and after returning to baseline (by the end of 8 days). These values differed from plasma ones ($91.0 \pm 2.3\%$) and were $42.0 \pm 5.5\%$, $46.7 \pm 6.6\%$, $41.3 \pm 11.9\%$ for the left ventricle of the heart; for the brain - $63.6 \pm 7.6\%$, $68.9 \pm 0.3\%$, $65.9 \pm 5.1\%$; for the kidneys - $58.5 \pm 8.9\%$, $62.8 \pm 8.9\%$, $60.4 \pm 2.0\%$, respectively. The obvious distinction in the redox status of CoQ10 in plasma and organs indicate to the oxidation of ubiquinol in the process of penetration into the tissues of organs due to the inclusion of the drug in local oxidation-reduction processes.

Conclusions: Intravenously administered ubiquinol penetrates into potential target organs - the brain and myocardium. Single administration provides long-term

preservation of elevated tissue levels of coenzyme Q10 and enhanced antioxidant protection, which is potentially important for the treatment of acute ischemic events.

CIRCULATING LEVELS OF SELECTED MICRORNAS AND THEIR RELATION TO NITRIC OXIDE LEVELS IN HYPERTENSIVE PATIENTS

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Objective: Pathophysiology of arterial hypertension (AH) is multifactorial and highly complex. One of the first changes occurring during AH development is decrease in nitric oxide (NO) levels related to profound endothelial dysfunction. microRNAs represent known regulatory molecules involved in endothelial dysfunction, however relationship between their circulating levels and levels of NO is still not completely understood. The aim of the current study was to determine, whether circulating levels of selected microRNAs differ between healthy and hypertensive individuals and whether they correlate with the NO levels.

Design and method: Study was conducted as a prospective single-centre study. 42 consecutive patients (16 females) were enrolled: 28 newly identified untreated hypertensive patients (group H; age 28.90 ± 6.69 years; BMI 26.45 ± 5.15 kg/m²) and 14 healthy individuals (group C; age 30.18 ± 7.89 years; BMI 27.96 ± 3.75 kg/m²). All enrolled subjects underwent 24-ABPM and plasmatic levels of NO as well as of selected microRNAs (miR-21, miR-126, miR-155 and miR-210) were determined using ELISA and qRT-PCR, respectively. Statistical analysis was performed in the STATISTICA software using appropriate statistical tests.

Results: Statistically significant differences have been observed between the study groups in the levels of nitric oxide (C vs. H: 30.93 ± 22.36 vs. 17.76 ± 10.53 [mM]; $p = 0.005$) and the plasmatic levels of all studied microRNAs (all of them showing statistically significant increase in hypertensive patients). Levels of miR-21 ($R = -0.416$), miR-126 ($R = -0.457$) and miR-210 ($R = -0.414$) statistically significantly ($p < 0.05$) negatively correlated with the levels of NO.

Conclusions: Levels of selected microRNAs are statistically significantly increased while levels of NO are statistically significantly decreased in patients with newly identified hypertension. All selected microRNAs are known to be involved in the processes of fibrosis, cardiac remodelling and systemic inflammation, suggesting all of these processes occurring within the initial phases of hypertension development. Moreover, levels of miR-21, miR-126 and miR-210 negatively correlated with NO levels, suggesting potential regulatory link between these microRNAs and NO-producing enzymes gene expression (e.g. iNOS – known target of miR-21 and miR-210).

MODULATION OF THE MICROBIOTA BY SALT AND MELATONIN ALTERS GUT SHORT CHAIN FATTY ACIDS PRODUCTION

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Objective: Emerging data demonstrate correlation between microbiota and cardiovascular disease including hypertension. The microbiota is exposed to the host diet, thus different diet components may change microbiota composition and metabolites production. Short chain fatty acids (SCFAs) are major products of microbiota fermentation which can be utilized by the host. Some advocate that SCFAs are pivotal mediators in microbiome host interaction in health and disease. The aim of this study was to evaluate the effect of high salt diet (HSD) and melatonin on microbiota and whether this effect is accompanied by fecal SCFAs change.

Design and method: Dahl salt sensitive rats were divided into 3 groups ($n = 10$ each): 1. Control- fed regular chow. 2. Fed HSD 3. Fed HSD and melatonin. High-throughput pyrosequencing of the 16S rRNA technique was used for microbiome characterizing. Chromatography /mass spectrometry (GCMS) was used to measure the levels of SCFAs: acetic acid(AA), propionic acid(PA), butyric acid (BA) and isobutyric acid (IBA) in fecal samples.

Results: Differences in microbial composition were noted between groups. PCoA PC1 primarily separated controls from the HSD and HSD+melatonin diets. In addition, the HSD+melatonin showed less within group microbial variations. We further noted specific taxa associations with HSD, and HSD+melatonin primarily from Proteobacteria and Firmicutes phyla. HSD increased significantly fecal acetic, propionic and isobutyric acids but not butyric acid. Melatonin attenuated this elevation of fecal SCFAs (Table 1).

	Acetic acid μmol/100mg	Propionic acid μmol/100mg	Butyric acid μmol/100mg	Isobutyric acid μmol/100mg
Control	27±1	1.5±0.2	0.2±0.03	0.08±0.01
HSD	32±2.3*	2.4±0.3*	0.3±0.09	0.16±0.02*
HSD+Mel	30±0.2	1.6±0.26	0.3±0.1	0.12±0.02

Table 1. Fecal short chain fatty acids (μmol/100mg of stool). * $p < 0.05$

Interestingly, higher butyric acid was negatively associated with taxa from the Actinobacteria phylum and Moraxellaceae family, while higher acetic acid was positively associated with taxa from the Moraxellaceae family.

Conclusions: Adding salt or melatonin to the diet has different impact on gut microbiome that may alter fecal SCFA production.

POSSIBILITY OF IMPROVING THE QUALITY OF DIAGNOSIS AND TREATMENT OF HYPERTENSION AND DYSLIPIDEMIA BY PHYSICIANS EDUCATION

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Objective: To study the possibility of improving the educational level of primary health care physicians (cardiologists and internists) of Kursk city (Russia) aimed at improving the quality of diagnosis and treatment of hypertension and dyslipidemia in the short and long term.

Design and method: The educational project (EP) covered all primary care physicians and cardiologists of Kursk ($n = 144$). During 1 year several seminars were held for physicians by the experts of national guidelines on hypertension and dyslipidemia. The criteria for the efficacy of EP was the achievement of target levels of blood pressure (BP) and total cholesterol, as well as positive changes of physicians actions on the diagnosis and treatment of hypertension and dyslipidemia. For this reason physician records from 300 randomly selected ambulatory cards was analysed before the start of the EP and following 1 and 3 years.

Results: Following 3 years after the EP, the frequency of achieving target BP was 39.6% ($n = 119$), which is significantly higher than before the project – 31.6% ($n = 95$), $p < 0.05$, but lower than 1 year after the EP – 51% ($n = 153$), $p < 0.01$). The frequency of achievement of the target level of total cholesterol after 3 years was 38.3% ($n = 115$), significantly higher than before the start of the project 9.3% ($p < 0.01$), and differs a little from the figures obtained after 1 year – 43.3% ($n = 130$), $p = 0.05$. There were the improvement of situation with the investigations aimed at revealing of target organ damages. So, after 3 years, heart ultrasound has appointed 24.7% ($n = 74$) of doctors, significantly higher than before the start of the EP ($p < 0.001$), but lower than 1 year after the EP ($p < 0.05$). Impressive increase of investigations to reveal microalbuminuria was found – after 3 years – 32.7% ($n = 98$), which is significantly higher than before the project ($p < 0.001$) and after 1 year ($p < 0.001$).

Conclusions: EP demonstrated not only short, but long-term efficacy. However, given a decline in several important variables of efficacy of education it should be done on systematic basis.

FACTORS ASSOCIATED WITH TARGET ORGAN DAMAGE REGRESS ON FIXED DOSE COMBINATION PERINDOPRIL/AMLODIPIN IN HYPERTENSIVE PATIENTS WITH AND WITHOUT ISCHEMIC HEART DISEASE

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Objective: In trial there were evaluated factors associated with target organ damage (TOD) regression on fixed-dose combination (FDC) Perindopril-Amlodipin in hypertensive patients with and without ischemic heart disease (IHD).

Design and method: There were included 60 patients with AH: 1st gr.-30 patients without IHD, 2nd gr.-30 with IHD. All patients in day of randomization were administered FDC in daily baseline dose 5–5 mg with up-titration to 10–10 mg every two weeks. If target BP was not achieved after 6 weeks the indapamide 1.5 mg was added. 66.7% and 96.7% patients of 1st and 2nd groups took beta-blockers. All patients were done: body mass index measurements, office and ambulatory BP measurements, pulse wave velocity (PWV) and aorta SBP, augmentation index adjusted to HR 75 (Aix75) evaluation, biochemical analysis,

ECG, EchoCG with Doppler, ankle-brachial index, intima-media thickness. The follow-up period was 12 months.

Results: It was found that in both groups treatment based on FDC led to significant TOD regression – improving arterial stiffness and left ventricular diastolic function, decreasing of urine albumin level, left ventricular hypertrophy (LVH) and left atrium size. Regressions of LVH, diastolic dysfunction, renal and aorta damage were associated with FDC influence on aorta BP. This influence was equal in both groups. Decreasing of ambulatory systolic BP was connected independently with lowering of albuminuria and LVH. Only in patients without IHD lowering of ambulatory systolic BP was associated with improving diastolic function and left atrium size reduction, ambulatory diastolic BP – with decreasing of e-e. In patients with IHD elderly age correlated with less dynamic of aorta PWV, diabetes mellitus - with less influence on albuminuria level. Independently from BP and presence of IHD the reduction of aorta PWV was correlated with muscular PWV, albuminuria, e/e⁺ lowering and LVH—with improving of diastolic function, reduction of left atrium size and albuminuria.

Conclusions: Thus assessed common and different factors associated with TOD regression in dependency on IHD could help in choice of antihypertensive therapy and management patients with arterial hypertension.

IS IT SAFE TO WITHDRAW COMBINED ANTIHYPERTENSIVE TREATMENT BEFORE NON-CARDIAC SURGERY IN THE VERY ELDERLY ?

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Objective: Elevated systolic blood pressure (SBP) during pre-operative evaluation is the main cause to postpone non-cardiac surgery. We hypothesized that white-coat phenomenon might be exaggerated in pre-operative visits.

Design and method: During their perioperative visit, we prospectively enrolled 22 very elderly hypertensive patients (aged 78 ± 4) under chronic treatment with at least two antihypertensive agents. The day of the surgery this treatment was not administered except b-blockers according to guidelines. On-treatment office SBP, and BP immediately before and after surgery were recorded, while all the participants underwent ambulatory SBP measurement ranging from at least four hours preoperatively, intraoperatively, to 4 hours postoperatively. A paired samples t-statistic was used for all comparisons after having checked for linearity and outliers.

Results: Pre-operative on-treatment office SBP (142.2 ± 18 mmHg) was significantly higher compared to inpatient SBP just before surgery (132.9 ± 19 mmHg, P = 0.037); ambulatory SBP 4h-before surgery (130 ± 17 mmHg, P = 0.004); ambulatory SBP during surgery (125.6 ± 17 mmHg, P < 0.001); ambulatory SBP 4h-after surgery (126.6 ± 25 mmHg, P = 0.022), and mean ambulatory SBP (129.9 ± 17 mmHg, P = 0.004. In 17 patients (77.2%) pre-operative SBP was higher than 140/90 mmHg (158.3 ± 16 mmHg) despite ongoing treatment, and the difference with SBP before operation was also significant (142.3 ± 17 mmHg, P = 0.005).

Conclusions: Office SBP during the usual pre-operative evaluation was significantly higher compared to SBP before, during and after surgery. A 24-hour withdrawal of any combined treatment was safe and was accompanied by significant SBP decrease, and this finding may stimulate randomized research in the field.

A MINIMAL ROLE FOR ENDOTHELIAL NITRIC OXIDE IN VASOCONSTRICTOR AND VASODILATOR RESPONSES OF GUINEA-PIG AORTA

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Objective: Acetylcholine (ACh) dilates rat isolated aorta by releasing nitric oxide (NO) from the vascular endothelium. The vasoconstrictors, U46619 (thromboxane mimetic), phenylephrine (α-adrenoceptor agonist) and b-phenylethylamine (PEA) (trace amine associated receptor (TAAR) agonist), also release NO causing opposing vasodilatation. The roles of NO and endothelium in these vasoconstrictor responses were examined in guinea-pig aorta, along with the status of the endothelium.

Design and method: Isometric contractions of guinea-pig aortic rings immersed in Krebs's solution gassed with 5% CO₂ in O₂ at 37 ± 0.5°C were recorded. Aortae were either intact or denuded of endothelium by rubbing. Cumulative concentration-response curves (CRC) for acetylcholine chloride, b-phenylethylamine hydrochloride (PEA) or (-)-phenylephrine HCl were obtained. Contractions were expressed as a percentage of the contraction to KCl (60 mM). Responses were compared by Student's paired t-test, P less than 0.05 indicating significance.

Results: Contractions to phenylephrine and PEA were not significantly different in endothelium intact and denuded aortae. The maxima for phenylephrine were 80.4 ± 3.0 (n = 11) and 77.1 ± 8.1% (n = 6), respectively and the maxima for PEA were 71.7 ± 3.6 (n = 22) and 60.2 ± 3.4% (n = 17), respectively. Contractions to U46619 (1 mM) were also not significantly different in intact (1.32 ± 0.14 g n = 4) and denuded tissues (1.24 ± 0.38 (n = 12)). We tested whether endothelium was present in intact tissues by adding ACh to U46619-pre-contracted aortae (1 or 0.5 mM). Of 16 intact tissues, only 6 responded with small falls in tension (0.07 ± 0.02 g), representing only 7.11 ± 3.04% of the contraction to U46619 (1.33 ± 0.27 g). Sodium nitroprusside, however, relaxed U46619-precontracted (1 mM) aorta reaching a maximum of 97.3 ± 5.1% of the U46619 contraction (1.58 ± 0.21 g, n = 4). No denuded preparations responded to ACh. ACh in non-contracted intact aortae produced small dose-related contractions. After washout (x2), tissues were raised from the bath and the endothelium removed before returning to the bath for a second CRC, which was potentiated, the maximum increasing from 25.1 ± 10.5% to 48.9 ± 21.5% (n = 4). Phenylephrine contractions also increased after rubbing to remove endothelium.

Conclusions: Intact guinea-pig aortae displayed poor relaxations to ACh suggesting a minimal role of endothelial muscarinic responses. In uncontracted aortae, ACh caused constriction which was potentiated when repeated after endothelium removal, indicating a minor opposing endothelium-dependent vasodilatation.

INTESTINAL ANGIONEUROTIC EDEMA ASSOCIATED WITH PERINDOPRIL ADMINISTRATION

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Objective: To report a case of rare severe adverse reaction to an inhibitor of angiotensin-converting enzyme (iACE).

Design and method: A 44-year-old female with a history of hypertension for 5 years, asthma, and atopy was admitted to a local emergency department due to diffuse abdominal pain with vomiting and diarrhea lasting for 2 days. A few days earlier, perindopril was administered due to suboptimal BP control. The first dose of iACE was followed by lower abdominal pain, urgency to defecate associated with difficulties in passing the stool. After the next dose of iACE, she developed severe, gradually increasing, diffuse abdominal pain with concomitant nausea, vomiting, and diarrhea. She arrived to emergency room and signs of peritonitis were present on physical examination. Acute abdomen was diagnosed and CT scan ordered which showed diffuse infiltrates within the small intestine and mesentery, with free abdominal fluid but no signs of perforation. Gastrointestinal angioneurotic edema related to iACE was suspected and patient was transferred to department of medicine. On admission to the medical unit, the patient was moderately unwell, conscious, with BP 170/100 mmHg, HR 110 bpm, SaO₂ 99% on room air, and normal body temperature. Physical examination of abdomen revealed reduced bowel sounds, guarding and tenderness on palpation, especially in the mid-abdomen with rebound tenderness. Laboratory tests showed elevated WBC (13,600/mm³) and CRP (22 mg/L).

Results: Perindopril was withdrawn, the patient received antihistamines, analgesics, and intravenous fluids, with improvement of the patient's condition and reduction of pain and levels of inflammation markers. Abdominal CT scan done after 5 days showed resolution edematous lesions in small intestine. The patient was discharged home in good condition, without abdominal pain, and with good BP control. The final diagnosis was gastrointestinal angioneurotic edema associated with iACE treatment.

Conclusions: Isolated angioedema of small intestine due to iACE administration is rare complication but creates diagnostic problems and may imitate acute abdomen. Prompt and accurate diagnosis may prevent unnecessary investigations and surgical interventions.

EVALUATION OF POLYMORPHO NUCLEAR CELLS (PMN) CYTOTOXIC ACTIVITY FROM PATIENTS WITH ACUTE CORONARY SYNDROMES

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Objective: Reactive oxygen species (ROS) are known as secondary toxic products of oxygen metabolism from mammalian cells and they are generated within the vascular wall by NADPH oxidase and this process can be stimulated by mechanical stress. The aim of this study was to investigate PMN oxygen dependent cytotoxic activity expressed as a liberation of anion superoxide within the extracel-

lular space(marker of oxidative stress),or intracellular production of superoxide (marker of antimicrobial defense oxygen dependent) by stimulated/non-stimulated PMN for CR3 and fMLP-R by cytochrome C reduction test. Evaluation of responsive cells proportion in controls and patients with acute coronary syndromes at stimulation of CR3 and fMLP-R as well as evaluation of responsive degree of cells. Evaluation of respiratory intensity with intracellular production of superoxide anion(NBT test)

Design and method: Our study was done on 21 patients aged 45–72 years old with acute myocardial infarction(AMI(6) and Unstable angina pectoris (U.A.P). (15) admitted in Cardiology Clinique of C.C. Iliescu” Cardiovascular Disease Institute.PMN from patients with (AMI) and (UAP)have been isolated from peripheral blood by centrifugation in density gradient and in vitro stimulated at CR3 and fMLP-R with major role in inflammatory process

Results: There is an increase in superoxide anion levels in patients with cardiovascular pathology both in the presence of zymosan and fMLP.The signal transmitted by CR3 and fMLP-R intensifies generation but not liberation of anion superoxide indicating a mobilization of a complex mechanism of destruction of pathogenes without exacerbation of oxydative stress. Leucocytosis found in patients with UAP suggests the existence of anti-inflammatory signals which determines extravasation of PMN population from bone marrow responsive to potential inflammatory stimuli.

Conclusions: Patients with UAP posses a non specific immune defense system accompanied by an increase in the basal potential of oxidative stress.

PHYSIOLOGICAL AND BIOCHEMICAL STUDIES OF RAT HEART WITH EXPERIMENTAL HYPERTHYROIDISM

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Objective: The aim of this study was to evaluate physiological as well as biochemical parameters of rat heart with experimental hyperthyroidism treated with T3 in excess.

Design and method: Our study was done on 10 adult male Wistar rats treated with T3 (i.p. injections 4.5 mg/kg body weight) for 4 weeks., versus 10 controls. After treatment, the animals were sacrificed and the heart was removed and mounted in a Langendorf retrograde perfusion system and perfused for 30 minutes with Krebs Hanseleit bicarbonate-buffered saline at 37°C, pH 7.6 supplemented with 10 mM glucose (stabilisation period). Then, ischemia was induced for 30 minutes by interrupting the flow of nutrients and oxygen. (ischemia period), and reperfused for 60 minutes. Physiological parameters of heart:left ventricular developed pressure(LVDP),heart rate(H.R.) and coronary flow(C.F.) were recorded at the end of stabilization and during reperfusion in order to estimate the recovery capacity of heart after ischemia. In plasma were and left ventricle homogenate were assayed with standard biochemical techniques: Lactic dehydrogenase(LDH), creatin kinase(CK), superoxide dismutase(SOD), gamma glutamyl transferase (GGT), total cholesterol(TC) LDL,HDL fractions, total lipids and (TL) and lipid peroxides (LP).

Results: Regarding LVDP in treated rats,cardiac recovery is achieved at higher values above those from controls. Heart frequency is not different in treated rats in comparison with controls.There is a decrease in coronary flow in hyperthyroid rat heart in comparison with controls,in both cases there is a decrease of this parameter during reperfusion with lower values in controls and a tendency of reaching a plateau value. Plasma LDH in treated rats was 4 times higher than in controls,plasma CK was also increased, and SOD activity was diminished in myocardium as well as gamma glutamyl transferase(GGT).

Conclusions: Because of lower total plasma cholesterol,and lack of significant changes in lipid peroxides,hyperthyroid rats are not exposed to action of atherogenic factors present in other forms of hypertension.

BLOOD PRESSURE CONTROL OF NIFEDIPINE GITS 60MG TREATMENT IN PREVIOUSLY UNCONTROLLED HYPERTENSIVE PATIENTS: A PROSPECTIVE, OPEN-LABEL, MULTICENTER, SINGLE-ARM, 8WEEK STUDY

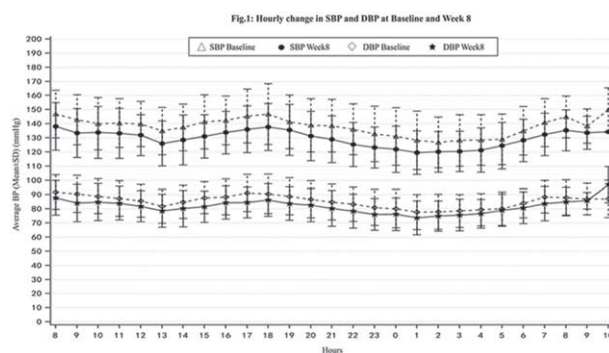
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Objective: Post-marketing surveillance data has confirmed the efficacy and tolerability of 30 and 60 mg Nifedipine GITS in the management of hypertension. However, role of high dose Nifedipine GITS in controlling blood pressure (BP) in patients with uncontrolled BP levels with prior antihypertensive therapy is not studied. This 2nd analysis of ADEPT study aimed to evaluate the effect of Nifedipine GITS 60 mg treatment on 24 hours BP control in uncontrolled hypertensive patients using Ambulatory Blood Pressure Monitoring (ABPM).

Design and method: Men and women (18–65 years) whose BP was uncontrolled with prior antihypertensive monotherapy were included in a prospective, open-label, multicenter, single-arm study. Patients received oral Nifedipine GITS 60 mg for 8 weeks, OD. BP data was obtained at baseline, week 2, 4, and 8. Mean 24-h systolic (SBP) and diastolic blood pressure (DBP) data was obtained through 24-h ABPM at baseline and after Week 8. BP reduction at each hour and throughout 8-week study period was analyzed along with heart rate (HR).

Results: Patients who started both baseline and week 8 ABPM between 8:00 and 11:59AM were included in the analyses (n = 138, age = 55.6 ± 8.1 years, 58% men, 42% women). Hourly variation in SBP and DBP at baseline and week 8 is represented in Fig.1. Mean 24-h SBP decreased from 129.1 ± 16.1 mmHg to 121.6 ± 12.7 mmHg and DBP decreased from 79.1 ± 10.1 mmHg to 76.0 ± 9.2 mmHg. T/P ratio for SBP was 0.71 and 0.63 for DBP. Mean change in SBP and DBP for last 4-h at baseline and week 8 was 133.4 ± 15.0 mmHg and 126.3 ± 12.6 mmHg, 82.9 ± 9.1 mmHg and 80.0 ± 8.8 mmHg respectively. Mean change in SBP and DBP for last 6-h at baseline and week 8 was 131.9 ± 14.9 mmHg and 124.6 ± 11.9 mmHg, 81.6 ± 9.0 mmHg and 78.4 ± 8.8 mmHg respectively. 24-h variation in HR was 1.5 bpm.



Conclusions: Nifedipine GITS showed good efficacy in the last dosing time along with good BP control for 24-h in patients with uncontrolled BP with prior antihypertensive monotherapy.

LOW FIXED-DOSES COMBINATION PERINDOPRIL/INDAPAMIDE/ AMLODIPINE -EFFECTS IN GRADE 2 HYPERTENSIVES NOT ADEQUATELY CONTROLLED

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Objective: Hypertension is worldwide spread, affects 40.41% of Romanians, and represents the leading cause of death. High blood pressure is associated with left ventricular hypertrophy and diastolic dysfunction. In 15–20% of patients with hypertension a combination of three drugs is needed to achieve blood pressure control, better in a single tablet with fixed doses, because the single-tablet formulation improves adherence, which is low. The most rationale combinations appear to be a blocker of renin-angiotensin system, a calcium antagonist and a diuretic. The aim of our study was to evaluate the efficacy of low fixed-doses combination perindopril/indapamide/amlodipine 5/1.25/5 mg on blood pressure, left ventricular hypertrophy, and diastolic dysfunction in patients with primary grade 2 hypertension who did not reach the blood pressure goal (< 140/90 mmHg) with previous antihypertensive treatment.

Design and method: We performed a prospective study, lasting 3 months, in which 46 treated, but not controlled, grade 2 hypertensives, medium age 55 ± 6 years, received in the evening, low fixed-doses combination perindopril/indapamide/amlodipine 5/1.25/5 mg. Office blood pressure was measured at baseline, 1 month and 3 months. Left ventricular echocardiographic parameters were measured at baseline and after 3 months of treatment. We assessed patient general

condition (well-being) as excellent, improved, appropriate or worse at baseline and after 3 months.

Results: Blood pressure was significantly reduced by treatment, both systolic (164 ± 15 vs 138 ± 11 mmHg, $p < 0.01$) and diastolic (95 ± 9.5 vs 84 ± 7 mmHg, $p < 0.01$). LVMI was decreased from 131.5 ± 19 to 111.3 ± 12.8 g/m² ($p < 0.001$). E/A ratio increased from 0.84 ± 0.25 to 1.01 ± 0.14 ($p < 0.002$). After 3 months of therapy, patient well-being was rated as excellent in 71.74%, improved in 17.40%, appropriate in 10.86% and worse in 0%.

Conclusions: Switching patients with uncontrolled grade 2 hypertension to low fixed-doses combination perindopril/indapamide/amlodipine 5/1.25/5 mg allowed to reach the target blood pressure value, with regression of cardiac hypertrophy and improvement in LV diastolic function. Treatment was well tolerated.

EFFECT OF 17-BETA ESTRADIOL ON HYPOXIA PULMONARY HYPERTENSION DEPENDS ON SEX AND DEGREE OF HYPOXIA

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Objective: Sex hormones play significant role in development of pulmonary hypertension (PH). Among women, patients with PH are more than. The reason for this phenomenon is not clear. One of the models of PH in animals is hypoxic PH (hPH). In the literature there are many conflicting data on the influence of the female sex hormone estradiol (E2) on the development of hPH. The aim of this work was to study the effect of E2 on hPH, depending on the degree of exposure to intermittent hypoxia.

Design and method: Female and male gonadectomized Wistar rats were used. Animals were being injected with or estradiol (15mg/kg/day (F-E2 and M- E2) or solvent of E2 (1,2-propanediol F-P and M-P) every day for 4 weeks. 2 weeks after the start of injections rats were exposed to hypoxia 10 h/day, 2wk. with 13% or 10% or 8% O₂ in hypobaric chamber. Wistar rats were divided into 12 groups by parameters: sex, E2 or 1,2-propandion, level of hypoxia (8%, 10%, 13% O₂). Two weeks after the onset of hypoxia systolic right ventricle pressure (SRVP) was measured as indices of hPH.

Results: Two weeks after the onset of hypoxia all groups of rats developed hPH with different extent of the disease. SRVP was higher by 30% in all 10% O₂ groups then 13% O₂ groups except for M-P group. Increasing degree of hypoxia from 10 to 8% O₂ did not change SRVP of all groups, but mortality in groups M-P, M-E2, F-P increased by 61%. 15 mg/kg E2 injecting increased only SRVP of male 10% group, did not change SRVP of other groups and increased the survival rate of rats of group F-E2 2,5 times with hypoxia of 8%.

Conclusions: Increasing the degree of hypoxia in the chamber (from 13% to 8%) is accompanied by increasing SRVP only up to certain values (about 60–70 mm Hg). Further decrease in oxygen content increases animal mortality. Chronic administration of estradiol (15 mg/kg in female rats with hPH caused by hypoxia 8% a significant increase in the survival rate of rats

EFFECTS OF HYDROGEN SULFIDE ON THE GARDOS CHANNELS ACTIVITY IN ERYTHROCYTES

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Objective: The molecules of NO, H₂S, CO formed in the body cells present a new group of intra- and intercellular mediators that may regulate a number of physiological functions. The targets of these molecules are often the proteins of ion channels. The aim of this research work was to study the effects of hydrogen sulfide (H₂S) on the membrane potential of erythrocytes caused by activation of Ca²⁺-dependent K⁺ channels (Gardos channels) in the presence of calcium ionophore or phenazinmetosulfate (PMS).

Design and method: The study was performed on packed red blood cells obtained from the venous blood of twenty-four healthy male volunteers aged 20–27

years. The registration of the membrane potential of erythrocytes in the presence of Ca²⁺-ionophore (A23187) or PMS was carried out by a potentiometric method. As an integral characteristic of Ca²⁺-dependent K⁺-permeability of erythrocytes membranes, the amplitude of the hyperpolarization response was calculated. Test compounds: sodium hydrosulfide (NaHS, 0.005, 0.01, 0.1, 0.2 mM), bumetanide (5 mM).

Results: It was found that the addition of NaHS in concentrations of 0.005–0.2 mM to the medium incubated caused a change in the amplitude of the hyperpolarization response of the erythrocyte membrane caused by Ca²⁺-ionophore (A23187) or PMS. In the presence of 0.005 mM NaHS the amplitude of the A23187-dependent response was significantly increased, while the amplitude of the PMS-dependent response was reduced. The suppression of A23187-dependent response in the presence of higher NaHS concentrations was more pronounced than the PMS-dependent one. The amplitude of the A23187-dependent response under the combined action of hydrogen sulphide and Na⁺, K⁺, 2Cl⁻ cotransport (NKCC) blocker bumetanide increased and the PMS-dependent hyperpolarization response decreased in comparison with the absence of the blocker.

Conclusions: This study showed that H₂S has a modulating effect on the Gardos channels activity in erythrocyte membrane. Effects of H₂S depend of the method of activation these channels. A23187-dependent response was more sensitive to H₂S.

EFFECT OF HYPERTENSION AND THYROID STATUS ON THE EXTRACELLULAR MATRIX AND INTERCELLULAR COMMUNICATION IN THE HEART AND POSSIBILITIES OF PREVENTION WITHS OMEGA-3 FATTY ACIDS DIET

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Objective: Extracellular matrix (ECM) and intercellular communication in the heart can be mainly affected by hypertension. Matrix metalloproteinases (MMP) is responsible for extracellular matrix remodeling what can be subsequently interconnected with disorders of intercellular communication mediated by connexin-43 (Cx43). Alternation of myocardial Cx43 resulted in to develop of malignant arrhythmias.

Design and method: In accordance with the European Union Council Directive 86/609/EEC were experiments performed on male 10-month-old wistar euthyroid (EU) rats and hypertensive (SHR) rats with altered thyroid status, which were supplemented with omega-3 fatty acids (PUFA) (200 mg/kg/day) for six weeks. Hypothyroidism (HY) was induced by 0,05% methimazole and hyperthyroidism (TH) was induced by triiodothyronine (0,15 mg/kg) applied for two months. Left ventricle tissue was used for molecular analyzes of MMP2, Cx43 and PKCε. Histological analysis of ECM was performed by staining according to van Gieson.

Results: Besides thyroid hormones and heart weight reduction, we have found in HY rats decreased expression and activity of MMP2 and elevation of MMP2 activity and expression in SHR HY rats. On the other hand, TH and SHR TH rats with increased heart weight and thyroid hormones and SHR groups did not reveal any changes in MMP2. Expression of Cx43 as well as PKCε, which directly phosphorylate Cx43, was decreased due to hyperthyroidism and increased due to hypothyroidism. Hypertension did not influence Cx43 and MMP2 in HY and TH rats. The histological staining of collagen in the left ventricle showed a significant increase of collagen in the heart of SHR HY rats. PUFA diet slightly increased the expression and activity of MMP2 in HY rats and decreased activity of MMP2 in the hyperthyroid group. The expression of Cx43 was normalized due to PUFA in HY and TH rats.

Conclusions: We can summarize that changes in MMP2 and Cx43 associated with hypertension and altered thyroid status are implicated in the arrhythmogenic mechanism based from the Cx43 alternation after heart remodeling. Short time period of PUFA administration did't have significant effect and therefore it would be appropriate to prolong the supplementation time in the future.

POSTER SESSION

POSTERS' SESSION PS13:

AGEING, CHILDREN AND ADOLESCENTS, WOMEN

NITRIC OXIDE, SERUM HOMOCYSTEINE AND INTIMA-MEDIA THICKNESS IN ADOLESCENT HYPERTENSION

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Objective: It is well known, that adult hypertensives have lower nitric oxide, higher serum homocysteine levels, and increased intima-media thickness. We investigated whether these abnormalities are also detectable in adolescent hypertension.

Design and method: 59 normotensive, 47 white coat hypertensive and 73 sustained hypertensive adolescents were included in our study. Plasma NOx as well as homocysteine levels were measured with validated and standardized laboratory methods. The intima-media thickness (IMT) of the common carotid artery was defined by measuring the distance between the media-adventitia layer and the lumen-intima interface. Spearman correlation was applied for the assessment of the relationship between homocysteine and IMT.

Results: The three groups had similar mean age (15.8 ± 0.6 years; 16.3 ± 1.1 years; 16.5 ± 1.0 years, $p = \text{NS}$). Compared to normotensives (38.8 ± 7.6 $\mu\text{mol/l}$), both white-coat hypertensive (30.6 ± 11.0 $\mu\text{mol/l}$) and sustained (28.7 ± 22.4 $\mu\text{mol/l}$) hypertensive adolescents had significantly lower nitric oxide levels ($p < 0.001$). We observed significantly ($p < 0.05$) higher homocysteine levels in adolescent white-coat hypertension (11.6 ± 6.8 $\mu\text{mol/l}$) and adolescent sustained hypertension (12.1 ± 7.0 $\mu\text{mol/l}$) compared to normotension (9.8 ± 3.1 $\mu\text{mol/l}$). IMT was higher in both white-coat (0.056 ± 0.001 cm) and sustained hypertensive adolescents (means 0.054 ± 0.001 cm) compared with controls (0.048 ± 0.001 cm). Not significant difference was observed in the two hypertensive group. In the two hypertensive groups between serum homocysteine levels and carotid artery intima-media thickness a significant positive correlation was observed ($r = 0.43$; $p < 0.01$).

Conclusions: We were able to confirm that not only the sustained, but also the white coat hypertensives have endothelial dysfunction and subclinical target organ damage.

INVESTIGATING OXIDATIVE-NITRATIVE STRESS TOGETHER WITH ARTERIAL UTERINE RESISTANCE MEASUREMENT IN HEALTHY PREGNANT WOMEN

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Objective: Alterations in placental circulation during pregnancy that may lead to higher circulatory resistance can be predictive for preeclampsia. Measuring the resistance of the uterine artery at the end of the first trimester may contribute to the identification of higher risk moms. As increased oxidative-nitrative stress may also play role in the development of pregnancy-related hypertension, our study aimed to interconnect these two processes (changes in the resistance of uterine artery and oxidative-nitrative stress).

Design and method: Healthy pregnant women were recruited at the 2nd Department of Obstetrics and Gynecology during the 10–13th week ultrasound examination. Based on the uterine artery pulsatile index, participants were divided into two groups: high resistance (H, $n = 30$) and low resistance (L, $n = 31$) with the cutoff point of 2.4. Besides clinical laboratory parameters signs of oxidative-nitrative stress were investigated in blood samples; plasma total peroxide, nitrotyrosine (NT), and isolated mononuclear leucocyte tyrosine nitration were determined. Pregnancies were followed; possible adverse events and anthropometric data of the newborns were registered.

Results: Age and BMI was similar in the two groups, however parity was significantly lower in the high resistance group (H: 0.40 ± 0.81 vs. L: 1.03 ± 1.08 , $p < 0.05$). Plasma total peroxide level reflecting systemic oxidative stress was significantly lower in the high resistant group (H: 3435.6 ± 809.3 vs. L:

3921.4 ± 538.7 mmol/l, $p < 0.05$). On the other hand, markers of nitrative stress like plasma and leukocyte protein tyrosine nitration was significantly higher in the high resistance group (plasma NT: H: 1751.7 ± 2007.9 vs. L: 710.2 ± 436.6 nmol/l, $p < 0.05$; leukocyte NT: H: $90 [86; 96]$ vs. L: $77 [55; 92]\%$; $p < 0.05$).

Conclusions: Based on our data, coincidence can be assumed for lower plasma total peroxide levels, higher tyrosine nitration and elevated artery uterine resistance. These results may suggest the alteration of nitric oxide metabolism and bioavailability in the high resistance group. The lower total plasma peroxide level of these patients however may reflect a delay in the first increase in oxygen tension of the placenta during its development that may also effect trophoblast invasion. Support: OTKA_PD 113022

MESENCHYMAL STEM CELLS INFLUENCE TROPHOBLAST AND ENDOTHELIAL CELL FUNCTIONALITY IMPORTANT FOR PREVENTION OF PRE-ECLAMPSIA VIA A NOVEL ANTI-ANGIOGENIC PROTEIN, FKBPL

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Objective: Pre-eclampsia is a disorder affecting 5–6% of all pregnancies globally. It is characterised by the new onset of hypertension and proteinuria post 20 weeks gestation. Pre-eclampsia is a leading cause of morbidity and mortality in both mothers and children. Although the pathogenesis of pre-eclampsia is poorly understood, aberrant angiogenesis and inadequate trophoblast cell function have both been implicated. Mesenchymal Stem Cell (MSC)-based therapies have shown benefits in animal models of pre-eclampsia however, the underlying mechanisms are not well understood. FKBPL is a novel anti-angiogenic protein which has a critical role in developmental, physiological and pathological angiogenesis. In this study, our objective was to evaluate the effects of MSC-conditioned medium (MSC-CM) on migration and differentiation of trophoblast and endothelial cell lines under both normoxic and hypoxic conditions. The role of FKBPL signalling in these processes was also investigated.

Design and method: Human trophoblast (BeWo and Jar) and endothelial cells (HUVEC) were incubated in the presence of human bone marrow-derived MSC-CM, normal or serum free medium under normoxia (21% oxygen) or hypoxia (1% oxygen). The confluent cell monolayer was wounded and the percentage of wound closure assessed at 24 h. HUVEC were stained with Calcein prior to 6-hour incubation in the presence of MSC-CM, normal or serum free medium under normoxia or hypoxia. Tubule formation was assessed using Image J. FKBPL protein expression was evaluated using western blot analysis where cells were lysed in RIPA buffer before being subjected to western blotting and probed for FKBPL and GAPDH.

Results: MSC-CM promoted cell migration significantly in all three cell lines under both normoxia and hypoxia compared to normal medium ($n = 6$; $p < 0.001$). MSC-CM also significantly increased the formation of HUVEC tubule networks under both normoxia and hypoxia compared to normal medium. Furthermore, concomitant reduction in FKBPL protein expression was observed, demonstrating potential FKBPLs involvement in MSC-driven effects on trophoblast and endothelial cell functionality.

Conclusions: Our findings suggest that MSCs could be explored as potential preventative therapy for pre-eclampsia by ameliorating trophoblast and endothelial cell functionality, and that the mechanism is likely to involve a novel anti-angiogenic protein, FKBPL.

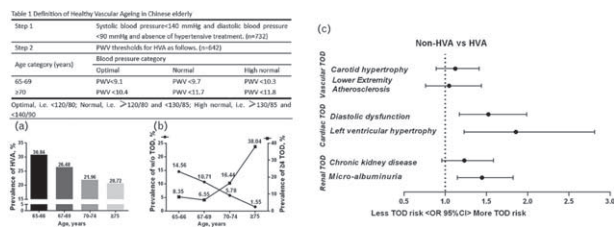
VASCULAR AGEING AND PRECLINICAL TARGET ORGAN DAMAGE IN COMMUNITY-DWELLING ELDERLY: THE NORTHERN SHANGHAI STUDY

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Objective: Vascular aging represents a mediating step between risk factors and cardiovascular (CV) events. And preclinical target organ damage (TOD) integrates the cumulative effects of CV risk factors with aging which can be detected

before clinical events occur. This study is focusing on the relationships between healthy vascular aging (HVA) and preclinical TOD.

Design and method: Cross-sectional data from the Northern Shanghai Study (NSS, Clinicaltrials.gov NCT02368938), prospectively recruited from June 2014 to June 2017 [n = 2098, 45.52% men, aged 71.3 ± 6.1 years]. Preclinical TODs were assessed in all the participants. Other clinical information was obtained by standard questionnaire. HVA was defined as absence of hypertension and a relatively normal cf-PWV (presented per age decade and blood pressure category). We fitted logistic regression models to assess the probability of Non-HVA in association with all the preclinical TOD.



Results: In this analysis, 642 (30.6%) elderly participants had HVA, the prevalence of HVA decreased from 30.84% (aged 65–66) to 20.72% (aged over 75). Increased age, increased SBP, increased fasting glucose, increased BMI and family history of premature cardiovascular disease (CVD) were significantly associated with accelerated vascular aging (Non-HVA) ($p = 0.005$ to $p < 0.001$). After multivariate adjustments, accelerated vascular aging was associated with left ventricular diastolic dysfunction (LVDD) (OR (95%CI), 1.525 (1.171, 1.988), $p = 0.003$), left ventricular hypertrophy (LVH) (OR (95%CI), 1.858 (1.228, 2.811), $p = 0.002$) and micro-albuminuria (MAU) (OR (95%CI), 1.525 (1.171, 1.988), $p = 0.002$).

Conclusions: Management of metabolic profile may help to prevent or delay vascular aging. And accelerated vascular aging is associated with LVH, LVDD and MAU, which provide a potential vascular target to reverse or terminate cardiac and renal TOD.

AMBULATORY VERSUS HOME BLOOD PRESSURE: WHICH CAN PREDICT BETTER EARLY VASCULAR AGEING?

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Objective: To identify the blood pressure (BP) measuring method, home, 24 h ABPM and clinic, that can better predict early vascular ageing (EVA) and to create a new predictive model for EVA from BP measurements and other risk factors.

Design and method: 282 consecutive subjects (39.7% male) aged 56.8 ± 15.8 years were included in the study. BP was measured at office and out of office with 24h-ABPM on a usual working day and seven days home BP monitoring. Pulse wave velocity (PWV) was measured after 15 min of rest in the supine position. EVA represented carotid-femoral PWV values higher than the expected for age average values.

Results: In the univariate analysis, EVA correlated with office systolic BP, average 24 h systolic BP, 24 h diastolic BP, average 24 h and home heart rate, and office heart rate ($p < 0.05$). The area under the curve for the diagnosis of EVA was 0.620 (90% CI 0.55, 0.69), 0.559 (90% CI 0.48, 0.64) and 0.565 (90% CI 0.49, 0.64), for 24 h, home and clinic systolic BP, respectively. The 24 h systolic and diastolic BP, 24 h heart rate and risk factors such as body mass index, gender, age, creatine clearance, diabetes mellitus, were used to develop a new prediction score with Random Forest algorithm for the prediction of EVA providing a total accuracy 0.82 and high rates of sensitivity and specificity.

Conclusions: In conclusion, 24 h systolic BP from ABPM is a better predictor for EVA than home and clinic systolic BP. A new risk assessment tool for EVA was created by 24 h ABPM variables, age, sex, body mass index, diabetes mellitus and creatine clearance.

MICROCIRCULATION REMODELLING IN CHILDREN WITH ARTERIAL HYPERTENSION

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Objective: Microvascular changes with rarefaction of small arterioles and neuronal damage are regarded as a late complication of arterial hypertension. New

optical technologies allow to analyze retinal vessels density and thickness of neuronal layer of retina. The aim of our study was to analyse retinal thickness and vascular density and its relationship with central systolic blood pressure (cSBP), central pulse pressure (cPP), subclinical target organ damage (TOD) in a non-selected group of children with primary (PH) and secondary hypertension (SH).

Design and method: 72 children (22 girls) in mean age 15.5 ± 2.5 years with PH (39) and SH (33) were included to the study. Retinal vessel density and retinal thickness was measured with optical coherent tomography. cSBP and cPP was estimated from pulse wave analysis assessed by oscillometric method. Subclinical TOD was assessed as carotid artery intima-media thickness (cIMT), pulse wave velocity (PWV) and left ventricular mass (LVM).

Results: Patients with PH and SH did not differ in terms of foveal and parafoveal thickness, superficial and deep vascular density of foveal and parafoveal areas of retina. When patients were divided according to presence or not of hypertensive subclinical TOD it was found that patients with increased cIMT had lower foveal thickness, foveal superficial and deep vessels density and greater foveal avascular zone (all $p < 0.05$). Foveal and parafoveal thickness correlated negatively with cPP and augmentation index ($p < 0.05$). Left ventricular hypertrophy (LVH) and increase of PWV was not associated with changes in foveal thickness and retinal vascular density.

Conclusions: Arterial hypertension in children and adolescents is associated with early remodelling and rarefaction of microcirculation expressed as lower foveal and parafoveal thickness, increase of avascular foveal area and decreased density of both superficial and deep foveal vessels. These changes were especially expressed in those of hypertensive children in whom subclinical arterial injury was also present and were associated with elevated central blood pressure.

PERCUTANEOUS APPROACH TO COMPLEX RENAL ARTERY STENOSES IN PEDIATRIC RENOVASCULAR HYPERTENSION

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Objective: Renovascular Hypertension in children (RVH), can be related to Fibrodysplasia, Neurofibromatosis, Alagille's and William's syndrome or Takayasu's. It is generally severe and difficult to control by drug treatment. Surgical or interventional treatments, are reported to have a high rate of failure. The clinical approach to the correct treatment requires a multidisciplinary strategy and a life-long follow-up

Design and method: Recently our multidisciplinary pediatric team has expanded with interventional cardiologists with extensive experience in the treatment of complex coronary lesions. The application of the methods of treatment of coronary lesions and the employment of the specific devices used in these diseases has been a breakthrough in the treatment of complex renal stenoses.

Results: 13/14 patients (9–12 years) affected by RVH underwent Percutaneous Interventional Procedures after a complete diagnostic and clinical evaluation. A total of 20/22 lesions were treated percutaneously. A cutting balloon was employed in 19/20 lesions; a bare metal stent in 2; a bioresorbable scaffold stent (BVS) in 1, a meshed stent for a post-stenotic aneurysm in 1. There were 15 critical stenoses, 2 total occlusions of the renal artery, 2 bifurcational lesions, 1 post-stenotic aneurysms. The only patient treated surgically had a big aneurysm near the aorta wall. An elective radial approach with a 6 French catheter guide was possible in all but one case. FOLLOW-UP There were no serious procedural complications. In all cases there was a good clinical response with significant reduction of BP, drug treatment was discontinued in 9 and significantly reduced in 5 pts after a mean follow-up of 12 months (6y-3m). Follow-up of the lesions was performed by color Doppler and MRI: we have not seen recurrences so far.

Conclusions: The identification of the correct therapeutic strategy with a multidisciplinary approach has proved to be fundamental in this series. The employment of the expertise and the devices used in the percutaneous treatment of complex coronary lesions in renal arterial stenosis of pediatric patients is the key to the treatment of lesions considered not amenable to correction or necessarily surgical candidates: in fact 13/14 patients were treated percutaneously.

24-HOUR AMBULATORY CENTRAL BLOOD PRESSURE IS MORE CLOSELY ASSOCIATED WITH CAROTID HYPERTROPHY THAN BRACHIAL AMBULATORY BLOOD PRESSURE IN ADOLESCENTS AND YOUNG ADULTS

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Objective: Carotid wall intima-media thickness (cIMT) is an established surrogate measure of preclinical target-organ damage. Accumulating evidence suggests that central (aortic) blood pressure (BP) may reflect the hemodynamic stress on target organs more accurately than brachial BP. This study investigated the associations between 24-hour brachial versus central ambulatory BP (ABP) with cIMT in adolescents and young adults.

Design and method: Apparently healthy adolescents and young adults (age 11–26 years) referred for elevated BP and healthy volunteers were subjected to: (i) 24-hour brachial and central (calibration with mean and diastolic brachial BP) ABP monitoring using a noninvasive brachial cuff-based oscillometric device (Mobil-O-Graph 24 h PWA) (ii) cIMT measurement (high resolution B-mode ultrasonography) at the level of common carotid and bulb bilaterally.

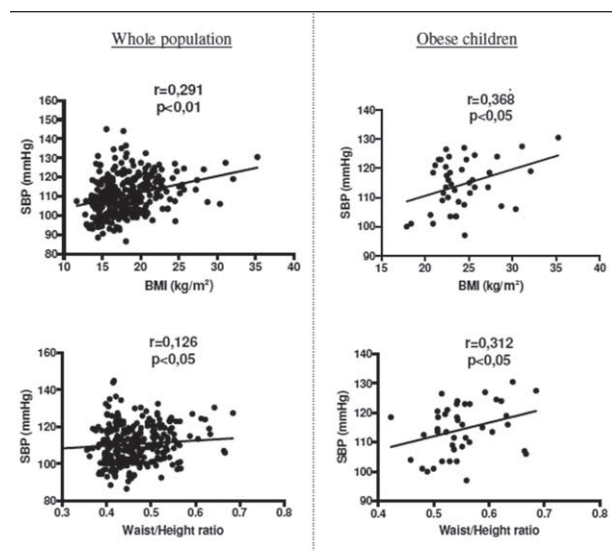
Results: Data from 127 subjects were analyzed (mean age 17.9 ± 4.7 years, 96 males, body mass index [BMI] 24.9 ± 5.0 kg/m², 34 volunteers, 40 with elevated 24-hour ABP [\geq 95th percentile for adolescents or \geq 130/80 mmHg for adults]). There was a strong association between 24-hour central and brachial systolic ABP ($r = 0.80$, $p < 0.01$), yet the latter was lower by 6.7 ± 8.4 mmHg (95% confidence intervals -8.2, -5.2, $p < 0.01$). cIMT was more closely associated with central than brachial systolic ABP ($r = 0.52$ vs. 0.34 , $p < 0.01$ for difference). In stepwise multivariate regression analysis (independent variables: age, gender, BMI, central and brachial systolic ABP), cIMT was determined by central systolic ABP and male gender ($R^2 = 0.32$).

Conclusions: In young individuals central ABP appears to be a stronger determinant of early carotid damage than conventional brachial ABP.

PREVALENCE AND RELATION OF WEIGHT EXCESS AND BLOOD PRESSURE WITH ANTHROPOMETRIC MEASUREMENTS IN A SAMPLE OF ITALIAN CHILDREN

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Objective: Weight excess and hypertension represent an increasing epidemics not only in adults but even in children. The aim of the present study was to assess the prevalence of weight excess and high blood pressure (BP) and their relation with other anthropometric measurements in a school-based study.



BMI: body mass index; SBP: systolic blood pressure.

Design and method: 309 children attending the 3rd and 4th classes of 4 primary schools (mean age 8.64 ± 0.7 y) in Verona south district participated. All children underwent anthropometric and vascular measurements at school.

Results: Based on the 85th and 95th percentiles of BMI, 19% of children were classified as overweight and 13% as obese, without significant gender differences. Waist/height ratio was below 0.5 in 93% of normal-weight children, 48% in overweight children and 12% in obese children. When considering the subgroup of children with weight excess (obese + overweight) in comparison to normal weight children, they showed higher systolic BP (including the z-score of systolic BP). Considering BP in the whole sample, 22% resulted above the 95th percentile and

17% between the 90th and 95th percentile whereas the prevalence of BP $>$ 95th percentile in obese was 31%. After repetition of BP measurement in standard conditions in a subsample of 25 children with BP $>$ 95th percentile at the first visit, only one child confirmed a BP $>$ 95th percentile. Systolic and diastolic BP were directly correlated with BMI, waist circumference, hip circumference and waist/height ratio, but the latter showed a weaker correlation with BP in comparison to the other anthropometric characteristics. In obese children, most correlations were still significant and showed a higher correlation coefficient.

Conclusions: Excess weight and high BP is frequent also in Italian children attending the primary school. Measures of adiposity and BP associate calling for preventive actions. Epidemiological studies should pay attention to standardize the conditions of measurement when the exact prevalence of hypertension has to be estimated.

CIRCULATING MICRORNAs LINKING PRE-ECLAMPSIA WITH FUTURE CARDIOVASCULAR DISEASE

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Objective: Women with a history of pre-eclampsia (PE) are at increased risk of cardiovascular events later in life. The mechanisms underlying this association are incompletely understood but likely include changes in vascular function and structure. microRNAs (miRs) may play a role in vascular health and disease; therefore, we assessed profiles of circulating miRs in women who had PE, with or without subsequent cardiovascular disease.

Design and method: We performed comprehensive profiling of circulating miRs by RNA sequencing (Qiagen, Hilden, Germany) of plasma samples from two independent cohorts: a cohort of women who presented with premature acute coronary syndrome (ACS; cohort 1: $n = 18$ with and $n = 17$ without history of PE) and a cohort of women without overt cardiovascular disease (cohort 2: $n = 20$ with and $n = 20$ without history of PE). miR profiles associated with history of PE and ACS were established based on fold change $\geq \pm 1.5$ and $P < 0.05$. Targetscan 7.0 was used to predict miR targets and KEGG pathway enrichment was determined with Partek Pathway and Genomics Suite.

Results: Women in the two cohorts were on average 48 years of age and had prior pregnancy over 20 years before. A total of 183 and 107 miRs were found to be differentially expressed between cases and controls in cohorts 1 and 2, respectively. Five miRs (hsa-miRs 3131, 346, 4305, 4670–3p and 5698) were concordantly increased or decreased in both cohorts. There were 39 and 29 KEGG pathways significantly ($FDR < 0.05$) enriched in cohorts 1 and 2, respectively, of which 23 pathways overlapped between the cohorts. Further analysis identified 13 KEGG pathways that were common between all comparisons of PE vs control in cohorts 1 and 2, and ACS vs non-ACS across the cohorts, including cancer, Wnt signaling, TGF-beta and focal adhesion pathways.

Conclusions: By analysing circulating miR profiles, we identified pathways that are common between women with ACS and women with history of PE. Of particular importance, pathways involved in cell growth and adhesion may provide explanations for the link between PE and future cardiovascular diseases.

PREECLAMPTIC WOMEN WITH FEATURES OF SUBCLINICAL SECONDARY HYPERPARATHYROIDISM HAVE ELEVATED BLOOD PRESSURE LEVELS AFTER DELIVERY

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Objective: Calcium supplementation has shown beneficial effects on blood pressure and its metabolism is altered in pregnancy hypertensive-related disorders. In this study, we hypothesized that calcium metabolism can be associated with blood pressure levels in preeclampsia complicated pregnancy.

Design and method: A group of 63 multiethnic preeclamptic women (age 35 ± 6 y, 83% European, 14% African, and 3% Hispanic) was consecutively recruited at our Hypertension Unit at 1 month after delivery. We collected clinical and anthropometric variables, blood and urinary samples and performed 24-hours ambulatory blood pressure monitoring (ABPM). We measured plasma and 24-hours urinary calcium, plasma 25-hydroxycholecalciferol, parathyroid hormone (PTH), and creatinine levels, and 24-hours protein excretion. Renal function was esti-

mated by the Modification of Diet in Renal Disease (MDRD) study equation. No women knew to be hypertensive before the current pregnancy or took calcium or vitamin D supplements.

Results: At recruitment, 60% of women were taking antihypertensive agents, all of which alpha-methylglutathione. For statistical purposes, we divided the group in tertiles according to PTH levels. Women in the third tertile showed biochemical characteristics of secondary hyperparathyroidism with elevated PTH and reduced vitamin D plasma levels (PTH 93 ± 15 pg/ml; 25-hydroxycholecalciferol 20 ± 8 ng/ml). In-office and ABPM blood pressure levels were higher in the third tertile than those in the first. At univariate analysis, PTH was directly associated with in-office systolic (Pearson's correlation coefficient $r = 0.417$; $P < 0.001$) and diastolic ($r = 0.372$; $P = 0.003$), 24-hours systolic ($r = 0.449$; $P < 0.001$) and diastolic ($r = 0.401$; $P = 0.001$), daytime systolic ($r = 0.421$; $P < 0.003$) and diastolic ($r = 0.378$; $P = 0.002$), and nighttime systolic ($r = 0.379$; $P = 0.002$) and diastolic ($r = 0.442$; $P < 0.001$) blood pressure. Multivariate analysis showed that PTH was associated with systolic and diastolic in-office and 24-hours blood pressure levels independently of age, body mass index, gestational week of delivery, plasma and urinary calcium, vitamin D, renal function, and urinary protein excretion.

Conclusions: Plasma PTH is independently associated with blood pressure levels in the post-partum and higher blood pressure was observed in preeclamptic women with subclinical secondary hyperparathyroidism. Further evaluations on the effects of calcium and vitamin D supplementation on blood pressure control of women with a preeclamptic complication should be performed.

LIPID PROFILE IN CHILDREN WITH ILLNESS HEREDITY IN CARDIOVASCULAR PATHOLOGY

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Objective: Dyslipidemia is a wide spectrum of lipid metabolism disorders. The greatest attention is attracted to the increase in level of total cholesterol and low density lipoproteins. Family hypercholesterolemia is an autosomal dominant condition, one of the most common forms of dyslipidemia that occurs in humans since birth. The absence of lipid-lowering therapy in familial hypercholesterolemia is associated with the development of premature atherosclerosis and cardiovascular diseases. Main aim of our research is to conduct an analysis of the lipid profile of children with a burdened cardiovascular pathology.

Design and method: The main method was targeted screening, based on the search for adult patients with premature cardiovascular disease (up to 50 years in men, up to 60 years in women) with further examination of the lipid profile of their children.

Results: We analyzed 938 medical records of inpatient patients treated in cardiology departments of one of the leading hospitals in our city in the period from January to September 2017. A total of 17 male patients under the age of 50 years were identified, the average age was 42 ± 1.5 years, with the diagnosis of acute coronary syndrome. When analyzing the lipidogram and the anamnesis of these patients, we isolated 6 patients with an increase in the level of total cholesterol and low-density lipoproteins combined with a family history of cardiovascular disease. At the next stage, after receiving voluntary informed consent, the lipid profile of the children of these patients was analyzed. The average level of total cholesterol in them was 5.1 ± 0.25 mmol/l, high density lipoproteins 1.9 ± 0.05 mmol/l, low density lipoproteins 2.68 ± 0.16 mmol/l, triglycerides 1.5 ± 0.03 mmol/l.

Conclusions: It should be noted that, pediatric practice lacks vigilance to identify dyslipidemia with a view to timely diagnosis of familial hypercholesterolemia. The combination of familial hypercholesterolemia in the absence of therapy with the premature development of cardiovascular disease creates the risk of increasing mortality among the population and suggests the need for additional educational activities among pediatricians and cardiologists.

COMPARATIVE EFFECTIVENESS OF ANTIHYPERTENSIVE THERAPY IN PREGNANT WOMEN WITH GESTATIONAL AND CHRONIC ARTERIAL HYPERTENSION

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Objective: The aim of this study was to analyze the efficacy of antihypertensive therapy in pregnant women with mild to moderate Gestational Hypertension (GH) and Chronic Arterial Hypertension (CAH) to achieve target blood pressure (BP).

Design and method: The retrospective analysis of management of mild to moderate hypertension during pregnancy of 100 women with GH and 100 women with CAH was conducted. The regimes of drug therapy and their effectiveness were analyzed. The criterion of the efficacy of antihypertensive therapy was target office BP level less than 150–100 mm Hg in accordance with the National Guidelines. Office BP levels were registered twice a month during pregnancy.

Results: The average age of women with CAH and GH was 34.0 ± 6.2 and 31.8 ± 5.1 years old relatively. To achieve target BP, regular antihypertensive therapy was required in 84% of pregnant women with CAH and 68% women with GH. In all cases methyldopa was administered, less often it was a combination with amlodipine. To control BP in 61% of pregnant women with GH was sufficiently lower doses of 250–750 mg daily methyldopa. But women with CAH needed large doses of 1000–2000 mg daily methyldopa (46% vs 29% of GH, $p < 0.05$) or its combination with amlodipine 5–10 mg daily (16% vs 8% of GH). Target BP levels were achieved in 90% of CAH and 96% of GH. There were no significant differences in maternal and fetal outcomes. Nevertheless, the incidence of preeclampsia with GH was slightly higher than with CAH (10% vs 6%, $p > 0.05$). In all cases of preeclampsia, low doses of methyldopa 250–500 mg or episodic use were needed to control BP during the previous period of pregnancy.

Conclusions: Target BP levels were achieved by the monotherapy of methyldopa in most pregnant women with mild to moderate CAH and GH. Pregnant women with CAH needed large doses of methyldopa in comparison with GH. Despite effective therapy, the incidence of preeclampsia with GH was higher than with CAH. It is not quite clear the value of blood pressure control in the development of complications in pregnant women with mild to moderate hypertension.

COMORBIDITIES AS PREDICTORS OF CARDIOVASCULAR RISK AND SURVIVAL IN HYPERTENSIVE VERY ELDERLY PATIENTS

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Objective: The aim of the study was to assess the cardiovascular risk in hospitalized very elderly patients with multiple comorbidities.

Design and method: The retrospective study included 82 patients admitted to Clinical Emergency Hospital between January 2014-May 2017.

Results: Patients in the study group were aged between 90 and 98 years, with an average age of 95 years. Gender distribution: 67% female and 33% male. 87.8% were presented to Acute Medical Unit. 63.4% of patients were already diagnosed with hypertension. Depending on severity the following distribution was observed: grade I 9.6%, grade II 63.4%, grade III 25%. One patient had secondary hypertension associated with renal parenchymal disease.

Comorbidities in hypertensive patients: chronic kidney disease evaluated by MDRD equation was encountered in 98% of cases, with the following staging: G2 28.8%, G3a 32.6%, G3b 24%, G4 9.6% and G5 28.8%. As electrolytes imbalance we noticed: hyponatremia in 15.3% of cases, hypernatremia in 3.8%, hypokalemia in 32.6% and hyperkalemia in 3.8%. Only 3.8% of patients had hypercholesterolemia. 23% were diagnosed with diabetes mellitus and had established treatment. Regarding the state of nutrition, 25% were cachectic patients and 17.3 were obese, and bedsores were found in 21% of them. Transthoracic echocardiography was performed in 26 patients. It showed heart valve calcifications in 73% of cases, diastolic dysfunction in 23% of cases and left ventricle hypertrophy in 46.15% of cases. 69% of the hypertensive patients studied had systemic atherosclerosis and 21% had stroke sequels. Hyperuricemia was also found in 23% of cases. 42% of patients had impaired cognitive performance, including dementia. For all the patients the average time spent in hospital was 6 days, with a maximum of 12 days.

Conclusions: The majority of the elderly patients with hypertension had multiple comorbidities. Chronic kidney disease was the most common comorbidity found, systemic atherosclerosis and impaired cognitive performance are very frequent in these patients. Comorbidities are the most important predictors of cardiovascular disease risk and mortality in very elderly patients.

VASCULAR AGE AND TARGET ORGAN DAMAGE IN THE MIDDLE-AGED UNTREATED PATIENTS WITH UNCOMPLICATED ESSENTIAL ARTERIAL HYPERTENSION

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Objective: to evaluate relationships between vascular age (VA) and target organ damage (TOD) in the middle-aged naive patients with grade 1–2 essential arterial hypertension (EAH).

Design and method: Case-control study. We examined 60 naive patients with uncomplicated grade 1–2 EAH (mean age 53.6 ± 0.8 years). Transthoracic echocardiography (Vivid 7 Dimension system, GE) with calculation of myocardial stiffness parameters was performed in all patients. 2-D speckle tracking echocardiography data were acquired for determination of LV myocardial global longitudinal peak strain (LV GLPS). Cardio-ankle vascular index, ankle-brachial index and augmentation index (AI) were measured using VaSera-1500N system. Brain damage was evaluated by magnetic resonance imaging (MRI) using MAGNETOM Skyra 3.0T, Siemens AG. Arterial spin labeling MRI sequence was applied to analyze cerebral blood flow (CBF). All the patients underwent the neuropsychological assessment with Montreal Cognitive Assessment (MoCA), Trail Making test (part A and part B), Stroop Color and Word Test, verbal fluency test, 10-item word list learning task. VA was calculated by Framingham Heart Study risk tables and SCORE project scales.

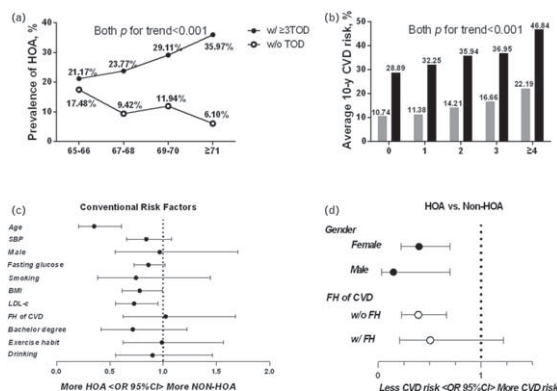
Results: VA calculated by Framingham Heart Study risk tables (70.6 ± 1.4 years) as well as VA estimated by SCORE project scales (59.1 ± 1.5 years) was significantly higher than chronological one ($p < 0.001$ and $p < 0.01$, respectively). VA demonstrated stronger associations with LV GLPS and tissue Doppler-derived left atrial strain ($r = 0.271$; $p < 0.01$ and $r = -0.206$; $p < 0.05$ for the VA by SCORE; $r = 0.401$; $p < 0.001$ and $r = -0.210$; $p < 0.05$ for the VA by Framingham Heart Study). Only AI closer correlated with VA: $r = 0.447$ for the VA by SCORE and $r = 0.449$ for the VA by Framingham Heart Study; $p < 0.001$ in both cases. VA by Framingham Heart Study negatively significantly correlated with MoCA score ($r = -0.282$; $p < 0.05$), verbal fluency test score ($r = -0.246$; $p < 0.05$), right sided CBF ($r = -0.374$; $p < 0.01$) and left sided CBF ($r = -0.392$; $p < 0.01$). Right- and left sided CBF also demonstrated significant associations with VA calculated by SCORE project scales ($r = -0.326$; $p < 0.01$ and $r = -0.298$; $p < 0.05$).

Conclusions: VA, especially estimated by Framingham Heart Study risk tables, is associated with cardiac, vascular and cerebral TOD in the middle-aged naive patients with uncomplicated grade 1–2 EAH.

HEALTHY ORGAN AGEING IS ASSOCIATED WITH LOW CVD RISK IN CHINESE ELDERLY: THE NORTHERN SHANGHAI STUDY

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Objective: Aging on organ level represents the decline of organ function. And the decline of cardiovascular function is associated with the cardiovascular risk. This study is focusing on the prevalence, correlates of healthy organ aging (HOA) and the relationship between cardiovascular risk and HOA.



Design and method: This analysis is nested in Northern Shanghai Study (NSS, Clinicaltrials.gov NCT02368938), participants prospectively recruited from June 2014 to June 2017 [$n = 2098$, 45.52% men, aged 71.3 ± 6.1 years]. To calculate the 10-year Framingham CVD risk, 847 participants aged 65–74 years of age without CVD were finally included in this analysis [40.4% of 2098, 48.76% men, aged 67.9 ± 2.8 years]. Preclinical TODs including left ventricular hypertrophy, left ventricular diastolic dysfunction, micro-albuminuria, CKD, carotid hyperplasia and lower-extremity atherosclerosis were assessed in all the participants.

Other clinical information was obtained by standard questionnaire. Healthy organ aging was defined as absence of any preclinical TOD. We fitted logistic regression models to assess the cardiovascular risk in association with healthy organ aging.

Results: In this analysis, 104 (12.3%) elderly participants had HOA without any preclinical TOD. With the increasing number of TOD, the average 10-year CVD risk increased in both gender. The prevalence of HOA decreased from 17.48% (aged 65–66) to 6.10% (aged over 71). Age, systolic blood pressure, metabolic syndrome and smoking were significantly associated with HOA ($p = 0.004$ to $p < 0.001$). After multivariate adjustments, HOA was significantly associated with low CVD risk ($<10\%$) (OR (95%CI), 0.409 (0.260, 0.643), $p < 0.001$). And the results were stable after stratifying for gender. However, after stratifying for family history of premature CVD, this significance disappeared in the subgroup with family history of premature CVD.

Conclusions: Smoking cessation, management of blood pressure and improve metabolic profile may help to delay and prevent organ aging. And HOA is beneficial in terms of the prevention of CVD.

RELATIONSHIPS BETWEEN RENAL VASCULATURE ABNORMALITIES AND ARTERIAL HYPERTENSION IN CHILDREN AND ADOLESCENTS

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Objective: This study investigated hypertensive children for non-stenotic renal vascular abnormalities, in terms of number of arteries, size, shape, course and possible relationships with arterial hypertension

Design and method: Patients referred for elevated blood pressure were considered and those with known causes for secondary hypertension were excluded from the study. Seventy-two patients were selected with persistent hypertension (blood pressure > 95 th centile) of more than one year's duration and confirmed by 24 h ambulatory blood pressure monitoring. All patients underwent abdominal CT-angiography or MRI scanning to rule out possible renal artery stenosis and echocardiography to evaluate left ventricular diastolic dysfunction and/or left ventricular hypertrophy. Antihypertensive treatment with Candesartan was used to control blood pressure.

Results: Most of patients (59/72 – 82%) had abnormal renal vasculature, either arterial or venous, in terms of the number of arteries, size, shape and course. 48/59 pts (81%) had a polar accessory artery which was unilateral in 39 (81%) patients and in 9 (19%) was bilateral. Five of 59 patients (8%) showed a so-called “nut-cracker syndrome” (2 of whom had also triple left renal veins). Only 13/72 patients (18%) showed a normal renal vasculature pattern. Thirty patients (40%) showed left ventricular diastolic dysfunction/hypertrophy. All patients were well controlled with Candesartan and no patients had any drug side-effects. Creatinine and potassium remained always in the normal range during treatment

Conclusions: The incidence of hypertension in children is increasing in recent decades for several reasons, particularly obesity. Young patients with persistent elevated blood pressure also should be investigated for renal vasculature abnormalities and possible left ventricular diastolic dysfunction/hypertrophy which may be treatable with Candesartan.

The Poiseuille equation suggests that both the radius and the length of the vessel may be operative in patients with abnormal renal arteries.

ROLE OF NOVEL ECHOCARDIOGRAPHIC METHODS TO DETECT EARLY MYOCARDIAL DYSFUNCTION IN WOMEN WITH PREECLAMPSIA

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Objective: Normal pregnancy is associated with reversible changes in both systolic and diastolic mechanics, consistent with an increase in preload and decrease in afterload and systemic vascular resistance. The aim of the study is to evaluate left ventricular cardiac mechanics via speckle tracking echocardiography in a population of pregnant women with per partum cardiomyopathy and preeclampsia (PE) after invitro fertilization (IVF) during different stages of pregnancy.

Design and method: The study population included 42 pregnant women with PE, after IVF, 10 of them with multiple pregnancy (46.5 ± 3 years) and 20 healthy non-pregnant women (33 ± 4 years). Apical and basal short axis and apical view for three, two and four chamber for 2D images were acquired (65 ± 7 frames/s) during the first, second and third trimester of the pregnancy, as well as up to two months post partum.

Results: Peak LVT and LVUR increased significantly in the 3rd trimester in both pregnancy groups (13.48 ± 2.90 , 13.12 ± 3.30 , 16.83 ± 3.61 , $P < 0.001$; and

-111.52 ± 23.54°/sec, -107.40 ± 26.58°/sec, -144.30 ± 45.14°/sec, $P < 0.001$; in the 1st, 2nd, and 3rd trimester, respectively. The pregnant with twins have the highest value for LVT and LVUR ($p < 0.01$), but in the last trimester, the time to peak LVUR is prolonged. An independent correlation was found between the change in LVT and LV end-systolic volume in 1st and 3rd trimester ($r = 0.56$). Peak LVUR at the 3rd trimester correlated significantly with LV end-diastolic volume. Multiple regression analysis indicates that only systolic blood pressure ($r = 0.394$, $P = 0.005$) was an independent predictor for increased LV torsion. Arterial hypertension (AH) and prevalence of preeclampsia (PE) are more often in IVF group. Longitudinal strain decreased significantly ($p < 0.001$) during 3th trimester in women with AH and PE. Global longitudinal strain measures of the LV were non-significantly different between the different groups in first and second trimester (GLS-20.6 ± 3.14 vs. -19.29 ± 2.17).

Conclusions: Blood pressure and condition of multiple pregnancy are independently associated with increased torsion during pregnancy and may predict the new onset heart failure. Global longitudinal strain is the main predictor of new onset peripartum cardiomyopathy

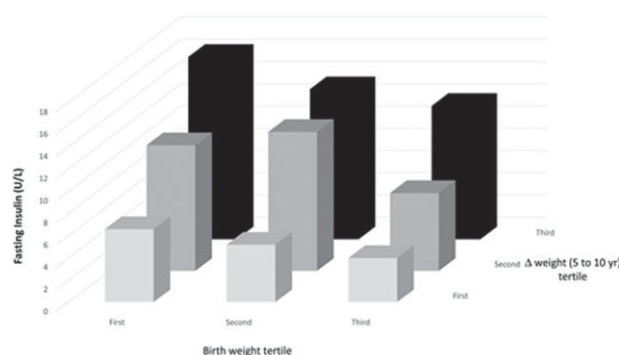
ASSESSING THE IMPACT OF BIRTH WEIGHT AND POSTNATAL WEIGHT GAIN ON INSULIN RESISTANCE DURING THE FIRST DECADE OF LIFE

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Objective: To assess the impact of birth weight and postnatal weight gain on insulin resistance at 5 and 10 years of life.

Design and method: This prospective study, starting at birth, includes 100 subjects born at term. Subjects were divided, according to size at birth, in small, appropriate and large for gestational age. Children were followed up at 5 and 10 years and anthropometric parameters, BP and metabolic parameters (insulin, HOMA index, HDL and Triglycerides) were obtained.

Results: Among the study population, 22 of the children at 10 years old had fasting insulin values higher than or equal to 15U/L, the threshold for defining insulin resistance in the prepertubal stage. Among them, half were overweight and half obese. In the presence of insulin resistance, a clustering of cardiometabolic abnormalities was observed with high values for office SBP (109.0 ± 8.7 vs 102.2 ± 6.5; $p < 0.001$), log triglycerides (2.1 ± 0.2 vs 1.8 ± 0.2; $p < 0.001$), uric acid (4.8 ± 0.7 vs 4.0 ± 0.9; $p < 0.001$), and lower values of HDL (44.1 ± 6.5 vs 56.0 ± 12.5; $p < 0.001$). In practically all subjects at 5 years that had insulin levels higher than or equal to 15 U/L, these remained high at 10 years. Between 5 years and 10 years, 11 subjects developed insulin resistance, and the main factor related to the incidence of insulin resistance was the presence of obesity (RR 2.6, CI95% 1.3–5.9). The relationship of BW and 5 to 10 year weight gain tertiles with fasting insulin is shown in the Figure.



Conclusions: The highest insulin levels, with a clustering of cardiometabolic factors, were observed in those children with the highest weight gain and the lowest BW.

CORRELATION OF OFFICE BLOOD PRESSURE MEASUREMENTS IN CHILDREN. COMPARISONS WITH DAYTIME AMBULATORY BLOOD PRESSURE MEASUREMENTS

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Objective: Measurement of blood pressure and diagnosis of hypertension in children and adolescents can be challenging. This is due to several factors such as conditions by which measurement takes place, the white coat effect but also increased physical activity during the day. This study assessed the correlation of clinic measurements to daytime ambulatory BP measurements in children that were examined in the hypertension clinic of a tertiary hospital.

Design and method: We examined 43 consecutive children. At baseline we measured office blood pressure according to international guidelines. Within 15 days from the first visit the subjects underwent ambulatory blood pressure measurement using the Spacelabs OnTrak device on child mode. 15 of these children were diagnosed with secondary hypertension at follow up.

Results: Results: The mean age of the population was 11 ± 2.95 years. Clinic systolic blood pressure (SBP) showed no significant correlation with ambulatory daytime SBP ($r = 0.279$, $p = 0.11$). The same was the case for the correlation of clinic diastolic blood pressure (DBP) to daytime ambulatory DBP ($r = 0.108$, $p = 0.54$). Mean values of clinic SBP were comparable to daytime ambulatory SBP (120.6 ± 13.4 vs 122.9 ± 9.9 mmHg for clinic and ambulatory respectively). Clinic DBP also showed no significant difference compared with daytime ambulatory DBP (75.8 ± 11.7 vs 74.9 ± 5.6 mmHg for clinic and ambulatory respectively).

Conclusions: Phenotypes in hypertension in children follow a different pattern than those in adults. Correlation between clinic and ambulatory measurements while not linearly correlated their mean values show no significant differences. One method should not exclude the other, rather they should be complementary.

RELATIONSHIP OF AORTIC AND CAROTID STIFFNESS WITH AMBULATORY BLOOD PRESSURE IN CHILDREN AND YOUNG ADULTS

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Objective: Arterial stiffness is an established surrogate measure of preclinical target-organ damage induced by elevated blood pressure (BP). This study assessed regional (aortic) and local (carotid) arterial stiffness measured by different noninvasive methods in children and young adults and their relationship with BP levels.

Design and method: Apparently healthy children, adolescents and young adults (age 8–26 years) referred for elevated BP and healthy volunteers were subjected to: (i) 24-hour ambulatory BP (ABP) monitoring, and to simultaneous (ii) M-mode ultrasonography for the assessment of carotid distensibility coefficient, and (iii) determination of aortic pulse wave velocity using noninvasive brachial cuff-based oscillometric device (Mobil-O-Graph 24 h PWA).

Results: Data from 37 subjects were analyzed (mean age 16.4 ± 5.3 years, 22 males, body mass index [BMI] 24.9 ± 4.5 kg/m², 11 with elevated 24-hour ABP [\geq 95th percentile for children/adolescents or \geq 130/80 mmHg for adults]). There was a significant inverse association between aortic PWV and carotid distensibility coefficient ($r = -0.45$, $p < 0.01$). Hypertensive compared to normotensive subjects had higher PWV (5.5 ± 0.5 versus 5 ± 0.5 m/sec respectively, $p < 0.05$ after adjustment for age and gender), but similar carotid distensibility coefficient (46.9 ± 24.2 versus 44.0 ± 14.0 kPa⁻¹ × 10⁻³, $p = \text{NS}$). Aortic PWV compared to carotid distensibility coefficient was more strongly correlated with 24-hour systolic ABP ($r = 0.77$ versus -0.46 respectively, $p < 0.05$ for difference).

Conclusions: In young individuals aortic PWV as an index of regional stiffness appears to be more closely associated with ABP levels than local carotid stiffness.

IMPACT OF AGE ON THE ASSOCIATIONS BETWEEN TARGET ORGAN DAMAGE AND HEMODYNAMIC COMPONENTS DERIVED FROM 24-HOUR AMBULATORY BLOOD PRESSURE MEASUREMENT

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Objective: Hemodynamic parameters obtained from 24-hour ambulatory blood pressure (BP) measurements (24hABPM) are more closely associated with markers of target organ damage than conventional office BP. The aim of this study was

to evaluate the impact of age on the associations between hemodynamic components derived from 24hABPM and target organ damage, in apparently healthy, non-medicated subjects.

Design and method: 24hABPM and target organ damage (left ventricular mass index, pulse wave velocity, urine albumin:creatinine ratio and carotid atherosclerotic plaques) were evaluated in 1408 subjects. Associations were examined in regression models, stratified for age [middle-aged (41 or 51 years) or elderly (61 or 71 years)], and adjusted for sex, smoking status, and total-cholesterol.

Results: In middle-aged subjects, an increase of 10 mmHg in 24-hour systolic blood pressure was independently associated with an increase of 3.8 (2.7–4.8) g/m² in LVMI. The effect was nearly doubled in the elderly subgroup, where the

same increase resulted in an increase in LVMI of 6.3 (5.0–7.6) g/m² (P for interaction < 0.01). An increase of 10 mmHg of 24-hour systolic blood pressure was associated with a 6.5% increase in pulse wave velocity in middle-aged subjects and with an 8.9% increase in elderly subjects (P for interaction < 0.01). An independent association between 24hABPM and urine albumin:creatinine ratio was only observed in the elderly subgroup. Associations between the presence of atherosclerotic plaques and components from 24hABPM, except that for 24hDBP, were not modified by age (P for all interactions > 0.26).

Conclusions: Age enhances the associations between hemodynamic components obtained from 24hABPM and measures of arterial stiffness, microvascular damage, and cardiac structure, but not atherosclerosis.

POSTER SESSION

POSTERS' SESSION PS14:

HEART

NON INVASIVE ASSESSMENT OF REGIONAL PRESSURE STRAIN LOOP IN HYPERTENSIVE WOMEN DURING PREGNANCY

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Objective: Normal pregnancy is associated with reversible changes in both systolic and diastolic mechanics, consistent with an increase in preload and decrease in afterload and systemic vascular resistance. The aim of the study is to evaluate left ventricular cardiac mechanics via speckle tracking echocardiography in a population of pregnant women with per partum cardiomyopathy and preeclampsia(PE)

Design and method: The study population included 42 pregnant women with PE and 20 healthy nonpregnant women (33 ± 4years).Apical and basal short axis and apical view for three, two and four chamber for 2D images were acquired (65 ± 7 frames/s) during the first, second and third trimester of the pregnancy, as well as up to two months post partum. The curves of longitudinal(GLS), circumferential(GCS), radial strain(GRS) and LVT /LVUR were extracted using a commercial software. Regional myocardial work (ejection work density [EWD]) was the area of the pressure-strain loop during ejection.

Results: Peak LVT and LVUR increased significantly in the 3rd trimester in pregnancy group (13.48 ± 2.90°,13.12 ± 3.30°,16.83 ± 3.61°,P < 0.001; and -111.52 ± 23.54°/sec,-107.40 ± 26.58°/sec,-144.30 ± 45.14°/sec, P < 0.001; in the 1st, 2nd, and 3rd trimester, respectively. An independent correlation was found between the change in LVT and LV end-systolic volume in 1st and 3rd trimester (r = 0.56). Peak LVUR at the 3rd trimester correlated significantly with LV end-diastolic volume. Multiple regression analysis indicates that only systolic blood pressure (r = 0.394, P = 0.005) was an independent predictor for increased LV torsionLongitudinal strain decreased significantly (p < 0.001) during 3th trimester in women with AH and PE. Global longitudinal strain measures of the LV were non-significantly different between the different groups in first and second trimester (GLS-20.6 ± 3.14 vs.-19.29 ± 2.17).There are not found significant differences for GCS and GRS during pregnancy.Two-dimensional LV strain decreased in participants with hypertension (P .008). Only in subjects with normal blood pressure EWD significantly increased (+14.7%, P = .0009).

Conclusions: Although women with hypertension compared with those with normal blood pressure have increased LV systolic stiffness and regional myocardial work to match arterial load at rest, they might have diminished cardiac reserve to increase myocardial performance.

HYDROCHLOROTHIAZIDE ASSOCIATED TO ANGIOTENSIN RECEPTOR BLOCKERS TREATMENT CAN DEVELOP ATRIAL FIBRILLATION ACCORDING CENTRAL HAEMODYNAMIC PARAMETERS IN HYPERTENSIVE PATIENTS

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Objective: Well-established that age and hypertension are risk factors for atrial fibrillation. Lately, it was found that the high diastolic blood pressure than systolic blood pressure as a stronger indicator of new onset atrial fibrillation. The objective of this study was assessed whether hydrochlorothiazide treatment in hypertensive patients can increase the central haemodynamic parameters (CHP), principally end-systolic pressure and augmentation index due to volume increased and arterial stiffness, and the appearance of atrial fibrillation.

Design and method: In the last two years, two groups of patients were registered consecutively: one of them (A) while being treated with hydrochlorothiazide combined to angiotensin receptor blockers (ARBs) (female/male n:14/17, average age:73/69) and another group (B) mineralocorticoid receptor antagonists (MRAs) added to ARBs (female/male n:53/56, average age: 72/69; each gender p = ns). Measurements of CHP was made with SphygmoCor device (Atcor-Sydney, Aus-

tralia) according method's standard; the augmentation index (AIx) was evaluated in correlation to age and gender in each patient. All patient enrolled in the study had a normal kidney function without cardiovascular, endocrine, and metabolic decompensated diseases.

Results: During 24 h Holter monitoring, in groups A/B was found brief episodes of atrial fibrillation, in female: 79%/15%, and male: 82%/2%. In groups A/B were measured: body mass index (female 32.7/30.5, male 29.2/29.6; p = ns) and heart rate: (female 69.3/67.9, male 66.9/67.6; p = ns). Assessed the systolic blood pressure (female 154.1/123.4, male 147.9/122.2), diastolic blood pressure (female 86.2/70.8, male 85.2/71.8), central aortic pressure (female 145.5/115.5, male 137.5/111.7), end-systolic pressure (female 130.9/103.8, male 123.9/101.8) mean arterial pressure (female 112.7/88.7, male 110.6/88.5), pulse pressure (female 56.8/44.8, male 51.2/39.2), AIx (female 34.9/29.5, male 26.7/21.2) and difference between AIx-observed and AIx-normal levels according to age (female +2.6/-3, male +3.8/-2.1), and each gender separately, had high statistically significant differences. During hydrochlorothiazide/ARBs therapy, in relation to MRAs/ARBs, were observed more high systolic and diastolic pressures, central aortic pressure, end-systole pressure, pulse pressure, and augmentation index correlated with a higher percentage of episodes of atrial fibrillation.

Conclusions: Hydrochlorothiazide associated to ARBs therapy can facilitate the development of atrial fibrillation in hypertensive patients more than MRAs added to ARBs.

THE IMPACT OF ARTERIAL HYPERTENSION ON LEFT VENTRICULAR STRAIN IN SEVERE AORTIC STENOSIS WITH PRESERVED EJECTION FRACTION

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Objective: The influence of arterial hypertension on aortic stenosis (AS) severity is still controversial. However, the influence of arterial hypertension on left ventricular (LV) mechanics in AS patients has not been established yet. The aim of this study was to evaluate the influence of hypertension on LV strain in patients with severe AS.

Design and method: This cross-sectional study included 78 subjects (45 men and 33 women) with severe AS and 65 normotensive age-matched controls (35 men and 30 women) who underwent comprehensive echocardiographic examination.

Results: Hypertension was present in 43 AS patients. LV mass index was significantly higher in hypertensive AS patients comparing with normotensive AS participants (142 ± 26 vs. 119 ± 21 g/m², p < 0.001). There was no significant difference in LV ejection fraction between hypertensive and normotensive AS patients. LV global longitudinal and circumferential strains were significantly lower in AS subjects than in controls. LV radial strain was not different between AS and control subjects. Moreover, multidirectional LV strain was significantly lower in hypertensive than in normotensive AS participants (-14.3 ± 3.2 vs. -16.6 ± 3.0 %, p < 0.01 for longitudinal strain; and -17.5 ± 3.8 vs. -19.8 ± 3.4 %, p < 0.01 for circumferential strain). LV radial strain was not different between hypertensive and normotensive AS patients (41.3 ± 8.9 vs. 43.4 ± 9.1 %, p > 0.05). Evaluation of layer-specific LV strain showed that endocardial longitudinal and circumferential strains were significantly lower in hypertensive AS patients than in their normotensive counterparts. LV twist was significantly lower in AS patients than in controls (19.6 ± 5.3 degree vs. 23.2 ± 6.0 degree, p < 0.01). Hypertensive AS patients had significantly lower LV twist than normotensive AS subjects (17.2 ± 4.8 degree vs. 22.7 ± 5.8 degree, p < 0.01). Systolic blood pressure was associated with LV global longitudinal strain (b = 0.404, p < 0.01) and LV twist (b = 0.308, p < 0.01) in AS patients independently of LV mass index, age and BMI.b

Conclusions: LV longitudinal and circumferential strains were significantly reduced in AS patients. Hypertension had additional significant negative influence on LV mechanics in patients with severe AS. Blood pressure was associated with LV global longitudinal strain and LV twist in AS patients independently of main clinical and demographic characteristics.

MANAGEMENT OF HYPERTENSION ACCORDING TO HEMODYNAMIC MODULATORS BY IMPEDANCE CARDIOGRAPHY IS NOT SUPERIOR TO STANDARD CLINICAL CARE IN TREATING NAÏVE HYPERTENSIVE PATIENTS

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Objective: Different hemodynamic profiles have been shown to underlie the process of incident hypertension. Aim of our study was to test the hypothesis that the choice of antihypertensive drugs according to the individual hemodynamic profile of patients might achieve a better control of hypertension than standard clinical care.

Design and method: Longitudinal study in 64 consecutive, treatment-naïve hypertensive patients referred to a Hypertension Unit for study. Standard clinical and laboratory examinations were performed, including ABPM. Impedance cardiography by the HOTMAN[®] System was used for noninvasive assessment of hemodynamic modulators and evaluation of the hemodynamic status of the patients. 30 patients (46.9%) were randomly assigned to the standard group and treated according to standard clinical care (S-group), while the treatment of the other 34 patients (53.1%) was derived from their hemodynamic profile (H-group). All the patients had a follow-up visit after six months.

Results: No significant differences were found at baseline between the two groups in anthropomorphic variables or office systolic, diastolic BP or 24-h-ABPM: 146/87 and 138/91 mmHg (S-group) vs. 143/85 and 136/88 mmHg (H-group). At follow-up, both groups showed a significant decrease in office and ambulatory BP without significant differences between groups: 128/77 and 123/80 mmHg in the S-group vs. 128/78 and 124/80 mmHg in the H-group. The number of antihypertensive drugs needed was slightly but not significantly higher in the S-group compared to the H-group (1.27 vs. 1.06, $p = 0.17$). Use of diuretics was significantly higher in the H-group (23/3; OR: 18.8, $p < 0.001$), while ACEI (11/3; OR: 4.2, $p = 0.07$), ARB (17/6; OR: 3.2, $p = 0.001$) and CCB (7/2; OR: 4.0, $p = 0.045$) were significantly more often used in the S-group. Interestingly, the prevalence of the most frequent hemodynamic abnormality in the H-group, intravascular hypervolemia, did not change compared to baseline.

Conclusions: Our study shows that management of debuting hypertensive patients guided by the measurement of hemodynamic modulators was not superior to standard clinical care in controlling hypertension. Future studies are required to test if higher doses and more intensive treatment are needed to achieve targets in hemodynamic abnormalities.

PREDICTORS OF ATRIAL FIBRILLATION PROGRESSION IN HYPERTENSIVE PATIENTS

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Objective: To identify predictors of AF progression in patients with hypertension.

Design and method: The study involved 136 patients (mean age 56.2 ± 4.9 years) followed up prospectively from September 2010 till June 2016. Observations (mean duration of 60 ± 3 months) included regular telephone interviews every 3 months and annual general clinical examination with laboratory and instrumental evaluation. Arrhythmia progression from paroxysmal to permanent form was evaluated.

Results: Cardiovascular complications and AF progression were documented in 63 (46%) patients during the observation period of 60 ± 3 months. According to the results of multifactorial analysis, independent predictors of progression from paroxysmal to permanent AF in hypertensives were left ventricular hypertrophy (OR 1.25, CI 1.03–1.52) and increased arterial stiffness (OR 2.3, CI 1.95–2.65). Pulse wave velocity more than 1106 cm/s in hypertensive patients with paroxysmal AF could predict progression to permanent arrhythmia in the next 5 years (sensitivity 66.6%, specificity 63.8%).

Conclusions: The multifactorial analysis revealed significant impact of left ventricular hypertrophy and increased arterial stiffness on the risk of atrial fibrillation progression from paroxysmal to permanent form. Pulse wave velocity can be considered as a predictor of this progression.

RELATIONSHIP BETWEEN OF LOCAL ARTERIAL STIFFNESS PARAMETERS AND ECHOCARDIOGRAPHIC INDICATORS IN PATIENTS WITH STEMI

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Objective: to evaluate the correlation between local arterial stiffness parameters and echocardiography in patients STEMI younger than 55 years old.

Design and method: the study included 69 STEMI patients aged 35 to 55 years, mean age 47.4 ± 7.1 years, body mass index (BMI) 26.9 ± 3.7 kg/m², office SBP - 120 (110; 130) mmHg, DBP - 80 (70; 80) mmHg. Inclusion criteria: STEMI confirmed by ECG data, troponin I level, CK-MB, hemodynamically significant stenosis of only one coronary artery (infarct-related) according to coronary angiography, and the absence of previous angina. Ultrasound of the common carotid arteries (CCA) was carried out using RF high-frequency signal technology on the MyLab scanner (Esaote, Italy) at 7–9th day from the disease onset. The following parameters were recorded: intima-media thickness (IMT), local pulse wave velocity (PWV), stiffness indices α and β , coefficient of transverse compliance (CC) and distensibility (DC), augmentation index (Aix). Echocardiography was performed on the MyLab scanner (Esaote, Italy). End-diastolic volume (EDV), end systolic volume (ESV), end-diastolic size (EDS), end-systolic size (ESS), and left ventricular ejection fraction (EF) were analyzed. Patients were received pharmacotherapy for STEMI during the study according to the ESC guidelines.

Results: A statistically significant positive correlation between age and CCA ultrasound parameters was revealed: IMT ($r = 0.25$, $p < 0.05$), PWV ($r = 0.25$, $p < 0.05$), Aix ($r = 0.43$, $p < 0.01$), indices α and β ($r = 0.30$, $p < 0.01$ and $r = 0.29$, $p < 0.01$, respectively), as well as a negative relationship with the coefficients CC and DC ($r = -0.25$, $p < 0.05$ and $r = -0.26$, $p < 0.05$, respectively). An increase of IMT correlated with increase of EDV ($r = 0.24$, $p < 0.05$), ESV ($r = 0.25$, $p < 0.05$) and EDS ($r = 0.28$, $p < 0.05$). The EF was positively related to the coefficients CC and DC ($r = 0.33$, $p < 0.01$ and $r = 0.32$, $p < 0.01$, respectively); negatively with PWV ($r = -0.36$, $p < 0.01$), stiffness indices α and β ($r = -0.37$, $p < 0.01$ and $r = -0.36$, $p < 0.01$, respectively).

Conclusions: An increase of stiffness and loss of elasticity of the CCA, a thickening of intima-media was associated with a deterioration of the structural parameters and left ventricle contractile function in STEMI patients of young and middle age.

EFFECT OF DIFFERENT DOSES OF ATORVASTATIN THERAPY ON CENTRAL PRESSURE PARAMETERS IN STEMI PATIENTS

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Objective: Analyze the central pressure and pulse wave velocity (PWV) in the aorta in patients with STEMI.

Design and method: 85 patients were included in the study: 75 men (88%) and 10 women (12%); the average age 51.9 ± 9.3 years. The main group received atorvastatin 80 mg/day, the comparison group received atorvastatin 20 mg/day. The first group included 46 patients (41 men and 5 women), the average age was 51.2 ± 9.5 years. The second group consisted of 39 people (36 men and 3 women), aged 52.7 ± 8.2 years. The groups were matched by age, sex, height, BMI, office BP.

The central pressure parameters were measured by applanation tonometry using the SphygmoCor device (AtCorMedical, Australia) at 7–9th day and after 24 weeks: systolic aortic pressure - SBPao, diastolic - DBPao, pulse - PPao. PWV was analyzed in synchronism with the ECG channel using the PWV program in sequential recording of pulse waves from the common carotid and femoral arteries.

Results: Initial levels of SBPao, DBPao and PPao were 101 ± 9.4 ; $71 (66; 80)$ and 29.4 ± 6.2 mmHg, respectively, PWV was 8.1 ± 2.1 m/s in the control group. The following parameters have increased after 24 weeks of treatment: SBPao up to 109.1 ± 12.0 (by 7%, $p < 0.05$), PPao up to 34.2 ± 8.1 mmHg. (by 14%, $p < 0.05$). There was no significant decrease in carotid-femoral PWV and DBPao. Baseline values of SBPao, DBPao, and PPao were 103.9 ± 9.8 ; $76 (66, 86)$, and $27.0 (24, 31)$ mmHg, accordingly, the PWV was 8.6 ± 1.7 m/s in the main group. There was a significant change in the parameters: an increase of SBPao to 109.3 ± 9.9 (by 5%, $p < 0.05$), PPao to 32.9 ± 7.5 (by 18%, $p < 0.05$) mmHg, and decrease of PWV to 7.8 ± 1.5 m/s (by 9%, $p < 0.05$), respectively, after 6 months of treatment.

Conclusions: The baseline and follow-up values of central arterial pressure were in normal range with a significant increase of SBPao and PPao in both groups after 6 months of therapy. Administration of high-dose atorvastatin was accompanied by a significant improvement in carotid-femoral PWV in patients with STEMI.

ATRIAL FIBRILLATION AND CHRONIC KIDNEY DISEASE ESH-FA PROJECT- DATA ON CROATIAN COHORT

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Objective: Chronic kidney disease (CKD) is well established risk factor for atrial fibrillation (AFib). The aim of the study was to analyze association of CKD and AFib in the consecutive sample of patients with AFib who were admitted to the UHC Zagreb Cardiology Clinic, part of the ESH Excellence centre of hypertension. This cohort is part of the ESH –FA project.

Design and method: Consecutive sample of 201 patients with AFib (115 M, 86 F; averaged age 71.6) was enrolled in period 2014–2016. Data were collected from medical records. BP was measured following the ESH/ESC guidelines. Hypertension (HT) was defined as BP equal or greater than 140/90 mmHg and/or antihypertensive drugs treatment, chronic kidney disease (CKD) was defined as eGFR (CKD Epi < 60 ml/min).

Results: CKD was diagnosed in 52.2% of patients with AFib, and 13.3% were in CKD stage > 3. CKD patients were older than non-CKD (72.2 vs. 68.3). Coronary heart disease, heart failure and known significant valvular disease were more frequently presented in CKD patients (64.4% vs. 47.2%, $p = 0.05$; 64.4% vs. 44.5%, $p = 0.02$; 38.9% vs. 21.6%, $p = 0.02$, respectively). Prevalence of HT was higher in CKD patients (92.4% vs. 77.1%; $p = 0.02$), but there were no differences in control of HT between CKD and non-CKD patients. Permanent and persistent AFib were more frequently diagnosed in CKD, while first diagnosed and paroxysmal AFib were more frequently diagnosed in non-CKD patients ($p = 0.003$). CKD patients had significantly more CHADVASC > 2 than non-CKD patients (90.2% vs. 70%; $p = 0.004$).

Conclusions: CKD is highly prevalent in patients with AFib and substantial numbers of patients are in advanced CKD stages. Prevalence of HT and CV comorbidity, as well as prevalence of permanent and persistent AFib are much more frequently presented in CKD than in non-CKD patients. Compared to non-CKD patients, CHADVASC was more often above 2 in CKD patients. In general, AFib patients with associated CKD have higher global CV risk as well higher risk for future thromboembolic incidents than non-CKD AFib patients.

NOVEL MARKER OF MYOCARDIAL REMODELING ST2 AND THE INFLUENCE OF ALDOSTERONE ANTAGONIST IN PATIENTS WITH HEART FAILURE CAUSED BY HYPERTENSION AND ISCHEMIC HEART DISEASE

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Objective: ST2 is a protein, member of interleukin1 receptor family, includes 2 isoforms: soluble and membrane-bound receptor form. Soluble ST2 (sST2) is the novel biomarker that displays the severity of cardiac remodeling and myocardial fibrosis is used for risk stratification of heart failure (HF) in hypertensive patients. Mineralocorticoid receptor antagonists (MRAs) have been approved to reduce myocardial remodeling. The aim of the study was to evaluate correlation between myocardial remodeling by measuring sST2 levels and effect of MRAs in patients with HF caused by arterial hypertension with and without underlying ischemic heart disease (IHD).

Design and method: Design and method: We examined 18 patients with severe essential hypertension grade 3 and heart failure NYHA III – IV. Biomarker sST2 levels were measured twice: at the admission and at the discharge. Accordingly to echocardiography all patients had left ventricular hypertrophy and LVEF below 45%. Values of sST2 were measured by ASPECT-PLUS ST2 test. Patients were divided into 2 groups: 1st group of 10 patients severe arterial hypertension and HF with underlying IHD, 2nd group of 8 patients with severe arterial hypertension and HF without IHD.

Results: The study included 11 males and 7 females, mean age 79 years. Average value of sST2 in 1st group at the admission was 112.44 ± 15.71 ng/ml, at the discharge lowered to 42.01 ± 7.32 ng/ml; in 2nd group sST2 was 75.81 ± 9.51 ng/ml and lowered to 48.83 ± 6.42 ng/ml respectively. All patients received treatment with optimal medical therapy (OMT) and MRAs. 1st group have achieved reduction of sST2 values up to 62.64% in average, in 2nd group reduction of sST2 levels were achieved up to 35.59% in average. MRAs on top of OMT decreased sST2 levels and myocardial remodeling more markedly in patients with HF, severe hypertension and IHD.

Conclusions: Conclusion: Considering that sST2 levels predict risk for myocardial remodeling in heart failure, guided therapy with MRAs on top of OMT improves risk reduction in all patients. More prominent and positive effect in prognosis improvement and reverse myocardial remodeling can be observed in patients with arterial hypertension, HF with underlying IHD.

DIAGNOSTIC OF EVA SYNDROME IN PATIENTS WITH CHD MANIFESTED AS STEMI

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Objective: to evaluate the structural and functional arterial properties, and biological age in STEMI patients.

Design and method: the study included 67 patients with CAD manifestation with STEMI aged 35 to 50 years (mean age 41.3 ± 8.2 years). Inclusion criteria was absence of previous angina. The patients were divided into 2 groups. Group 1 included 34 people without history of AH. Group 2 comprised 33 patients with AH. The control group (C) consisted of 28 healthy individuals. The regional arterial stiffness was assessed by volume sphygmography (Fukuda Denshi, Japan) on the following parameters: PWV - pulse wave velocity in the aorta, B-PWV in the predominantly muscular arteries, R/L-PWV in the predominantly elastic arteries, L-/CAVI-1 - cardio-ankle vascular index, R/L-ABI - ankle-brachial index, AI - augmentation index, biological age.

Results: according to volume sphygmography, the smallest values of PWV were registered in control: PWV - 7.1 ± 1.0 m/s, B-PWV - 7.3 ± 0.8 m/s, R/L-PWV - 10.2 ± 1.8 m/s. An increase of the following parameters was found in group 1: PWV - $7.8 (6.5, 8.5)$ m/s, B-PWV - 8.0 ± 1.3 m/s, R/L-PWV - 11.8 ± 1.5 m/s. The highest values were diagnosed in group 2: PWV - 8.4 ± 1.2 m/s, B-PWV - 8.9 ± 1.2 m/s, R/L-PWV - $12.7 (11.9, 13.5)$ m/s ($p_{1-c,2-c,1-2} < 0.05$). The L-/CAVI-1 index was 6.4 ± 0.8 in the C group, in group 1 - $7.4 (6.8, 7.5)$, in group 2 - $8.5 (7.9, 9, 2)$ ($p_{1-c,2-c,1-2} < 0.05$). The lowest AI values were registered in healthy individuals - $0.9 (0.8, 1.0)$ compared to group 1 - $1.1 (0.9, 1.2)$ and group 2 - $1.1 (0.9, 1.3)$ ($p_{1-c,2-c} < 0.05$). R/L-ABI prevailed in control group - $1.0 (0.9, 1.2)$, intermediate values were revealed in patients without history of AH - $0.8 (0.6, 1.0)$, the smallest in patients with AH - $0.7 (0.5, 1.0)$ ($p_{1-c,2-c} < 0.05$). The differences in biological age were found despite comparability by age: in C group - 40.5 ± 4.1 years, in group 1 - 45.5 ± 9.2 years, in group 2 - $47 (43.53)$ years ($p_{1-c,2-c} < 0.05$).

Conclusions: A significant disruption of regional vascular stiffness parameters was found in STEMI patients, more pronounced in those with AH history. Manifestation of CAD with STEMI in young and middle-age subjects is a clinical manifestation of early vascular aging process.

IMPROVEMENT OF SYSTOLIC FUNCTION IN STABLE CORONARY ARTERY DISEASE PATIENTS AFTER REVASCULARISATION

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Objective: Myocardial strain detected by transthoracic echocardiography is a more sensitive method for systolic function evaluation than ejection fraction. Impact of coronary revascularisation on systolic function in stable coronary artery disease (SCAD) patients remains an object of research.

Design and method: 36 SCAD patients with single lesion in left anterior descending artery (LAD) undergoing percutaneous coronary intervention (PCI) were included in a single center prospective cohort study from December 2015 to December 2017. Patients with previous myocardial infarction, coronary vessel occlusions, stents in LAD or left main artery, PCI in previous 3 months time in left circumflex or right coronary artery, atrial fibrillation at the time of study were excluded. In study group there were no patients with medium or pronounced left ventricular hypertrophy, II – IIIrd degree valvular regurgitation, any valve stenosis, hypo- or akinetic segments visually, or decreased ejection fraction. Transthoracic echocardiography at rest was performed the day before PCI and 3 months after. Acquired images were measured by TOMTEC ARENA, using 16-segment model, and results analysed using SPSS 22.

Results: Mean age in the study group was 67 years. Out of 36 patients, 22 (61%) were men. 16 (44%) patients had proximal 1/3 LAD stenosis, 16 (44%) had diastolic dysfunction. Mean GLS before and after the revascularisation was $-16.22 \pm 1.14\%$ and $-19.43 \pm 1.35\%$ respectively ($\Delta = 3.21$; $p < 0.001$) and improvement remained statistically significant in each of 16 segments, too. When comparing results in subgroups, Δ (change) after revascularisation in proximal LAD group was $3.61\% \pm 1.79$ ($p < 0.001$) and in middle 1/3 LAD group $2.9\% \pm 1.33$ ($p < 0.001$). Difference between subgroup results was statistically significant ($p = 0.02$). Δ in normal diastolic function group and diastolic dysfunction group was 3.18 ± 1.89 ($p < 0.001$) and 3.26 ± 1.09 ($p < 0.001$) respectively, and difference between subgroups was not statistically significant.

Conclusions: In this small prospective cohort study PCI in SCAD patients was associated with statistically significant LV myocardial strain improvement.

PULSE-COR REGISTRY: BIOCHEMICAL FACTORS ASSOCIATED WITH ARTERIAL STIFFNESS AND LV STIFFNESS

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Objective: The pathogenesis of LV diastolic failure development remains unknown. The aim of creation of this registry was to evaluate the role of additional factors that influence arterial stiffness and due to that may affect LV function, especially diastolic function.

Design and method: We included 553 patients with AH who were hospitalized in the Symptomatic hypertension department NSC Institute of cardiology n.a. acad. M.D. Strazhesko. Final analysis included 320 patients, that underwent all necessary diagnostic procedures. cPWV was measured with SphygmoCor device (AtCor, Australia). CAVI was measured with VaSera 1500 (Fukuda Denshi, Japan). Echocardiography was performed according ASE standardized protocol, LV diastolic function was evaluated according ASE 2016 guidelines. Ventricle-arterial coupling (VAC) was evaluated using formula, described in literature. Also we used biochemical blood tests with evaluation levels of thyrotropic hormone (TTH), aldosterone, renin and its ratio (ARS), C-reactive protein (CRP), cholesterol and fractions, triglycerides (TG) and atherogenic index (AI), glucose (Glu) and uric acid.

Results: Mean SBP/DBP was $154.5 \pm 1.5/92.8 \pm 0.9$ mmHg. VAC was significantly associated with LDL ($r = 0.473$, $p < 0.05$), AI ($r = 0.370$; $p < 0.05$), TG ($r = 0.287$; $p < 0.05$), CRP ($r = 0.304$; $p < 0.05$), TTH ($r = 0.679$; $p < 0.05$), ARS ($r = 0.714$; $p < 0.05$). E/A was significantly associated only with Glu ($r = -0.239$; $p < 0.05$). E/e' was correlated with ARS ($r = 0.657$; $p < 0.05$), renin ($r = 0.571$; $p < 0.05$), TG ($r = 0.211$; $p < 0.05$). CAVI was associated with AI ($r = 0.555$; $p < 0.05$), LDL ($r = 0.335$; $p < 0.05$), uric acid level ($r = 0.387$; $p < 0.05$), Glu ($r = 0.451$; $p < 0.05$). cPWV was associated with Glu ($r = 0.293$; $p < 0.05$), uric acid ($r = 0.178$; $p < 0.05$), AI ($r = 0.278$; $p < 0.05$).

Conclusions: Our findings demonstrate that both arterial stiffness (defined as CAVI and cPWV) and LV stiffness (defined as VAC) were associated with metabolic problems (uric acid level, Glu, AI). Moreover, CAVI was more associated with these factors, maybe due to that cPWV is more dependent on BP level that may weaken association found. Hypothyroidism and impaired ARS may bring additional risk for LV stiffening.

SYSTEMIC VASCULAR RESISTANCE OF VASOSPASTIC ANGINA IS HIGHER COMPARED WITH MICROVASCULAR ANGINA AFTER SHEATH INSERTION

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Objective: To compare the vascular resistance of microvascular angina and vasospastic angina after sheath insertion.

Design and method: Continuous 22 cases who were suspected of angina pectoris by exercise ECG and/or, portable monitor of ECG and underwent coronary angiography and who had no obvious coronary organic stenosis. All patients underwent acetylcholine provocation test to estimate presence or absence of coronary spasm. Swan-ganz catheter was used for measuring circulation parameters including systemic resistance (SVR) after sheath insertion. Atrial stiffness parameter was measured using cardio-ankle vascular index (CAVI) at same time.

Results: The subjects were divided into coronary spasm positive group (Group A, $n = 13$) and coronary spasm negative group (group B, $n = 9$). There were no difference in age, gender, body mass index and central blood pressure between the two groups. And in circulation parameters, there were no difference in cardiac output, pulmonary resistance and pulmonary artery wedge pressure between the two groups. But, SVR was higher in Group A than that of group B (2226.8 ± 693.9 vs 1561.9 ± 706.5 dyne \cdot sec \cdot cm $^{-5}$, $p < 0.05$). On the other hand, CAVI correlated positively to systemic vascular resistance.

Conclusions: Systemic vascular resistance of vasospastic angina pectoris was higher than microvascular angina pectoris. CAVI could be partly relating to systemic vascular resistance.

COMPARISON OF TWO FORMS OF LEFT VENTRICULAR MASS INDEXATION IN PATIENTS WITH BMI GREATER THAN 25: VASCULAR CHARACTERISTICS

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Objective: 1- Compare the prevalence of left ventricular hypertrophy (LVH) using traditional indexing versus height indexation to 2.7 in the entire sample 2- To compare the anthropometric and vascular characteristics among those with LVH detected with index 2.7 versus those detected with traditional indexing.

Design and method: We evaluated 680 patients in the context of a cardiovascular primary prevention program (Cardiometabolic Unit, Hospital Universitario Austral), which includes measurement of anthropometric parameters, body mass index (BMI), laboratory, measurement of the PA (ESH), echocardiogram, oscillometric determination of the pulse wave velocity (PWV) (Mobil-o-Graph), measurement of the intima media thickness (IMT) in common carotid artery, and tracking of subclinical carotid and femoral atherosclerosis. The exclusion criteria were the following: BMI < 25 , age < 18 , > 80 years; Secondary hypertension, history of cardiovascular disease, missing studies.

Four groups were defined: Without LVH (group1), with LVH by both methods (Group2), with LVH exclusively by LVMI (group3), and by LVMI2.7 (group4). Subsequently, Age, Body Mass Index (BMI), Systolic BP (SBP), IMT, PWV and subclinical atherosclerosis were evaluated through number of plaques (n-PLC) and plate area (A-PLC) between the 4 groups

Results: A total of 422 patients were included: 52.34 ± 12.43 years, $129.63 \pm 16.01/84.95 \pm 10.81$ mmHg, BMI: 29.54 ± 16 , 26.5% female, 46.4% hypertensive, 5.7% diabetics. The prevalence of LVH with LVMI was 12.3%, while with LVMI2.7 the prevalence was 14.2% ($p > 0.05$).

Group 1 turned out to be younger ($p = 0.002$), with a lower average IMT ($p = 0.0104$) compared to the other 3 groups. Group 2 resulted in the oldest group ($p = 0.002$), with the highest number of atherosclerotic plaques ($p = 0.0025$) and highest PWV ($p = 0.00061$), respecting the other 3 groups. Finally, group 4 was the group with the highest BMI ($p = 0.001$), highest mean of IMT ($p = 0.0104$) and largest A-PLC ($p = 0.03$).

Conclusions: Those who present LVH exclusively according to Index 2.7 seem to be associated with a higher degree of obesity and an increased IMT. Given that these patients with these anthropometric and vascular risk characteristics were not detected with traditional indexation but with index 2.7, it makes us reflect on whether it would be necessary to use both in patients with BMI > 25 .

MAGNESIUM THERAPY IN HYPERTENSIVE HEART DISEASE

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Objective: According to earlier results of the MACH study an additional magnesium orotate therapy has shown a positive effect on life expectancy and quality in patients with heart insufficiency degree NYHA III-IV. Both magnesium and orotate can be cardio protective.

Design and method: In the presented data here additional magnesium orotate therapy was tested in 11 patients with hypertensive heart insufficiency NYHA III-IV as compared to 10 patients with hypertensive heart disease NYHA III-IV as controls. Additional magnesium orotate therapy was 4500 mg magnesium orotate daily for 1 week. Serum creatinine levels were normal in both groups before study beginning.

Results: NTproBNP levels decreased significantly in the magnesium orotate group versus controls ($p < 0.01$). NTproBNP blood values of the magnesium treated group were 4761 ± 2284 pg/ml pre therapy and 3516 ± 2114 pg/ml post therapy ($p < 0.01$). In the control group pre therapy NTproBNP was measured 4331 ± 2688 pg/ml and after therapy 4091 ± 2491 pg/ml. Serum creatinine values did not change significantly in both groups under treatment (n.s.). About 75% of magnesium treated patients reported an improvement of quality of life. About 70% of the additional magnesium treated group still were alive after one year follow-up.

Conclusions: In conclusion an additional therapy with magnesium orotate is safe and can be of an additional benefit in patients with hypertensive heart insufficiency NYHA III-IV. Under therapy kidney function remained stable. An improvement in quality of life and life expectancy under an additional magnesium therapy in hypertensive heart insufficiency was observed.

CIRCULATING LEVELS OF MATRIX METALLOPROTEINASE-9 ARE ELEVATED IN INDIVIDUALS WITH HYPERTENSIVE CRISIS

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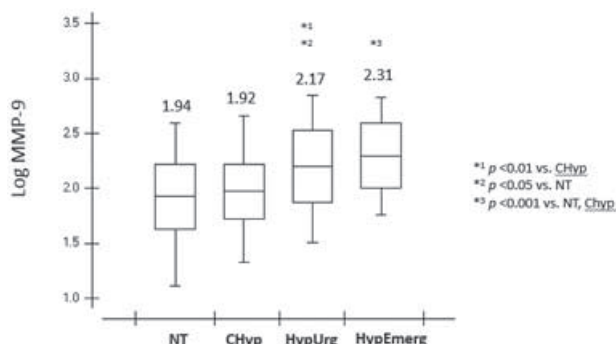
Objective: Matrix metalloproteinase-9 (MMP-9) participates in the degradation of components of the extracellular matrix and it is involved on vascular

remodeling. The imbalance between their activation and inactivation mechanisms seems to be associated with vasomotor changes. The aim of this study was to investigate the plasma levels of MMP-9 in acute vascular alterations due to hypertensive crisis.

Design and method: This cross-sectional study was performed in 40 normotensive (NT) and 58 controlled hypertensive subjects (CHyp) as well in 57 patients with hypertensive emergency (HypEmerg) and 43 in hypertensive urgency (HypUrg). Hypertensive crisis was divided in HypEmerg, which was characterized by elevated levels of systolic blood pressure (BP) higher or equal 180 mmHg and/or diastolic BP higher or equal 120 mmHg complicated with target-organ damage (TOD), and HypUrg, defined by BP elevation without TOD. The levels of MMP-9 were assessed using the Human Matrix metalloproteinase-9 Quantikine ELISA kit (R & D Systems, Inc., Minneapolis, MN, USA) with a calculation of medians being presented as nanograms per milliliter (ng/mL). Subsequently, MMP-9 values were transformed into logarithms to reflect normal distribution for statistical analysis.

Results: The mean blood pressures were $116.5 \pm 13.9/72.4 \pm 10.6$ mmHg for NT, $123.2 \pm 12.6/79 \pm 9.2$ for CHyp, $194.1 \pm 24.3/121.4 \pm 17.3$ for HypUrg and $191.6 \pm 34.3/121.7 \pm 18.8$ mmHg for HypEmerg, respectively (p-value < 0.0001 between groups). MMP-9 levels were statistically different between the HypEmerg (log 2.31 ± 0.2) and HypUrg groups (log 2.17 ± 0.3) compared to the NT (log 1.94 ± 0.3) (p-value < 0.01 and p-value < 0.05, respectively) and CHyp groups (log 1.92 ± 0.2) (p-value < 0.01). There was no difference in the MMP-9 levels between the different clinical presentations of hypertensive crisis.

Conclusions: Matrix metalloproteinase-9 concentrations are progressively higher in the order normotensive, controlled hypertensive, hypertensive urgency and emergency groups with significant differences between the hypertensive crisis groups (urgency and emergency) compared to the other groups. Therefore, MMP-9 may be a new biomarker in cases of acute elevations of blood pressure.



RENAL RESISTIVE INDEX: GENERAL AND HEMODYNAMIC DETERMINANTS IN HYPERTENSIVE PATIENTS

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Objective: To evaluate the hemodynamic and other general determinants of the renal resistive index (IRR) in a group of middle age hypertensive subjects.

Design and method: The population of our study were 62 patients (34 females and 28 males, mean age 45.26 years \pm 5.2 years) with grade I-II arterial hypertension. All subjects underwent careful clinical history and physical examination. A complete echocardiographic study, ambulatory blood pressure monitoring and color Doppler ultrasound of renal and intrarenal arteries were performed to all of the subjects. Intrarenal Doppler measurements were repeated in three parts of both kidneys (superior, median, and lower) until three reproducible waveforms were obtained. RRI was calculated with the following formula: (peak systolic velocity – end diastolic velocity)/peak systolic velocity, and the mean value of three measurements at each kidney was considered.

Results: The mean RRI was 0.678 ± 0.092 , mean daytime ambulatory systolic blood pressure (SBP) was 141.96 ± 16.04 mmHg, mean nighttime SBP was 131.46 ± 17.36 mmHg, mean 24 hours SBP was 136.91 ± 19.09 mmHg, mean daytime ambulatory diastolic blood pressure (DBP) was 82.07 ± 18.93 mmHg, mean nighttime DBP 71.92 ± 26.80 mmHg, mean 24 hours DBP 77.10 ± 22.4 mmHg. The mean pulse pressure (PP) was 59.10 ± 22.90 mmHg. The mean 24 hours heart rate (HR) was 75.14 ± 26.86 beats/minute. RRI was negatively related to ambula-

tory 24 hours DBP ($r = -0.339$, $p = 0.05$), mean nighttime DBP (-0.299 , $P < 0.01$), HR ($r = -0.326$, $p < 0.01$) while it was positively associated with ambulatory 24 hours SBP ($r = 0.659$, $p = 0.05$), mean daytime SBP (0.560 , $p < 0.05$) ambulatory PP ($r = 0.366$, $p < 0.01$), age ($r = 0.253$, $p < 0.01$), left ventricular mass (LVM) ($r = 0.459$, $p < 0.01$) and relative wall thickness (RWT) ($r = 0.493$, $p < 0.01$), statistically significant even after adjustment for various confounding factors. In multiple regression analysis, mean 24 hours SBP, daytime SBP, PP ($p < 0.01$) and LVM ($p < 0.05$) were revealed as main determinants of RRI.

Conclusions: The interaction between the systemic hemodynamics and the intrarenal circulation is a complex physiological phenomenon. In addition to renal vascular properties, the central hemodynamic factors significantly influence the intrarenal arterial patterns.

ANALGESIC DRUG USE IN PATIENTS WITH HYPERTENSION AND CORONARY ARTERY DISEASE

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Objective: Purpose: Non-steroidal anti-inflammatory drugs (NSAIDs) are commonly used in the management of pain in a variety of conditions. Available data clearly indicate that the NSAIDs use is associated with a number of adverse effects especially in patients with cardiovascular disease. The aim of the study was to assess the prevalence and frequency of analgesic drug use in patients with coronary heart disease and knowledge about possible interactions of these drugs with conventional cardiac therapy.

Design and method: Materials/methods: The study included 183 patients with ischaemic heart disease hospitalized in the tertiary cardiological centre. Majority of patients from the study group had hypertension ($n = 141$; 77.0 %). Data on the use of analgesics and patients' knowledge about their safety were collected using self-prepared questionnaire. Information about current medication, accompanying diseases and blood-test results were checked in patients' medical records.

Results: In the examined group regular use of analgesic drugs (defined as at least 3 times per week) was reported by 29 subjects (15.8%). The most frequently used analgesics were NSAIDs and paracetamol, with their regular use reported by 7.0% and 8.8 % of respondents respectively. The majority of patients using NSAIDs were not aware about their possible interactions with antiplatelet therapy and did not consult the use of analgesics with the physician. Only 19.8% of patients admitted that they received the information about analgesics from their doctor.

Conclusions: The regular use of analgesic drugs by 15.8% of patients with coronary artery disease is a significant concern. Patients with coronary heart disease should be provided with detailed information and recommendations about safe analgesic therapy and alternatives for NSAIDs.

LEFT VENTRICULAR FILLING PATTERN IN RELATION WITH THE TYPE OF CAVITY REMODELLING IN HYPERTENSIVE PATIENTS

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Objective: To evaluate the mitral inflow and diastolic left ventricle parameters in hypertensive patients to detect the onset of systolic dysfunction.

Design and method: Patients admitted with arterial hypertension and normal ejection fraction EF. Exclusion criteria was: moderate and severe valvulopathies, cardiomyopathies, ischemic heart disease, secondary forms of hypertension, low ejection fraction, pericardial disease, oncologic disease, arterial pulmonary hypertension. Clinical evaluation and laboratory results excluded patients with end stage renal disease and chronic obstructive lung disease. Echocardiographic parameters used was: diastolic spectral and tissue mitral velocities A, E, a', e', E wave deceleration time TDE, left ventricle filling pressure ratio E/e', indexed myocardial mass IMM, left ventricle ejection fraction LVEF, myocardial wall-stress MWS, relative wall thickness index RWTI

Myocardial mass was calculated in relation with body surface area and myocardial wall stress use in calculator Laplace formula: systolic arterial pressure, parietal thickness and the radius of left ventricle cavity.

Results: 45 patients evaluated: 24 women and 21 men; 58.8 ± 3.4 years old. LVEF = $56 \pm 4\%$. They were isolated in main groups: group I: IMM increased 178.4 ± 23.8 g/m² surface area and RWTI > 0.45 and group II: IMM increased 182.58 ± 20.3 g/m² and RWTI < 0.45. A velocity in group I was 0.78 ± 0.25 m/sec and in group II was 0.67 ± 0.4 m/sec. Tissue velocities e' was 0.09 ± 0.04 m/

sec respectively 0.12 ± 0.03 m/sec. E/e' ratio was 12 ± 3 group I and 8 ± 4 for group II.

Conclusions: 1. Most frequently form of left ventricle remodelling was concentric hypertrophy 68% followed by excentric hypertrophy 32%.
2. Distribution by gender was same for women and men.
3 Myocardial systolic wall stress was highest in concentric hypertrophy = 2292 ± 560.8 dyne/cm² surface square area.
4. Mitral diastolic flow of diastolic dysfunction type I was associate mostly with concentric hypertrophy.
5. Concentric hypertrophy was associate the lowest systolic tisular velocities which suggest that it may be the beginning of the systolic left ventricle dysfunction, undetectable by 2D echocardiographic techniques.
6. The highest values of E/e' ratio presented in patients with concentric hypertrophy suggest that the left ventricles filling pressure are increased in this group of patients.

HEART RATE VARIABILITY, LARGE VESSEL REMODELLING AND METABOLIC PARAMETERS IN STAGE 1 HYPERTENSION ACCORDING TO THE ACC/AHA 2017 GUIDELINES

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Objective: Controversial definition of arterial hypertension (AH) by the ACC/AHA 2017 Guidelines renewed interest in the earlier stages of blood pressure (BP) elevation.

The aim: to investigate the features of the heart rate variability (HRV), large vessel remodelling (VR) and metabolic parameters in subjects with stage 1 AH according to the new American guidelines (130–139 / or 80–89 mmHg).

Design and method: We investigated 148 untreated subjects with the following BP levels (mmHg): < 120 / and < 80 (group 1; n = 33), 120–129 / and < 80 (group 2; n = 27), 130–139 / or 80–89 (group 3; n = 60), > = 140 / or > = 90 mmHg (group 4; n = 28). HRV indices were assessed by 24-hour Holter monitoring data, large vessel remodelling parameters - on the basis of applanation tonometry (Sphygmocor) and carotid echo-tracking (Artlab) data. The results are presented as mean \pm standard deviation.

Results: In comparison to group 1, group 2 had lower levels the high-density lipoproteins levels (61.7 ± 15.6 and 51.7 ± 11.6 mg/dl, respectively, $p = 0.009$), increased diameter of carotid artery (6.8 ± 0.4 and 7.5 ± 0.5 mm, respectively, $p = 0.034$) and similar pattern of HRV parameters. Group 3, compared to groups 1 and 2, had significantly higher glucose and uric acid levels ($p = 0.045$ and $p = 0.017$, respectively), and also increased carotid-femoral pulse wave velocity, compared to groups 1 (7.8 ± 1.2 and 7.2 ± 0.9 m/s, respectively, $p = 0.025$). These alterations were associated with an increase in the high-frequency component of HRV (HF, $p = 0.013$ and r-MSSD, $p = 0.022$) and greater distensibility of the carotid vascular wall ($p = 0.004$), which were not observed in the group 4.

Conclusions: Subjects with blood pressure of 130–139 / or 80–89 mmHg are characterized by distinct metabolic abnormalities, initial signs of vascular remodelling and alterations of HRV, which might predispose to further progression of BP elevation and development of target organ damage.

POSTER SESSION

POSTER SESSION P15

LIFESTYLE, HYPERTENSION MANAGEMENT

UPWARD-SHIFT AND STEEPENING OF THE BLOOD PRESSURE RESPONSE TO EXERCISE IN HYPERTENSIVE SUBJECTS AT HIGH ALTITUDE

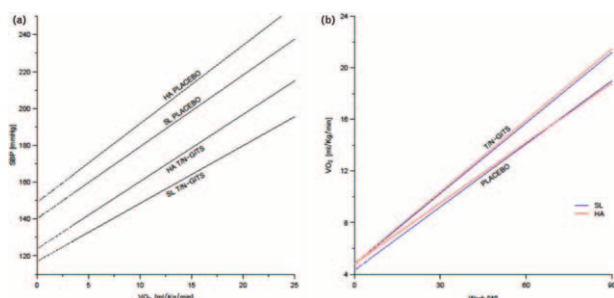
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Objective: Acute exposure to high altitude hypobaric hypoxia induces a blood pressure rise in hypertensive humans, both at rest and during exercise. It is unclear whether this phenomenon reflects specific blood pressure hyperreactivity or rather an upward shift of blood pressure levels.

We aimed at evaluating the extent and rate of blood pressure rise during exercise in hypertensive subjects acutely exposed to high altitude, and how these alterations can be counterbalanced by antihypertensive treatment.

Design and method: Fifty-five mild hypertensive subjects, double-blindly randomized to placebo or to a fixed-dose combination of an angiotensin-receptor blocker (telmisartan 80 mg) and a calcium-channel blocker (nifedipine slow release 30 mg), performed a cardiopulmonary exercise test at sea level and after the first night of stay at 3260 m altitude.

Results: High altitude exposure caused both a 8 mmHg upward-shift ($p < 0.01$) and a 0.4 mmHg/mL/Kg/min steepening ($p < 0.05$) of the systolic blood pressure/oxygen consumption relationship during exercise, independently of treatment (figure 1a). Telmisartan/nifedipine did not modify blood pressure reactivity to exercise, but downward shifted ($p < 0.001$) the relationship between systolic blood pressure and oxygen consumption by 26 mmHg, both at sea level and at altitude (figure 1a). Muscle oxygen delivery, as evaluated by means of the relationship between oxygen consumption and workload, was not influenced by altitude exposure, but was higher on telmisartan/nifedipine than on placebo ($p < 0.01$, figure 1b).



Conclusions: In hypertensive subjects exposed to high altitude we observed a hypoxia-driven upward-shift and steepening of the blood pressure response to exercise. The effect of the combination of telmisartan/nifedipine slow-release outweighed these changes, and was associated with better muscle oxygen delivery.

FIRST-IN-MAN EXPERIENCE OF DISTAL RENAL DENERVATION IN SEGMENTAL BRANCHES OF RENAL ARTERY USING MULTI-ELECTRODE BALLOON DEVICE

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Objective: Antihypertensive pharmacotherapy is maximally developed yet population control of hypertension is unsatisfactory prompting a search for non-pharmacological therapies. Percutaneous renal denervation (RDN) emerged as promising endovascular treatment of high blood pressure but failed to consistently show efficacy in clinical trials. Our recent study successfully proved that the this inconsistency resulted from anatomically wrong mode of the procedure as a series point treatments equally distributed in main trunk of renal artery whereas surgical and anatomical studies indicate that renal nerves are more concentrated around distal than proximal portions of the artery. We demonstrated that distal treatment in segmental branches of renal artery is significantly more effective than conventional main trunk therapy using Symplicity Flex single-electrode catheter. It is not clear, however, whether devices with more advanced design, e.g. multi-electrode balloons may be used in segmental branches. To assess feasibility of use the Vessix multi-electrode balloon system for distal renal denervation in segmental branches of renal artery.

Design and method: We performed a single-center study in 12 patients meeting criteria of resistant hypertension who provided written consent to the treatment. In 2 patients a diagnostic angiography revealed multiple branches narrower than 3 mm not suitable for distal treatment. In remaining 10 patients the multi-electrode balloon device was sequentially advanced into segmental branches of renal arteries and radiofrequency energy was delivered to each branch in 4–6 points. We assessed renal blood flow (Doppler flowmetry), 24-h proteinuria, serum creatinine, eGFR (MDRD), office and ambulatory blood pressure at baseline and 1 week following the procedure.

Results: No damage of segmental branches was found by intra-operational angiography. Also there were no significant changes either of renal function or renal blood flow including segmental branches of renal artery from baseline to 1 week after the treatment. In contrast, both office and 24-h ambulatory blood pressure decreased substantially at 1 week after the treatment by $-18.7 \pm 9.8/-7.6 \pm 9.0$ and $-11.7 \pm 9.8/-2.4 \pm 6.7$ mmHg, respectively.

Conclusions: These data indicate that distal renal denervation in segmental branches of renal artery may be safely performed by Vessix multi-electrode balloon system in the majority of patients.

ADAPTATIONS IN THE ARTERIAL FUNCTION OF FEMALE RUGBY ATHLETES—A CROSS-SECTIONAL STUDY

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Objective: Intensive exercise training is associated with a wide array of adaptive changes that occur particularly in the heart. The effect of intensive training over the arterial system has been less studied, and the available data regarding female athletes is even more scarce. The purpose of this study was to understand the effect of intensive training in the arterial mechanics of competitive rugby female players.

Design and method: Fifteen female rugby athletes and fifteen non-athletes, matched for age (mean age: 19.87 ± 2.50 years) participated voluntarily in a cross-sectional study. Carotid-femoral (cf) and carotid-radial (cr) pulse wave velocity (PWV) were measured with the Complior Analyse device in baseline conditions. With an adapted flow-mediated dilation paradigm, cr-PWV was measured again after a five minutes forearm ischemia period (hyperemia) induced with a bladder inflated for a suprasystolic pressure, thus allowing for the evaluation of the flow mediated slowing (FMS).

Results: In the group of the athletes, mean cf-PWV was 5.7 ± 0.8 m/s and mean cr-PWV was 8.9 ± 1.0 m/s. The non-athletes presented a similar mean cr-PWV (8.9 ± 0.9 m/s) but a significantly higher mean cf-PWV (6.5 ± 1.0 m/s; $p < 0.05$). The reflected wave coefficient (AiX) also presented significant between-group differences: -25% to the athletes, contrasting with -6% for the non-athletes; $p < 0.05$. Endothelial function as measured with the FMS method was also significantly different, with a greater decrease in cr-PWV after hyperemia in the athletes as compared with the non-athletes ($p = 0.04$). There were no statistically significant differences when comparing the central pressures between groups.

Conclusions: The present results, combined with the available evidences, indicate that rugby, a sport characterized by a moderate amount of isometric and isotonic features, is associated with a beneficial arterial profile in female athletes, mainly

through a better endothelial function, better arterial compliance and lesser effect of the reflected waves, when compared to age-matched non-athlete girls. The effect of different levels of training intensity over the arterial mechanics and the long-term effects of this particular type of sports in women needs to be ascertained.

ASSESSMENT OF SALT INTAKE IN VALID 24 HOUR URINE SAMPLING. APPROPRIATE AND COMPREHENSIVE INSTRUCTIONS LEAD TO HIGH PERCENTAGE OF SUCCESS OF REAL URINE 24 HOURS COLLECTION

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Objective: Measurement of sodium (Na) and potassium (K) excretion in validated 24-h urinary sampling in still the most accurate way to estimate daily Na and K intakes. However, the generalization of the 24-h urine collection has been questioned on the grounds that in practice it is difficult to adhere to a proper full day collection.

Design and method: We evaluated 24-h Na and K excretion in a hypertensive patients followed in out-patient clinic and to determine the percentage of valid 24-h urine (by creatinuria value according Brenner & Rector) on the basis of a simple instruction (SI) for collection (neglect the first morning urine on the first day of collection and to collect all further voiding till the first urine of the morning of the second day) and to compare it with no instructions (NI).

Results: We studied 1407 patients, 53.3% women aging of 61 ± 15 years and 28 ± 6 BMI Kg/m², 904 received SI whereas 503 received NI. In SI 84.3% had valid 24-h urines whereas in NI this percentage was 67% ($p < 0.01$). Ageing and gender did not differ between SI and NI. Considering only valid samples 24-h UNa was 193 ± 83 mmol/dia (11.4 g salt/day) and potassium 76 ± 33 mmol/d. Urinary albumin excretion was 172 ± 567 mg/12:00 am. The Na/K ratio was 2.7 ± 1.3. UNa correlated with BMI ($r = 0.145$, $p < 0.001$) and with urinary albumin excretion ($r = 0.112$, $p < 0.001$). UNa > 100 mmol/d (i.e salt consumption > 5.8 g/day) occurred in 90.8% of subjects and in 40.4% of UNa was > 200 mmol/d. 24-h UK was < desirable 100 mmol/d in 80.5%.

Conclusions: Our data shows that high salt and low potassium intakes are common among hypertensive patients which are associated with obesity and high levels of albuminuria. A precise and comprehensive instruction for 24 hours urine collection clearly allows a valid sampling in more than 83% which challenges the argument of the general difficulty of obtaining in practice valid urinary samplings representative of 24 hours.

AN EXAMINATION ABOUT EVALUATION OF BLOOD PRESSURE AND PULSE WAVE VELOCITY IN HEALTHY YOUTHS WITH/ WITHOUT FITNESS HABITS

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Objective: Pulse Wave Velocity (PWV) was an examination to measure the level of atherosclerosis in many medical institution in recent years. Previous report showed that Risk factor of atherosclerosis as hypertension, diabetes mellitus, hyperlipidemia, aging, smoking made the PWV fast. On the other hand, PWV in non-smoking youths were correlative with obese and hyperlipidemia and familial history in previous report. Correlation PWV with other risk factors were not elucidated. Here, in this study, we paid attention to the relationship between PWV and Familial History (FH) and Blood Pressure (BP) in Healthy, non-smoking youths without abnormal data of blood test in medical examination (blood sugar, lipid, liver and renal function).

Design and method: Non-smoking healthy youths, 72 men and 30 women with chance fitness habits (CFH), 36 men and 15 women with daily fitness habits (DFH), without abnormal data of blood test in medical examination was entry in this study. Medical examination by interview was done to all of them. If he or she had a familial history of hypertension, diabetes mellitus, hyperlipidemia, ischemic heart disease, cerebrovascular disease in father or mother, it counted as two point, and also in grandfather or grandmother, as one point by each risk factor. And in this study, called three former risk factors as "disease risk (DR)", two latter risk factors as "outbreak risk (OR)".

Results: Mean PWV was faster in men and women with CFH than those with DFH. Next we sort these data into ascending-order, and divided into "low PWV (LP)" and "high PWV (HP)" bound on the median. Both PWV of Men and women recorded HP is faster than recorded LP with CFH and DFH, however in BP, both Men and women recorded HP is faster than recorded LP with CFH but these difference in men and women with DFH has tendency to shrink statistically.

Conclusions: We conclude that familial history and BP may correlate with PWV in healthy youths with chance fitness habits especially in HP. But daily fitness habits pretend to rise their BP.

MEDICATION ADHERENCE AND UNREPORTED DRUG USE DURING WORKUP FOR PRIMARY ALDOSTERONISM

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Objective: Non-adherence to prescribed medication and unreported use of incompatible drugs may lead to misinterpretations of aldosterone-to-renin ratios during workup for primary aldosteronism but data are lacking. We compared antihypertensive drug prescriptions with measured plasma drug concentrations in patients with difficult-to-treat hypertension evaluated for possible aldosteronism.

Design and method: Newly referred patients to our clinic with uncontrolled blood pressure despite 2 or more antihypertensives were prospectively recruited over 12 months. On the 1st visit, incompatible renin-angiotensin system inhibitors, beta-blockers, diuretics and central acting agents were routinely stopped before aldosterone-to-renin ratio determinations on a subsequent 2nd visit. Ca-antagonists and doxazosin were allowed. Patients with severe comorbidity or incompatible but mandatory drugs were excluded. Plasma concentrations of 10 prescribed antihypertensives (8 incompatible) out of 18 used were systematically determined on both visits by LC-MS/MS. Results were additionally compared with expected therapeutic concentration ranges.

Results: Twenty-four patients were included: 42% female, age 54 ± 13 years, all with standardized glomerular filtration rate > 60. Mean interval between visits was 15 ± 6 days and average numbers of prescribed antihypertensives 3.2 ± 1.1 on the 1st vs. 1.1 ± 0.7 on the 2nd. In total, 76% of all antihypertensive prescriptions (60/79) were checked for presence in plasma on the 1st visit and 77% on the 2nd visit (20/26). On the 1st visit, 33% of patients showed discrepancies between prescriptions and plasma results (21% non-adherence/13% unprescribed drug use), 25% on the 2nd visit (0%/25%) and 46% for both visits combined (21%/29%). Unreported incompatible drugs were detected in 21% on the 2nd visit. For 1st and 2nd visits, 59% vs. 78% of plasma drug levels were within ± 50% of expected peak, 57% vs. 35% between peak and trough, and 17% vs. 15% below trough levels. Non-adherence because of previous day drug intake was thus suspected by quantitative analysis in additional 4 vs. 3 patients (17% vs. 13%).

Conclusions: Unreported drug use is frequent during clinical work-up for primary aldosteronism and laboratory results need cautious interpretations in view of possible medication bias. Quantitative analysis of plasma drug concentrations may increase the sensitivity of non-adherence screening.

HEALTH PERCEPTION AMONG MENOPAUSAL WOMEN

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Objective: Commonly, people who perceive their health status as poor have a higher mortality. Nevertheless, women are used to sense a worse health, especially after the fifties, although their life expectancy is higher.

AIMS: To evaluate whether a poor health perception is related to menopausal status or to the negative consequences that this status confers to cardio-metabolic risk factors or other variables.

Design and method: This is an epidemiological, transversal study, carried out in Villa María (Córdoba) and Rancul (La Pampa), Argentina. 2560 women were included, 2292 in Villa María (urban), 268 in Rancul (rural). These variables were measured: blood pressure (BP), Heart rate (HR), weight, height, waist perimeter, depression/anxiety screening by the HADS scale (pathological if equal or higher than 11); plasmatic testing: glucose, total Cholesterol, HDL-c, LDL-c, triglycerides. Also, smoking status, educational level, menopausal status, number of children, working status. Logistic regression models were adjusted via a vdw method from potentially confounding variables of the menopausal study group.

Results: Mean age was 49.4 ± 15.9. 87.5% had 1 or more children. 40.9% worked out of their houses. 22.1% had less than 5 years of education, 31.3% between 6–7 years, 33.4% between 8–12 years, and 13.2% more than 12 years.

1357 (53%) were menopausal. There are statistically significant differences between menopausal (M) and non-menopausal (NM) women ($p < 0.001$) in age, BP, HR, lipid profile, glycaemia and waist perimeter. We found more patients with a normal weight among NM ($p < 0.001$) and a higher prevalence of obesity in M ($p < 0.001$). We did not find differences in depression prevalence (12.2 vs 15.5; $p = ns$) or anxiety (20.7 vs 27.3; $p = ns$). Health was perceived as poorer among M ($p < 0.05$).

We did not find a relationship between a negative health perception and metabolic syndrome, depression and anxiety, Tobacco consumption, residence I rural area and a lower educational level, however it is not related to a menopausal status.

Conclusions: The negative perception of the health is not related to menopause but to psychological factors, life conditions and the presence of metabolic syndrome.

HIGH PREVALENCE OF SUBJECTS WITH HIGH CARDIOVASCULAR RISK IN COMMUNITY PHARMACIES – HIC RHODUS. HIC SALTO. PHYSICIAN-PHARMACIST COLLABORATIVE PROJECT OF THE CROATIAN SOCIETY OF HYP

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Objective: Pharmacists are highly accessible healthcare professionals and it has been reported that community pharmacist-led interventions improved patients' BP control and outcomes. The aim of this study was to identify subjects who may benefit from such interventions by analyzing characteristics and global cardiovascular (CV) risk in sample of subjects who visited pharmacies in Zagreb County on World Hypertension Day 2017.

Design and method: Blood pressure (BP) and total serum cholesterol (TC) (Roche Accutrend Plus; not always fasting) were measured by local pharmacists. In total, 906 subjects (369 M, 546 F, mean age 53.7, range 21–74) who visited pharmacies for various reasons and agreed to participate were enrolled. BP was measured twice after rest of 5 minutes in seated position using Omron M6 device. Subjects were divided in 2 subgroups depending on smoking habits. There is a risk of sampling bias as only those who agreed to participate were included. Demographic and anthropometric data; cardiovascular risk factors; data on salt intake and opinion about the usefulness of smart-phone applications in hypertension were collected.

Results: BP > 140/90 mmHg was found in 34.7% (M vs. F 41.9% vs. 30.0%; $\chi^2 = 13.04$; $p < 0.0001$), TC > 5 mmol/l in 29.1% (M vs. F 36.9% vs. 24.0%; $\chi^2 = 15.8$; $p < 0.0001$), and there were 34.9% smokers (M vs. F 38.6% vs. 32.6%; $p > 0.05$). Heart Score > 5% was determined in 20.5% subjects, and 6.3% had risk higher than 10%.

Conclusions: Subjects with elevated BP, TC and high global CV risk regularly visit pharmacies. Most of subjects had modifiable risk factors like hypertension, smoking and obesity. Pharmacists should have more emphasized role in patient education about life-style changes and could contribute to better drug adherence. Additionally, public health actions organized in pharmacies could identify subjects with high global CV risk who should be referred to physicians.

BODY IMAGE PERCEPTION AMONG FIRST GENERATION CHINESE MIGRANTS IN ITALY

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Objective: In Italy, hypertension and diabetes prevalence in the Chinese community was found to be higher than in the host population. Overweight was associated with hypertension and diabetes, thus highlighting the importance of monitoring weight in prevention strategies. Considering that body size preference may be an important factor in motivating individuals to lose weight, information about this determinant among Chinese migrants is necessary. The goals of this study were to explore ethnic differences on body image perception, to determine the association with BMI, hypertension and diabetes, and to investigate the effect of the time spent in Italy.

Design and method: Cross sectional study enrolling 1500 first generation Chinese migrants (aged 18–59 years), and 300 native Italians. Participants were requested to select the two silhouettes (Pulvers' figure rating scale) closest to how they perceived themselves (current) and to how they would have preferred to look like (preferred). Comparisons were performed by multivariable adjusted regressions.

Results: Chinese participants had a smaller BMI than Italians both for both men and women (OR 0.78; CI 95% 0.69 to 0.94). Among Chinese, BMI was not affected by years spent in Italy (10 ± 5 years). Chinese chose significantly thinner current (OR 0.34; CI 95% 0.26 to 0.43 for men, and 0.64; 0.54 to 0.76 for women) and preferred (OR 0.44; 0.35 to 0.56 and 0.73; 0.60 to 0.89 respectively) silhouettes than Italians. Perceived current body size (current silhouette) was correlated with BMI, hypertension and type 2 diabetes both among Chinese and Italians (Spearman's correlation $p < 0.001$ for all). Preferred silhouette was thinner than current silhouette for both men and women in both ethnic groups. Among Chinese, preferred silhouette was not correlated with the

time (percentile) spent in Italy (Spearman's correlation $p = 0.46$). However, at multivariate adjusted linear regression a trend for the time (years) spent in Italy was observed for the selection of a thinner silhouette (B coefficient -0.014; -0.029 to 0.001, $p = 0.054$).

Conclusions: For Chinese migration seems to be associated with a tendency to further enhance the preference for thinner figures, a point which could be crucial for prevention strategies in this high risk group.

FIXED DOSE COMBINATION THERAPY IS ASSOCIATED WITH BETTER BLOOD PRESSURE CONTROL AND LOWER ALBUMINURIA IN REAL-LIFE COHORT DURING 7 YEARS OF FOLLOW UP. ENAH – CROATIAN RURAL STUDY

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Objective: The aim of this study was to analyze differences in blood pressure (BP) control and albuminuria between subjects treated with fixed dose combination (FDC) and those treated with free components in real-life during the 7 years follow up period.

Design and method: Out of 1134 subjects (door-to-door enrollment, participation rate 80%) data on 236 (54 men; 182 women; mean age 63.2 years) treated hypertensives (HT) were analyzed at the end of 7 years of follow-up. At enter 136 of them were already treated HT (group A) and 100 were new-diagnosed HT (group B) who had started with antihypertensive therapy from that moment. Local GP were allowed to tailor antihypertensive therapy during the follow up period. At basal and at the end of follow up BP was measured by physicians who were project collaborators (ESH/ESC guidelines; Omron M6); salt intake (spot urine - Kawasaki equation), eGFR (CKD-Epi) and albumin-to-creatinin ratio (ACR mg/g; first morning urine sample) were analyzed in central lab. Pregnant women, terminal ill, bed-ridden patients, those with severe disability, mentally ill or suffering from dementia or at least one limb amputated/immobilized were excluded.

Results: At the end of follow up BP control was achieved in 31.6% and 38% of HT (group A and B, respectively). In both groups, there were no significant differences in salt intake, BMI, smoking and the number of used drugs between controlled and uncontrolled subjects ($p < 0.05$). However, in group A significant increase in FDC prescription was observed in the controlled vs. uncontrolled subjects (22% vs. 5.5%). BP control was associated with lower ACR in group A (14.9 vs. 76.3; $p < 0.01$) and group B (9.1 vs. 24.9; $p < 0.05$).

Conclusions: In this real-life cohort after 7 years of follow-up BP control was achieved with more drugs but only if used as FDC what was associated with better organoprotection i.e. lower ACR. Overall poor BP control and organoprotection could be improved using more FDC.

PLASMA BETA BLOCKER LEVEL MEASUREMENT - THE DIFFERENCE IN TREATMENT ADHERENCE ACCORDING TO TYPE OF BETA BLOCKER

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Objective: Beta-blocker treatment is commonly used in patients with arterial hypertension. Patients treated with more selective beta-blocker are believed to experience less frequently adverse effects of the drug. Suboptimal medication adherence is common in patients treated with beta-blocker, but there is little evidence about comparing the adherence between different beta blockers. The aim of our study was to evaluate non adherence rate among the patients taking beta-blockers for the treatment of arterial hypertension and to compare the adherence to different types of beta-blockers.

Design and method: We analyzed 421 serum beta blocker levels in 261 patients. Minimal time interval between the two measurements was three months. We analyzed "first measurement" within the single patient ($n = 261$) and also repeated measurements in patients with more than one plasma level sample ("all measurements", $n = 421$). Non-adherence to betaxolol, bisoprolol, metoprolol and nebivolol was analyzed separately and compared.

Results: Non-adherence to beta-blocker based on the results of the “first measurement within the patient” was 25,30 % and based on the results of the “all measurement” was 23,3%. 46,3% patients varied in non-adherence status among 70 patients with two or more measurement available, 53,7% of patients were adherent or non-adherent in all measurements. The highest rate of non-adherence was in patients prescribed with nebivolol (30,9%), the lowest in patients prescribed with betaxolol (15,9%), $p < 0,269$. Non-adherence to treatment was most common in nebivolol also in “all measurements” (33,7%) and lowest in betaxolol (8,9%), $p < 0,001$. Association between adherence to the treatment and number of used antihypertensive drugs was not statistically significant ($p = 0,416$).

Conclusions: Non-adherence to beta-blocker treatment in patients with arterial hypertension was lower than expected and is not equal in different types of beta-blockers. Adherence does not correlate with beta-1 selectivity of the beta-blocker. The variability of adherence is high among patients with repeated testing.

Table 1a: Compliance to treatment based on results of the first measurement of specific beta-blocker within patient (n = 261)

Beta-blocker	No. of measurements	No. (%) of non-adherences	No. (%) of adherences	p ¹
Betaxolol	44	7 (15.9%)	37 (84.1%)	0.269
Bisoprolol	90	26 (28.9%)	64 (71.1%)	
Metoprolol	72	16 (22.2%)	56 (77.8%)	
Nebivolol	55	17 (30.9%)	38 (69.1%)	
Total	261	66 (25.3%)	195 (74.7%)	-

¹Overall P value of Fisher's exact test is reported.

Table 1b: Compliance to treatment based on results of all beta-blocker measurements (n = 421)

Beta-blocker	No. of measurements	No. (%) of non-adherences	No. (%) of adherences	p ¹
Betaxolol	79	7 (8.9%)	72 (91.1%)	0.001
Bisoprolol	136	36 (26.5%)	100 (73.5%)	
Metoprolol	120	26 (21.7%)	94 (78.3%)	
Nebivolol	86	29 (33.7%)	57 (66.3%)	
Total	421	98 (23.3%)	323 (76.7%)	-

¹Overall P value of Fisher's exact test is reported.

SALT INTAKE AND ASSOCIATED FEATURES IN A PORTUGUESE HYPERTENSION CLINIC

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Objective: High salt intake is associated with hypertension and poor blood pressure control. Although recent efforts managed to reduce salt intake in Portugal it's still considered a public health problem. We aimed to describe the salt intake of a group of hypertensive patients and their main clinical features.

Design and method: Retrospective study based on clinical records from patients evaluated in Hypertension clinic of a tertiary care hospital during a year. Demographic, biometric and clinical data were gathered. Every patient with stable anti-hypertensive therapy were instructed to collect a 24 hours urine sample to measure daily salt intake. Samples were considered valid according to creatinine excretion adjusted for age and body weight. Student t tests and chi-square test were used to compare continuous and categorical variables, respectively.

Results: A total of 228 patients, 55% females, aged 60.4 ± 15.9 were evaluated in a year. 200 patients had a valid 24 h urine collection with a mean salt intake of 9.3 ± 3.5 g/day. Salt intake was higher in males and obese patients. Salt consumption was not statistically different between patients with resistant and non resistant hypertension. Salt intake did not appeared to be different in diabetic comparing with non diabetic patients and it did not seem to be related with LDL cholesterol control. Patients with Obstructive Sleep Apnea did not seem to have a higher salt intake. 72 patients (32%) were in secondary prevention with the majority (69%) with a prior stroke. Patients with a prior cardiovascular event showed a tendency towards lower salt intake although it did not reach significance. Considering this group of patients there was not evident a significant relationship with the patients with established cerebrovascular disease.

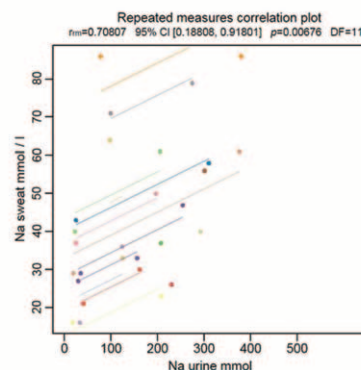
Conclusions: In this group of hypertensive patients salt intake was lower than the average Portuguese population. However, it is still higher than recommended. Salt intake was higher in obese patients, an association well established. In this sample, salt intake didn't seem to be related to resistant hypertension or other cardiovascular risk factors. Patients with prior cardiovascular event tended to show lower salt intake probably related to a more intensive lifestyle intervention.

SODIUM CONCENTRATION OF SWEAT CORRELATES WITH DIETARY SODIUM INTAKE

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Objective: There is increasing evidence that sodium is accumulating in the skin and muscle where it can be stored without being osmotically active. This might suggest that sweat is involved in the control of the human sodium balance, but this has received little attention thus far. The aim of this study was to assess whether changes in sodium intake induce parallel changes in the sodium concentration of sweat in healthy subjects.

Figure: Graphical representation of the repeated measures correlation showing Na sweat concentration and 24h Na excretion under high salt and low salt conditions of each participant, as well as the corresponding correlation plots



Design and method: In this crossover study we measured the sodium concentration of sweat (Na sweat) in 12 healthy normotensive volunteers (aged 33.8 ± 11.8 years, 16.7% male) under two levels of dietary sodium intake. Participants followed a high salt (HS) diet (6 gr of salt per day added to their normal diet during 5 days) and, one month later, a low salt (LS) diet (5 days of their normal diet). After each diet, a 24 h urine collection was performed, and Na sweat was measured using a standardized pilocarpine test and the Macroduct sweat collection system. Differences in concentration between the two diets were tested using paired t-tests, and the relationship between 24-hour urinary sodium (Na urine) and Na sweat was tested using an analysis of repeated measures of correlation (Rmcorr, R package).

Results: Sweat sodium concentration (Na sweat) increased from 39.9 ± 22.5 mmol/l under LS to 49.7 ± 19.9 mmol/l under HS conditions ($p = 0.05$), whereas urinary sodium excretion (Na urine) increased from 43.2 ± 30.2 mmol to 230.7 ± 89.1 mmol ($p < 0.001$). The changes in Na sweat correlated significantly within changes in Na urine ($r = 0.71$, $p < 0.001$, see Figure 1). Sodium concentration in sweat also correlated with the chloride concentration ($r = 0.9$, $p < 0.001$). The increase in dietary sodium intake was associated with an increase in body weight ($r = 0.63$, $p < 0.001$), without changes of blood pressure (systolic $r = 0.1$, $p = 0.55$, diastolic $r = 0.05$, $p = 0.8$).

Conclusions: The sodium concentration of sweat is higher under high salt conditions, suggesting that sweat might play a role in the maintenance of sodium balance in humans. Yet, the Na concentration in the sweat is highly variable within subjects and the diet-induced change is relatively modest in terms of amount.

CARDIOVASCULAR ADAPTATION TO PHYSICAL ACTIVITY IN ETHNICALLY DIFFERENT YOUNG ATHLETES

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Objective: Cardiovascular adaptation to intense physical training is determined by many factors including age, gender, body size, load training, ethnicity and blood pressure response to exercise. Our retrospective study aimed to assess secondary left ventricular (LV) remodelling to exercise, in terms of interventricular septum (IVS) and posterior wall (PW) thickness, in young male black soccer players (BP) compared to male white soccer players (WP).

Design and method: 77 BP and 53 WP (17.8 years old), trained with the same load and having the same lifestyle, were evaluated with maximal ergometric test, echocardiography and speckle-tracking global longitudinal strain (GLS). 30 younger BP and 27 WP (13.2 years old) were selected and followed up for 4 years.

Results: In the older group of athletes blood pressure response to exercise and GLS were comparable in BP and WP, whereas IVS and PW thickness were significantly higher in BP (IVS: 10.04 ± 0.14 and 9.35 ± 0.10 mm, $p < 0.001$; PW: 9.70 ± 0.20 and 9.19 ± 0.10 mm, $p < 0.05$; in BP and WP respectively). Considering the younger group of athletes no significant difference was found in blood pressure while a higher LV remodelling was detected (IVS = 9.29 ± 0.3 and 8.53 ± 0.12 mm, $p < 0.002$; PW = 9.01 ± 0.2 and 8.40 ± 0.20 , $p = 0.1$; in BP and WP respectively). The degree of LV remodelling was proportional with body-size and LV mass during the four years of follow-up (IVS = 10.52 ± 0.17 and 9.03 ± 0.22 mm, $p < 0.001$; PW: 10.06 ± 0.17 and 8.26 ± 0.19 mm, $p < 0.001$; in BP and WP respectively).

Conclusions: Since no significant difference in blood pressure response to exercise was detected and since all principal determinants of cardiovascular response to exercise were overcome by specific selection of all athletes enrolled, ethnicity seems to remain the principal factor involved in cardiovascular adaptation to physical training.

THE IMPACT OF A FRUIT AND VEGETABLE DIET ON BLOOD PRESSURE IN A COMMUNITY OF AFRICAN DESCENT

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Objective: It is widely reported that a western type of diet, with an excessive Na⁺ intake and low K⁺ intake is associated with an increase in BP. Consequently, global strategies have focused on the reduction of Na⁺ while increasing K⁺ though a high intake of fruits and vegetables. Whether these strategies can benefit communities of African ancestry with a high prevalence of salt sensitive hypertension is currently unknown. We therefore studied the effects of an exclusively vegetarian diet over a three week period on the sodium-to-potassium ratio and BP in a black South African population.

Design and method: We recruited 80 participants of African ancestry from the South-Western township of Johannesburg South Africa to partake on a three week (21 days) exclusively vegetarian diet. We measured conventional BP and collected 24-hour urine samples before and after the diet on all the participants. Anthropometric measurements were taken before and after the diet and a standard questionnaire was issued to determine lifestyle habits and history of medication. A blood sample was collected to determine lipid profiles.

Results: There was a significant reduction in 24-hour urinary Na⁺ ($p = 0.0135$) while urinary K⁺ excretion increased significantly ($p = 0.0256$). This led to a significant decrease in the sodium-to-potassium ratio ($p = 0.0011$). Plasma insulin was also significantly reduced ($p = 0.0301$). Systolic BP was significantly reduced ($p = 0.0247$) while there was no significant reduction in diastolic BP ($p = 0.0551$).

Conclusions: In a population sample of African ancestry, a three week exclusive vegetarian diet results in reduced urinary sodium excretion (an index of dietary sodium intake) and an increased urinary potassium excretion (an index of dietary potassium intake) resulting in a reduced systolic BP. Therefore, dietary strategies to increase fruit and vegetable intake at a community level could lead to the effective control of BP in salt sensitive African communities easing the burden of patient care on the resource limited health care system.

HIGH SODIUM INTAKE IS ASSOCIATED WITH MASKED HYPERTENSION IN THE GENERAL POPULATION

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Objective: We investigated the association between office (OBP) and daytime ambulatory blood pressure (ABP) and sodium dietary intake and renal handling, as assessed by 24-hour urinary sodium excretion (24hUVNa) and endogenous lithium clearance (FELi), respectively.

Design and method: We recruited from general population 192 individuals, never treated with antihypertensive medications. We administered standardized questionnaires to obtain information on subjects' medical history and life style. SpaceLab 90207 monitors were programmed to measure blood pressure each 15 min during daytime (6:00–22:00) and each 30 min night-time. In adjusted categorical analyses, normotension was the referent group (OBP < 140/90 and daytime ABP < 135/85 mmHg). White-coat hypertension was defined as OBP > 140/90 and daytime ABP < 135/85 mmHg; masked hypertension as OBP < 140/90 and daytime ABP > 135/85 mmHg; and sustained hypertension as OBP > 140/90 and daytime ABP > 135/85 mmHg. Blood and 24-hour

urine samples were collected. We calculated fractional excretion of lithium (FELi) as the marker of proximal sodium handling. A higher FELi indicates that less sodium and water is reabsorbed in the proximal tubule.

Results: The study group included 87 men and 105 women, mean age 40.5 years, office BP 124.3/84.0 mm Hg, 24hUVNa 160 mmol/24 h, 128 (66.7%) normotensives, 29 (15.1%) sustained hypertensives, 8(4.2%) individuals with masked hypertension, 27 (14.0%) subjects with white coat hypertension. In adjusted analyses, we did not find any associations between office or daytime ambulatory BP and 24hUVNa ($P > 0.24$) or FE. Li ($P > 0.30$). However, in categorical multivariate analyses, individuals with masked hypertension had higher 24hUVNa as compared to normotensives (197 vs 153 mmol/24 h; $P = 0.04$). There were no differences in 24hUVNa between white-coat hypertensives ($P = 0.59$) or sustained hypertensives ($P = 0.44$) and normotensive reference group. None of BP categories differed from normotensives in terms of FELi ($P > 0.19$).

Conclusions: Excessive sodium intake may play a part in the genesis of masked hypertension in the general population.

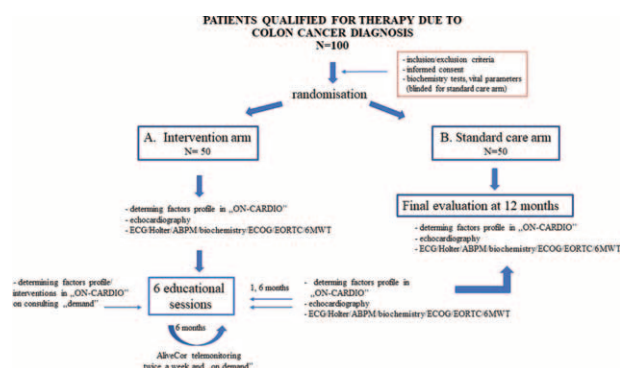
CARDIOONCOLOGICAL AND TELEMEDICAL CARE IN PATIENTS WITH COLON CANCER - MANAGEMENT OPTIMISATION (CARTAGINA STUDY)

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Objective: Cardiovascular (CV) diseases and cancer constitute the main causes of contemporary death reasons. CV prevention in patients with colon cancer enable implementation of more effective, life-saving oncological treatment and might prevent distant CV mortality in cancer survivors. Unfortunately, available data shows that prevention actions are rarely undertaken in oncological patients compared to patients without cancer. The aim of the planned study is developing a model cardiooncological care programme, ON-CARDIO™ in patients with colon cancer emphasizing the role of telemedicine and prevention. In particular the study is aiming at:

1. The assessment if telemedical care programme, ON-CARDIO™ implementation will result in obtaining the cardiooncological prevention goals
2. Determining the type and demand on cardiooncological interventions using the ON-CARDIO™ programme
3. The assessment of implemented cardiooncological interventions on control level of cardiovascular risk factors and frequency of cardiological complications in patients with colon cancer
4. The assessment of heart rhythm disorders frequency and their relationship with oncological therapy using ECG telemonitoring with AliveCor Kardia Mobile application
5. Assessing the influence of oncological therapy in colon cancer on blood pressure level, left ventricle function, cardiac arrhythmia and potential signs of ischemia
6. Determining the influence of applied cardiooncological interventions on biochemistry parameters (NT-proBNP, troponin, CRP, HbA1c, lipid panel)

Design and method:



Results: The programme is planned to be started this year, so far no results are available. The research hypothesis assumes that implementation of intensive, complex cardiooncological care using the model telemedical care programme, ON-CARDIO™ will influence on achieving the cardiooncological prevention goals, contribute to early detection of cardiological complications occurring along with oncological therapy and will serve as a prototype for building similar systems in other cancer diseases.

Conclusions: The above described project constitutes original, authorial idea, so far in medical literature there are no available data in this field. This programme for the first time will provide significant contribution and new knowledge concerning the role of telemedicine and cardiooncological prevention in patients with colon cancer characterized by similar risk profile as in CV diseases, which may subsequently lead to improvement of their prognosis.

CARDIOVASCULAR PREVENTION: METABOLIC SYNDROME AND LIFESTYLE IN WOMEN, THE PROSA STUDY

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Objective: Menopause is not a disease, but changing in hormonal status determines modifications in woman's metabolism with rising of new cardiovascular risk factors. It is well known that metabolic syndrome (MetS) after menopause is associated with an increased cardiovascular risk.

Design and method: The PROSA (Prevention in Rosa) study is a randomized controlled trial designed to test the efficacy of dietary change and physical activity in preventing or delaying the development of CVS disease in patients estimated to be at high risk based on the presence of at least one MetS factor or in treatment for one of them. Participants were recruited through the Hypertension Unit of the University Hospital of Milan. 1032 women were randomized in two groups: 513 received standard recommendation for healthy lifestyle (ESC/

AHA) without any active support (control group); 519 received standard recommendation and were invited to attend kitchen courses, gym and dance classes and reinforcing meetings (intervention group). The goal was to reduce MetS factors through lifestyle change.

Results: The data show that each MetS factor can be modifiable by changing the lifestyle (table 1). Physical activity (moderate/intense) seems to improve MetS factor more strongly than nutritional changes. Daily consumption of plant foods (whole grains, pulses, vegetables and fruit) is more effective in modulating MetS compared to other indications.

	No MetS (n. 615)	MetS (n. 357)	PRs (CI)
Moderate daily physical activity	64.8	53.2	0.80 (0.72 - 0.89)
No sugary drinks consumption	81.4	84.7	1.03 (0.98 - 1.08)
Daily consumption of plant foods	39.4	32.0	0.81 (0.69 - 0.95)
Moderate consumption of animal foods and no processed meats	54.0	47.7	0.90 (0.80 - 1.01)
Moderate alcohol consumption (≤ 10 gr alcohol daily)	91.8	88.5	0.99 (0.96 - 1.03)

Table 1: Percentage of women who followed the individual recommendations

Conclusions: In conclusion we observed that for cardiovascular prevention it is important to promote a daily physical activity (at least 30 min/day) and to increase consumption of plant foods before starting pharmacological treatment, because these lifestyle changes are able to modify MetS factors

POSTER SESSION

POSTERS' SESSION PS16:

BLOOD PRESSURE MEASUREMENT AND VARIABILITY

HOME BLOOD PRESSURE VARIABILITY AND PRECLINICAL TARGET-ORGAN DAMAGE IN UNTREATED HYPERTENSION

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Objective: To assess the relationship between different indices of home blood pressure (HBP) variability with preclinical target-organ damage in untreated hypertensives.

Design and method: Untreated hypertensives were subjected to HBP monitoring (duplicate morning and evening measurements; 6–7 days; automated devices), as well as to assessment of echocardiographic left ventricular mass index (LVMI) and urine albumin excretion (UAE).

Results: A total of 276 subjects (mean age 51.8 ± 11 [SD] years, men 58%, body mass index [BMI] 29 ± 4.8 [SD] kg/m², HBP systolic/diastolic $139.9 \pm 13.1/88.7 \pm 8.6$ mmHg) were analyzed. Average HBP was correlated to LVMI ($n = 263$; $r = 0.37/0.15$, systolic/diastolic, $p < 0.01/0.05$ respectively) and UAE ($n = 230$; $r = 0.31/0.21$, $p < 0.01$ for both). Maximum systolic HBP was associated with LVMI ($r = 0.34$, $p < 0.01$) and UAE ($r = 0.31$, $p < 0.01$). Other indices of systolic or diastolic HBP variability (standard deviation, coefficient of variation, average real variability, variability independent of the mean) did not present significant associations with LVMI or UAE (r range from -0.04 to 0.13 , all $p = \text{NS}$). In stepwise multivariate regression analyses (age, gender, BMI, systolic/diastolic HBP, maximum systolic HBP as independent variables), LVMI was determined ($R^2 = 0.40$) by systolic HBP and age, whereas UAE ($R^2 = 0.36$) by maximum systolic HBP and male gender.

Conclusions: These data suggest that average HBP and maximum systolic HBP, but no other HBP variability indices, appear to determine preclinical target-organ damage in untreated hypertensives.

CIRCADIAN RHYTHM OF BLOOD PRESSURE IS RELATED WITH HEART RATE BUT NOT GLUCOSE VARIABILITY IN LONG-STANDING TYPE 1 DIABETES

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Objective: Non-dipping pattern has been associated with cardiac autonomic neuropathy (CAN) in diabetic patients. However, in normotensive patients with type 1 diabetes (DM1) ambulatory blood pressure monitoring (ABPM) is not routinely performed. Surprisingly, none of the previous studies analyzed the relationship of autonomic regulation, glucose variability and non-dipping status (defined as less than 10% night-time blood pressure (BP) drop) in DM1.

The aim of the study was to investigate the possible association of circadian BP rhythm with glucose levels and its variability as well as with parameters of autonomic regulation.

Design and method: We examined 42 subjects with long-standing (>20 years) history of DM1 (without cardiovascular disease, including hypertension). In all patients, simultaneous 24-hour continuous glucose monitoring (iPro2), ABPM (Spacelabs 90217) and Holter electrocardiographic recording (Medilog Darwin, Schiller) were performed. Time- and frequency heart rate variability (HRV) parameters were used as indicators of cardiovascular autonomic regulation. Subjects were divided into two groups depending on presence of dipping pattern (dippers $n = 20$, non-dippers $n = 22$).

Results: Groups with dipping and non-dipping pattern did not differ with respect to age, BMI, mean heart rate, mean glucose levels, parameters of glucose variability and its long-term control (HbA1c).

As expected, the systolic and diastolic 24-hour BP variability (BPV, expressed as SD) were significantly lower in non-dippers. Time-domain HRV parameters, such as SDNN ($p = 0.03$), rMSSD ($p = 0.016$), pNN50 ($p = 0.01$) and SDNN-i ($p = 0.03$) were also significantly lower in non-dippers.

In spectral HRV analysis, non-dippers were characterized by lower LF and HF power in the whole recording ($p = 0.01$ and $p = 0.04$, respectively) and for day-time period ($p = 0.03$ and $p = 0.04$, respectively). For night-time period total power ($p = 0.03$) was lower in non-dippers. Unexpectedly, night-time LF spectrum power was also lower ($p < 0.01$) in the absence of differences in HF spectrum parameters. However, LF/HF was similar in both groups.

Conclusions: In patients with long-standing DM1, glucose variability was not related to BP dipping pattern. The abnormal circadian BP rhythm was associated with lower HRV. However, this relationship cannot be explained by night-time vagal withdrawal.

BLOOD PRESSURE VARIABILITY AMONG RHEUMATOID ARTHRITIS PATIENTS

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Objective: Rheumatoid arthritis (RA) is a systemic autoimmune inflammatory disorder that primarily affects peripheral joints with 0.5–1% prevalence in the population. The risk of developing cardiovascular disease in RA patients is twice compared to normal population. Some studies suggest that in RA patients, prevalence of hypertension is increased due to prednisolone use, clinical status, genetic factors and physical inactivity. Ambulatory blood pressure monitoring (ABPM) can be used to investigate diurnal variability of the blood pressure in patients. To our knowledge there is no data about prevalence of dipper and non-dipper status in RA patients compared to non-RA subjects. Purpose of the study is to investigate if non-dipper status is more common in RA patients.

Table 1. Comparison of the baseline characteristics and laboratory results of the study groups.

Variables	Rheumatoid Arthritis Patients (n=65)	Control Group (n=61)	P
Mean ± SD			
Men, %	23 (35.4%)	28 (45.9%)	0.229
Age, years	55.1 ± 10.2	52.3 ± 15.0	0.198
LVEF, %	57.3 ± 5.1	56.8 ± 2.7	0.520
FBG, mg/dL	104.5 ± 36.5	99.5 ± 26.8	0.389
BUN, mg/dL	12.6 ± 3.3	14.1 ± 4.3	0.118
Creatinine, mg/dL	0.7 ± 0.1	0.7 ± 0.1	0.379
HDL-C, mg/dL	48.6 ± 8.0	53.2 ± 13.1	0.183
LDL-C, mg/dL	112.7 ± 49.4	125.3 ± 33.8	0.357
Triglyceride, mg/dL	141.0 ± 65.4	137.9 ± 82.7	0.890
Hb, g/dL	13.5 ± 1.7	13.6 ± 1.2	0.565
Leukocyte, $\times 10^3/\text{mm}^3$	9.1 ± 2.5	7.8 ± 1.9	0.001
Neutrophils, $\times 10^3/\text{mm}^3$	5.8 ± 2.2	4.6 ± 1.6	0.001
Lymphocytes, $\times 10^3/\text{mm}^3$	2.5 ± 0.8	2.4 ± 0.7	0.343
Eosinophils, $\times 10^3/\text{mm}^3$	0.1 ± 0.1	0.2 ± 0.1	0.854
Platelets, $\times 10^3/\text{mm}^3$	289.7 ± 89.3	279.5 ± 63.6	0.483
RDW, %	45.4 ± 5.9	46.6 ± 5.8	0.000
MPV, fL	10.5 ± 1.0	10.4 ± 0.9	0.804
PDW, fL	12.4 ± 2.4	12.3 ± 2.0	0.744

Abbreviations: BUN, blood urea nitrogen; FBG, fasting plasma glucose; Hb, hemoglobin; HDL-C, high density lipoprotein cholesterol; LDL-C, low density lipoprotein cholesterol; LVEF, left ventricular ejection fraction; MPV, mean platelet volume; PDW, platelet distribution width; RDW, red cell distribution width.

Table 2. 24-h ambulatory blood pressure monitoring results of the study groups

Variables	Rheumatoid Arthritis Patients (n=65)	Control Group (n=61)	P
Mean ± SD			
Non-dipper patients, %	45 (69.2%)	38 (62.4%)	0.412
Day SBP, mmHg	131.3 ± 13.3	130.9 ± 14.9	0.882
Day DBP, mmHg	78.6 ± 8.1	77.3 ± 9.4	0.420
Night SBP, mmHg	122.6 ± 15.8	123.0 ± 15.2	0.903
Night DBP, mmHg	72.3 ± 9.5	70.5 ± 10.2	0.322
SBP, mmHg	129.7 ± 12.9	129.5 ± 14.9	0.955
DBP, mmHg	77.3 ± 8.0	76.0 ± 9.0	0.406
BP variability, %	6.3 ± 7.1	6.2 ± 9.1	0.980

Abbreviations: BP, blood pressure; DBP, diastolic blood pressure; SBP, systolic blood pressure.

Design and method: Sixty-five RA patient and 61 control patients are enrolled in this study. Patients with previous hypertension diagnosis, coronary artery disease, abnormal kidney function were excluded.

Results: Mean age of the study sample is 53.7 ± 12.3 years and 40.5% of the sample is male. There is no significant difference among groups in terms of age, gender, left ventricular ejection fraction, fasting plasma glucose, blood-urea nitrogen, creatinine, high density lipoprotein cholesterol, low density lipoprotein cholesterol, triglyceride, hemoglobine, lymphocyte, eosinophil, platelet, mean platelet volume and platelet distribution width values ($p > 0.05$). Leukocyte counts ($p = 0.001$), neutrophil counts ($p = 0.001$) and red cell distribution width ($p = 0.000$) were significantly higher in rheumatoid arthritis group.

ABPM results indicate no significant difference among rheumatoid arthritis patients and control group in terms of day-time systolic and diastolic blood pressure, night-time systolic and diastolic blood pressure, average systolic and diastolic blood pressure results ($p > 0.05$). 69.2% of rheumatoid arthritis patients and 58.4% of control group were non-dipper patients. There were no statistical difference among the non-dipper status of patient groups ($p = 0.412$). Also day-time and night time blood pressure variability was significantly similar among groups ($p = 0.980$).

Conclusions: In conclusion RA patients have similar values in term of blood pressure variability and hypertension diagnosis compared to control group. Further studies and larger sample size is needed in order to improve upon the findings of this study.

INTENSIVE ANTIHYPERTENSIVE TREATMENT ON PATIENTS WITH LOW BLOOD PRESSURE VARIATION REDUCES RISK OF DEATH FROM CARDIOVASCULAR DISEASES: A MACHINE LEARNING APPROACH ON SPRINT

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Objective: High blood pressure (BP) contributes to the burden of cardiovascular diseases (CVD). Recently, blood pressure variability (BPV) was suggested to be associating with CVD; however, no standardized risk stratification for BPV level exists and the corresponding antihypertensive treatment strategy remains unclear. This study aims to stratify BPV level by using machine learning and compare the risk of CVD between standard and intensive treatment groups.

Design and method: Data of Systolic Blood Pressure Intervention Trial (SPRINT) were obtained from a clinical data sharing platform; non-diabetic mellitus participants who had hypertension or at risk of CVD were recruited. Participants were randomized to receive intensive treatment (targeting systolic blood pressure (SBP) below 120 mmHg) or standard treatment (targeting SBP below 140 mmHg). BP were measured and recorded throughout the study. To stratify BPV level, this study included patients with more than 6 visit-to-visit BP measurements in 18 months. BPV was measured by the deviation between the BP records and the personalized BP trends, which were fitted by linear regression. Two-dimensional clustering on SBP and diastolic BP were conducted by applying K-means clustering. The risk of CVD death, stroke, myocardial infarction (MI), non-MI acute coronary syndrome and serious adverse event (SAE) were assessed regarding the BPV level and presented in terms of hazard ratio (HR) with 95% confidence interval (CI).

Results: With 8,092 patients, the mean age was 67.9 and 65.1% were male. A total of 3,532, 3,385 and 1,175 patients were classified into low, medium and high BPV group. Patients with low BPV who took intensive treatment had reduced risk of CVD death (HR, 0.26; 95% CI, 0.10 to 0.69) when compared to the standard treatment group. Patients with high BPV and intensive treatment were at increased risk of SAE (HR, 1.23; 95% CI, 1.03 to 1.47). Subgroup analysis on BPV for stroke, MI and non-MI acute coronary syndrome showed no significant results.

Table 1. Risk of Cardiovascular Events between Intensive and Standard Treatment Group Regarding Blood Pressure Variation

Outcome	Low BPV Group (N = 3,532)		Medium BPV Group (N = 3,385)		High BPV Group (N = 1,175)	
	no. of events	HR (95% CI)	no. of events	HR (95% CI)	no. of events	HR (95% CI)
CVD Death	23	0.26 (0.10 - 0.69)	44	0.68 (0.29 - 1.60)	11	0.25 (0.03 - 2.19)
Stroke	23	0.80 (0.34 - 1.88)	47	0.72 (0.39 - 1.33)	28	1.13 (0.48 - 2.66)
Myocardial infarction	67	0.75 (0.45 - 1.22)	69	0.76 (0.47 - 1.25)	43	0.63 (0.31 - 1.27)
Non-MI acute coronary syndrome	16	0.33 (0.11 - 1.00)	33	1.07 (0.52 - 2.17)	13	3.19 (0.90 - 11.24)
Serious Adverse Event	34	1.05 (0.93 - 1.18)	56	1.04 (0.93 - 1.17)	40	1.23 (1.03 - 1.47)

Conclusions: Hypertensive patients with low BPV who take intensive treatment would have significant reduction in risk of CVD deaths and insignificant increase in risk of SAE. The opposite holds true for patients with high BPV.

INFLUENCE OF REPEATED CUFF-INFLATIONS ON 24 HOUR BLOOD PRESSURE LEVELS

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Objective: Currently non-invasive blood pressure (BP) levels measured by cuff-based devices are considered the gold standard, with 24 hour ambulatory measurements being recommended by international guidelines. However, many patients poorly tolerate the devices, especially during the night, which may cause falsely elevated BP readings. We therefore investigated the influence of cuff inflations on systolic BP levels using a cuffless, non-invasive device.

Table 1 Systolic mean blood pressure indices of the first and second cuffless measurements

N=20	First measurement	Second measurement	p-value
24h BP, mmHg	137.2 (± 22.1)	135.3 (± 26.4)	0.6
Awake BP, mmHg	138.3 (± 22.7)	137.1 (± 26.6)	0.7
Asleep BP, mmHg	135.5 (± 22.0)	132.8 (± 25.9)	0.5
Dipping, mmHg	2.9 (± 5.3)	4.3 (± 5.4)	0.3

BP = blood pressure; p-values are based on paired t-tests.

Design and method: Between May and October 2017, 20 individuals were prospectively enrolled. Main exclusion criteria were age < 25 years or a difference in blood pressure > 10 mmHg between both upper extremities. Non-invasive, cuffless 24 h BP-measurements based on pulse-transit-time were performed twice within 4 days on the left arm. During the first measurement, the participants wore an automatic, cuff-based 24 h BP-measurement device on the right arm, simultaneously. The cuff was inflated every 20 minutes from 08:00 to 22:00 and every 30 minutes in the remaining time period. During the second measurement, the participants wore solely the cuffless device. Means (\pm standard deviation) of systolic 24 h, awake and asleep BP levels and the difference of systolic awake and asleep BP (dipping) levels of the first and the second cuffless measurements were compared using paired t-tests.

Results: Mean age was 46 (± 15) years and 45% were male. Four (20%) participants took antihypertensive drugs and mean BMI was 25 (± 4.6) kg/m². Mean systolic 24 h BP levels were 137.2 (± 22.1) and 135.3 (± 26.4) mmHg for the first, simultaneously, and the second, solely, taken BP measurement, respectively ($p = 0.6$). The differences between awake and asleep systolic BP levels were 2.9 (± 5.3) and 4.3 (± 5.4) for the first and second measurement, respectively ($p = 0.3$). Additionally, there was no statistical significant difference for separate awake ($p = 0.7$) and asleep ($p = 0.5$) BP levels (Table 1)

Conclusions: In our study we could not show a large impact of cuff-inflations on the BP values during a 24 h BP measurement evaluated by a cuff-less BP device. However mean values were numerically lower for the second cuff-less measurement, therefore larger participant numbers may be needed to show a statistically significant difference.

INFLUENCE OF HEART RATE AND HEART RATE VARIABILITY TO BLOOD PRESSURE LEVEL AND VARIABILITY

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Objective: To analyze influence of heart rate and heart rate variability to blood pressure level and fluctuations.

Design and method: 65 patients (63.1 ± 7.7 years old) with permanent artificial pacemaker (VVI) were examined. All of them had fixed ventricle rate thus no heart rate variability. Control group include 49 patients (63.8 ± 3.7 years old) with sinus rhythm and normal heart rate variability. The main and control groups were divided to subgroups of patients with and without arterial hypertension. 24-hour ambulatory blood pressure monitoring was done in all cases at baseline. In patients with artificial pacemaker we repeated ambulatory blood pressure monitoring after ventricle rate reduction by 10–15 beats per minute at night (31 patient) or for 24 hours (34 patients).

Results: Arterial hypertension was accompanied by elevated daytime and night-time systolic blood pressure variability in persons with sinus rhythm as well as in patients with artificial pacemaker ($p < 0.01$). The night-to-day systolic ($p < 0.05$) and diastolic ($p < 0.01$) blood pressure ratio and blood pressure variability at night ($p < 0.001$) were lower in patients with arterial hypertension and artificial pacemaker (no heart rate variability) then in hypertensive persons with sinus rhythm. In patients with fixed ventricle rate night-to-day ratio was low ($1.9 \pm 6.0\%$ for systolic blood pressure and $1.3 \pm 7.2\%$ for diastolic blood pressure). Ventricle rate

reduction by 10–15 beats per minute at night-time led to diastolic blood pressure lowering and improved night-to-day diastolic blood pressure ratio ($9.5 \pm 6.0\%$, $p < 0.001$). Permanent heart rate reduction from 70 to 55 or from 75 to 60 beats per minute for 24-hour in patients with artificial pacemaker was accompanied by diastolic blood pressure lowering at daytime ($p < 0.001$) and night-time ($p < 0.01$).

Conclusions: Fixed ventricle rate (absence of heart rate variability) in patients with arterial hypertension leads to low blood pressure variability and low night-to-day blood pressure ratio. Ventricle rate reduction in patients with artificial pacemaker accompanies by lowering of diastolic blood pressure.

EFFECTS OF AIR POLLUTION IN 24H AMBULATORY BLOOD PRESSURE MONITORING

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Objective: Air particulate matters and nitrogen and sulfur dioxide are the most worrying environmental pollutants, with the greatest impact on public health. There are studies that relate atmospheric pollution with the increase in office blood pressure, but there is no study that relates air pollution with 24 h ambulatory blood pressure (ABP).

OBJECTIVE: To know the relationship between ABP and classic atmospheric pollutants (PM10, PM2.5, NO2 and SO2) and the most recent measurement (ultrafine particles, PUF).

Design and method: Observational study of temporary and geographical measures of pollutants in individual patients (case-time series design) in centers of Primary Care and Units of Hypertension of a large urban area. Untreated > 18 years hypertensive patients were included, with a first valid ABP monitoring (ABPM) conducted between 2005–2014 and with at least one atmospheric pollution reader at < 3 km of radius of the center where the ABPM was performed. Analysis of regression of temporal series adjusted by individual variables (sociodemographic and risk factors) and ecological (environmental temperature).

Results: Sample of 2,888 hypertensive patients. Mean age of 54.3 (SD 14.6) years and 50.1% are women. Body Mass Index (BMI) 28.8 kg/m² (SD 6.4) and 16.9% of the sample smokes. Baseline 24 h ABPM 128.0 (12.7)/77.4 (9.7) mmHg. For each increase of 10 mg/m³ of PM10 an increase of 1.37 mmHg in 24 h diastolic BP (DBP) and 1.48 mmHg in daytime-DBP was observed, statistically significant. For each increase of 1 mg/m³ of PUF 24 h DBP increases in 1.46 mmHg and daytime-DBP in 1.56 mmHg, statistically significant. The calculation was adjusted by temporal variables of ABPM measures, sociodemographic variables and risk factors, and by environmental temperature. No association was found with any of the two pollutants and nighttime-DBP. No statistical relationship was detected between the PM2.5, NO2 and SO2 pollutants and ABPM, nor between any air pollutants and the office BP.

Conclusions: The increase in the atmospheric concentration of PM10 and PUF particles the day prior to ABPM is significantly associated with an increase in 24 h DBP and daytime-DBP.

ARE REPEATED DAYTIME WRIST BLOOD PRESSURE (BP) MEASUREMENTS USEFUL IN OBESE HYPERTENSIVE PATIENTS WHO DO NOT TOLERATE AMBULATORY BLOOD PRESSURE MONITORING (ABPM)?

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Objective: Out-of-office BP measurements using home or ambulatory BP monitoring are recommended by international hypertension guidelines to confirm the diagnosis of hypertension or monitor the efficacy of treatments. In very obese patients, ABPM can be painful and technically difficult despite the use of a large size cuff. In this pilot study, we assessed the usefulness of obtaining multiple wrist BP values in obese patients comparing BP obtained at the wrist and the arm during daytime.

Design and method: In a first set of data, daytime BP was obtained at the arm in 16 obese patients using the WATCH BP03 ABPM device (arm group) and in 16 other obese patients in whom BP was measured every 20 min at the wrist from 10 am to 10 pm with the OMRON R7-R6 wrist device (wrist group) because ABPM

was technically not possible. In a small group of 5 patients, BP was measured simultaneously at the arm and at the wrist.

Results: 32 obese participants were included in the first part of the study. All were females. Mean BMI was 46 kg/m² in the wrist group and 40.1 kg/m² in the arm group ($p < 0.01$); mean age was 37 years in the wrist group and 46 years in the arm group. The mean number of values obtained was 32 over 12 h with both techniques. Mean systolic and diastolic BP were respectively 125.3/78 \pm 11/8.6 mmHg in the wrist group and 125.7/80.1 \pm 11.1/10.9 mmHg in the arm group ($p = ns$). Heart was comparable in both groups (81.5 vs 82 beats/min, $p = ns$). In the 5 patients (4 F/1 M) in whom BP was measured simultaneously at the arm and at the wrist, no significant difference in BP and heart rate was observed (mean values of 126.0/78 \pm 12/7.5 mmHg at wrist and 125.5/80 \pm 10.5/9.5 mmHg ($p = ns$)).

Conclusions: These results suggest that in very obese hypertensive patients, in which ABPM is not possible because of pain or for technical reasons, repeated wrist BP measurements may be useful to obtain out-of-office ambulatory BP values provided the devices are validated. Larger studies should be performed to confirm our observation.

CONCORDANCE BETWEEN THE BLOOD PRESSURE PROFILE (BPP) AND AMBULATORY BLOOD PRESSURE MONITORING (ABPM) FOR THE DIAGNOSIS OF HIGH BLOOD PRESSURE (HBP) IN PRIMARY HEALTH CARE

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Objective: The general aim of the Global Project of Standardized Treatment of Hypertension is to evaluate the standardized strategy for diagnosis and control of hypertension, including the use of ABPM for confirmation hypertension diagnosis and follow-up treatment. The objective of the present study is to evaluate the concordance in the diagnosis of hypertension conducted with BPP and ABPM.

Design and method: In a pilot phase, the project was implemented in 3 family health centers at Santiago (Metropolitan Health Service South East –SSMSO–). Subjects aged 15 to 79 years with suspicion of HBP, who were given BP measurements via BPP, 3 serial blood pressure measurements under standardized conditions (7–15 days) with automatic monitor (Omron HEM 907[®]), and 24-hour ABPM (Mobil-O-Graph[®] equipment), according to current guidelines. Correlation between continuous variables (SBP and DBP, between BPP and ABPM average/day/night) was determined. Concordance was assessed in the diagnosis of HBP between BPP and ABPM, by determination of Kappa coefficient. The study was approved by the SSMSO Ethics Committee and informed consent was obtained from all participants.

Results: 123 subjects were recruited (50% of total calculated sample); Age: 53 \pm 15 years; Male Sex: 66 (53.2%); BMI: 29 \pm 5 kg/m²; Average BP per BPP: 1st measurement: SBP: 139 \pm 10 mmHg/DBP: 84 \pm 9 mmHg. Patients with HBP according to BPP: 103 (83%); Stage 1: 87 (69%); Stage 2: 16 (14%). The analysis of correlation between BPP and ABPM showed a low correlation with SBP (R2 BPP vs ABPM: min: 0.14; max: 0.18) and moderate with DBP (R2 BPP vs ABPM: min: 0.21; max: 0.41). We observed low concordance in the diagnosis of HBP between BPP and ABPM, being greater for night ABPM (Kappa coefficient vs ABPM average: 0.18; vs ABPM Day: 0.17; vs ABPM Night: 0.30).

Conclusions: The results show high discordance between BPP and ABPM in the diagnosis of hypertension. If technical superiority of the ABPM is accepted, the BPP diagnosis would have a high rate of false positives. It is still pending to determine whether these results are confirmed by completing the total sample size.

SHORT-TERM REPRODUCIBILITY OF AMBULATORY BLOOD PRESSURE MONITORING: A SYSTEMATIC REVIEW

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Objective: Ambulatory blood pressure monitoring (ABPM) is the recommended blood pressure (BP) measurement method to diagnose hypertension. Besides the absolute BP values, BP variability and nocturnal dipping on ABPM were found to predict cardiovascular outcomes. However, a comprehensive review of reproducibility of these ABPM parameters is lacking. Our objective is to systematically review the short-term reproducibility of ABPM.

Design and method: A comprehensive search was performed on MEDLINE (PubMed) from database inception to December 2017. Included studies were (i) published in English and (ii) reported measures of short-term reproducibility of ABPM BP values/BP variability/dipping status in human adult subjects, for which at least 2 sessions of ABPM with a between-session time interval of less than or equal to 1 month were performed. Studies involving participants who were pregnant or were receiving haemodialysis were excluded.

Results: Initial literature search identified 1043 titles and abstracts; of these, 86 full texts articles were retrieved for further assessment and eventually a total of 21 studies were included. Due to heterogeneity of the included studies, data pooling in the form of a meta-analysis was not possible. A qualitative synthesis was performed. The majority of studies used the Spacelabs ABP monitors and measured 24-hour, daytime and night-time systolic and diastolic BP in two sessions, with between-session time intervals ranging from 4 days to 1 month. Types of participants varied across studies and included normotensives, hypertensives as well as mixed cohorts. Most studies were conducted in western population. Sample size was generally small, ranging from 10 to 330. The included studies employed a wide array of methods to quantify reproducibility and the majority reported moderate to good short-term reproducibility of ABPM. Reproducibility of BP variability and dipping status was rarely studied.

Conclusions: More studies about reproducibility of ABPM in various ethnic groups and in BP variability and dipping status are needed.

THE CORRECTION OF PSYCHOLOGICAL STYLE OF BEHAVIOR MAY IMPROVE THE EFFECTIVENESS OF ANTIHYPERTENSIVE THERAPY IN THE WORKPLACE IN PATIENTS WITH HYPERTENSION

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Objective: The aim of study was to define if the emotional intelligence (EI) of patients with arterial hypertension (AH) may influence the effectiveness of antihypertensive therapy in the workplace.

Table 1. BP changes during treatment in the control group (n=35)

Indices	BP levels		
	Before treatment	After treatment	p
workplace SBP	146,5±11,1	144,4±17,1	Ns
workplace DBP	92,5±15,1	89,7±10,2	Ns
Night SBP	126,5±12,1	127,1± 11,6	Ns
Night DBP	73,0± 8,0	74,4± 11,1	Ns
daytime SBP	145,9± 12,2	143,9± 12,0	Ns
daytime DBP	91,4± 11,0	88,8± 8,1	Ns

Table 2. BP changes during treatment in the intervention group (n=35)

Indices	BP levels		
	Before treatment	After treatment	p
workplace SBP	143,5±13,3	131,6±11,3	p<0,05
workplace DBP	91,5± 8,3	85,2±11,1	p<0,05
Night SBP	123,5±14,3	119,9± 10,3	Ns
Night DBP	76,0±11,4	72,8± 10,1	Ns
daytime SBP	142,0±14,4	136±14,4	p<0,01
daytime DBP	89,0±14,4	81,0±14,4	p<0,01

Ns - no significant changes

Design and method: We assessed 70 ambulatory blood pressure monitoring (ABPM) data of AH patients without serious concomitant diseases. ABPM monitor (Spacelabs 90207) was applied after the washout period. We defined daytime period as 8.00–22.00, nighttime – 0.00–6.00, and work period as 11.00–19.00. After ABPM session patients completed the emotional intelligence questionnaire (EmIn) by Lyusin D. We analyzed following EmIn scale scores: I - emotion self-awareness; II - management of one's own emotions; III - control of emotional expression; IV - understanding others' emotions; V - management of others' emotions. The patients were randomized to treatment antihypertensive drugs. Then the patients were randomized to the control and intervention groups. In the control

group were used standard recommendations for cardiovascular disease patients. In the intervention group, physicians advised to follow both standard recommendations for cardiovascular patients and additional recommendations according to the results of the EmIn questionnaire. The patients were treated with antihypertensive drugs in average therapeutic doses for 3 weeks (amlodipine, metoprolol, enalapril, telmisartan). If the therapy was ineffective, the patient dropped out of the study and began to treatment with the combined therapy. At the end of the three-week therapy was performed EmIn test and ABPM.

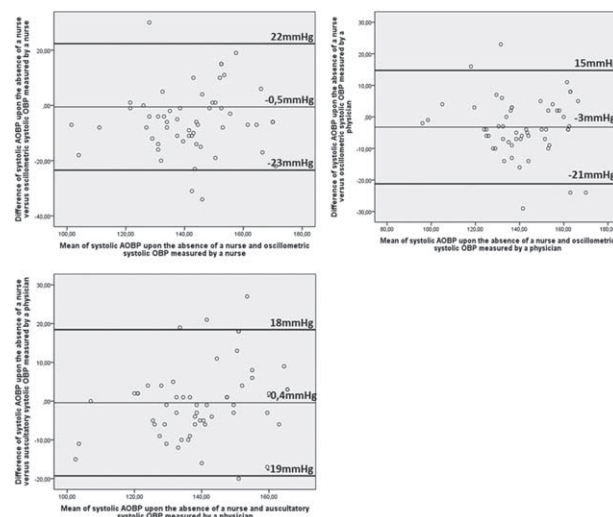
Results: The mean daytime BP was (M ± SD): systolic (SBP) - 142.1 ± 14.5; diastolic (DBP) - 90.1 ± 10.9 mm Hg. The groups were comparable in baseline BP, sex, age, EmIn characteristics, body mass index and drugs doses. We found that treatment with average therapeutic doses of antihypertensive drugs is not effective (table 1) in the control group. However, in the intervention group, the same doses of the drug leads to the significant BP reduction of workplace and daytime BP levels. Night BP indices in this patients did not decrease significantly (table 2).

Conclusions: Thus, lifestyle changes based on both conventional and additional recommendations with regard of the results of the EmIn psychological questionnaire may improve the effectiveness of the antihypertensive therapy in the workplace.

SYSTOLIC AUTOMATED OFFICE BP (AOBP), WITH NURSE ABSENT, COMPARED TO OTHER CLINIC BP MEASUREMENTS

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Objective: To compare differences between systolic AOBP measured without the presence of a nurse with other oscillometric and auscultatory OBP measurement taken by a nurse or a physician.



Design and method: We prospectively evaluated 55 hypertensive patients seen in the Hypertension clinic of the Washington DC VA Medical Center, mean age 68 ± 13 years, 10 women. Four types of BP measurements were obtained; (i) AOBP measurements, using the fully automated Omron-HEM 907 sphygmomanometer with the nurse out of the exam room (ii) Oscillometric office BP (OBP) taken by a nurse, using a validated digital oscillometric BP electronic device (Dinamap), (iii) OBP taken by a physician, using the same validated oscillometric device and (iv) Auscultatory OBP measurements taken by the same physician. Appropriate cuff size was used in all cases. AOBP readings were programmed to start after 5 minute wait and to record 3 BP readings at one-minute intervals. Participants were alone during the five-minute resting period and the three measurements. All other OBP measurements were also taken in triplicates and the average was calculated. Subjects remained seated for five minutes, before OBP was measured, and were asked to refrain from speaking during measurements. Of note, the nurse and the physicians from the study team were blinded to each other's BP measurements. Continuous variables are reported as mean ± SD. Frequencies are described as percentages. We evaluated agreement between methods by using the method of Bland and Altman. A calculated difference of p < 0.05 was considered to be statistically significant. We used SPSS version 22.0 for data analysis.

Results: Mean AOBP values averaged 135/75 mmHg, the oscillometric nurse and physician OBPs averaged 145/75mmHg (P < 0.001), and 142/78 mmHg (P < 0.001)

respectively and the physician auscultatory measurement averaged 140/77 mmHg ($P = \text{NS}$). Bland-Altman plots with bias and 95% limits of agreement for systolic AOBP (with nurse absent) and other systolic conventional OBP measurements are given in Figures 1–3.

Conclusions: High quality AOBP measurements are lower than other conventional OBP readings, suggesting AOBP may be eliminating some of the white-coat effect in everyday clinical practice.

COMPARISON OF DIFFERENT BLOOD PRESSURE ASSESSMENT METHODS

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Objective: Compare different blood pressure (BP) assessment methods.

Design and method: Prospective longitudinal observational study of patients with high BP (HBP) diagnosis. Patients are evaluated at inclusion in the study, after 1 month, 3 months and 1 year. In each evaluation is carried out: sociodemographic and clinical data registry; measurement of peripheral BP (pBP; OMRON M6 2014®) and central BP (cBP; aplanation tonometry with Sphygmocor® system); self-monitoring BP (SMBP) and 24-hour ambulatory BP monitoring (ABPM) registry, regarding previous 6 months if patient remained stable and without therapeutic changes. Were excluded individuals with diagnosis of secondary hypertension, peripheral artery disease, atrial fibrillation or flutter, hospitalization and therapeutic changes in prior 6 months. Controlled BP was defined as: systolic pBP (SpBP) < 140 mmHg and diastolic pBP (DpBP) < 90 mmHg; systolic cBP (ScBP) < 130 mmHg and diastolic cBP (DcBP) < 90 mmHg.

Results: The sample corresponds to first evaluation during the first month of study: 19 patients, with mean age of 63 ± 10 years, majority male (73.7%), on average with 14 ± 7 years of HBP. Most frequent comorbidities are dyslipidemia (57.9%), type 2 diabetes (36.8%) and smoking (26.3% ex-smokers, 10.5% active smokers). pBP mean values are higher than cBP: SpBP 152 ± 14 vs ScBP 142 ± 15 mmHg; DpBP 88 ± 10 vs DcBP 86 ± 13 mmHg. Considering cBP, only 10.5% of patients present controlled BP, as opposed to 21.1% if considering pBP. SMBP was obtained in 36.8% of patients and revealed lower BP - SBP 131 ± 10 mmHg and DBP 77 ± 10 mmHg. As well as ABPM, performed in 26.3% of patients - SBP 126 ± 8 mmHg and DBP 81 ± 4 mmHg. In the subgroup of patients with SMBP and ABPM, 84.2% and 80% patients, respectively, presented controlled BP.

Conclusions: BP differ when obtained by different methods, as well as patients with controlled BP, with a low value considering cBP. Currently cBP seems to be a best predictor of target-organ injury opposed to pBP, but not yet as predictor of cardiovascular events. Authors intend with continuation of the study to relate the values of pBP and cBP with therapy and clinical evolution of the patient, in order to establish the utility of cBP in study and therapeutic orientation of hypertensive patient.

THE BLOOD PRESSURE MEASUREMENTS TAKEN BY BOTH DOCTORS AND NURSES IN THE SAME ENVIRONMENT: DIFFERENCES AND INFORMATION

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Objective: Blood pressure (BP) surge during medical visit represents a phenomenon associated to vascular damage but little is known on implication of BP change measured by nurse and doctor in the same medical setting. Aim of the study was to discern the association of different indices of vascular damage and cognitive impairment with the different BP measures in hypertensives treated with ARBs or ACEi as monotherapy.

Design and method: In the same day, hours (08.00–11.30 a.m.) and medical controlled environment, by the same sphygmomanometer (Microlife Afib), 226 grade 1–2 hypertensives with similar age, education, metabolic and hypertensive state, were visited. After ambulatory blood pressure monitoring (day/night), they underwent to BP measurement by the nurse (lab) and the doctor (doc), general cognitive impairment (COGtot) by 18-items (NPI) and, by carotid intima-media thickness (IMT) and carotid-femoral pulse wave velocity (PWVcf), assessment of preclinical, structural and functional, vascular damage.

Results: Patients, subdivided in tertiles by the SBPdoc-lab difference, reduced (R), intermediate (M) and elevated (E), showed significant differences ($m \pm \text{s.d.}$; * $p < .05$, ** $p < .01$, *** $p < .001$ vs SBPdoc-labR; ° $p < .05$, °° $p < .01$, °°° $p < .001$ vs SBPdoc-labM).

pts/var	S/D BPdoc	S/D BPlab	SBPdoc-lab	S/D BPday	S/D BPNight	
SBPdoc-labR	133±12/79±8	141±11/82±8	-8.3±7.2	138±10/79±7	119±10/68±9	
SBPdoc-labM	135±10/80±8	131±11/79±9	3.3±2.4***	142±17/86±11	117±13/70±10	
SBPdoc-labE	138±12/83±8	122±13/75±8	16.3±7.5*****	140±16/84±12	119±16/68±10	
pts/var	COGtot	NPI3	NPI4	NPI5	IMT	PWVcf
SBPdoc-labR	26.2±7.3	1.7±0.8	1.4±0.6	1.4±0.6	.96±.17	9.8±1.5
SBPdoc-labM	24.2±7.4	1.6±0.8	1.3±0.5	1.3±0.5	.92±.12	9.4±1.2
SBPdoc-labE	28.1±7.8***	1.9±0.9**	1.6±0.8****	1.5±0.7**	.96±.14	10.2±1.9**

SBPdoc-labE patients demonstrated a higher total cognitive deficit score, particularly, brief-term memory (NPI3) and phrontal cortex activity (NPI4, NPI5) impairment. Pearson analysis, adjusted for age and history of hypertension, showed the association between SBPdoc-lab and PWV (.193*), NPI3 (.148*) and COGtot (.137*). The BP surge during the medical examination, mostly due to the doctor visit, seems to be associated to the onset to functional preclinical vascular damage in patients with similar circadian profile.

Conclusions: The findings showed that brief-term BP changes, ascertained in a controlled environment by standardized methods, particularly the changes ascribable to the “white-coat effect”, might be predictive of preclinical vascular damage and, then, of cardiovascular prognosis.

ATRIAL FIBRILLATION INFLUENCES AUTOMATIC OSCILLOMETRIC ANKLE-BRACHIAL INDEX MEASUREMENT

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Objective: The ABI (ankle - brachial index) repeated measurements using Doppler method were shown to be accurate despite atrial fibrillation (AF). However, they require expertise and are time consuming. Automatic oscillometric devices can be effective in ABI, but their accuracy during AF is unknown. The purpose of the study was to investigate whether AF influences ABI obtained with automatic oscillometric method.

Design and method: Ninety-nine patients (age 66.6 ± 11 years, M/F - 63/36) who underwent AF electrical cardioversion (EC) were investigated. ABI measurements using oscillometric and Doppler methods were performed on both lower extremities (198 cases) before and after EC.

Results: The ABI measured using oscillometric method on both lower limbs didn't change after EC ($1.21 [1.13-1.27]$ vs. $1.22 [1.14-1.26]$, $p = 0.664$, respectively). Correlation was found between measurements performed with oscillometric method before and after EC ($r = 0.49$, $p < 0.001$). ABI measured before and after EC using Doppler and oscillometric method showed significant difference ($1.14 [1.07-1.22]$ vs. $1.21 [1.13-1.27]$, $p < 0.001$; and $1.18 [1.09-1.13]$ vs. $1.22 [1.14-1.26]$, $p < 0.001$ respectively). Upper 95% CI margins for the median of difference in ABI between methods were 0.08 and 0.06 before and after EC and the difference was higher during AF than during sinus rhythm (0.07 vs 0.04 , $p = 0.002$). That may be significant from clinical perspective suggesting clinical significance. Both methods showed week correlation before EC ($r = 0.35$, $p < 0.001$) and lack of correlation after EC ($r = 0.12$, $p = 0.07$). The Bland-Altman plot showed poor agreement between measurements performed with the Doppler and oscillometric method in sinus rhythm and during AF. ROC analysis revealed AUC of 0.57 (95% CI: 0.10–1) with 1.39 oscillometric cut-off for sensitivity (0.5) and specificity (0.96).

Conclusions: The study results show, that atrial fibrillation can have an impact on ABI measurements performed with the oscillometric method. Therefore, we postulate, that the automated oscillometric method should not replace the reference Doppler method in patients with atrial fibrillation.

PULSE WAVE VELOCITY NON-DIPPING PATTERN IS ASSOCIATED WITH CARDIOVASCULAR MORTALITY IN HYPERTENSIVE PATIENTS UNDERGOING CHRONIC HEMODIALYSIS

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Objective: Increased arterial stiffness is established as an independent cardiovascular (CV) risk factor. Although this association was found also in patients undergoing hemodialysis (HD), reports are frequently contradictory largely because measurements were obtained shortly before or after HD. The aim of our study was to analyze circadian variations of aortic stiffness using ABPM device which provides valid measures in ambulatory conditions and association with CV mortality.

Design and method: A total of 31 hypertensive patients (19 M, 12 F; averaged age 59.4) who had been on intermittent HD treatment for more than 6 months were enrolled in this study (22.6% diabetic, 16.1% smokers) and followed up for average 18.6 months. Patients received HD treatment 4 hr/session three times a week during the study period. TensioMed Arteriograph which records oscillometric BP and pulse waveforms at the brachial artery and provides valid measures of aortic BP, AIx, and PWV in ambulatory conditions was applied on non-dialysis midweek day. Control group consist of 25 healthy subjects without prior diabetes, CKD, hypertension and hyperlipidemia.

Results: Systolic BP, PWV and AIx non-dipping patterns were found in 74.2%, 64.5% and 61.3% of patients.

We failed to find difference in AIx dipping pattern between patients and control subjects (38.7% vs. 28.0%; $p = 0.4$) while PWV non-dipping pattern was significantly more frequently found in HD patients (64.5% vs. 16.0%, $p < 0.001$). At the end of follow-up period 13 (41.9%) patient died from CV deaths. We have not found any differences in age, dialysis parameters, comorbidity, HD therapy and laboratory parameters between survived and deceased HD patients. Differences in basal systolic and diastolic BP, PWV, AIx between survived and deceased were not statistically significant. There were no differences in number of BP and AIx non-dippers between survived and deceased patients while significantly higher number of deceased patients had PWV nocturnal non-dipping pattern (84.5% vs. 50.0%, $p = 0.04$).

Conclusions: A newly introduced ABPM devices for ambulatory recordings provide new insights on importance of arterial stiffness for CV mortality in patients undergoing HD. Our results showed that PWV non-dipping pattern is independently associated with CV mortality.

DIPPING PROFILE, NIGHTTIME SYSTOLIC BLOOD PRESSURE AND VASCULAR DAMAGE IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: Both increased nighttime systolic blood pressure (SBP) and a non-dipping pattern are predictors of adverse cardiovascular outcomes. We investigated dipping profile and nighttime SBP in relationship with subclinical vascular damage in patients with rheumatoid arthritis (RA), a disease characterized by excess cardiovascular risk.

Design and method: Patients with RA and non-RA individuals underwent 24-hour ambulatory blood pressure monitoring. Carotid-femoral pulse wave velocity (PWV) was assessed with applanation tonometry as a measure of central arterial stiffness. Carotid atherosclerosis was evaluated from carotid ultrasound by measurement of carotid intima-media thickness (cIMT). Peripheral vascular resistance was estimated from impedance cardiography. Disease-related characteristics were addressed, including erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), disease duration and activity, and pain.

Results: RA patients ($n = 91$) exhibited a higher prevalence of non-dipping pattern (64.8 vs 28.0 %, $p < 0.001$), elevated nighttime SBP (112.6 ± 12.8 vs 105.8 ± 9.7 mmHg, $p = 0.001$) and a lower degree of dipping (6.5 ± 7.4 vs 13.0 ± 5.6 %, $p < 0.001$), compared to non-RA individuals ($n = 50$), whereas both office and daytime SBP did not differ. In the RA group, dipping (%) was inversely associated with PWV ($r = -0.218$, $p = 0.045$). Nighttime SBP strongly correlated with all vascular indices, including PWV ($r = 0.493$, $p < 0.001$), cIMT ($r = 0.407$, $p < 0.001$) and systemic vascular resistance index ($r = 0.383$, $p < 0.001$). In addition, nighttime SBP increased with increasing ESR ($r = 0.213$, $p = 0.046$), CRP ($r = 0.245$, $p = 0.022$), intensity of pain over the past 24-hour hours ($r = 0.255$, $p = 0.042$) and disease duration ($r = 0.246$, $p = 0.027$). The combination of a non-dipping profile with high nighttime SBP was accompanied by the highest ($p = 0.019$) PWV (10.0 ± 2.5 m/s), compared to both non-dippers with normal nighttime SBP (7.8 ± 2.1 m/s, $p = 0.003$) and dippers (8.1 ± 1.9 m/s). In the multivariate analysis for dipping, ESR was identified as an independent predictor ($\beta = -0.234$, $p = 0.037$), and the same was observed in the multivariate analysis for nighttime SBP ($\beta = 0.201$, $p = 0.019$).

Conclusions: Patients with RA exhibit high prevalence of blunted dipping due to elevated nighttime SBP. Inflammation appears to mediate the observed associations of nighttime SBP and dipping with markers of central and peripheral vascular damage. The combination of a non-dipping profile with abnormal nighttime SBP is accompanied by pronounced subclinical vascular impairment.

CHANGES IN PARAMETERS OF ARTERIAL STIFFNESS WITH POSTURE IN NORMOTENSIVE PATIENTS AND HYPERTENSIVE PATIENTS WITH AND WITHOUT ANTI-HYPERTENSIVE TREATMENT

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Objective: 1. To determine and compare any differences in postural variations for the parameters of arterial stiffness among 3 test groups – normotensives, hypertensives with anti-hypertensive medications and hypertensives without anti-hypertensive medications

Design and method: Postural variations of parameters of arterial stiffness are measured in hypertensive patients on anti-hypertensive medication ($n = 41$), subjects off anti-hypertensive medication ($n = 15$) and normotensive subjects ($n = 54$). Operator index, central aortic systolic pressure (ASP), central aortic pulse pressure (APP), Augmentation Index (AI) and brachial systolic pressure (SP) and brachial diastolic pressure (DP) were measured in supine and sitting positions.

Hypertensive subjects were chosen based on their ambulatory blood pressure monitoring and had brachial blood pressure above 140/90 mmHg on at least two separate occasions in clinic. BP characteristics were obtained through Sphygmocor device between 8am to 10am initially on supine position. After three minutes, values in sitting position were obtained. Informed verbal consent was obtained from all participants and ethics approval was taken before the start of the study. Demographics such as age, race, gender, height and BMI were noted. Differences between BP characteristics in supine and sitting were compared using non-parametric paired test of Wilcoxon Signed-rank test. Differences in BP characteristics amongst the three test groups were analysed using Man Whitney U test. A $p < 0.05$ was accepted as statistically significant.

Results: A statistically significant decrease in median APP (38(35–54) vs 38(31–48), $p = 0.0058$) and a significant increase in median DP (74(69–83) vs 76(69–87), $p = 0.023$) was observed in hypertensive subjects on medications when moved from supine into sitting position (Table 1). A similar pattern was seen in normotensive subjects for median APP and DP respectively (32(28.3–36) vs 28.5(23.3–33.8), $p = 0.00158$; 61(55–67) vs 67(59–71), $p = 0.0006$) (Table 3). However, no significant changes were seen in hypertensive subjects off medications (Table 2).

Table 1: Hypertensive subjects on anti-hypertensive medication			
Number	41		
Mean age in years (SD)	45.3 (19.5)		
Mean BMI (SD)	29.2 (7.4)		
Parameters	Supine	Sitting	P-value
Median Aortic SP mm Hg (Interquartile range)	119 (112–130)	119 (113–127)	0.74896
Median Aortic PP mm Hg (Interquartile range)	38 (35–54)	38 (31–48)	0.00578
Median AP Aortic Augmentation (Interquartile range)	6 (0–17)	4 (1–14)	0.79486
Median AI Aortic Augmentation Index (Interquartile range)	14 (2–28)	9 (2–28)	0.83366
Median SP mm Hg (Interquartile range)	136 (128–144)	138 (131–144)	0.71138
Median DP mm Hg (Interquartile range)	74 (69–83)	76 (69–87)	0.0226

Table 2: Hypertensive subjects off anti-hypertensive medication			
Number	15		
Mean age in years (SD)	33.1 (12.6)		
Mean BMI (SD)	26.9 (4.9)		
Parameters	Supine	Sitting	P-value
Median Aortic SP mm Hg (Interquartile range)	118 (109–127.25)	120 (107.5–129)	0.20054
Median Aortic PP mm Hg (Interquartile range)	39.5 (32–46.5)	38 (34.75–47.25)	0.85716
Median AP Aortic Augmentation (Interquartile range)	7 (3.75–15)	9 (4.25–12)	0.71884
Median AI Aortic Augmentation Index (Interquartile range)	16.5 (0.75–31)	23 (0.75–27.5)	0.5485
Median SP mm Hg (Interquartile range)	133 (128–139.25)	136 (128.75–147)	0.19706
Median DP mm Hg (Interquartile range)	76 (69.75–83.75)	83.5 (68.75–86.25)	0.18352

Table 3: Normotensive patients			
Number	54		
Mean age in years (SD)	30 (8.18)		
Mean BMI (SD)	25.4 (6.5)		
Parameters	Supine	Sitting	P-value
Median Aortic SP mm Hg (Interquartile range)	96 (87.5-105)	96 (90-105)	0.6818
Median Aortic PP mm Hg (Interquartile range)	32(28.3-36)	28.5 (23.3-33.8)	0.00158
Median AP Aortic Augmentation (Interquartile range)	5 (1.25-8)	4 (1-7)	0.09692
Median AI Aortic Augmentation Index (Interquartile range)	15 (5.5-20)	13.5 (4.5-21.8)	0.63122
Median SP mm Hg (Interquartile range)	112 (103.3-116.8)	110 (102.3-116)	0.60306
Median DP mm Hg (Interquartile range)	61 (55-67)	67 (59-71)	0.0006

Conclusions: Parameters of arterial stiffness behave similarly with postural changes in normotensive subjects and hypertensive subjects on anti-hypertensive medications. However, there are no significant changes in hypertensive subjects off anti-hypertensive medications. Anti-hypertensive medications could possibly have helped in the normalisation of central postural changes as seen in normotensive patients.

24-HOUR CENTRAL VERSUS PERIPHERAL AMBULATORY BLOOD PRESSURE VARIABILITY AND CAROTID HYPERTROPHY IN ADOLESCENTS AND YOUNG ADULTS

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Objective: Accumulating evidence suggests that blood pressure (BP) variability may provide additional prognostic information beyond that of average BP levels. This study investigated the relationship between 24-hour central and peripheral ambulatory BP (ABP) variability and asymptomatic carotid atherosclerosis in young individuals, in whom central and peripheral systolic BP are known to be substantially different.

Design and method: Apparently healthy adolescents and young adults (age 11–26 years) referred for elevated BP and healthy volunteers were subjected to (i) 24-hour brachial and central (calibration with mean and diastolic brachial BP) ABP monitoring using a noninvasive cuff-based brachial oscillometric device (Mobil-O-Graph 24 h PWA) and (ii) carotid intima-media thickness (cIMT) measurement (high resolution B-mode ultrasonography) at the level of common carotid and bulb bilaterally. The 24 h weighted standard deviation (SD) of central and peripheral systolic ABP, as well as the respective coefficients of variation (CV) were used for assessing variability.

Results: 127 individuals were included (mean age 17.9 ± 4.7 years, 96 males, body mass index [BMI] 24.9 ± 5.0 kg/m², 34 volunteers, 40 with elevated 24-hour ABP [> 95 th percentile for adolescents or $> 130/80$ mmHg for adults]). 24-hour weighted SD and CV of central systolic ABP were higher than those of peripheral systolic ABP by 2.3 ± 3.4 mmHg and $1.2 \pm 2.1\%$ respectively (both $p < 0.01$). cIMT was more closely correlated with 24-hour weighted SD of central systolic ABP than that of peripheral ABP ($r = 0.48$ versus 0.23 , $p < 0.01$ for difference). In addition, cIMT was correlated with the CV of central systolic ABP but not with that of peripheral ABP ($r = 0.38$, $p < 0.01$ versus 0.11 , $p = \text{NS}$, respectively). In multivariate regression analyses (independent variables: age, gender, BMI, peripheral ABP and SDs of peripheral and central ABP), cIMT was determined ($R^2 = 0.30$) by male gender and 24-hour weighted SD of central ABP.

Conclusions: In adolescents and young adults 24-hour central but not peripheral ABP variability appeared to be associated with early carotid damage, independently of the average ABP levels.

DAILY VARIABILITY OF ARTERIAL STIFFNESS INDEX IN RELATION TO TARGET ORGAN DAMAGE AND SEVERITY OF ARTERIAL HYPERTENSION

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Objective: to study the daily variability of arterial stiffness, depending on the severity of damage to target organs and the stage of hypertension (AH).

Design and method: 107 patients with AH aged from 30 to 65 years were examined, mean age was 53.4 ± 0.9 years. Depending on the stage of AH, patients are divided into 3 groups. In 1 group with stage I 7 patients 38.4 ± 2.7 years; second group included 59 patients, 52.6 ± 1.1 years, and 3 group with stage III HB included 38 patients, 57.2 ± 1.2 years. With the help of the 24-hour BP monitoring system, mean values of pulse pressure (PP), SBP, DBP, arterial stiffness index (ASI) and the variability of these indicators during the day. For the evaluation of target organ damage, the glomerular filtration rate (GFR), the intima-media common carotid artery index was evaluated by the color duplex scanning method; and the left ventricular myocardial mass index was determined by echocardiography.

Results: When assessing the parameters of monitoring of BP as a function of the stage of AH, it was found that as the severity of the blood flow increases from stages I to III, SBP and PP, while the variability of SBP increased during the transition from II to III stage of AH, while the variability of PP increased during the transition from I to II and from I to III stages of AH.

In the correlation analysis, an increase in the number of significant var. ASI with BPMD parameters depending on the severity of the AH flow. Thus, in patients with stage II AH, variability ASI was associated with the PP and ASI, and in patients with stage III AH variability ASI had significant correlation with SBP, PP, ASI, variability of SBP and PP.

Conclusions: The daily variability ASI, determined by a non-invasive oscillometric method, increases with a high degree of reliability as the severity of AH increases, unlike other BPMD parameters, which changed less significantly. The daily variability ASI has a close relationship with the average daily PP and variability in PP in patients with stage II and stage III AH.

EARLY MORNING SURGE BLOOD PRESSURE AND ISOLATED SYSTOLIC HYPERTENSION - A CLINICAL IMPORTANCE IN ELDERLY

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Objective: In hypertensive patients treated with antihypertensive medication, even patients whose clinic blood pressure is well controlled, morning blood pressure prior taking medication remains high, and therefore morning hypertension is currently the blind spot in the clinical practice of hypertension. To objective is to assess now again on a wider group of patients whether an increased early morning blood pressure surge is related to more prominent target organ damage.

Design and method: 623 treated hypertensive patients randomly attended the out-patient clinic of our hypertension centre from 6 October 2009 to 1 November 2014, and supplemented from 2 November 2014 to 31 October 2016. The Isolated Systolic Hypertension patients ($n = 176$, 78 ± 11 yrs) were divided into 2 groups ($n = 176$ {with morning hypertension [sleep > 120 mmHg] $n = 140$ [nondippers] and those without $n = 36$ [dippers]}). Early Morning Blood Pressure Surge, was defined as peak Blood Pressure during morning period (4–6am, average of 5 values, mean = 124.19 mmHg, SD 21.91 mmHg) minus average BP during the sleep period (average of lowest 3 sleep values, mean = 145.49 mmHg, SD 22.14 mmHg). Early morning surge had a mean of 22.78 mmHg, SD 11.92 mmHg, ($P < 0.01$). Pulse Pressure was also used in this study as a direct predictor of hypertensive target organ damage.

Results: Nondipping pattern is related to metabolic syndrome, masked hypertension and female gender. Pulse pressure mean was higher in Nondippers by 1 mmHg. Higher cases of stroke and MI were reported in the Early Morning Surge group.

Conclusions: Early Morning Surge is a predictor of hypertensive target organ damage.

UNATTENDED VERSUS OFFICE, AMBULATORY AND CENTRAL BLOOD PRESSURE MEASUREMENTS IN HYPERTENSIVE AND DIABETIC PATIENTS

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Objective: To compare unattended blood pressure (BP) data with casual, 24-ambulatory and central measurements in hypertensive patients with and without diabetes

Design and method: In the same hypertension clinic we evaluate 130 consecutive hypertensive patients (HTs, 56% female, 59 ± 16 yrs, BMI 28 ± 5 Kg/m²) and 96 hypertensive diabetics (DMs, 62% female, 64 ± 9 yrs, BMI 29 ± 5 Kg/m²) who were referred to perform a 24-h ambulatory BP and who within the interval of

48 hours were underwent casual BP (average of 3 recordings) to an unattended 3 BP measurements separated by 2 minutes with a pre-programmed Omron M10-IT and to the evaluation of central BP from the aortic wave form (SpygmoCor).

Type of BP mm Hg	Office	Unattended	24h	Daytime	Central
SBP (HTs) (difference)	149±20* +17±12	132±17 -	<u>132±11</u> +1±8	137±13* +4±11	130±16 -2±10
SBP (DMs) (difference)	152±19* +12±9	141±16 -	135±11* -6±13	<u>140±14</u> +3±9	136±16 -6±9
DBP (HTs) (difference)	88±12* +6±8	83±11 -	79±10 -3±9	<u>82±13</u> +4±11	84±11 +1±8
DBP (DMs) (difference)	84±11* +3±5	81±10 -	72±9* -7±9	76±10* -5±12	<u>81±10</u> -1±11
HR (HTs) (difference)	79±15* +3±6	75±13 -	<u>75±11</u> +1±8	77±12 +2±9	72±11 -3±9
HR (DMs) (difference)	76±13* +4±7	71±12 -	<u>71±12</u> +0±8	74±11 +3±9	73±10 +2±6

BP (mm Hg) and HR (b/min) data compared to those measured unattended. Underlined are the measurements more close to the unattended data. * p<0.05 vs unattended data

Results: Table shows that in both HTs and DMs unattended BP was significantly lower than casual BP although less pronounced in DMs. Average of anti-hypertensive drugs were 2.7±0.6 in HTs and 3.2±0.7 in DMs. In both groups the difference persisted along the terciles of distribution of unattended systolic BP values. Unattended SBP values were similar to ambulatory BP values (to 24 h SBP in HTs and daytime BP in DMs).

Conclusions: In HTs with and without DM the unattended BP measurement significantly underestimates by SBP 12–17; DBP 3–6 mm Hg the BP measured in office, being more close to ambulatory BP values. That difference should be taken into account since targets based on these measurements are not equivalent.

SYSTOLIC BLOOD PRESSURE PHENOTYPING BASED ON BOTH AORTIC AND BRACHIAL MEASUREMENTS AND ITS RELATIONSHIP WITH INTERMEDIATE HYPERTENSION PHENOTYPES AND ARTERIAL STIFFNESS

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Objective: High aortic systolic blood pressure (aSBP) is stronger associated with target organ damage as compared to brachial systolic BP (bSBP). Office SBP phenotypes based on both brachial and aortic measurements have been recently proposed as a new classification system that could improve cardiovascular risk stratification and reveal subgroups of higher or lower risk of vascular damage. We sought to investigate: A) whether the above phenotyping could help to identify all hypertension phenotypes [True (TH), white-coat (WCH) and masked hypertensives (MH)] without applying ambulatory BP monitoring (ABPM), a gold standard method in the diagnosis of hypertension, however not always available in everyday clinical practice, and B) if the above combination of aSBP and bSBP is more sensitive to detect subgroups with increased arterial stiffness and thereby increased cardiovascular risk.

Design and method: Based on their office bSBP and aSBP values, participants were classified into four office SBP phenotypes, using both the sex-adjusted 90th percentile and the rounded threshold of 130mmHg: type I was defined as both normal bSBP and aSBP, type II high bSBP with normal aSBP, type III normal bSBP but high aSBP and type IV both high bSBP and aSBP. Moreover, all participants underwent ABPM and were further classified into normotensives (NT), WCH, MH and TH. Arterial stiffness was assessed via pulse wave velocity (PWV).

Results: The study included 391 untreated individuals (58.1% male) with a mean age of 44.0 ± 12.6 years (138 NT, 21 WCH, 52 MH and 180TH). No differences were observed in age, body mass index and smoking status. Most TH (68.9–87.8%) were type IV, while > 90% of normotensives were classified as type I. The majority of WCH (47.6–71.4%) were type IV, while < 45% of the MH had high aSBP and were type III. PWV was significantly lower between type I and all other types, as well as between III and IV type (p < 0.001).

Conclusions: Our results showed that high aSBP deteriorates arterial stiffness regardless of the levels of bSBP. Therefore although SBP phenotyping doesn't help to identify WCH or MH, its use in the everyday clinical practice can improve cardiovascular risk stratification.

INTER-ARM BLOOD PRESSURE MEASUREMENT: THE CONTROL-ARM ASSIGNMENT VARIABILITY

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Objective: It is recommended to assign the arm with the higher blood pressure (BP) reading for hypertensive patients' follow-up. This is known as the control-arm. The objective was to evaluate the reproducibility of this assignment in the same patient.

Design and method: Diagnostic concordance study that included hypertensive patients from two Primary Care Centers. Office BP was measured simultaneously on both arms in two visits separated < 10 days. Six BP readings were performed in each visit (2 sets of 3 readings). Two control-arm were assigned per visit using a two-arm BP device (Microlife-WatchBP). The intra-visit and inter-visit agreements of this assignment were evaluated.

Results: We included 313 hypertensive patients. Age 66.2 (10.0) years, 52.4% women, 30.7% with type 2 diabetes and 91.7% receiving treatment for hypertension. First visit mean right arm BP was 133 (17)/76 (9) mmHg and left arm was 134 (17)/76 (9) mmHg (p = 0.002). Intra-visit concordance in the first and second visits were kappa = 0.60 [95% CI 0.516 to 0.696] and kappa = 0.45 [95% CI 0.356 to 0.555], respectively. Therefore 21.8% of patients (in the first visit) and a 29.1% (in the second visit) with right control-arm in the first round of readings changed to left in the same visit in the second round. The inter-visit kappa was 0.25 [95% CI 0.147–0.365]. After that, 36.8% of patients with right control-arm in the first visit changed to left in the second visit. The subgroup (9.5%) with a difference in systolic BP (SBP) > = 10 mmHg between both arms in the first visit did not differ significantly from the rest of patients. When we compared the first and third tertiles patients according their mean inter-arm SBP differences (<3 mmHg vs > = 6 mmHg), a greater difference in first visit improved the intra-visit agreement but a weak inter-visit agreement persisted (kappa = 0.26, first tertile patients; kappa = 0.18 third tertile patients).

Conclusions: The control-arm assignment agreement is weak to moderate. The assignment of the control-arm should be individualized and not considered as definitive.

ASSOCIATION OF NOCTURNAL BLOOD PRESSURE PATTERNS WITH CARDIOVASCULAR RISK IN NEWLY DIAGNOSED, NEVER-TREATED ESSENTIAL HYPERTENSIVE PATIENTS

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Objective: Both non-dipping pattern and elevated nighttime systolic blood pressure (SBP) are predictors of adverse cardiovascular outcomes. Despite the fact that these are often related features, research to date has focused on the association of either with cardiovascular risk, as separate features. We assessed whether the combination of a dipping pattern with abnormal nighttime SBP confers increased cardiovascular risk for patients with essential hypertension

Design and method: Newly diagnosed, never-treated hypertensive patients free from any known health problems were eligible to participate. Only true hypertensives, based on their office blood pressure measurements and the 24-hour ambulatory blood pressure monitoring, were included. 10-year risk of general cardiovascular disease was determined from the Framingham Heart Study.

Results: In a total of 182 patients aged 46.7 ± 8.8 years, nighttime SBP positively correlated with cardiovascular risk (r = 0.190, p = 0.010). Initially, patients were classified according to their dipping status as dippers (n = 117) and non-dippers (n = 65). The groups did not differ in terms of age, gender, body mass index (BMI), office blood pressure, smoking, and lipids (p > 0.05 for all comparisons). Cardiovascular risk [9.8 (6.3–15.9) vs 10.3 (6.5–15.2) %, p = 0.981] was similar between dippers and non-dippers. Participants were then classified in three groups, based on the combination of dipping status with nighttime SBP: dippers with normal nighttime SBP (n = 45), dippers with elevated nighttime SBP (n = 72), and non-dippers (n = 65). Age, gender, BMI, smoking status, and lipids were similar between groups (p > 0.05 for all comparisons). However, dippers with normal nighttime SBP exhibited the lowest levels of office SBP (144.1 ± 13.5 vs 153.0 ± 15.2 vs 151.9 ± 14.9 mmHg, p = 0.004) and, importantly, the lowest cardiovascular risk score [8.4 (5.8–12.9) vs 11.6 (7.7–18.6) vs 10.3 (6.5–15.2) %, p = 0.050], compared to dippers with abnormal nighttime SBP and non-dippers.

Conclusions: In a population of relatively young, untreated patients with uncomplicated, early-stage essential hypertension, the combination of a dipping profile

with elevated nighttime SBP confers the same cardiovascular risk as the non-dipping pattern. Subsequently, further classification of dippers according to their nighttime SBP levels may improve cardiovascular risk stratification.

OLDER SUBJECTS WOULD MORE LIKELY USE SMARTPHONE APPLICATIONS FOR HYPERTENSION THAN MIDDLE-AGED PATIENTS. DATA FROM THE 2017 WORLD HYPERTENSION DAY IN CROATIA

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Objective: Smartphone-based applications have been considered as a great opportunity to increase adherence and improve control of hypertension. However, several important items should be elucidated before applying this armature in real life. One of first tasks is to identify target population which would most likely use these applications. This was the aim of our study which was conducted in a group of individuals (aged 18 years or older) participating in the 2017 World Hypertension Day in Croatia.

Design and method: This study was organized by the Croatian Society of Hypertension on 2017 World Hypertension day at 26 sites in 5 cities in Croatia (hospital open points, central squares and pharmacies). Along with BP measurement, a short questionnaire on hypertension awareness/salt intake/smartphone use was completed at the time of the interview by the physicians, trained nurses, pharmacist and medical students.

Results: A total of 2175 subjects, 873 (40.1%) men, 1211 (59.9%) women were examined. Smartphones were used by 36.4% examined subjects (no gender difference), average age was 53.9 (15.6), and in the group of subjects who are using smartphone men were older (56.8(15.2) vs. 52.0(15.6); $p < 0.001$). We analyzed utilization of smartphone in several age categories and significant difference was found among age groups: under 35 years, 35–55 years, 55–70 years and above 70 years (87.5%, 70.4%, 33.6% and 13.3%, respectively). In the whole group 32.1% of individuals answered positive on the question of whether they would use mobile application for blood pressure control (no gender difference). Average age of those who answered positive was 55.7 (15.2) years (m vs. 58.1(15.2) vs. 54.2(15.1), $p = 0.013$). Significant difference in positive answer was obtained among age groups: under 35 years, 35–55 years, 55–70 years and above 70 years (58.7%, 57.7%, 32.4%, 13.3%, respectively, $p < 0.001$).

Conclusions: In this large cohort we found that one-third of subjects having smartphone would use mobile applications for hypertension. Interestingly, all subjects older than 55 years and 58 % of subjects younger than 55 years who own a smartphone would like to use mobile applications for BP control.

MASKED HYPERTENSION IN MIDDLE-AGE PATIENTS AND ELDERLY WITH SPECIAL ASPECT TO PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Objective: To assess the detection frequency of masked hypertension (MAH) in middle-age patients and in elderly, clinical features and the prevalence of cardiovascular risk factors with special aspects to pts with type 2 diabetes mellitus (T2D).

Design and method: A screening study that included 314 consecutive patients aged 30–70 years with normal in-office blood pressure (BP), and T2D patients in hypertension center. Participants were performed a complex of methods to identify cardiovascular risk factors, underwent following 24-hours blood pressure monitoring to verify the MAH diagnosis, too.

Results: MAH was detected among middle-aged 30–40 years in 18.7 % men and 8.9 % women (in a age category 40–50 years in 24.2 % and 9.9 % women; 50–60 years 19.4% men and 8.1 % women, and 60–70 years in 12.3% and 12.8 %, respectively). Middle-aged and elderly men with MAH frequently identified cardiovascular disease factors compared to even aged women with MAH - family history of cardiovascular diseases, higher rate of smoking and dyslipidemia, as

well as lower physical activity prevailed. From a total 88 of patients with the diagnosis of T2D, a total of 39 pts (44.3%) presented normal in-office BP and these pts with the diagnosed of MAH were older (63.9 vs. 54.7 years; $p < 0.001$), also with earlier diagnosis of T2D, higher rate of smokers (26.4 % vs. 1.9%; $p = 0.002$), and higher levels of HBA1c (10.7 % vs. 9.9%; $p = 0.006$), creatinine (0.73 vs. 0.65 mg/dl; $p = 0.040$), and microalbuminuria (139.4 vs 27.4 mcg/mg; $p < 0.001$).

Conclusions: Masked arterial hypertension is common finding in patients especially in a age category 30–40 and 50–60 years. MAH is common in males, typically aged between 30 and 50 years, smokers with unfavorable risk profile, and it is also common in diabetics (and their renal function are worse). It is important to search for MAH actively, therefore, we should recommend home BP measurements also to those subjects whose office BP is normal.

CORRELATION BETWEEN EMOTIONAL INTELLIGENCE INDICES AND WORKPLACE AMBULATORY BLOOD PRESSURE LEVEL IN PATIENTS WITH HYPERTENSION

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Objective: The aim of our study was to determine correlation relationship between ambulatory blood pressure level in workplace and emotional intelligence (EI) in untreated patient with arterial hypertension (AH).

Design and method: We analyzed 200 ambulatory blood pressure monitoring (ABPM) data of AH patients without serious concomitant diseases. ABPM monitor (Spacelabs 90207) was applied after the washout period. We defined daytime period as 8.00–22.00, nighttime – 0.00–6.00, and work period as 11.00–19.00 (BPw). After ABPM session patients completed the PS and EI questionnaire: “Minnesota Multiphase Personality Inventory” (MMPI) and “EmIn Questionnaire” (only for 70 patients), by Lyusin D, 2006. We analyzed following EmIn scale scores: I - emotion self-awareness; II - management of one’s own emotions; III - control of emotional expression; IV - understanding others’ emotions; V - management of others’ emotions. We used Spearman Partial Coefficient for correlation analysis adjusted for age, sex and duration of AH.

Results: The mean workplace systolic BP level (SBP) was 141.5 ± 15.5 and diastolic (DBP) - 89.4 ± 11.2 mm Hg ($M \pm SD$). We have found the following correlations ($p > 0.05$): V scale scores (management of others’ emotions) and II (management of one’s own emotions) of EmIn Questionnaire positively correlated with workplace SBP level ($r = 0.36$ and 0.31 respectively), and V scale scores related with DBP workplace level ($r = 0.38$). MMPI scale scores (psychological questionnaire) did not correlate with SBP and DBP workplace levels. Thus, V and II scale scores of “EmIn Questionnaire” (management of others’ and one’s own emotions) was related with workplace BP level.

Conclusions: Management of others’ and one’s own emotions (V and II scale scores of “EmIn Questionnaire”) was related with workplace SBP and DBP levels.

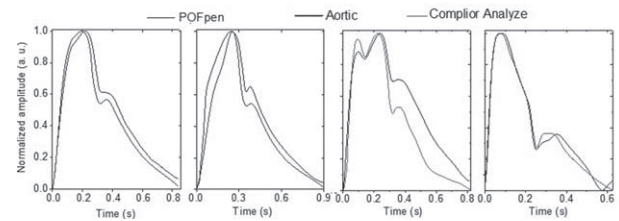
CLINICAL EVALUATION OF PLASTIC OPTICAL FIBRE BASED PROBE IN THE DETERMINATION OF CENTRAL SYSTOLIC PRESSURE AND AUGMENTATION INDEX

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The present study aimed to clinically evaluate the accuracy of central systolic pressure (cSP) and augmentation index (AIx) acquisition with a new non-invasive plastic optical fibre probe, using as references invasive and non-invasive pressure acquisition techniques. For the invasive reference comparison, pulse waves were acquired simultaneously in the ascending aorta, during catheterization, and in the right common carotid. For the non-invasive study, the pulses were successively acquired with the optical fibre device and the Complior Analyse[®] in the right carotid artery. For all the subjects respecting the inclusion criteria ($n = 105$), the assessed pulse waveforms with the optical fibre sensor and the references were superimposed to analyse the deviation and point-by-point correlation between them. AIx and cSP were compared using intraclass correlation and Bland-Altman analysis, with a confidence interval of 95%. For the catheterization study, the ac-

quired waves presented a mean deviation of $11 \pm 3\%$ and a mean intraclass correlation of 0.97 ± 0.02 . For the AIx ($n = 21$) and cSP ($n = 29$), correlations of 0.79 ($p < 0.001$) and 0.94 ($p < 0.001$) were, respectively, observed. In the non-invasive comparison, the assessed mean deviation between the waves' morphologies was $13 \pm 5\%$, with correlation coefficients of 0.91 ($p < 0.001$) for AIx ($n = 53$) and 0.98 ($p < 0.001$) for cSP ($n = 71$). The results showed that the optical fibre probe results highly correlated with the reference techniques in pulse waveform, cSP and AIx assessment.

Variables	Studies and quantity	
	Invasive	Non-invasive
Male gender, n (%)	20 (69)	42 (55)
Age, years \pm SD	69 ± 11	53 ± 16
Body Mass Index, $\text{kg/m}^2 \pm$ SD	26 ± 4	28 ± 5
Dyslipidemia, n (%)	20 (69)	30 (40)
Diabetes, n (%)	7 (24)	12 (16)
Reported Hypertension, n (%)	17 (59)	71 (93)
Smoking habits:		
Never smoked, n (%)	22 (76)	50 (66)
Ex-smoker (>1year), n (%)	4 (14)	15 (20)
Current smoker, n (%)	3 (10)	11 (14)
Acute Myocardial Infarction, n (%)	8 (28)	5 (7)
Cerebrovascular accident, n (%)	6 (21)	9 (12)



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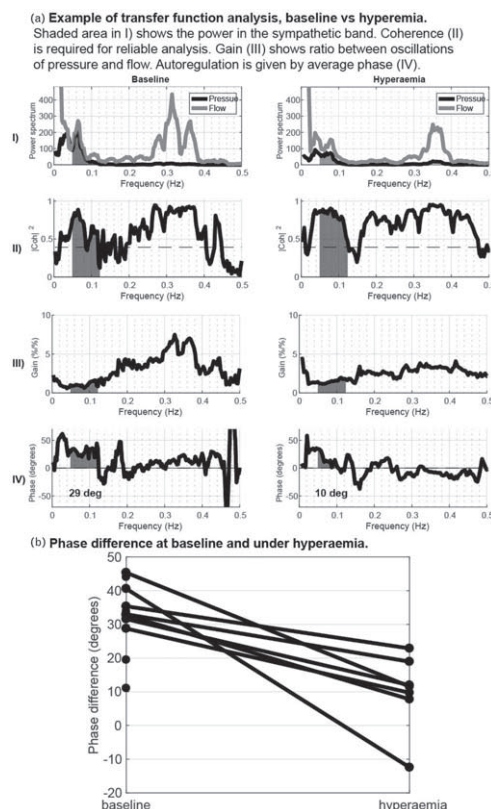
KIDNEY AND RAAS, ENDOCRINE HYPERTENSION

FEASIBILITY OF DETERMINING DYNAMIC RENAL AUTOREGULATION IN HUMANS USING COMBINED INTRARENAL PRESSURE AND FLOW MEASUREMENTS

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Objective: Renal autoregulation is important for maintenance of renal perfusion, glomerular filtration and may be of prognostic value in hypertensive-induced kidney damage. In animal models, transfer function analysis of spontaneous blood pressure fluctuations has been used to assess the (patho)physiology of renal autoregulation. Our aim was to determine the feasibility of measuring renal autoregulation in humans using combined intrarenal pressure and flow measurements.

Design and method: We performed intrarenal pressure and flow velocity measurements in clinically stable patients with an indication for renal or coronary angiography, aged 18–75 and with eGFR > 45 ml/min/1.73m². Measurements were conducted at baseline and under hyperaemia following intrarenal injection of dopamine 30 mg/kg. Transfer function analysis was performed on the beat-to-beat pressure and flow data. Autoregulation was assessed by the time difference between the peaks in the pressure and flow signal, and was quantified as the average phase difference over the manually selected coherent peak around the sympathetic frequency (period 6 to 14 seconds).



Results: We included 21 patients, of which assessment of autoregulation was successful in 11 patients. In the remaining group it was not possible to find a coherent signal, mostly due to lack of blood pressure variations in the sympathetic frequency domain. During baseline, the mean phase difference was 32 degrees (range 11 to 45 degrees), where flow leads pressure. Under hyperaemia, in 7 patients the phase difference could be determined, which showed a reduction to a phase difference of 10 degrees (range -12 to 19 degrees, $p = 0.003$ compared to baseline). An example of the spectrum before and after infusion of dopamine is shown in Figure A. The individual phase differences at baseline and under hyperaemia are shown in Figure B.

Conclusions: Measurement of renal autoregulation in humans is feasible provided that patients have sufficient spontaneous blood pressure variations. The disappearance of renal autoregulatory responses during dopamine infusion may provide useful information regarding the degree of induced hyperaemia.

PROINFLAMMATORY ROLE OF ANGIOTENSIN II IN THE AORTA OF NORMOTENSIVE MICE

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Objective: Angiotensin II exerts important physiological functions on cardiovascular system homeostasis and may mediate actions leading to inflammatory responses. This study aimed to verify the ability of angiotensin II to induce an inflammatory response in the aorta and if there is a relation with variations of arterial pressure, even if discrete.

Design and method: For this, C57Bl/6 mice treated with saline solution (0.9%, control group) or Angiotensin II (30ng, Ang II group) were used. The animals were cannulated in the carotid artery and jugular vein, and 48 hours later blood pressure and heart rate levels were recorded at baseline and after administration of saline or Ang II at 30 min, 1, 2, 6, 12 and 24 h. The evaluation of the baroreflex sensitivity was performed after administration of phenylephrine and sodium nitroprusside. The evaluation of the inflammatory reaction in the aorta was performed by immunohistochemistry, using TGF- β , iNOS as inflammatory markers and CD45 as a marker of macrophages. The evaluation of α -actin was performed in order to demonstrate a possible change in CMLV phenotype.

Results: At the end of the treatments, we verified that there was no change in blood pressure or heart rate. In addition, there was a reduction of the tachycardic response in animals receiving Ang II. A biphasic response was observed both for TGF- β expression and for the presence of CD45 positive cells, with an acute increase (between 30 and 60 minutes) and another more chronic increase, between 24 and 48 hours. Positive staining for iNOS increased in longer periods, from 24 to 72 hours. Immunohistochemistry for α -actin showed no alterations, suggesting that the applied dose of angiotensin II does not alter the aortic CMLV phenotype.

Conclusions: The results suggest that angiotensin II, even at doses that do not alter blood pressure, is capable of inducing the expression of inflammatory markers and the migration of inflammatory cells into the aorta of normotensive mice. Thus, angiotensin II may be considered to be capable of increasing the propensity to develop a cardiovascular injury, even in normotensive individuals.

CONFIRMATORY AND SUBTYPE TESTING IN PATIENTS WITH SUSPECTED PRIMARY ALDOSTERONISM

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Objective: Primary aldosteronism is one of the most common causes of secondary hypertension. Despite this, little information is available on routine clinical practice results of confirmatory and subtype testing in patients with suspected primary aldosteronism.

Design and method: In patients with suspected primary aldosteronism based on a positive screening test (serum aldosterone/renin ratio > 30 and aldosterone > 100 ng/l) we performed a confirmatory test with an infusion of 2 l of saline within 4 hours. In case of insufficient suppression of aldosterone secretion, the stress test was evaluated as positive and the patient was referred to adrenal vein

sampling to determine the laterality of aldosterone secretion. The work was supported by a grant from the Palacký University in Olomouc IGA_LF_2017_029.

Results: Confirmatory testing with saline infusion was performed in 312 patients, 190 of whom were men (61%). Mean age of patients in the group was 54 ± 14 years, mean office blood pressure was $145/87$ mmHg and they were using on average 4.0 ± 1.8 different antihypertensive drugs. In 277 (89%) of the patients, the confirmatory testing was performed after withdrawal of interfering medications. 82 patients (26%) reported adverse events after the withdrawal of the interfering medications prior testing, most commonly leg edema, fluctuations in blood pressure, weakness, fatigue or headache. Primary aldosteronism was confirmed by the confirmatory test in 110 patients (35%). These patients were referred to adrenal vein sampling, where 39 patients (35%) had unilateral aldosterone secretion (12.3% of all patients with a positive screening test) and 45 patients (41%) had bilateral form. In 26 patients (24%) the subtype of primary aldosteronism was not identified, mostly because of the refusal of invasive examinations or subsequent surgery by the patient.

Conclusions: Primary aldosteronism was in routine clinical practice confirmed by saline infusion test in 35% patients with a positive screening test. Every eighth patient (12.3%) with a positive screening test had unilateral disease amenable to surgical treatment.

EFFECT OF ALLOPURINOL ON ENDOTHELIAL FUNCTION, BLOOD PRESSURE, ARTERIAL STIFFNESS AND RENAL DAMAGE IN PATIENTS WITH CHRONIC KIDNEY DISEASE AND ASYMPTOMATIC HYPERURICEMIA

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Objective: Asymptomatic hyperuricemia (AH) is common in patients with chronic kidney disease (CKD).

However, the effects of AH treatment on endothelial function, peripheral and central arterial pressure, and arterial stiffness are controversial and not well defined in patients with CKD. Our aim was to study the effect of xanthine oxidase inhibition with allopurinol in patients with CKD and AH on endothelial function (EF), blood pressure (BP), arterial stiffness (AS) and renal function (RF).

Design and method: Randomized clinical trial, double-blind, placebo-controlled, crossover design with 4-week treatment period with either allopurinol 100 mg orally daily or placebo, 4-week wash-out period and 4-week period of treatment with placebo or allopurinol. Studies performed at first and last visit of each treatment period: 1) EF: endothelium-dependent vasodilation after ischemia-reperfusion using Periflux System 5000 device; 2) BP: 24-hour averages of peripheral and central systolic and diastolic BP and 3) AS: pulse wave velocity (PWV), reflection coefficient (RC) and normalized augmentation index (AI@75lpm) using MOBIL-O-GRAPH PWA device. 4) RF: glomerular filtration rate estimated (eGFR) by MDRD-4 and albumin/creatinine ratio in urine.

Results: 23 patients finished the study (65.2% men, age 57.52 ± 11.75 years, baseline MDRD-4 42.1 ± 11.2 ml/min/1.73 m², urinary albumin/creatinine ratio 0.29 ± 0.39 mg/mg and serum uric acid levels of 8.3 ± 1 mg/dl). There were no differences in baseline uric acid levels at the start of each study period. Treatment with allopurinol significantly reduced serum uric acid levels to 7 ± 1.1 mg/dl ($p < 0.05$). Treatment with placebo did not reduce uric acid levels (baseline 8.7 ± 1.5 mg/dl, final 8.5 ± 1.3 mg/dl, NS). No differences were observed in EF parameters. Allopurinol did not modify peripheral BP, central BP, PWV or AI@75lpm. Finally, no effect of allopurinol on eGFR or albumin/creatinine ratio was observed.

Conclusions: According to our results, 100 mg allopurinol daily for 4 weeks did not induce significant changes in EF, BP, AS and RF in patients with CKD and AH.

MICROALBUMINURIA AND CARDIOVASCULAR DISEASE IN HYPERTENSIVE PATIENTS INCLUDED IN THE IBERICAN STUDY

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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 disease in the hypertensive patients of the IBERICAN Study

Design and method: The IBERICAN Study is a longitudinal, observational, and 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 ($n = 5.944$). In this abstract, we analyzed patients with microalbuminuria and we analyzed their association with the presence of cardiovascular disease. Microalbuminuria was defined as an albumin/creatinine ratio between 30 and 299 mg/g, according to the Guide KDIGO 2012. The established cardiovascular disease were: ischemic heart disease, stroke, heart failure, peripheral arterial disease. We also analyze the presence of atrial fibrillation.

Results: 2.873 hypertensive patients (prevalence: 48.3%), the mean age in the sample was 64.7 ± 12 years, 49.7% women, antiquity of hypertension 9.7 ± 6 years, BMI 31.1 ± 8.9 kg/m². Prevalence of microalbuminuria in hypertensive patients: 11.7%. Prevalence of cardiovascular disease was: 23.8%; ischemic heart disease 10.4%, stroke 5.5%, peripheral arterial disease 7%, and heart failure 5.6%. The prevalence of microalbuminuria in relation to the presence of each of the cardiovascular disease, regarding its absence was: ischemic heart disease 15.6% vs. 9.6%, $p < 0.01$; stroke 8.8% vs 5.1%, $p < 0.05$; heart failure 7.8% vs. 5.2%, $p = \text{NS}$; peripheral arterial disease 13.2% vs. 6.1%, $p < 0.001$; atrial fibrillation 13.6% vs. 7.8%, $p < 0.001$.

Conclusions: The population of hypertensive patients of the IBERICAN study has a prevalence of microalbuminuria of 11%. This prevalence is higher, statistically significantly, in the presence of cardiovascular disease: ischemic heart disease, stroke, heart failure, peripheral arterial disease and atrial fibrillation.

RELATIONSHIP BETWEEN SALT INTAKE AND SLEEP DISORDERED BREATHING IN DIALYSIS PATIENTS

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Objective: Salt restriction is widely recommended in the management of hypertension, and is also very important for the control of blood pressure (BP) and body fluid volume in dialysis patients. The National Kidney Foundation Kidney Dialysis Outcome Quality Initiative and European Best Practice Clinical Guidelines recommend less than 6 g/day of salt intake for dialysis patients, however, we previously reported that the achievement rate of salt reduction was low in dialysis patients. It is also reported that the prevalence of sleep apnea syndrome is high in patients with end stage renal failure. In this study, we examined the relationship between salt intake and sleep disordered breathing in patients on maintenance hemodialysis.

Design and method: Subjects comprised 128 patients on hemodialysis (94 males, 34 females, mean age 63 ± 11 years old). Salt intake was estimated by body composition analysis using InBody S10 (InBody Japan). 3% oxygen desaturation index (ODI) during sleep was measured using Pulsewatch PMP-200 GplusX (Pacific Medico). Sleep disordered breathing was defined as 3% ODI 12 and more. We also assessed BP, antihypertensive medication and other confounding factors including lifestyles.

Results: The estimated salt intake was 8.0 ± 2.6 g/day. BP before and after dialysis were $140 \pm 18/78 \pm 11$ and $127 \pm 13/72 \pm 8$ mmHg, respectively. The geometric average 3% ODI was 7.1, and sleep disordered breathing was detected in 29.7% of all subjects. Patients with 7.5 g/day or more in salt intake were younger and more frequently male, and had higher dry weight (DW) and BP before dialysis compared to those who had salt intake less than 7.5 g/day. Patients with 7.5 g/day or more in salt intake had significantly higher geometric average 3% ODI, however, this relationship became weaker after adjusting with DW. Patients with 7.5 g/day or more in salt intake showed significantly higher prevalence of sleep disordered breathing. The same relationship was obtained for the prevalence of sleep disordered breathing.

Conclusions: Salt intake in patients on maintenance hemodialysis was high, and it was correlated with sleep disordered breathing. It seems that individual salt restriction guidance for dialysis patients may lower DW and improve sleep disordered breathing.

POOR ADHERENCE TO BLOOD PRESSURE MEASUREMENT RECOMMENDATIONS IN EUROPEAN DIALYSIS CENTERS

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Objective: Background: International Hypertension and Nephrology societies have issued recommendations on standardized blood pressure (BP) measurements in dialysis (Pantelis et al., J. Hypertens 2017;35:657–676). Whether these recommendations are followed in hemodialysis (HD) or peritoneal dialysis (PD) centers has not been investigated so far. The objective of this study was to assess adherence to BP measurement recommendations across dialysis centers.

Design and method: An online questionnaire was sent to 600 members of two working groups from the ERA-EDTA (European Renal and Cardiovascular Medicine) and the ESH (Hypertension and the Kidney). Besides basic demographic characteristics, the questionnaire included 16 items recommended for standardized BP measurement. The total score was calculated for each center. A t-test was used to detect differences in scores among regional or teaching centers and hemodialysis or peritoneal dialysis centers.

Results: Ninety-five centers representing 92 (67%) hemodialysis center and 46 (33%) peritoneal dialysis centers, mostly from Europe (75%), responded to the questionnaire. Thirty-seven % were regional centers and 63% were teaching centers. The percentage of adherence to at least 4, 8, 12 and 16 recommendations was respectively 99 %, 93%, 51% and 4%. The mean score was 11.5 ± 2.7 out of 16 recommendations. Measurement of arm circumference and assessment of patients' condition (nervosity, tobacco, caffeine intake) before BP measurement were the two least followed recommendations (20% and 39% of centers, respectively). Notably also, in 45% of centers, assessment of BP was based on a single BP measurement. The score of adherence to BP measurement recommendations did not differ between regional (11.6 ± 2.7) and teaching centers (11.5 ± 2.6 , $P = 0.91$). In contrast, PD centers had a higher score than HD centers (12.5 ± 2.5 vs 11.1 ± 2.7 , $P = 0.004$). In addition, the level of adherence was higher in physicians who reported following KDIGO guidelines (11.7 ± 2.7 vs 10.3 ± 2.4 , $P = 0.032$).

Conclusions: Some standard recommendations for BP measurement are poorly followed in dialysis centers. Only a minority of centers are fully adherent to BP measurement recommendations. These results may partly explain the poor association between BP in dialysis centers and outcome.

HAEMATOLOGICAL PROFILE OF CHRONIC KIDNEY DISEASE IN A MIXED-ANCESTRY SOUTH AFRICAN POPULATION

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Objective: Chronic kidney disease (CKD) encompasses a range of physiological processes altered by the progressive decline in glomerular filtration rate (GFR). Haematological factors, particularly red blood cell (RBC) indices, are most commonly affected, giving rise to anaemia. This study aimed to characterise the haematological profile of screen-detected CKD patients in a community-based sample, and to correlate the blood count measures with the commonly advocated kidney function estimators of CKD in urban South Africans.

Design and method: Mixed-ancestry adults ($n = 1564$) were examined between February and November 2015. Kidney function was assessed using serum creatinine-based estimators of GFR (eGFR), including the Modification of Diet in Renal Disease (MDRD) and Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equations; omitting the ethnicity correction factor. CKD was defined as an eGFR < 60 ml/min/1.73m², anaemia as a haemoglobin level < 13.5 g/dL (men) and < 12 g/dL (women) and hypertension as a systolic blood pressure (BP) > 140 mmHg and/or diastolic BP > 90 mmHg.

Results: Based on the MDRD and CKD-EPI equations, the crude prevalence of CKD was 6% and 3%, with 53.2% and 63.3% of these individuals being hypertensive. Irrespective of the eGFR equation used, RBC indices were consistently

lower in CKD patients compared to those with normal kidney function [RBC count (MDRD): median (25th–75th percentiles): $4.3(3.9–4.7)$ vs. $4.7(4.4–5.0) \times 10^6$ cells/ml, $p < 0.0001$; (CKD-EPI): $4.2(3.8–4.7)$ vs. $4.7(4.4–5.0) \times 10^6$ cells/ml, $p < 0.0001$, haematocrit (MDRD): median (25th–75th percentiles): $38(35–41)$ vs. $41(39–44)\%$, $p < 0.0001$; (CKD-EPI): $37(34–41)$ vs. $41(39–44)\%$, $p < 0.0001$ and haemoglobin (MDRD): median (25th–75th percentiles): $12.2(11.2–13.3)$ vs. $13.5(12.7–14.5)$ g/dL, $p < 0.0001$; (CKD-EPI): $11.9(11.1–13.2)$ vs. $13.5(12.6–14.4)$ g/dL, $p < 0.0001$]. Of the CKD patients, 45.5% (MDRD) and 57.8% (CKD-EPI) were anaemic, with the prevalence increasing with increasing severity of CKD, from 17.2% (stage 1) to 82.4% (stages 4–5). Furthermore, CKD-EPI-eGFR, but not MDRD-eGFR, was positively associated with RBC indices and anaemia.

Conclusions: Though it remains unclear whether the advocated kidney function estimators provide accurate estimates of CKD burden in Africans, the correlation of their estimates with deteriorating profile of RBC (an indicator of the severity of kidney function impairment), suggests that advocated GFR estimates, to some extent measure the true kidney function in African populations.

CLINICAL CHARACTERISTICS AND COMORBIDITIES OF VERY ELDERLY PATIENTS WITH HYPERTENSION AND CHRONIC KIDNEY DISEASE

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Objective: The aim of the study was to assess the characteristics and cardiovascular risk in hospitalised very elderly patients with hypertension and chronic kidney disease.

Design and method: The retrospective study included 52 patients with high blood pressure admitted to Clinical Emergency Hospital between January 2014 - May 2017.

Results: The average age was 95 years, with a minimum age of 90 years and a maximum age of 98 years. Gender distribution: 69.23% women and 30.76% men. The following distribution in patients with high blood pressure was observed: grade I 9.6%, grade II 63.4%, grade III 25%. One patient had secondary hypertension associated with renal parenchymal disease. Comorbidities: chronic kidney disease evaluated by MDRD equation was encountered in 98% of cases, with the following staging: G2 28.8%, G3a 32.6%, G3b 24%, G4 9.6% and G5 28.8%. The average level of creatinine at admission was 1.46 and at discharge was 1.34. Worsening of renal function was noticed in 9.6% of patients.

At 63.46% of patients, nonspecific inflammatory syndrome was identified, with a mean erythrocyte sedimentation rate of 55 and a mean fibrinogen level of 639. Urinary tract infection has been proven in 26.92% of cases. Identified germs were E. Coli in 71.42% cases of infections, Enterococcus, Klebsiella, Proteus and Pseudomonas in 7.14% of each cases.

At admission 25% of patients had acidosis and 5.7% alkalosis, hyponatremia was found in 15.3% of cases, hypernatremia in 3.8%, hypokalemia in 32.6% and hyperkalemia in 3.8%. Hyperuricemia was found in 23% of cases. 69% of patients had systemic atherosclerosis and 21% have had a stroke.

During hospitalization, 46.15% of patients received treatment with beta blockers, calcium channel blockers were used in 30.76% of cases, diuretics in 63.46%, angiotensin converting enzyme inhibitors in 26.92% and antibiotics in 69.23% of cases.

Conclusions: Hypertension is a significant risk factor for kidney disease in the elderly population and special attention should be paid on medication and the doses of drugs that are used to treat these patients.

ACUTE KIDNEY INJURY WITH KARYOMEGALIC INTERSTITIAL NEPHRITIS AFTER NIVOLUMAB TREATMENT - TWO CASE REPORTS

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Objective: Background: Acute kidney injury (AKI) caused by immune checkpoint inhibitors are poorly described. Herein, we present 2 cases of AKI in patients under nivolumab treatment. Each case displayed acute interstitial nephritis (AIN) with karyomegalic interstitial nephritis (KIN), which was successfully treated with the discontinuation of nivolumab or the administration of corticosteroid.

Design and method: Case 1: A 76-year old male with pancreatic cancer was admitted for AKI (serum creatinine (SCr) level from 0.84 to 3.08 mg/dL) after a series of nivolumab treatment. Five months after the initiation of nivolumab, he suffered from edema in his lower extremities along with the elevation of blood pressure (BP) to 170/97 mmHg. Kidney biopsy showed AIN where tubular epithelial cells with

variably sized nuclei that were massively enlarged, irregularly shaped, and abnormally hyperchromatic, which findings were indicative of KIN. Approximately one year after quitting nivolumab treatment, his renal function improved to SCr level of 1.42 mg/dL.

Results: Case 2: A 76-year old female with non-small cell lung cancer started treatment by nivolumab. Two months later, she exhibited AKI (SCr level from 0.81 to 1.54 mg/dL). Kidney biopsy revealed tubular injury with interstitial infiltration of inflammatory cells. Of note, tubular epithelial cells were focally enlarged with hyperchromatic nuclei, which finding was consistent with that of KIN. Since most of the enlarged tubular epithelial cells were positive for Ki-67, karyomegalic changes of tubular epithelia are suggested to be associated with the cell cycle abnormalities of tubular cells. The patient was administered high dose of corticosteroid, and SCr level returned to that of her baseline.

Conclusions: Conclusion: This is the first report of characteristic histological findings of KIN in nivolumab-associated AIN. The association of nivolumab-induced AIN with cell cycle derangement in our patients suggests that the activation of effector T cell by nivolumab may affect the proliferation of tubular epithelial cells, thereby leading to karyomegalic changes. In addition to the discontinuation of nivolumab, the administration of corticosteroid successfully improved renal function.

DEEP VENOUS THROMBOSIS AND KIDNEY DISEASE

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Objective: Deep venous thrombosis (DVT) affects 2 million people in the USA. Usually occurs in the leg, mainly affecting the large veins in the calf and thigh on one side. Half of patients experiencing DVT do not show symptoms. DVT is potentially life threatening conditions that come under the category of venous thromboembolism (VTE). Kidney disease is one of independent risk factors for VTE/DVT. Very little has been done to study the relationship between DVT, especially distal DVT (DDVT) and kidney disease.

Design and method: Patients (p) with DDVT were consecutively enrolled in this study from January to June 2016.

Baseline kidney function was assessed, and p were followed during 3 months. Changes in eGFR for up to 3 months were evaluated. eGFR was calculated using the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) formula $< 60 \text{ ml/min/1.73m}^2$

The study was approved by local ethics committees and provided written informed consent to participate.

Results: Of 3209 p in Emergency Department we identified 65 (2% of all) with symptomatic (pain + edema) limb DVT (upper limb 3p, proximal lower limb 22p + 40 p with DDVT). The mean age was 61.5 years (27–92 years), 70% and 32% had hypertension and diabetes mellitus. 38% atrial fibrillation and no one known malignant disease; body mass index was $34.4 \pm 5.1 \text{ kg/m}^2$, eGFR $55 \pm 21 \text{ ml/min/1.73m}^2$. At baseline 25% had chronic kidney disease: 10% moderate chronic kidney disease (stage 3 CKD) (CrCl 30–59 mL/min), 15% had mild CKD (CrCl 60–89 mL/min). After ultrasound doppler imaging and confirmation of DDVT with positive D-dimer test result, we put p on DOACs. The 3-month administration of DOACs for DVT caused a nonsignificant decrease of eGFR (declined from $55 \pm 21 \text{ ml/min-1.73m}^2$ to $54 \pm 16 \text{ ml/min-1.73m}^2$ ($p = 0.01$)). Control ultrasound imaging after 3 months was associated with recanalisation of DVT, without proximal extension and no thromboembolic events. In 20% of p with DDVT we found new malignant disease (lung and colon).

Conclusions: Kidney dysfunction is common among individuals with DVT. The results of our study suggest that the treatment of DDVT of the limbs with DOACs in p with kidney dysfunction is safe therapy.

NEBIVOLOL AND IRBESARTAN REDUCE POST-HEMODIALYSIS AND AMBULATORY BP IN PATIENTS WITH INTRADIALYTIC HYPERTENSION: A RANDOMIZED CROSS-OVER STUDY

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Objective: Blood pressure (BP) increase during or immediately after hemodialysis is an abnormal hemodynamic response to ultrafiltration and occurs in 5–20% of patients. Intradialytic hypertension is associated with adverse clinical outcomes and is often poorly diagnosed and controlled. This study aimed to evaluate the effects of nebivolol and irbesartan in 24-hour ambulatory BP in hemodialysis patients with intradialytic hypertension.

Design and method: This is a randomized cross-over study in 38 hemodialysis patients (age: 60.4 ± 11.1 years, male: 65.8%) with intradialytic hypertension, defined as mean intradialytic rise $\geq 10 \text{ mmHg}$ in systolic BP (SBP) over 6 consecutive hemodialysis sessions. After baseline evaluation, patients were randomly assigned to nebivolol 5 mg and subsequently irbesartan 150 mg, or vice versa. Half of the patients received a single drug-dose 1 hour before hemodialysis ($n = 19$) or for a whole week, before evaluation ($n = 19$). A two-week wash-out period took place before the initiation of the second drug. All subjects underwent 24-hour ambulatory BP monitoring starting before a midweek session.

Results: In total, 20 (52.6%) patients received nebivolol first and 18 (47.4%) received irbesartan first. Patients receiving a single dose of either nebivolol or irbesartan had lower post-dialysis SBP and diastolic BP (DBP) [Baseline: $161.6 \pm 16.3/95.4 \pm 12.3$; Nebivolol: 146.1 ± 20.4 ($p = 0.003$), 84.5 ± 11.8 ($p < 0.001$); Irbesartan: 144.7 ± 29.9 ($p = 0.003$), 86.8 ± 18.0 ($p = 0.047$) mmHg; respectively], non-significantly lower 24-hour SBP and lower DBP [Baseline: $147.8 \pm 16.0/87.7 \pm 11.9$; Nebivolol: 144.0 ± 19.5 ($p = 0.070$), 83.3 ± 11.7 ($p = 0.015$); Irbesartan: 143.1 ± 21.7 ($p = 0.171$), 84.7 ± 12.8 ($p = 0.095$) mmHg]. Patients on weekly administration of either nebivolol or irbesartan had significantly lower post-dialysis SBP and DBP (Baseline: $167.1 \pm 13.6/99.8 \pm 10.6$ Nebivolol: 145.2 ± 16.6 ($p < 0.001$), 91.0 ± 11.8 ($p = 0.003$); Irbesartan: 147.1 ± 23.8 ($p = 0.002$), 87.6 ± 12.5 ($p = 0.001$) mmHg), significantly lower 24-hour SBP and DBP (Baseline: $148.2 \pm 12.5/91.7 \pm 9.7$ Nebivolol: 139.2 ± 10.4 ($p < 0.001$), 85.2 ± 7.7 ($p = 0.001$); Irbesartan: 142.9 ± 15.7 ($p = 0.188$), 85.5 ± 9.9 ($p = 0.015$) mmHg; accordingly) and significantly lower daytime and nighttime ambulatory SBP and DBP. No significant differences in BP reduction between nebivolol and irbesartan were observed.

Conclusions: Both nebivolol and irbesartan reduce post-dialysis and 24-hour BP in patients with intradialytic hypertension. Weekly administration had greater effect and nebivolol seemed numerically slightly more potent than irbesartan; permanent administration of these agents may be more effective than pre-dialysis dosing.

TRANSIENT SALT LOADING CAUSES PERSISTENT HYPERTENSION THROUGH EPIGENETIC MODIFICATION OF THE RENAL ARTERIOLES

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Objective: We have previously reported that the medial hypertrophy of the renal arterioles induced by transient salt loading causes sustained elevation of blood pressure in spontaneous hypertensive rat (SHR) even after the salt loading had completed [Oguchi et al. Hypertension 2014]. Epigenetic modification of gene expression has attracted attention as a possible mechanism for sustained biological effects and onset of hypertension. The present study investigated the significance of histone acetylation in each segment of the kidney in the induction of hypertension after transient salt loading.

Design and method: C57Bl6 mice were implanted deoxycorticosterone acetate (DOCA) pellets and given drinking water containing 1% NaCl for 2 weeks to induce hypertension. We evaluated blood pressure, histological findings and gene expressions of the kidney during and after the transient salt loading. The degree of histone acetylation was assessed by immunostaining of acetylated H3 and H4 in each segment of the kidney including renal arterioles, segmental arteries, glomeruli and tubules. Gene expressions were examined in each segment of the kidney collected by laser capture microdissection (LCM).

Results: Transient salt loading caused elevation in blood pressure during and even after stopping salt loading associated with persistent medial hypertrophy of renal arterioles. In the media of renal arterioles, histone acetylation was enhanced during salt loading, and the enhanced histone acetylation persisted even after stopping salt loading. The gene expression of MMPs in the renal arterioles collected by LCM increased during salt loading, and did not decline even after stopping salt loading. On the other hand, in the segmental arteries, neither hyper-acetylation nor hyper-expression of MMPs was observed. Also, in the tubules, enhanced histone acetylation by the salt loading returned to the initial level after the completion.

Conclusions: The persistent medial hypertrophy along with focally sustained histone hyper-acetylation and elevation in MMPs expressions in the renal arterioles

were suggested to cause sustained elevation of blood pressure after transient salt loading. The focal epigenetic modification in the kidney due to environmental factors would participate in the onset of persistent hypertension.

IN-HOSPITAL BLOOD PRESSURE VARIABILITY AS A PREDICTOR OF RENAL IMPAIRMENT IN PATIENTS WITH MYOCARDIAL INFARCTION: A 6-MONTH FOLLOW-UP STUDY

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Objective: Recent data have associated blood pressure variability (BPV) with subclinical renal damage, acute renal injury and progression of chronic kidney disease but not in the setting of an acute coronary event. The aim of this study is to determine the impact of in-hospital short-term BPV on future renal impairment in patients suffering an acute myocardial infarction (AMI).

Design and method: A total population of 57 AMI patients [74.5% male; mean age: 67.56 years; 75.4% hypertensives; 28.1% chronic kidney disease (GFR < 60 ml/min on admission)] underwent 24hr ambulatory BP measurement during their hospitalization. At 6 months a follow-up was scheduled for each patient in order to estimate their present renal function. Renal impairment was defined as a decline in GFR value between a discharge and a 6-month visit, which were calculated by using the Cockcroft-Gault Equation. In-hospital BPV was derived by assessment of standard deviation (SD), weighted-SD (SDw), average real variability (ARV) and coefficient of variability (CV). The study population was divided into a STEMI group (n = 24) and a non-STEMI (n = 33) one.

Results: After analysis of BPV indices, 6-month renal impairment was significantly associated with increased SBP CV [odds ratio, 0.467; CI, 0.218–1.003 (P = 0.051)]. This observation was met only in the STEMI group. A multinomial logistic regression analysis was conducted for this group of patients, in which SBP CV demonstrated a significant prognostic role of renal impairment [odds ratio, 0.623; CI, 0.394–0.987 (P = 0.044)], independently of age, gender and 24hr SBP.

Conclusions: In the setting of STEMI, assessment of BPV using SBP CV has a prognostic role in the future development of renal dysfunction. This observation, if confirmed by further studies, could influence the therapeutic approach of ACS in terms of BP management.

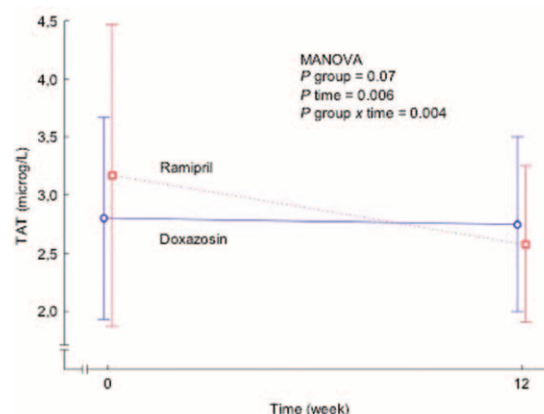
THE EFFECTS OF ANGIOTENSIN CONVERTING ENZYME INHIBITION AND ALPHA 1-ADRENERGIC RECEPTOR BLOCKADE ON HAEMOSTASIS AND INFLAMMATION IN MILD-TO-MODERATE HYPERTENSION

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Objective: Hypertension is associated with oxidative stress and low-grade chronic inflammation, contributing to phenotypical alterations of the endothelium to a proconstrictive, proinflammatory and prothrombotic phenotype. Antihypertensive therapy improves vascular structure and function, and reduces cardiovascular complications. However, the relative contribution of antihypertensive therapy on vascular inflammation, thrombotic mechanisms, and endothelial dysfunction remains unclear. We have previously demonstrated that treatment of hypertensive patients with ramipril, an ACE inhibitor, reduced thrombin generation compared to placebo treatment. This study aimed to extend these observations and to investigate the possible contribution of blocking the RAAS on haemostasis and systemic inflammation beyond the effects of lowering blood pressure.

Design and method: We examined 59 individuals with mild-to-moderate hypertension randomized to receive double blind ramipril 10 mg od or the alpha 1-adrenergic receptor blocker doxazosin 8 mg od for 12 weeks. Haemostasis (plasminogen activator inhibitor-1 activity, tissue plasminogen activator antigen, thrombin-antithrombin complex, and thrombin generation by calibrated automated thrombogram) and inflammatory markers (interleukin-6, soluble interleukin-6 receptor, interleukin-8, tumor necrosis factor-alpha, monocyte chemoattractant protein-1, and C-reactive protein) were assessed.

Results: Treatment reduced blood pressure in both groups. Thrombin-antithrombin complex decreased by treatment, and this was dependent on a reduction in thrombin-antithrombin complex in the ramipril group alone (figure). Changes in thrombin-antithrombin complex by treatment did not relate to changes in blood pressure. There were no changes in plasminogen activator inhibitor-1 activity, while tissue plasminogen activator antigen increased by ramipril and decreased by doxazosin. Only minor changes were observed in systemic inflammation by treatment.



Conclusions: These results extend our previous findings to suggest that antihypertensive treatment with ramipril reduces thrombin generation beyond the effects on blood pressure reduction alone. Thus, drugs blocking the RAAS may reduce atherothrombotic complications beyond their effects to reduce blood pressure. Furthermore, doxazosin might have beneficial profibrinolytic effects. The antihypertensive treatment effects on inflammatory markers, however, were small.

SOME CONN'S ADENOMA CAN BE MISSED BY THE CORTISOL-NORMALIZED ADRENAL VENOUS SAMPLING

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Objective: To analyze discordances between lateralization predicted by CT scan or by adrenal venous sampling (AVS) in patients with primary aldosteronism (PA) and a unilateral adrenal mass

Design and method: Monocentric retrospective analysis of data of 33 selective AVS in patients with primary aldosteronism (PA) and a unilateral adrenal mass. In our center AVS is performed simultaneously on both adrenal veins (AV) without stimulation and analyzed not only with cortisol but also epinephrine as a reference for selectivity and lateralization. lateralization index (LI) > 4 is considered significant. Immunohistochemical analysis of CYP11B1, CYP11B2 and CYP17 was performed in the adrenal adenoma of one patient.

Results: One patient with severe hypertension and hypokalemia showed PA, no hypercortisolism and a 2 cm right adrenal mass. AVS was selective in both AV and cortisol-normalized AVS showed right/left LI = 0.8, ruling out lateralization, despite the fact that absolute values of aldosterone, but also cortisol, were higher in the right AV. By contrast epinephrine-normalized AVS showed right/left LI = 6.25 as absolute values of epinephrine were similar in both AV.

The patient was treated medically but showed poor tolerance of anti-aldosterone treatment and eventually underwent right adrenalectomy, resulting in normalization of blood pressure and remission of PA. Immunohistochemical analysis of his right adrenal adenoma showed expression of CYP11B2 but also CYP11B1 and CYP17. Analysis of the 32 other patients identified 5 discordances between cortisol-normalized AVS lateralization and epinephrine-normalized AVS, with 2/5 patients showing concordance in epinephrine-normalized AVS and CT scan. These 2 patients were not operated as cortisol-normalized AVS was still considered the standard.

Conclusions: Cortisol-normalized AVS can fail to detect lateralization of aldosterone secretion by Conn's adenoma expressing not only CYP11B2 but also CYP11B1 and CYP17, which must allow secretion of not only aldosterone but also cortisol, without being necessary responsible for hypercortisolism. In these adenoma cortisol measurements during AVS is not a reliable reference to normalize aldosterone, as it is produced by both the normal adrenal gland and the adenoma.

THE PROGNOSTIC ROLE OF HEART RATE RECOVERY AFTER EXERCISE IN IGA NEPHROPATHY

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Objective: Based on previous studies the cardiovascular mortality and morbidity is higher in chronic kidney disease (CKD) than in the average population. Attenuated heart rate recovery (HRR) is an independent risk factor for cardiovascular disease. The literature data are limited about the prognostic effect of HRR on the cardiovascular outcome in CKD. The goal of the study was to determine the prognostic significance of HRR in a homogenous group of chronic kidney disease patients.

Design and method: One hundred and fifteen IgA nephropathy patients (76 males, 39 females, age 44 ± 11 years) with CKD stage 1–4 were investigated and followed for average 70 months. End stage renal disease was an exclusion criterion. We performed a graded exercise treadmill stress test. HRR was measured as the heart rate difference between the peak value and the heart rate at 1 min after exercise. The patients were divided into two groups based on the average HRR value (22.9 beats/min). The combined end point were 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 attenuated HRR (<23 bpm) had significantly more end point events (22/62 patients vs. 9/53 patients, Chi square: 6.138; $p = 0.013$ by Mantel-Cox log-rank test) than patients with higher HRR (≥ 23 bpm). Analysing the endpoints separately (cardiovascular or renal) only the renal endpoint was significant (Chi-square: 4.739; $p = 0.029$), the cardiovascular was not (Chi-square: 1.145; $p = 0.285$). The only independent predictors on survival were eGFR and diabetes mellitus by using Cox regression model.

Conclusions: On the basis of our results the attenuated HRR measured by treadmill exercise seems to be an eligible factor to predict the prognosis in IgA nephropathy. The decreased HRR may be helpful to identify the high-risk patients in IgA nephropathy.

NON-DIPPING PHENOMENON MEASURED BY 24H-AMBULATORY BLOOD PRESSURE MONITORING IS A STRONG PREDICTOR OF LEFT VENTRICULAR HYPERTROPHY IN CHRONIC KIDNEY DISEASE

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Objective: Few studies have assessed the role of 24 h ambulatory blood pressure monitoring (ABPM) in adults suffering from non-dialysis chronic kidney disease (CKD). We examined potential determinants of left ventricular hypertrophy (LVH) and mass index (LVMI) in this population.

Design and method: We conducted a cross-sectional study on 69 stage 3b–5 CKD adults who had ABPM and transthoracic echocardiography performed simultaneously. Hypertension (HT) was defined as 24 h blood pressure (BP) $> \text{or} = 130/80$ mmHg. ABPM parameters considered were BP dipping status, BP load and BP nighttime/daytime ratio. We conducted stepwise backward multivariate linear and logistic regression to assess determinants of LVH and LVMI. ABPM parameters were considered main predictors whereas HT, ACEI/ARAI use, $\text{GFR} < 30 \text{ ml/min/1.72m}^2$, diabetes, smoking, age, gender, Hb and PTH levels were considered covariates.

Results: LVH was present in 22 (31.8%) patients. In linear regression analysis, systolic ($\beta = -13.8$, 95% CI = $-26.3; -1.3$, $p = 0.031$) and mean ($\beta = -13.5$, 95% CI = $-25.7; -1.2$, $p = 0.031$) dipping statuses were negatively associated with LVMI. BP load and nighttime/daytime ABPM ratio were not associated with LVMI. In logistic regression analysis, systolic dipping status (OR = 0.27, 95% CI = 0.08; 0.91, $p = 0.036$) was negatively associated with LVH. Amongst covariates, $\text{eGFR} < 30 \text{ ml/}$

min/1.72m^2 and HT were positively associated with LVH and LVMI. At one-year follow-up, mean dipping status on the initial ABPM remained significantly associated with LVMI ($\beta = -19.8$, 95% CI = $-36.6; -3.0$, $p = 0.022$).

Conclusions: These data confirm the high incidence of LVH amongst non-RRT CKD patients and suggest that non-dipping phenomenon on ABPM is an independent and strong predictor of LVH and LVMI in this population.

DETERMINANTS OF RENAL FUNCTIONAL IMPAIRMENT, THE IMPORTANCE OF FASTING PLASMA GLUCOSE CONTROL: THE NORTHERN SHANGHAI STUDY

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Objective: Chronic kidney disease is a global health problem. However, the causes of renal functional impairment in the general elderly population remains unclear. The aim of this study was to investigate the determinants of renal functional impairment, within a framework of cardiovascular (CV) risk assessment in a community-dwelling elderly cohort.

Design and method: From June 2014 to August 2015, a total of 912 community-dwelling elderly subjects (aged ≥ 65 years) from the northern Shanghai were recruited. CV risk factors were assessed, and renal function was evaluated by estimated glomerular filtration rate (e-GFR) at baseline and during 2-year follow-up. Rapid decline in e-GFR was defined as an e-GFR slope (decline in e-GFR) $> 5 \text{ ml/min per } 1.73 \text{ m}^2 \text{ per year}$.

Results: The average decline in e-GFR was $0.104 \text{ ml/min/1.73m}^2 \text{ per year}$, while the increasing risk of having rapid decline in e-GFR was 1.25-fold every additional year. Decline in e-GFR was significantly different between diabetics and non-diabetics ($p = 0.03$). In full adjustment model, decline in e-GFR ($p = 0.03$) and rapid decline in e-GFR (OR 1.37, CI 1.07–1.75) were both significantly associated with fasting plasma glucose. Similar result of the association of rapid decline in e-GFR with fasting plasma glucose was obtained in the diabetes (full adjustment, OR 1.57, CI 1.05–2.34).

Conclusions: In the community-dwelling elderly Chinese, the average decline in e-GFR was $0.104 \text{ ml/min/1.73m}^2 \text{ per year}$, and renal functional impairment was significantly associated with hyperglycemia in the old Chinese.

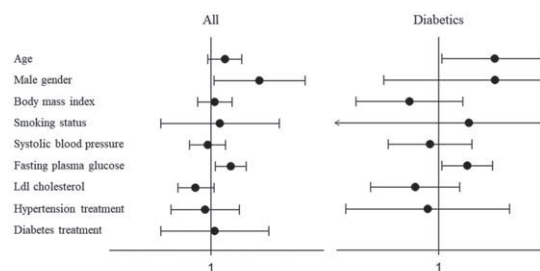


Figure 1. Association of rapid decline in estimated glomerular filtration rate (e-GFR) with cardiovascular risk factors in different groups of participants in the full adjustment model
Notes: Multivariate logistic regressions were conducted to investigate the association of rapid decline in e-GFR with cardiovascular risk factors in all participants and participants with diabetes with adjustment for treatment of hypertension and diabetes. Rapid decline in e-GFR was defined as an e-GFR slope $> 5 \text{ mL/min per } 1.73 \text{ m}^2 \text{ per year}$. Abbreviations: Ldl, low density lipoprotein.

POSTER SESSION

POSTERS' SESSION PS18:

METABOLIC DISORDERS AND SLEEP APNOEA

INFLUENCE OF DIFFERENT CLASSES OF ANTIHYPERTENSIVE DRUGS ON INSULIN RESISTANCE IN PATIENTS WITH MILD AND MODERATE ARTERIAL HYPERTENSION

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Objective: To reveal the prevalence of metabolic syndrome in patients with hypertension and methods of correction with antihypertensive therapy.

Design and method: 223 patients with mild to moderate hypertension (AH) and metabolic syndrome (MS) were screened according to ATP III criteria, of which 105 (47.1%) were males and 118 (52.9%) were females. The average age of patients was 50.29 ± 0.96 years. The average duration of hypertension is 5.01 ± 0.26 years. The average for the office of SBP and DBP was 157.03 ± 0.79 and 92.17 ± 0.32 mm Hg., heart rate - 75.02 ± 0.69 beats/min. Average daily blood pressure monitoring were $135.90 \pm 1.13/80.38 \pm 0.81$ mm Hg. Patients was divided for groups takes for 6 months atenolol, nebivolol, carvedilol, bisoprolol, fosinopril, telmisartan.

Results: Assessing the effect of drugs on the state of insulin resistance, it was found that atenolol, in contrast to fosinopril and telmisartan, significantly impaired IR, which was manifested in an increase in HOMA level by 78.18%, $p < 0.05$. At the same time, against the background of treatment with fosinopril the HOMA index decreased by 12.5%. However, an even more pronounced improvement in IR was observed in the treatment of telmisartan, HOMA decreased by 31.64%, $p < 0.05$. The difference between the telmisartan and fosinopril group is significant, $p < 0.05$. Therapy with carvedilol contributed to a significant decrease in HOMA by 21.7%, $p < 0.05$. On the background of treatment with bisoprolol, HOMA decreased by 17.4%, $p < 0.05$, in the group of nebivolol HOMA decreased by 23%, $p < 0.05$. Thus, telmisartan and nebivolol had the highest positive effect on IR.

Conclusions: The use of telmisartan and nebivolol as monotherapy can be rational in patients with mild to moderate arterial hypertension and the clinical signs of a metabolic syndrome without diabetes with manifestations of insulin resistance.

HIGH INCIDENCE METABOLIC SYNDROME AMONG HYPERTENSIVES IN THE ISLAND OF CRETE, GREECE

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Objective: The metabolic syndrome (MetS) is recognized as a cluster of cardiovascular risk factors. We sought to study the incidence of MetS, defined by the Adult Treatment Panel III criteria, in patients with Essential Hypertension in the island of Crete.

Design and method: We studied 1042 hypertensives (403 men), of median age 61 (range: 16–87) years. A health questionnaire was completed for all participants, including personal history of hypertension, diabetes mellitus (DM), ischemic heart disease (IHD), smoking habits and medications taken. The waist circumference and blood pressure were measured. Fasting blood samples were obtained in order to measure glucose, and a complete lipid profile.

Results: Seven hundred four out of 1042 patients (67.6%) met the criteria for MetS. MetS was more prevalent in females than in males (71.2% vs 62.1%, $p < 0.01$). The overall prevalence of MetS in hypertensives was 3 fold higher compared with that of the general Greek population.

We divided our patients in three groups according their age (<40 , 40–65 and >65 years). There was no statistical significant difference in the incidence of MetS in these 3 groups (64.8%, 67.3% and 68.8% respectively, $p = 0.758$).

Concerning MetS related factors, increased waist circumference was by far the most common one (90.8%) among hypertensives who met the criteria for MetS. Patients under antihypertensive treatment had increased risk to have MetS than those who were untreated (70.3% vs 63.4%, $p = 0.02$).

One hundred seventy three out of 191 (90.6%) of DM patients met the criteria for MetS. There was no significant difference in the incidence of MetS between smokers and non-smokers women (68.4% vs 72.0%, $p = 0.495$). On the contrary, men smokers had significant higher incidence than non-smokers (69.0% vs 57.8%, $p = 0.03$).

Conclusions: Our results suggest that the incidence of MetS is dramatically increased in patients with Essential Hypertension in Crete, especially in women, compared to the general population of Greece. The incidence of MetS is not influenced by age.

MYOCARDIAL STIFFNESS IN THE MIDDLE-AGED HYPERTENSIVE PATIENTS IN THE PRESENCE OF OVERWEIGHT OR OBESITY

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Objective: to evaluate left ventricular (LV) and left atrial (LA) stiffness parameters in middle-aged patients with arterial hypertension grade 1–2 without concomitant cardiovascular diseases in terms of the presence of overweight or obesity.

Design and method: Case-control study. We examined 127 naive patients with uncomplicated essential arterial hypertension grade 1–2 and divided them into three groups in accordance with body mass index (BMI) values. The first one is included 19 patients with normal weight - mean BMI 23.2 ± 0.2 kg/m², mean age 50.6 ± 1.0 years; 7 men; mean office blood pressure $142.1 \pm 3.6/83.2 \pm 2.5$ mm Hg). The second group consisted of 52 patients with overweight - mean BMI 28.0 ± 0.2 kg/m², mean age 53.1 ± 1.0 years; 26 men; mean office blood pressure $147.9 \pm 2.0/90.9 \pm 1.5$ mm Hg). And the third group is included 56 patients with obesity - mean BMI 34.2 ± 0.4 kg/m², mean age 52.0 ± 0.8 years; 33 men; mean office blood pressure $151.7 \pm 2.0/94.4 \pm 1.5$ mm Hg). Comprehensive transthoracic echocardiography using Vivid 7 Dimension system (GE) were performed. LV end-diastolic stiffness, LV end-systolic elastance (ESE), LV diastolic elastance, LA stiffness index, LA expansion index and tissue Doppler-derived LA strain were calculated. 2-D speckle tracking echocardiography data were acquired for determination of LV myocardial global longitudinal peak strain (LV GLPS).

Results: LV GLPS was significantly ($p < 0.001$) lower in absolute value in patients with obesity ($-15.6 \pm 0.4\%$) compared with overweight group ($-18.0 \pm 0.4\%$) and the patients with normal weight ($-18.5 \pm 0.5\%$). LV ESE was significantly lower in patients with obesity (3.75 ± 0.13 mm Hg/ml) compared with overweight persons (4.34 ± 0.16 mm Hg/ml; $p < 0.05$) and the patients with normal weight (4.81 ± 0.26 mm Hg/ml; $p < 0.001$). No significant differences between studied groups were obtained in other myocardial stiffness parameters.

Conclusions: The present study reveals that obesity leads to increased LV myocardial stiffness in untreated middle-aged patients with uncomplicated arterial hypertension grade 1–2 in comparison with sex-, age- and hypertension history-matched patients with overweight or normal BMI.

RELATIONSHIP BETWEEN PERICARDIAL AND ABDOMINAL OBESITY AND ERECTILE FUNCTION IN PATIENTS WITH OBSTRUCTIVE SLEEP APNOEA AND ARTERIAL HYPERTENSION

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Objective: The aim of our study was to determine the interrelation between pericardial and abdominal fat (PF, AF) and erectile dysfunction (ED) in patients with obstructive sleep apnea (OSA) and arterial hypertension (AH). The combination of ED with obesity and OSA increases the risk of cardiovascular diseases and their complications.

Design and method: We included 71 men (mean age 47.9 ± 9.2 years) with AH ($147.4 \pm 13.8/87.6 \pm 9.0$ mm Hg), receiving antihypertensive therapy (except b-blockers), overweighted or obese (BMI 30.8 ± 2.8 kg/m²), with OSA and ED (according to the IIEF-5 questionnaire), not suffering from coronary artery disease and diabetes mellitus. All patients underwent sleep study (apnea/hypopnea index (AHI) 25.4 ± 20.8 /h), multispiral computed tomography (MSCT) of PF (44.7 ± 24.1 cm³) and AF, evaluated as total fat area (TFA), subcutaneous fat area (SFA) and visceral fat area (VFA) (879.2 ± 187.3 cm³; 449.5 ± 129.6 ;

427,6 ± 130,5 cm³ respectively) and 21 patients underwent intracavernous pharmacodopplerography (IPD) with alprostadil, which included an assessment of the erection degree (Er scale, from 0 to 5), penile blood flow parameters, such as peak systolic velocity (PSV), end diastolic velocity (EDV) and a resistive index (RI).

Results: At first in 71 patients, a statistically significant correlation between PF and VFA has been found ($r = .47$, $p < .0001$). There's been also found correlation between parameters of OSA (AHI) and VFA ($r = .24$, $p = .04$). Patients who underwent IPD with evaluation of penile blood flow parameters (PSV 38,6 [18,8; 62,3] cm/sec; EDV 9,2 [4,3; 18,7] cm/sec; RI 0,79 [0,52; 1,0]) had AHI 25,6 ± 18,1/h; systolic and diastolic blood pressure (SBP/DBP) was 146,4 ± 12,1/86,6 ± 8,9 mm Hg. Their TFA was 863,2 ± 162,4 cm³; SFA - 453 ± 93,3 cm³; VFA - 416,3 ± 127,4 cm³ and PF - 43,0 ± 23,4 cm³. We found statistically significant correlation between PF and severity of ED. In addition, was revealed a statistically significant correlation between PSV and the SBP.

Correlated parameters (n=21)	<i>r</i>	<i>p</i>
PF, cm ³ - EDV, cm/sec	.49	.03
PF, cm ³ - RI	-.56	.008
SBP, mm Hg - PSV, cm/sec	-.49	.02

Conclusions: There is a significant correlation between amount of abdominal visceral and pericardial fat tissue, the severity of OSA and ED according to IPD. A correlation between the level of SBP and the quality of systolic penile blood flow is present too.

EFFECTS ON HOME BLOOD PRESSURE AND HEART RATE OF SEQUENTIALLY ADDING DULAGLUTIDE TO THERAPY IN PEOPLE WITH TYPE 2 DIABETES MELLITUS WHO HAD PREVIOUSLY BEEN RECEIVING EMPAGLIFLOZIN

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Objective: Glucagon-like peptide-1 (GLP-1) receptor agonists, used to treat type 2 diabetes mellitus, have been reported to be associated with a small reduction in systolic blood pressure (SBP) and increases in heart rate (HR). However, for patients with type 2 diabetes mellitus (T2DM) at high cardiovascular risk who had previously been receiving 10 mg of sodium-glucose cotransporter 2 inhibitor empagliflozin once daily for one year, the effects are not known regarding the effects of once-weekly GLP-1 receptor agonist dulaglutide in addition to therapy on self-measured home blood pressure (BP) and heart rate (HR) at home.

Design and method: We followed twelve consecutive T2DM patients (mean age: 68 years old, 4 men, mean BMI: 28.0 kg/m²) with cardiovascular risk after adding 0.75 mg of dulaglutide once weekly, for three months. Home BP and HR were measured once every morning at home, using an oscillometric device.

Results: The administration of empagliflozin induced significant ($0.7 \pm 0.8\%$) reductions of glycated hemoglobin (HbA1c) and significant (2.8 ± 2.5 kg) reductions of body weight (BW) during the first three months, and dulaglutide also significantly reduced HbA1c and BW from $7.4 \pm 0.8\%$ and 68.8 ± 10.2 kg at baseline to $6.3 \pm 0.5\%$ and 66.7 ± 11.0 kg at the end of the study, respectively ($P < 0.01$). For home blood pressure, dulaglutide significantly reduced SBP from 128 ± 10 mmHg at baseline to 124 ± 10 mmHg at the fourth week (4W) of the administration ($P < 0.05$). SBP achieved the target home blood pressure goal at 4W, and was maintained during the study (8W: 122 ± 10 mmHg, $P < 0.01$). In the case of empagliflozin, at 1W of the administration it significantly reduced SBP from 130 ± 11 mmHg at baseline to 126 ± 11 mmHg ($P < 0.01$) (12W: 124 ± 10 mmHg). However, there was no change in diastolic blood pressure (DPB) upon administration of empagliflozin or dulaglutide (DPB: 71 ± 6 mmHg at baseline). Dulaglutide significantly increased HR from 68 ± 10 beats per minute (bpm) at baseline to 72 ± 10 bpm at 8W ($P < 0.01$), although there was no significant change in HR upon administration of empagliflozin.

Conclusions: Dulaglutide significantly and slowly reduced home SBP with increase of HR at home, compared with empagliflozin.

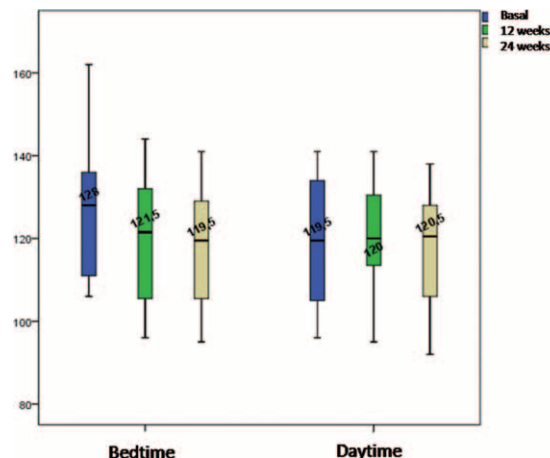
ADMINISTRATION-TIME-DEPENDENT EFFECTS OF CANAGLIFLOZIN IN TYPE 2 DIABETIC PATIENTS AND ARTERIAL HYPERTENSION

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Objective: Nocturnal hypertension is more frequent in diabetics, due to the dysfunction of the autonomic nervous system. Several prospective studies have concluded that nocturnal BP is a better predictor of CV mortality than daytime BP or even, than the 24-hour average.

Renal inhibition of the sodium-glucose co-transporter type 2 (SGLT2) leads to an increase in urinary sodium excretion and, therefore, to a relative depletion of volume that results in a drop in blood pressure.

No reported data have evaluated the efficacy of SGLT2 inhibitors in terms of nighttime blood pressure reduction regarding the time-based administration of the treatment.



Design and method: Phase IV, unicentric, prospective, randomized and open study of parallel groups evaluated in the Hypertension and Vascular Risk Unit of the University Clinical Hospital of Santiago de Compostela with diagnosis of Diabetes Mellitus type 2 (DM2). 36 patients were randomized to the two treatment arms (canagliflozin 100 mg before breakfast Vs canagliflozin 100 mg before dinner) and were followed up for 24 weeks.

The systolic, diastolic and heart rate of each patient were monitored every 20 minutes during the daytime period (07:00 am to 11:00 pm) and every 30 minutes during the night period for at least 24 consecutive hours, using a device oscillometric SpaceLabs 90207® (SpaceLabs Inc., Redmon, Washington).

Results: Greater decrease of nocturnal systolic blood pressure was observed when canagliflozin was administered at bedtime. Similar results were observed when analyzing the nocturnal decrease in diastolic blood pressure.

Conclusions: Our data showed a decrease on nocturnal BP in hypertensive patients with DM type 2, after the administration of canagliflozin 100 mg at bedtime. This antihypertensive effect is not objectified when the administration was at daytime. Due to high prevalence of nocturnal arterial hypertension in patients with DM type 2, the results provided might support the use of ABPM and the administration of SGLT-2 co-receptor inhibitors according to a chronotherapy regimen.

HEART RATE IS ASSOCIATED WITH RENAL PARAMETERS IN PATIENTS WITH TYPE 1 DIABETES AND NORMAL RENAL FUNCTION

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Objective: Heart rate (HR), blood pressure and albuminuria are established predictors of an adverse cardiovascular outcome. The objective of this study was to explore relationship between HR, systolic blood pressure (SBP) and diastolic blood pressure (DBP) with renal function in patients with type 1 diabetes (T1DM).

Design and method: Study included 313 normoalbuminuric T1DM with estimated glomerular filtration rate (eGFR) > 60 ml/min-1.73m⁻², and before any interventions with statins, ACE inhibitors or angiotensin II receptor blockers. Data on serum creatinine levels, age, sex and race were used to calculate the estimated glomerular filtration rate (eGFR) using the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) formula. Urinary albumin excretion rate (UAE) was measured from at least two 24-h urine samples and determined as the mean of 24-h urine collections. Blood pressure was measured twice in the sitting position with a mercury sphygmomanometer after a resting period of 10 minutes. HR was determined using a standard 12-lead ECG after a resting period of 10 minutes.

Results: Serum creatinine was significantly associated with BMI, HbA1c, HDL-cholesterol, SBP and HR, with HR showing the strongest correlation ($r = -0.17$, $p = 0.002$). eGFR was significantly associated with duration of diabetes, HbA1c, LDL-cholesterol, and HDL-cholesterol, with duration of diabetes showing the strongest correlation ($r = -0.29$, $p < 0.001$). UAE significantly correlated with duration of diabetes, HDL-cholesterol, triglycerides, HR and DBP, with HR and DBP showing the strongest correlation ($r = 0.21-0.23$, $p < 0.001$). Subjects in the 4th quartile of UAE had significantly higher HR rate compared to subjects in 1st, 2nd, and 3rd quartiles (70 ± 11 vs 74 ± 12 vs 79 ± 13 beats/min, $p = 0.001$). Subjects in the 4th quartile of serum creatinine had significantly lower HR compared to subjects in 1st, 2nd, and 3rd quartiles (77 ± 13 vs 75 ± 13 vs 73 ± 11 vs 71 ± 13 beats/min, $p = 0.03$).

Conclusions: Results of our study suggest that interplay between HR and renal function parameters are present even in T1DM with normal renal function and that higher HR may be predictor for higher UAE in those subjects.

AORTIC-BRACHIAL STIFFNESS MISMATCH IN PATIENTS WITH ARTERIAL HYPERTENSION AND TYPE 2 DIABETES MELLITUS

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Objective: Aortic stiffness (AS) is a strong predictor of cardiovascular (CV) mortality in various clinical conditions. The impact of AS on CV outcomes is mediated by the reversal of the AS gradient. Its negative prognostic significance has been studied only in the dialysis population.

Aim of the study: to assess AS gradient in patients with arterial hypertension (AH) and type 2 diabetes mellitus (T2DM).

Design and method: The study group included 90 patients (39% males, mean age 63.8 ± 11.6 years, 44% smokers, 80% with dyslipidemia, mean office BP $146 \pm 23/86 \pm 10$ mmHg); control group included 42 patients with AH matched by basic parameters. Median duration of diabetes was 8.5 years (IQR 2;13). All patients received combined antihypertensive therapy, target BP $< 140/85$ mmHg was achieved in 29 (52.7%) patients. BP was measured with a validated oscillometric device. Parameters of arterial stiffness (AS) were assessed by applanation tonometry. AS gradient was calculated as carotid-femoral (cf)PWV/carotid-radial (cr)PWV and its elevation > 1 was considered as AS mismatch. $p < 0.05$ was considered significant.

Results: Mean cfPWV was 10.5 ± 2.4 vs 9.5 ± 1.8 m/s ($p = 0.04$), crPWV $- 8.5 \pm 1.4$ vs 10.4 ± 1.7 m/s ($p = 0.001$), AS gradient $- 1.2 \pm 0.3$ vs 0.9 ± 0.1 ($p = 0.04$). Incidence of AS mismatch in the study group was 93% vs 19% in the control group ($\chi^2 = 59.5$, $p < 0.001$) and 70% vs 9% in the group with PWV < 10 m/s respectively ($\chi^2 = 37.1$, $p < 0.05$). Patients with AS gradient > 1.0 were older (65.2 ± 10.7 vs 59.1 ± 10.7 years), had longer median duration of DM (10 vs 3 years), higher creatinine (96.8 ± 21.1 vs 91.3 ± 22.1 mmol/l) and lower GFR (62 ± 18 vs 70 ± 20 ml/min/1.73m²), $p < 0.05$ for trend. Spearman analysis revealed significant correlations between AS gradient and age ($r = 0.4$), DM duration ($r = 0.3$), creatinine ($r = 0.2$) and GFR ($r = -0.2$), $p < 0.05$ for trend. Age and DM duration were significant predictors of aortic-brachial stiffness mismatch ($b = 0.4$, $p = 0.0002$ and $b = 0.3$, $p = 0.004$, respectively). ROC analysis showed that presence of DM was an early factor of AS mismatch with AUC 0.849, sensitivity of 98% and specificity of 58%, $p < 0.05$.

Conclusions: In diabetic patients with arterial hypertension AS mismatch is highly prevalent and in patients with normal PWV may be regarded as an early marker of arteriosclerosis.

HEMODYNAMIC FACTORS ASSOCIATED WITH INADEQUATE CONTROL OF NOCTURNAL HYPERTENSION DURING DIFFERENT COMBINED ANTIHYPERTENSIVE THERAPY IN HYPERTENSIVE DIABETIC PATIENTS

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Objective: To determine the factors associated with inadequate control of nocturnal hypertension during combined antihypertensive therapy with RAAS inhibitors and in their absence in patients with type 2 diabetes mellitus without renal involvement.

Design and method: The study included 71 hypertensive diabetic patients (56.8 ± 6.5 yrs, m/f 22/49); the therapy course was completed by 69 patients. To achieve target blood pressure (BP) patients of Gr.1 ($n = 22$) received perindopril in combination with indapamide retard and amlodipine, patients of Gr.2 ($n = 25$) received valsartan in combination with indapamide retard and amlodipine, and patients of Gr.3 ($n = 22$) received amlodipine in combination with indapamide retard and metoprolol succinate. Office BP values, 24-h ambulatory BP monitoring parameters were determined before and after 30–32 weeks of therapy. Albumin excretion rates were measured. An estimated GFR (eGFR) was calculated

using the MDRD Study equation. All the included patients had eGFR > 60 ml/min/1.73m² and normoalbuminuria.

Results: Target office BP was achieved in most patients in all three groups. However, patients of Gr.3 had higher levels of systolic BP-night (SBP) after the treatment compared to patients of Gr.1 and patients of Gr.2: 120.2 ± 10.9 mm Hg vs. 113.9 ± 8.9 mm Hg and vs. 112.8 ± 13.8 mm Hg, respectively ($p < 0.05$ for all). Target SBP-night (< 120 mm Hg) was achieved in 77.3% patients of Gr.1, in 68% patients of Gr.2 and in 54.5% patients of Gr.3. Achieved SBP-night positively correlated with baseline 24h-SBP load ($r = 0.4311$), pulse BP-day ($r = 0.4883$) and pulse BP-night ($r = 0.5583$) when RAAS inhibitors were absent ($p < 0.05$ for all). In patients of Gr.3 target SBP-night was achieved only at 24h-SBP load $< 50\%$, pulse BP-day < 52 mm Hg and pulse BP-night < 56 mm Hg before the treatment.

Conclusions: Our data demonstrate benefits of RAAS inhibitors in achieving target level of night SBP compared to therapy without them in hypertensive diabetic patients that did not have renal involvement. Hemodynamic factors associated with inadequate control of nocturnal hypertension in diabetic patients during antihypertensive therapy without RAAS inhibitors are baseline levels of 24h-SBP load $> 50\%$, pulse BP-day > 52 mm Hg and pulse BP-night > 56 mm Hg.

COMMUNITY SCREENING FOR DIABETES RISK REVEALS A HIGH PREVALENCE OF HIGHER THAN OPTIMAL BLOOD PRESSURE LEVELS

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Objective: Community-based risk screening actions are advocated to reduce the growing global burden of diabetes. We report on the unexpectedly high burden of hypertension and adverse cardiovascular risk profiles discovered during the screening process for the pilot phase of the South African Diabetes Prevention Programme.

Design and method: Black and mixed-ancestry participants, of 25 years or more, without known diabetes, from six low-socioeconomic communities were screened using a brief questionnaire, anthropometric and blood pressure (BP) measurements to estimate their risk of diabetes by the African Diabetes Risk Score. An oral glucose tolerance test, other biochemical and clinical assessments, and a detailed questionnaire were thereafter administered to participants identified as high risk for diabetes.

Results: Among 329 adults (43% Black, 80.5% women, mean age = 45.9) screened, 76% had a body mass index (BMI) equal or more than 25 kg/m², 30% had hypertension (140/90 mmHg or known hypertension) and 41% were identified as being at high risk for diabetes. Of the 111 high-risk participants that presented for further investigation (49% Black and 78% female, mean age = 50.7, Mean BMI = 33.4), 59% ($N = 65$) had known hypertension, with 64% [$N = 71$] of the total at risk sample ($N = 111$) having high BP readings for both SBP [36% had normal SBP (< 80 mmHg) 42% pre-hypertensive more or = to 80 mmHg), 10% stage 1 (90–99 mmHg), 11% stage 2 (100–109 mmHg) and 1% stage 3 (more or = 110)] and DBP [36% had normal DBP (< 120 mmHg) 27% pre-hypertensive (120–139 mmHg), 26% stage 1 (140–149 mmHg), 6% stage 2 (160–179 mmHg) and 5% stage 3 (more or = 180 mmHg)] during the clinic visit. The proportion of those with known hypertension who had controlled SBP (less than 140 mmHg) were 68% and for DBP (less than 90 mmHg) were 55%. The prevalence of impaired fasting glycaemia, impaired glucose tolerance and hypercholesterolaemia in those with known hypertension was 18%, 26% and 57%, respectively, while it was 18%, 15% and 57% in those with unknown hypertension.

Conclusions: The high prevalence of hypertension coupled with adverse cardiovascular risk profiles in these populations, highlight the importance of embracing a multiple cardiovascular risk factor approach to diabetes prevention in these settings.

CHANGE IN CARDIOVASCULAR AND METABOLIC PARAMETERS OF DIABETIC PATIENT, AFTER CHANGING FROM DIIPEPTIDYL PEPTIDASE-4 INHIBITOR TO SODIUM GLUCOSE COTRANSPORTER 2 INHIBITOR

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Objective: The dipeptidyl peptidase-4 inhibitor (DPP4-I) is effective to control diabetes mellitus, but its effect for cardiovascular risk reduction is not established. On the other hand, the sodium glucose cotransporter 2 inhibitor (SGLT2-I) has marked cardiovascular risk reduction by using empagliflozin (EMPAREG OUT-COME study) and canagliflozin (CANVAS trial).

So we evaluated the cardiovascular and metabolic parameters in diabetic patient who is well controlled by using DPP4-I, before and after changing to SGLT2-I.

Design and method: Well controlled diabetic patient (n = 54, male 36 age 52.4 ± 10.4 , female 18, ± 10.2 , HbA1c 6.9 ± 0.7) who has obesity (BMI 32.7 ± 5.3) and treated with DPP4-I and without SGLT2-I was evaluated after changing DPP4-I to SGLT2-I. DPP4-I used for were 18 Sitagliptin, ⁸Linagliptin, 13 Vildagliptin, 11 Alogliptin, ⁴Teneligliptin. SGLT2-I used for are 20 Ipragliflozin, 10 Luceogliflozin, ⁹Kanagliflozin, 10 Empagliflozin, ⁵Tohogliflozin. Evaluated parameters are blood glucose, HbA1c, body weight(BMI), systolic and diastolic blood pressure, serum creatinine, uric acid, LDL and HDL cholesterol, triglyceride, Uric acid, AST, ALT, g-GTP. These parameters are evaluated before changing to SGLT2-I and after 1,3 and 6 months.

Results: After changing to SGLT2-I from DPP4-I, HbA1c decreased from 6.9 ± 0.7 to $6.8 \pm 0.5\%$ (NS), blood glucose decreased from 146.1 ± 57.6 to 127.2 ± 35.9 mg/dL (NS), body weight decreased from 88.1 ± 15.1 (BMI 32.7 ± 5.3) to 84.8 ± 15.4 kg (BMI 31.7 ± 5.5). The systolic blood pressure decreased from 140.4 ± 18.8 to 132.1 ± 14.8 mmHg ($P < 0.05$), the diastolic blood pressure decreased from 82.0 ± 11.3 to 80.2 ± 8.9 . Serum creatinine showed no significant change (0.73 ± 0.2 to 0.73 ± 0.2 mg/dL). Serum uric acid decreased from 5.5 ± 1.3 to 5.0 ± 1.2 mg/dL ($P < 0.05$). Triglyceride decreased from 89.6 ± 12.0 to 154.9 ± 98.9 mg/dL ($P < 0.05$) but LDL and HDL cholesterol did not show significant change. g-GTP decreased from 53.1 ± 49.0 to 37.5 ± 24.6 ($P < 0.05$). AST decreased from 31.0 ± 19.3 to 25.2 ± 9.9 , and ALT also decreased from 41.2 ± 32.7 to 32.7 ± 20.0 , but not significant.

Conclusions: The effect for controlling blood glucose is similar between DPP4-I and SGLT2-I. But SGLT2-I has multiple aspect for changing cardiovascular parameters (blood pressure) and metabolic parameters (body weight, lipid profile, liver function, uric acid). So SGLT2-I may has dominant effect to protect cardiovascular disease than DPP4-I.

INTERMITTENT FASTING WITH 72 HOURS FASTING AND 96 HOURS REFEEDING PROMOTES FAT OXIDATION AND WEIGHT SUPPRESSION

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Objective: Intermittent fasting (IF) has been shown to have benefits in increasing insulin sensitivity, stress resistance and lowering blood pressure. However, the underlining mechanism for the beneficial effects has not been elucidated yet.

Design and method: Mice were subjected to a severe IF regimen, in which they were fasted for 72 hours and then refed ad libitum for subsequent 96 hours. This regimen was consecutively repeated 4 times to enforce the effects. After 4 courses of the IF regimen, mice were fed a high-fat diet (HFD) ad-libitum for subsequent 4 weeks of observational period. The body weight (BW) was monitored throughout the study period in the IF and ad-libitum feeding groups. At the 2 different time points: just after 4 courses of the IF regimen and after subsequent 4 weeks of observational ad-libitum feeding period, the glucose tolerance and respiratory gas were examined.

Results: There was no significant difference in the BW between the adlib eating and IF groups just after 4 courses of the IF regimen. Glucose tolerance tests showed a significant decrease in the glucose level of IF group. Respiratory gas analysis showed a significant increase in oxygen uptake and a significant decrease in respiratory quotient of IF group. In PCR analysis, expressions of genes responsible for fat oxidation and thermogenesis (ACO, HSL and UCP1 et al.) were significantly increased in the harvested tissues (the skeletal muscle, white and brown adipose tissues). After subsequent 4 weeks of observational feeding period, the BW in IF group was significantly lower than ad-libitum feeding group. At the time-point, the glucose tolerance, respiratory gas and expression of genes maintained the similar changes observed just after 4 courses of the IF regimen.

Conclusions: The 72 hours fasting IF regimen resulted in a suppression of the BW after HFD administration, in addition to a decrease in the blood glucose level. PCR analysis suggested that promotion of fat oxidation and thermogenesis in the skeletal muscle and adipose tissue of the IF group contributed to suppression of the BW.

BEHAVIORAL RISK FACTORS AND METABOLIC HEALTHY OBESITY IN POPULATION-BASED SAINT PETERSBURG SAMPLE

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Objective: There is a subgroup among obese people who have normal insulin sensitivity, lipid profile and blood pressure – these subjects are generally considered metabolically healthy obese (MHO) individuals. The aim of the study was to identify how behavioral habits such as physical activity, smoking, consumption of fish, vegetables and fruit are associated with the MHO phenotype.

Design and method: As a part of all-Russian epidemiology survey ESSE-RF random sampling of 1600 Saint-Petersburg inhabitants stratified by age and sex was recruited. Anthropometry, blood pressure (BP) measurement and fasting blood-tests: glucose, lipids, C-reactive protein (CRP), insulin was performed according to standard protocols. HOMA IR was used as a marker of insulin resistance and elevated CRP was considered exceeding the 90th percentile in a sample of residents of St. Petersburg. Wildman criteria were applied for detection of metabolic health among obese (BMI > 30 kg/m²) subjects: presence of 0–1 factors (SBP > 130 or DBP > 85 mm Hg or antihypertensive therapy; triglycerides > 1.70 mmol/L; HDL < 1.04 (males), < 1.30 (females) mmol/L or lipid-lowering therapy; glucose > 5.55 mmol/L or hypoglycemic therapy; CRP > 4.72 mg/L; HOMA > 4.81). All participants completed questionnaires regarding the level of physical activity, smoking status, consumption of fish, vegetables and fruit.

Results: Obesity (BMI > 30 kg/m²) was detected in 428 (27.4%) participants. According to the Wildman criteria MHO were diagnosed in 85 (21.5 %) out of this group. Logistic regression, adjusted for sex and age, showed that MHO phenotype was not associated with the level of physical activity and smoking in obese participants. When assessing sufficient consumption of fish, vegetables and fruits, there was also no association with metabolic health in obese patients.

Conclusions: Probably, such generally recognized factors of unhealthy lifestyle as smoking and hypodynamia, in the same way as factors such healthy food as a sufficient intake of fish, vegetables and fruit, do not have a significant effect on the preservation of metabolic health in obese individuals.

PRESENCE OF CARDIOVASCULAR DISEASE IN OBESE PATIENTS IN THE IBERICAN STUDY

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Objective: The general objectives of IBERICAN are to determine the prevalence and incidence of cardiovascular risk factors in Spain, as well as cardiovascular events. The objective of this work is to analyze the presence of cardiovascular disease in obese patients.

Design and method: IBERICAN is a longitudinal, observational, and multicenter study in which patients from 18 to 85 years of age are included in Primary Care consultations in Spain, until a sample of 7,000 patients is collected, which will be followed for at least 5 years. The basal characteristics of the fifth cut are presented (n = 6,007). Obesity was defined as the presence of a body mass index (BMI) > 30 kg/m². Patients were classified in secondary prevention when they presented ischemic heart disease, heart failure, stroke or peripheral arterial disease.

Results: The average age of the subjects included in IBERICAN is 57.4 ± 15.5 years, and 54.5% were women. The prevalence of obesity was 35.8%. Obese patients were older (59.9 ± 14.7 years vs. 56.2 ± 15.7 years, $p < 0.001$) and with a lower percentage of women (52.9% vs. 55.2%, $p < 0.001$). The prevalence of cardiovascular disease was more frequent in obese patients (19.9% vs 14.6%, $p < 0.001$). Ischemic heart disease (8.7% vs. 6.3%, $p = 0.015$) and heart failure (4.4% vs. 2.6%, $p = 0.019$) were more frequent in obese patients. Stroke (4.1% vs. 3.7%, $p = 0.975$), peripheral arterial disease (5.8% vs. 4.6%, $p = 0.377$) and retinopathy (0.6% vs. 0.4%, $p = 0.572$) did not reach statistically significant differences.

Conclusions: The prevalence of cardiovascular disease is higher in obese patients, in particular ischemic heart disease and heart failure, which leads to a higher cardiovascular risk.

HYPERTENSION-RELATED PROTEIN DEACETYLASE SIRT3 AFFECTS GLUCOSE METABOLISM THROUGH REGULATION OF GLUCAGON-LIKE PEPTIDE 1 IN MICE

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Objective: Sirt3 is a NAD-dependent protein deacetylase that is presumably related to the onset of hypertension. Recent reports have shown that Sirt3-deficient knockout (KO) mice develop pulmonary hypertension, high-fat diet induced obesity and metabolic syndrome-like phenotype. However, the precise mechanism by which they cause glucose intolerance has not known. To elucidate the regulatory

mechanism of glucose metabolism through Sirt3, the metabolic parameters in the Sirt3-KO mice were investigated.

Design and method: Blood glucose levels in the Sirt3-KO mice after glucose loading were examined, associated with blood glucagon-like peptide-1 (GLP-1) levels and dipeptidyl peptidase-4 (DPP-4) activity. Gene expressions which were associated with GLP-1 and DPP-4 were quantified by qPCR. The expression levels of sirtuins in various organs in wild-type mice and, the histone acetylation in the Sirt3-KO mice. The levels of histone acetylation in various organs of the KO mice were estimated by immunostaining of acetylated histone H3 (H3Ac) and H4 (H4Ac).

Results: The Sirt3-KO mice fed with a standard or a high-fat diet were subjected to an oral glucose tolerance test (OGTT), together with an intraperitoneal glucose tolerance test (ipGTT). OGTT revealed an increase in the blood glucose levels in the KO mice, although ipGTT did not show the increase after the glucose loading. Blood GLP-1 and insulin levels which were examined before and 15 minutes after oral glucose loading were found to decrease in the KO mice. The plasma DPP-4 activity increased significantly in the Sirt3-KO mice. qPCR analysis revealed a predominance of Sirt3 expression in the small intestine, colon, kidney, and liver in the wild-type mice. The immunostaining of H3Ac and H4Ac showed enhanced intensity in the glandular and stromal cells in the small intestine and colon, and in the renal tubular cells and the vascular endothelial cells in the KO mice.

Conclusions: These results suggest that Sirt3 deficiency impairs the incretin effect by a suppression of blood GLP-1 levels and causes glucose intolerance. Enhanced acetylation of histone H3 and H4 in the Sirt3-KO mice might relate to the increase in the DPP-4 activity, which lead to the decrease in the GLP-1 levels.

BENEFICIAL EFFECTS OF AZILSARTAN MEDOXOMIL ON TARGET ORGANS IN PATIENTS WITH HYPERTENSION AND METABOLIC SYNDROME

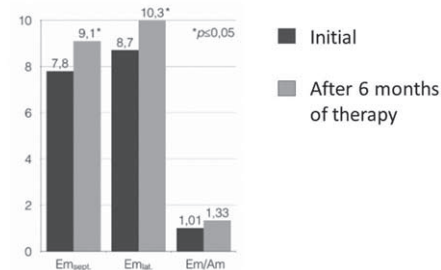
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Objective: 32 patients with 1–2 stage hypertension, metabolic syndrome (19 men-59%, 13 women-41%, mean age 47.32 ± 8.4 years) were enrolled in a 6 months therapy by azilsartan medoxomil (40 or 80 mg).

Design and method: 24-hour blood pressure monitoring, echocardiogram, central aortic systolic pressure, carotid-femoral pulse wave velocity, intima-media thickness was performed initial and after therapy. Calculation was done with software STATISTICA 6.0.

Results: All patients had abdominal obesity (BMI 35.67 ± 8.44 kg/m², waist circumference- 103.68 ± 14.89 cm). 30.2% patients had therapy before program without the target blood pressure. 75% of patients were treated by 40 mg, 25%-by 80 mg. 82% by the end of treatment achieved the target blood pressure (others were excluded from the program). 75% were treated by 40 mg, 25%- by 80 mg. 64% had atherosclerotic lesions in the brachiocephalic vessels. After the 6 months therapy: SBP decreased from 151.56 ± 7.16 to 131 ± 86 mmHg, DBP – from 86.52 ± 5.9 to 80.4 ± 6.1 mmHg ($p < 0.0001$); time index of SBP and DBP normalized (from $60.65 \pm 30.5\%$ to $27.28 \pm 24.8\%$ ($p < 0.0001$), from 59.56 ± 30.1 to $35.65 \pm 28.46\%$ ($p < 0.01$) respectively). By echocardiogram we noticed improving parameters of diastolic function in 56% patients: Em sept. from 7.8 ± 1.7 to 9.1 ± 1.26 cm/sec ($p < 0.05$), Em/Am sept. from 1.01 ± 0.61 to 1.33 ± 0.22 cm/sec ($p < 0.05$), Em tat. 8.7 ± 1.48 to 10.3 ± 1.74 cm/sec ($p < 0.05$). cfPWV decreased from 11.8 ± 3.1 to 8.4 ± 1.9 m/sec ($p < 0.05$).

Pic.1. Parameters of left ventricular diastolic dysfunction. Initial and after 6 months of therapy azilsartan medoxomil



Conclusions: Azilsartan medoxomil therapy in patients with 1–2 stage hypertension and metabolic syndrome effectively decreases targets blood pressure and has favorable effects on diastolic function and arterial stiffness.

ASSESSMENT OF CARDIOVASCULAR RISK IN DIABETIC PATIENTS WITH CHRONIC KIDNEY DISEASE

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Objective: Diabetic patients with chronic kidney disease (CKD) have an increased risk of cardiovascular disease. We aimed to investigate echocardiogram parameters in relation to estimated glomerular filtration rate (eGFR) and urine albumin/creatinine ratio (ACR).

Design and method: We investigated 176 patients both sexes with diabetes type 1 and type 2 aged 55.54 ± 8.37 years. Control group included 50 healthy subjects the same age. Echocardiography was performed to measure left ventricular mass index (LVMI), LV hypertrophy (LVH), systolic function, and diastolic function. LVH was defined as LVMI of 125 g/m² or more for males and as LVMI of 110 g/m² or more for females. The renal function of the diabetic patients was evaluated using the albumin-creatinine ratio (ACR) and estimated glomerular filtration rate (eGFR), which was calculated by CKD-EPIscr_{cys} equation.

Results: The prevalence of LVH was higher in diabetic patients with lower values of eGFRscr_{cys} than in those with normal renal function (56.4% vs 7.1%, respectively, $p < 0.05$). Diastolic dysfunction of LV was prevalent in 61.4% with the declining renal function vs 7.4% of diabetic patients with normal renal function, $p < 0.001$. The eGFRscr_{cys} was negatively associated with total cholesterol, apo-B, uric acid, hs-CRP, pro-BNP and BNP ($p < 0.05$) and positively associated with left ventricular ejection fraction (LVEF) ($p < 0.001$). We observed significantly higher LVMI mass index according to reduced eGFRscr_{cys} (trend $p < 0.001$) and increased ACR (trend $p < 0.001$). The multiple regression analysis confirmed the inverse association between eGFRscr_{cys} and LVMI independently of confounding factors.

Conclusions: We confirmed the high prevalence of LVH in patients with diabetes and CKD. Echocardiographic LVH and LV diastolic dysfunction may be predictors of low eGFR in diabetic patients with CKD. Taking into account the pathophysiological processes behind cardiorenal syndrome, cardiac assessment should be evaluated in patients with diabetes and CKD.

POSTER SESSION

POSTERS' SESSION PS19:

LARGE ARTERIES AND MICROCIRCULATION

BIOMECHANICAL PROPERTIES OF SMALL CORONARY ARTERIOLES IN VITAMIN D DEFICIENCY AND PCOS: INTRODUCTION OF A NEW FEMALE RAT MODEL

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Objective: PCOS and vitamin D deficiency are both frequent multifactorial endocrine disorders, lead to metabolic and early cardiovascular complications. According to actual data, there are an estimated 10.5 million fertile women suffering from PCOS only in the US. With this study we would like to describe the biomechanical changes of small coronary arterioles leading to a higher risk of cardiac and cerebral insult.

Design and method: 46 adolescent (21–28 day-old), 90–110 gramm-weighted female Wistar rats were grouped randomly in 4 groups: 24 animals received vitamin D supplemented diet, from which 12 animals went under transdermal testosterone treatment. 22 animals received vitamin D deficient diet, from which 11 were treated with testosterone. After 8 weeks of treatment, arterioles (in vivo diameter of 100–200 micrometer) from left anterior coronary artery were obtained. Isolated coronary arterioles were examined, in vitro, with pressure myography method. With videomicroscopic angiotomy the inner and outer radii of the arteriole was evaluated. Such biomechanical properties as normal myogenic, maximal passive vasorelaxative and vasoconstrictive tone of the arterioles were obtained and statistically analysed.

Results: In coronary arterioles, actual vitamin D status with and without testosterone supplementation caused significant differences in the vessel's maximal smooth muscle relaxant potential, thromboxane induced contraction capacity and normal myogenic tone.

Conclusions: The novel finding of our study was, that the vitamin D deficiency could lead to eutrophic remodelling and myogenic adaptation failure, which can elevate the risk of cardiovascular events. Supplementation of vitamin D could improve myogenic tone and relaxation, which hold cardiovascular benefits.

TARGETING ENDOPLASMIC RETICULUM STRESS AS A THERAPY TO MANAGE ABDOMINAL AORTIC ANEURYSM DISEASE

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Objective: Abdominal aortic aneurysm (AAA) is a degenerative vascular disease with high morbidity and mortality. It has a prevalence of 4–8% in men over the age of 65 years that is increasing in association with the aging population. Clinical management of AAA is limited to elective surgical repair while an effective pharmacotherapy is awaited. Therefore, we aim to determine whether inhibition of endoplasmic reticulum stress is an effective therapy to reduce aortic wall degeneration occurring in AAA.

Design and method: The endoplasmic stress activation was studied by real Time PCR, Western Blot and by immunostaining in a cohort of AAA samples from 100 patients compared with abdominal aorta from 20 healthy donors and in abdominal aorta of a mouse model of AAA (apolipoprotein E-deficient mice infused with angiotensin II for 4 weeks with osmotic minipumps). In males and females mice, the aortic diameter was monitored and recorded by ultrasonography at 0, 7, 14, 21 and 28 days of Ang II infusion and blood pressure was measured by tail-cuff method.

The phenylbutyrate sodium or PBA and Tauroursodeoxycholic Acid or Tudca as classic endoplasmic reticulum stress inhibitors, were administered intraperitoneally for 3 days a week to hypertensive mice.

Results: In human AAA the endoplasmic reticulum stress induction was assessed by enhanced expression of ATF6, IRE-1, XBP-1 and CHOP and by an increase in protein expression of active ATF6 and XBP1 and of the pro-apoptotic protein CHOP. This was accompanied by an exacerbated apoptosis in vascular wall measured by TUNEL and by cleaved caspase-3 and by an increase in NADPH oxidase expression and in superoxide anion production.

In the abdominal aorta of the murine AAA model the gene expression of ATF4, GRP78 and IRE-1 was increased while no differences were found in ATF6 or CHOP between AAA and control mice. The administration of PBA and Tudca decreased the incidence of AAA by reducing the abdominal aortic dilatation, systolic blood pressure and aorta wall disorganization.

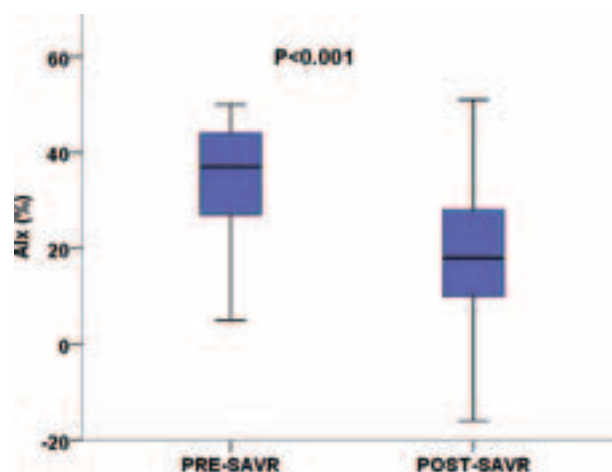
Conclusions: Our results evidence that inhibition of ER stress is a potential therapy to reduce aortic dilatation and medial wall destruction in AAA.

ACUTE EFFECTS OF SURGICAL AORTIC VALVE REPLACEMENT ON AORTIC HEMODYNAMICS AND WAVE REFLECTIONS

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Objective: Aortic hemodynamics and wave reflections are independent predictors of adverse cardiovascular events. Surgical aortic valve replacement (SAVR) is still the first choice for treatment of patients with aortic stenosis. We sought to investigate in this pilot study the effect of SAVR upon aortic vascular function and hemodynamics.

Design and method: Twenty-five patients (mean age 71.0 ± 7.1 years, 11 female) with severe aortic stenosis undergoing SAVR were included. Aortic hemodynamics and wave reflections (aortic pressures, aortic augmentation index [AIx@75], augmented pressure) and subendocardial viability ratio (SEVR) were measured with Sphygmocor. Measurements were conducted prior to the surgery and at discharge.



Results: There was a statistically significant decrease in aortic systolic blood pressure (SBP) (134 ± 24 vs 118 ± 17 mmHg with $p = 0.002$, respectively). That was not apparent in peripheral SBP. Diastolic blood pressure (both peripheral and aortic) did not change significantly, while heart rate was increased after the surgery (67 ± 11 vs 88 ± 15 bpm with $p < 0.001$, respectively). We observed a marginally significant decrease in aortic AIx@75 (29 ± 13 vs $22 \pm 12\%$ with $p = 0.05$, respectively) and a decrease in aortic AIx ($p < 0.001$, Figure) and augmented pressure (20 ± 10 vs 8 ± 7 mmHg with $p < 0.001$, respectively). Moreover, there

was a marginally non-significant trend for an increase in SEVR (137 ± 30 vs $149 \pm 35\%$, $p = 0.095$).

Conclusions: Our study shows that shortly after SAVR subjects show a decrease in aortic wave reflections with a small improvement of myocardial perfusion. These findings further elucidate the short-term hemodynamic consequences of SAVR.

TRIGLYCERIDES-GLUCOSE INDEX: A NEW PREDICTOR OF INCREASED ARTERIAL STIFFNESS. RESULTS FROM SEPHAR III – BRISIGHELLA HEART STUDY POOLING PROJECT

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Objective: To analyse the use of Triglycerides-Glucose Index (TGI) – an easy index of insulin-sensitivity, as a predictor of increased arterial stiffness.

Variables	Male N=1378	Female N=1525	P value
Age (years)	47.19±16.59	48.48±17.01	NS*
Active smoker	445 (59.3)	305 (40.7)	<0.0001**
Sedentary	505 (45.2)	612 (54.8)	0.029*
Family history of premature CVD	1127 (49.7)	1139 (50.3)	<0.0001**
SBP (mmHg)	133.72±19.02	126.10±21.73	<0.0001*
DBP (mmHg)	80.61±11.29	77.87±11.43	<0.0001*
HR (bpm)	71.64±11.82	72.96±11.35	0.002*
TG (mg/dl)	144.62±41.68	107.65±28.51	<0.0001*
FFG (mg/dl)	93.27±19.53	88.31±17.09	<0.0001*
TGI index	8.87±3.46	8.91±2.8	<0.0001*
TC (mg/dl)	197.59±45.03	200.82±45.76	NS*
LDLcholesterol	130.95±40.26	130.21±42.02	NS*
HDLcholesterol	49.76±15.89	59.17±15.40	<0.0001*
SUA (mg/dl)	5.59±1.28	4.36±1.24	<0.0001*
eGFR (ml/min)	79.34±8.23	76.59±7.35	NS*
PWVao (m/s)	8.82±2.17	8.92±2.48	NS*

Table 1 Values are presented as mean values ± s.d. for numeric variables and absolute number (percent) for categorical variables. *Independent samples t test; **chi square test; NS: no statistical significant ($p > 0.05$); CVD: cardiovascular disease; SBP: systolic blood pressure; DBP: diastolic blood pressure; HR: heart rate; bpm: beats per minute; TG: serum triglycerides; FPG: fasting plasma glucose; TGI: triglycerides-glucose index; TC: total cholesterol; SUA: serum uric acid; eGFR: estimated glomerular filtration rate; PWVao: aortic pulse wave velocity.

Predictors	Whole group model			Men group model			Female group model		
	OR	95%CI for OR	p value	OR	95%CI for OR	p value	OR	95%CI for OR	p value
Age (years)	0.447	0.057-0.267	<0.0001	0.415	0.048-0.261	<0.0001	0.461	0.161-0.274	<0.0001
DBP (mmHg)	0.142	0.021-0.237	<0.0001	0.103	0.009-0.231	<0.0001	0.210	0.036-0.255	<0.0001
HR	0.078	0.010-0.222	<0.0001	0.135	0.017-0.233	<0.0001	-	-	-
TGI	0.051	0.010-0.102	0.001	0.114	0.011-0.226	<0.0001	0.067	0.010-0.196	<0.0001
SBP	0.079	0.004-0.114	<0.0001	0.111	0.006-0.219	<0.0001	-	-	-
LDLc (mg/dl)	0.059	0.002-0.085	<0.0001	0.059	0.010-0.102	0.008	0.056	0.001-0.096	0.010
SUA (mg/dl)	0.038	0.001-0.046	0.018	0.035	0.002-0.051	0.021	0.031	0.002-0.044	0.024

Table 2: Multilinear regression analysis results for prediction arterial stiffness in the whole group and by genders. OR: odds ratio; 95%CI for OR: 95% confidence interval for odds ratio; DBP: diastolic blood pressure; HR: heart rate; bpm: beats per minute; TGI: triglycerides-glucose index; LDLc: LDL cholesterol; SUA: serum uric acid.

Design and method: A pooling project combining SEPHAR III's (Study for the Evaluation of Prevalence of Hypertension and cardiovascular risk among the Adult population of Roumania III) and Brisighella Heart Study's databases was carried out selecting all subjects with common variables available and excluding frankly diabetic subjects and subjects with severe CKD, resulted in a very large database of 2903 adult subjects (52.5% females). Arterial stiffness was evaluated by aortic PWV values. TGI was calculated as serum triglycerides to fasting plasma glucose ration (mmol/L). Variables included in the multiple linear regression analysis, having PWVao as the target variable, were: age, smoking habit, sedentary, family history of premature CVD, SBP, DBP, HR, total cholesterol (TC), LDLcholesterol, HDLcholesterol, serum uric acid (SUA), eGFR and TGI.

Results: The results of the descriptive analysis of the target variables are detailed in Table 1. Multiple linear regression analysis validated TGI as predictor of increased arterial stiffness in a model that includes also age, SBP, DBP, HR, LDLcholesterol and serum uric acid, irrespective of the gender (Table 2).

Conclusions: Although having some limitation arising from the pooling design, our results offers support that Triglyceride-Glucose Index (an easy index of insulin-sensitivity, already demonstrated to be a good predictor of IMT) could serve as a predictor for increased arterial stiffness in our large sample.

THERAPEUTIC EFFECT OF SLEEP APNOEA ON ATHEROSCLEROSIS DEPENDED ON OCULAR MICROCIRCULATION SHOWN BY LASER SPECKLE FLOWGRAPHY

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Objective: Recently, obstructive sleep apnea(OSA) is reported as a risk factor for atherosclerosis. But it is difficult to predict responder of sleep apnea treatment for atherosclerosis. We examined whether there are differences in effect of OSA treatment on atherosclerosis by ocular microcirculation.

Design and method: Subjects were 109 patients with sleep apnea diagnosed with attend polysomnography in Japan. Subjects were treated with continuous positive airway pressure(CPAP) for 1year. All subjects had eye check on ocular microcirculation using laser speckle flowgraphy before CPAP treatment. Ocular microcirculation were estimated by mean blow rate(MBR) and blow out time(BOT). Influence of CPAP treatment for atherosclerosis were defined by change of intima-media thickness(IMT) using carotid ultrasonography.

Results: Mean IMT was not correlate to age, body mass index and severity of OSA in first health check data. Mean IMT was decreased significantly after 1year CPAP treatment (0.84 ± 0.6 to 0.82 ± 0.7 $p < 0.05$). There was no relationships for change of mean IMT in age, blood pressure and estimate glomerular filtration rate(eGFR) at first health check. Correlating factor for change of mean IMT were high IMT, body mass index, HbA1c, BOT and severity of OSA ($r = -0.38$, $r = 0.25$, $r = 0.43$, $r = 0.37$, $r = 0.29$. $p < 0.05$ respectively.) at first health check. Max IMT were not changed after 1year CPAP treatment. Correlating factor for change of Max IMT were age, HbA1c, eGFR and MBR at first health check.

Conclusions: Change of IMT correlate to microcirculation before CPAP treatment for OSA. These result suggesting that responder of OSA treatment for atherosclerosis could be predicted by measuring ocular microcirculation shown by laser speckle flowgraphy.

IS THERE A SEX-RELATED DIFFERENCE IN ENDOTHELIUM-DEPENDENT MICROVASCULAR RESPONSE TO ACUTE SALT LOADING IN YOUNG HEALTHY INDIVIDUALS?

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Objective: We have earlier reported that acute salt loading affects acetylcholine (ACh) induced vasodilation (endothelium-dependent) in forearm skin microcirculation in young healthy women independently of blood pressure (BP) changes. The aim of the present study was to test if there is a sex-related difference in endothelium-dependent forearm skin microvascular response to acute salt loading in young healthy individuals.

Design and method: 16 young healthy men participated in this study (age range 19–24). All subjects took 7-days low-salt (LS) diet – washout period (<3.2 g salt/day) followed by 7-days HS diet (~ 14 g salt/day). Skin microvascular blood flow measurement was done using Laser Doppler Flowmetry in response to iontophoresis of acetylcholine (ACh) before and after diet protocols. BP and heart rate (HR) were measured at the beginning of each visit (mean of three repeated measurements). 24h-urine sodium, potassium, urea and creatinine levels were measured before and after diet protocols. Salt intake was estimated based on calculation of 24-hour urinary sodium excretion.

Results: Changes in 24 h urinary sodium excretion and calculated salt intake confirmed that subjects conformed to the diet protocols. There was no significant difference in BMI and WHR before and after HS diet. There was no change in BP and HR before and after HS diet. In accordance with our earlier results obtained in young healthy women (flow change compared to basic flow: before HS diet 1797 ± 523 vs. after HS diet 1309 ± 751 , $P = 0.024$; Physiology 2016), ACh induced dilation was significantly impaired after HS diet protocol in young healthy

men as well (flow change compared to basic flow: before HS diet 2157 ± 1048 vs. after HS diet 1592 ± 586 , $P = 0.014$).

Conclusions: The results of the present study demonstrated that 7-days HS diet impairs forearm skin microvascular ACh-induced dilation independently of BP changes in young healthy men, just as we earlier reported in women. Eventhough there are many known sex-related differences in various cardiovascular responses even in healthy individuals, the results of this study suggest that one week HS loading affects endothelium-dependent vasodilation in peripheral microcirculation correspondingly in young healthy men and women.

FEMALE SEXUAL DYSFUNCTION WITH DIURETICS IN WOMEN WITH ARTERIAL HYPERTENSION

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Objective: Sexual dysfunction is more prevalent in female than in male hypertensive patients. Although the pathophysiology of female sexual dysfunction is more complex than the male one, antihypertensive drugs seem to contribute to female sexual dysfunction. The role of diuretics in female sexual dysfunction remains largely unclarified. We therefore aimed to evaluate the impact of diuretic therapy on female sexual function in hypertensive women free of sexual dysfunction.

Design and method: Consecutive female hypertensive patients between 30 and 70 years of age attending our Hypertension Outpatient Clinic who initiated diuretic therapy participated in the study. Female sexual function was evaluated at baseline and three months after diuretic initiation. Female sexual function was assessed using the Female Sexual Function Index, a validated 19-item questionnaire.

Results: In total, 218 female hypertensive patients participated in the study. Diuretics were introduced either as monotherapy in patients not taking antihypertensive drugs (58 patients) or as part of combination therapy in patients already taking angiotensin receptor blockers (103 patients) or angiotensin receptor blockers plus calcium antagonists (57 patients). Female sexual dysfunction occurred in 6/58 (10.3%) participants on diuretic monotherapy, in 18/103 (17.4%) participants on dual therapy (ARBs and diuretic addition), and in 9/57 (15.8%) participants on triple therapy (prior ARBs+calcium antagonists and diuretic addition).

Conclusions: Initiation of diuretic therapy is associated with incident female sexual dysfunction in 10–20% of women with arterial hypertension. Further studies are needed to verify our findings, enlighten the mediating mechanisms, and clarify the management of such patients.

THE IMPACT OF DIURETICS ON ERECTILE FUNCTION IN PATIENTS WITH ARTERIAL HYPERTENSION

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Objective: Erectile dysfunction is frequently encountered in hypertensive patients. Along with blood pressure elevation, antihypertensive drugs have been implicated in the pathogenesis of erectile dysfunction. Although the effects of diuretics on erectile function seem detrimental, contradictory findings are available in the literature. We therefore aimed to evaluate the impact of diuretic therapy on erectile function in hypertensive patients without erectile dysfunction.

Design and method: Consecutive male hypertensive patients between 30 and 70 years of age attending our Hypertension Outpatient Clinic who initiated diuretic therapy participated in the study. Erectile function was evaluated at baseline and three months after diuretic initiation. Erectile function was assessed using the International Index of Erectile Function, a validated 15-item questionnaire.

Results: Overall, 247 male hypertensive patients participated in the study. Diuretic monotherapy was initiated in 56 participants, while diuretics were added to prior therapy in the rest 191 participants. From the latter group, 122 were on monotherapy with angiotensin receptor blockers and 69 were on dual therapy with angiotensin receptor blockers plus calcium antagonists. Erectile dysfunction appeared in 8/56 participants (14.2%) on diuretic monotherapy, in 27/122 participants (22.1%) on dual therapy with diuretics added to ARBs, and in 14/69 participants (20.3%) on triple therapy (diuretics on top of prior ARBs plus calcium antagonists administration).

Conclusions: Diuretic-induced erectile dysfunction is common among patients with arterial hypertension. Further studies are needed to verify our findings, enlighten the mediating mechanisms, and clarify the management of such patients.

THE FIXED COMBINATION OF PERINDOPRIL/AMLODIPIN IN A THERAPY OF ARTERIAL HYPERTENSION AND ARTERIAL STIFFNESS: TWO WEEK STUDY RESULTS

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Objective: To investigate the efficiency and safety of the fixed combination of perindopril/amlodipin in a treatment of grade I and grade II arterial hypertension and arterial stiffness values after only two weeks of treatment.

Design and method: The open clinical prospective controlled study was designed. The study was designed for two weeks and two groups were formed. The first group was comprised of arterial hypertension grade I patients and group 2 of arterial hypertension grade 2. The cardiovascular risk profile was notified for all patients. The peripheral and central blood pressure, pulse wave velocity, stroke volume, augmentation index, pulse pressure, heart rate, the reflection index were analyzed before and two weeks after treatment. For the grade I arterial hypertension the fixed combination of perindopril/amlodipin was used in a dose of 5 mg/5 mg, and for grade 2 arterial hypertension dosage was 10 mg/10 mg. Therapy was given as a single tablet advised to be taken in the evening. The average grade I hypertension values were 158/92mmHg, and for grade II the average value was 162/102mmHg. The average vascular age for grade I arterial hypertension was 4.5 years, and for grade II arterial hypertension the average vascular age was 8.5 years.

Results: Results obtained from this short study showed significant lowering of blood pressure and the improvement of arterial stiffness values and in the vascular age was detected as well in both groups. The average values of arterial hypertension felt within normal range after treatment in both groups after two weeks of therapy. Patient compliance and satisfaction was notified. There were no side effects.

Conclusions: The fixed combination of perindopril/amlodipin in a dose of 5 mg/5 mg for grade I arterial hypertension and 10 mg/10 mg for grade II arterial hypertension was proven to be effective in all patients. No adverse events were observed. The compliance of patients was excellent and evening dose is more preferable than morning regime. The arterial stiffness values are not constant and permanent. They are rather flexible and arterial hypertension values major dependent. The lower arterial hypertension, the lower arterial stiffness and vascular age.

THE ARTERIAL STIFFNESS IS INFLUENCED BY THE HEMOSTATIC SYSTEM IN NON-DIABETIC HYPERTENSIVE PATIENTS

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Objective: In the general population an increased arterial stiffness is associated with a high risk of cardiovascular events. In essential hypertension high plasma fibrinogen and D-dimer levels are associated with cardiovascular damage. The aim of this study was to search for a relationship between indexes of activation of the coagulation system and parameters of arterial stiffness, such as the pulse wave velocity (PWV) and the augmentation index (AIx), in essential hypertensive patients without diabetes or renal failure.

Design and method: In 76 hypertensive patients (age 52 ± 14 y; 35 male; 30 never treated with antihypertensive drugs) we evaluated clinical and anthropometric variables, plasma level of glucose, lipids, fibrinogen and D-dimer, and creatinine clearance, PWV e AIx.

Results: Patients were subdivided into tertiles of PWV. Patients with higher PWV were older, more frequently males, had a greater percentage of antihypertensive drugs, a greater alcohol consumption, and higher fibrinogen e D-dimer levels than in patients with lower PWV.

At univariate analysis the PWV was significantly and directly related to age, BMI, systolic pressure, duration of hypertension, alcohol intake, plasma levels of glucose, fibrinogen ($r = 0.369$, $P = 0.001$) and D-dimer ($r = 0.390$, $P < 0.001$). The PWV was higher in males than females ($P = 0.036$) and in previously treated patients than in naive subjects ($P = 0.003$). At multivariate analysis including PWV as the dependent variable, PWV was independently associated with age ($\beta = 0.310$, $P = 0.015$) and D-dimer levels ($\beta = 0.222$, $P = 0.049$). At univariate analysis AIx was significantly and directly related to age, total and LDL-cholesterol, fibrinogen ($r = 0.349$, $P = 0.002$), and inversely related to diastolic pressure, and it was higher in previously treated than in never treated patients. At multivariate analysis AIx was independently associated with age ($\beta = 0.235$, $P = 0.048$) and LDL-cholesterol ($\beta = 0.328$, $P = 0.003$).

Conclusions: This study supports the hypothesis of an association of a prothrombotic state with the vascular damage of hypertension that might contribute to the cardiovascular risk in these patients.

PULSE WAVE VELOCITY AND BIOMARKERS RELATIONSHIP IN PATIENTS WITH CARDIOVASCULAR RISK FACTORS

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Objective: Relationship between pulse wave velocity (PWV) and cardiac biomarkers of ventricular and carotid intima media thickness (IMT) remains unclear. This better understanding was our main objective.

Design and method: Cross-sectional analytical study, with retrospective chart review of patients that performed central blood pressure measurement (CBPM) with Mobil-O-Graph®, had at least one of the following diagnoses: diabetes mellitus, dyslipidemia, pre-hypertension or hypertension; and a carotid doppler or an echocardiogram in the last three months before or after the CBPM. Statistical analyses with Pearson and Spearman correlation, multilinear regression for association and t test for independent sample.

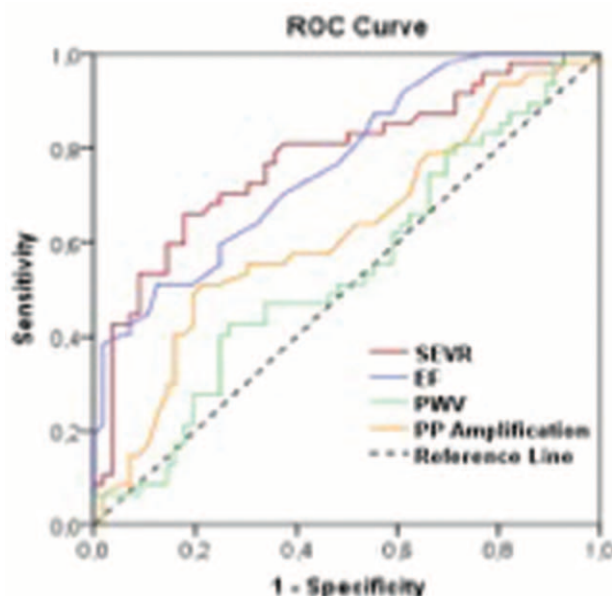
Results: 355 patients, average age 56,1 ($\pm 14,8$) years, 51% male. Correlation was observed between PWV and IMT ($r = 0,310$), PWV was also correlated with left ventricular septum and free wall length ($r = 0,191$ and $r = 0,215$) and with left atrial diameter ($r = 0,181$). The variables together were associated with PWV ($p = 0,0001$) and IMT hold an independent association with PWV ($p = 0,001$): PWV rise 2,36 m/s with 1 mm enhance in IMT. Pulse wave velocity was significantly higher in the patients with IMT superior to 1 mm ($p = 0,006$); atherosclerotic plaque less then 50% ($p = 0,0001$) equal or greater then 50% ($p = 0,003$); and target organ damage (TOD) ($p = 0,0001$).

Conclusions: PWV correlated with IMT and parameters of left ventricular hypertrophy. An independent association between IMT and PWV was observed in the patients with a higher length in carotid wall, atherosclerotic disease and TOD.

TROPONIN INCREASE AND SUBENDOCARDIAL OXYGEN SUPPLY AND DEMAND IMBALANCE IN CARDIAC AMYLOIDOSIS

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Objective: The increase in serum troponin is a known peculiarity of cardiac amyloidosis (CA). The most acclaimed hypothesis to explain this phenomenon is the direct toxicity of amyloid fibrils on cardiomyocytes, but a possible subendocardial ischemia due to discrepancy between oxygen supply and demand imbalance has not been investigated yet



Design and method: 113 outpatients, attending the Pavia Amyloid Center either for suspected or already diagnosed cardiac amyloidosis were enrolled, 58 of them were affected by CA. The subendocardial viability ratio (SEVR) was used to quantify non-invasively the relationship between subendocardial oxygen supply

and demand, obtained by analysing the central pressure waveform obtained with a high-fidelity applanation tonometry (PulsePen, DiaTecnica, Italy) and by calculating the ratio between the diastolic and systolic pressure-time indexes. Aortic stiffness was assessed measuring carotid-femoral pulse wave velocity (PWV). Echocardiogram data were used to quantify left ventricular diastolic pressure and left ventricular mass index. The SEVR was compared to plasmatic troponin I (TnI).

Results: Troponin was higher in subjects with CA than in non-affected (NCA) ($p < 0.001$). There was an inverse linear correlation between troponin and SEVR ($p = 0.002$). Troponin was strongly directly correlated with left ventricle mass index (LVMI) ($p < 0.001$), while the correlation between TnI and PWV was not statistically significant. Both the increase in TnI and the reduction of SEVR were significantly related to low values of left ventricular ejection fraction (EF%) ($p < 0.001$). The ROC curves comparing hemodynamic parameters and the SEVR showed that SEVR had a greater sensitivity and specificity (AUC = 0.778) than EF% (AUC = 0.765) and PWV (AUC = 0.539) in identifying pathological troponin values.

Conclusions: There is a close connection in patients with CA between troponin values and the reduction in the SEVR. Ischemic suffering, with undamaged coronary arteries, may be a cause of cardiac myocytes damage in amyloidosis. LVMI increasing with the disease progression and the presence of amorphous amyloid mass altering the microcirculation may limit myocardial perfusion. Moreover, amyloid alters the macrostructural organization of myofibrils, thus heart may need an increased energy-metabolic supply. SEVR assessment may improve the identification of subclinical myocardial damage in patients with cardiac amyloidosis.

SUPPLEMENTATION OF VITAMIN D IN HYPERTENSIVE PATIENTS WITH CKD STAGE 3 AND VITAMIN D-DEFICIENCY DOES NOT IMPROVE ARTERIAL STIFFNESS

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Objective: Elevated arterial stiffness has been described in hypertensive patients with CKD stage 3 and Vitamin D-deficiency in population-based cross-sectional studies. However, the role of supplementation in improving pulse wave velocity is controversial in most published series. Aim of this study is to analyze if the supplementation of VitD in never before treated hypertensive patients with CKD stage 3 and Vitamin D-deficiency modifies arterial stiffness.

Design and method: Longitudinal study in the Hypertension Unit of a district hospital in 221 consecutive hypertensive patients with CKD stage 3 (CKD-EPI 30 – 60 ml/min), not treated before with VitD and with VitD-levels < 20 ng/ml. Arterial stiffness was measured as Pulse Wave Velocity (PWV, m/s) and Augmentation Index (%) in all the patients by brachial oscillometry (MOBIL-O-GRAPH®, IEM, Stolberg, Germany). Oral Calcifediol (266 mcg/month) was prescribed to all the patients. A follow-up visit was performed after 12 months.

Results: 126 (57%) patients were women, 95 men (43%). Mean age was 74.5 ($SD \pm 9.5$), years, renal function measured by CKD-EPI was 49.3 ml/min ($SD \pm 7.2$), BP averaged 130/66 mmHg, mean number of antihypertensive drugs was 3.5. Mean levels of baseline VitD were 15.6 ng/ml ($SD \pm 6.6$), mean PWV was 11.0 m/s ($SD \pm 1.8$). At follow-up after one year, mean levels of VitD in the whole group increased to 24.2 ($DE \pm 11.5$), PWV was 11.1 m/s ($DE \pm 1.8$). 63.8% of the patients were still under supplementation with VitD at follow-up while 36.2% had stopped the treatment. In the former, VitD increased to 29.0 ng/ml versus 15.3 ng/ml in the latter. Although the significant difference between those patients who kept the treatment and those who stopped were highly significant, no significant change of PWV was found between the two groups at follow-up.

Conclusions: Correction of VitD-deficiency in hypertensive patients with CKD stage 3 and Vitamin D-deficiency is readily feasible, but in our study it did not translate into a significant change in vascular damage, measured as decrease of PWV, suggesting that the relationship between variables of arterial stiffness and VitD metabolism is not causal.

POOR CONCORDANCE BETWEEN NON-INVASIVE AND LOCALLY INVASIVE TECHNIQUES OF EVALUATION OF MICROVASCULAR MORPHOLOGY IN THE DETECTION OF HYPERTROPHIC REMODELING OF SMALL RESISTANCE ARTERIES

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Objective: The evaluation of the morphological characteristics of small resistance arteries in human beings is not easy. The gold standard is generally considered to be the evaluation of the media to lumen ratio (MLR) of subcutaneous small vessels obtained by local biopsies and evaluated by wire or pressure micromyography. 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 (SLDF) and adaptive optics (AO); both of them provide an estimation of the wall to lumen ratio (WLR) of retinal arterioles, as well as of internal and external diameters and wall cross-sectional area.

Design and method: In the present study we enrolled 12 normotensive subjects, 12 lean hypertensive patients (HP), 9 severely obese normotensive patients (ONP) and 8 severely obese hypertensive patients (OHP), undergoing an election surgical intervention. All patients underwent a biopsy of subcutaneous fat during surgery. Subcutaneous small resistance artery structure was assessed by wire micromyography and the MLR was calculated. WLR of retinal arterioles was obtained by Scanning Laser Doppler Flowmetry and AO (SLDF, Heidelberg Engineering, Heidelberg, Germany and RTX-1, Imagine Eyes, Orsay, France). In hypertensive/obese patients the characteristics of microvascular remodeling were assessed by the calculation of the remodeling and growth indices, according to Heagerty AM et al, Hypertension 1993; 21:391–391). The remodeling index quantifies the proportion of the increase in the MLR or WLR that may be explained by a re-arrangement of the same amount of wall material around a narrowed lumen (eutrophic remodeling), while the growth index quantifies the contribution of vascular smooth muscle cell hypertrophy or hyperplasia (hypertrophic remodeling). When eutrophic remodeling is present, the remodeling index is close to 100%.

Results: are reported in the Table.

	Wire Micromyography	SLDF	AO
Remodeling index HP	109%	127%	91%
Growth index HP	35%	17%	1%
Remodeling index ONP	115%	110%	112%
Growth index ONP	68%	1%	32%
Remodeling index OHP	142%	95%	83%
Growth index OHP	34%	41%	9%

Conclusions: Our data suggest that the three methodological approaches seems are not completely concordant in the detection of hypertrophic remodeling, since data provided are in relative poor agreement. The presence of a relevant proportion of hypertrophic remodeling in obese patients (Hypertension 2011; 58:29–36), observed with micromyographic approaches, is not always confirmed by non-invasive approaches.

MARKERS OF ARTERIAL STIFFNESS AND ATHEROSCLEROSIS IN HIV-INFECTED INDIVIDUALS

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Objective: HIV infection is associated with increased cardiovascular risk. Also, premature atherosclerosis is more frequent in HIV-infected individuals when compared with age-matched noninfected general population. According to 2013 ESH/ESC Guidelines for the management of arterial hypertension, carotid-femoral pulse wave velocity (cfPWV) > 10m/s, carotid wall thickening (intima-media thickness, IMT > 0.9 mm) and plaque are subclinical markers of arterial stiffness and atherosclerosis representing asymptomatic organ damage. The objective of this study is the measurement of cfPWV, IMT and identification of plaque in common carotid in HIV-infected individuals of our unit.

Design and method: cfPWV was determined by applanation tonometry using the Sphygmocor (Atcor, Australia) device in 69 male HIV-infected individuals over 50 years old (mean: 54.44 ± 3.5 years) without hypertension, diabetes mellitus and no history of cardiovascular disease. Furthermore, IMT and presence of plaque were measured in both common carotid arteries by carotid ultrasound in 44 HIV-infected individuals (mean: 54.77 ± 3.8 years). HIV history, including time of first positive HIV test and years of antiretroviral therapy, smoking (pack years), alcohol abuse, body mass index (BMI) and physical activity described as metabolic equivalents (METs) were recorded in all patients. Moreover, blood pressure and heart rate were measured and blood tests were performed for the calculation of eGFR, using MDRD formula, and lipid analysis (total, HDL, LDL cholesterol and triglycerides).

Results: Mean cfPWV was 8.56 ± 1.34m/s, mean left IMT (LIMT) 0.69 ± 0.12 mm and mean right IMT (RIMT) 0.71 ± 0.11 mm. cfPWV > 10m/s was determined in 12 out of 69 individuals (17.39%), while 4 out of 44 had LIMT > 0.9 mm (9.09%) and 5 out of 44 RIMT > 0.9 mm (11.36%). Plaque in at least one carotid was found in 12 out of 44 individuals (27.27%).

Conclusions: Aortic stiffness was increased in 17.39% of our HIV-infected population over 50 years old with no history of hypertension, diabetes and cardiovascular disease, while subclinical atherosclerosis was present in 27.27% of them. Both of these markers indicate accelerated total cardiovascular risk.

FACTORS AFFECTING CAROTID-FEMORAL PULSE WAVE VELOCITY IN HIV-INFECTED INDIVIDUALS

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Objective: Carotid-femoral PWV (cfPWV) is considered as the ‘gold-standard’ measurement of arterial stiffness. According to 2013 ESH/ESC Guidelines for the management of arterial hypertension, cfPWV > 10m/s is indicative of asymptomatic organ damage. The aim of this study is to determine possible correlation between cfPWV and HIV infection and by extension the effect of HIV infection in arterial stiffness.

Design and method: We studied 69 male HIV-infected individuals over 50 years old (mean: 54.44 ± 3.5 years) without hypertension, diabetes mellitus and no known history of cardiovascular disease. HIV history, including time of first positive HIV test and years of antiretroviral therapy, smoking (pack years), alcohol abuse, body mass index (BMI) and physical activity described as metabolic equivalents (METs) were recorded. Furthermore, blood pressure and heart rate were measured and blood tests were performed for the calculation of eGFR using MDRD formula and lipid analysis (total, HDL, LDL cholesterol and triglycerides). cfPWV and central aortic blood pressure were determined by applanation tonometry using the Sphygmocor (Atcor, Australia) device in each patient. Simple and multiple linear regression analysis were performed to predict independent variables of cfPWV.

Results: In simple linear regression analysis, cfPWV was associated with the years of HIV infection and antiretroviral therapy, age, heart rate, peripheral diastolic blood pressure and central diastolic aortic blood pressure ($p < 0.05$). In multiple linear regression analysis, years of HIV infection ($b = 0.298$, $p = 0.009$), pack-years ($b = -0.242$, $p = 0.029$) and age ($b = 0.234$, $p = 0.034$) were determined as the three independent variables of cfPWV predicting 32.3% of the variance of cfPWV ($R^2 = 0.323$).

Conclusions: Our study showed that duration of HIV infection, as well as smoking and age, are strongly associated with cfPWV in male HIV infected individuals over 50 years old without hypertension or diabetes mellitus. Therefore, HIV infection increases total cardiovascular risk through increasing arterial stiffness.

FMD CASE SERIES FROM AN EASTERN EUROPEAN UNIVERSITY ANGIOGRAPHIC CENTER

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Objective: To follow-up patients with angiographically proven fibromuscular dysplasia (FMD).

Design and method: Design: These is a case series of 10 Caucasian patients with FMD that are followed from diagnosis and up to the present time. They were diagnosed for one year among the patients who have undergone angiography for other reason. The relative percent of the patients with diagnosed FMD was 0.5% from all who have undergone angiography in University Hospital Alexandrovska.

Methods: The mean age at diagnosing FMD was around 60 years and 6 (60%) were females. Full medical history and physical examination were taken, ECG, echocardiography, carotid and renal ultrasound in all, in 9 of the cases coronary and renal angiography, in 8 extra- and intracranial angiography.

Results: The clinical presentations were unspecific – only in case there was a clear correlation between poorly controlled arterial hypertension and renal FMD inducing significant renal stenosis. All of the patients with renal FMD had hy-

pertension of various severity. Three of the patients received renal interventions (only one for FMD due to significant stenosis), one – carotid stenting for FMD. One of the patients with coronary angiography had coronary FMD of the LAD. All the others were followed and scheduled for angiography of the other vascular beds at risk.

Conclusions: This is the first registry and follow-up of patients with FMD in Bulgaria. Careful screening for subtle symptoms is vital for the early angiographic referral and special treatment if needed. There may be specific local differences in the clinical and angiographic presentation of FMD patients. This is unknown to the moment. The gathered patients through the year prompted the first National FMD Registry and a Nation-wide screening program for FMD.

STUDY ON THE PREVALENCE AND DETERMINANTS OF EARLY VASCULAR AGEING IN A COMMUNITY SETTING – PRELIMINARY RESULTS FROM THE ASINPHAR@2ACTION PROJECT

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Objective: The ASINPHAR@2action programme aims at raising awareness to early vascular ageing (EVA) through a community pharmacy-based intervention. This preliminary analysis is focused on the analysis of the proportion of participants with abnormal arterial stiffness (AS) and the definition of its main determinants.

Design and method: This preliminary analysis is a cross-sectional, observational, descriptive, non-interventional study of participants enrolled in 10 communal pharmacies in Portugal (HOLON pharmacies), between April and November 2017. Blood pressure (BP) and arterial function parameters were measured with a non-invasive validated device (MOBIL-O-GRAPH, IEM®), according to the ESH-recommendations. Clinical and demographic information was gathered, as well as the estimation of global cardiovascular risk, health related quality of life and dietary profile. Cholesterol and glycaemia were measured.

Results: Participants recruited for the project account for 658, 65.7% women, with a mean age of 57.34 ± 16.26 years (range: 20–96 years), with an average body mass index of 26.41 ± 4.48 Kg/m². Brachial BP was 126.60 ± 16.43 mmHg and 79.89 ± 11.54 mmHg, and central BP was 115.80 ± 15.35 mmHg and 81.18 ± 11.60 mmHg, respectively for systolic and diastolic BP. Mean pulse wave velocity (PWV) was 8.45 ± 2.28 m/s and the augmentation index was $23.64 \pm 15.55\%$. Significant differences were depicted as a function of gender, with males presenting higher BP and PWV. The proportion of participants with increased PWV, according to the available reference values, was 19.9%. Participants with increased PWV were significantly older and had higher brachial and central BP and BMI. Increased PWV was observed in 68.2% of the hypertensive patients, in 64% of the diabetics and in 79.5% of patients with dyslipidemia. Of notice, 12.3% of participants without known risk factors had high PWV. Multivariate linear regression indicated age ($b = 0.118$; CI: 0.113;0.122; $p = 0.001$), central BP ($b = 0.015$; CI: 0.001;0.029; $p = 0.040$) and brachial BP ($b = 0.017$; CI: 0.003;0.031; $p = 0.015$), as independent determinants of PWV.

Conclusions: The preliminary results of this pioneering large scale study measuring arterial function in communal pharmacies provides the grounds for the operationalization of subclinical target organ damage screening in pharmacies, as a strategy to improve cardiovascular risk monitoring and to promote adherence to treatment.

RAISING AWARENESS TO ARTERIAL STIFFNESS AND EARLY VASCULAR AGEING THROUGH A COMMUNITY PHARMACY-BASED INTERVENTION - PROTOCOL OF THE ASINPHAR@2ACTION PROJECT

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Objective: Vascular dysfunction is a major determinant of cardiovascular disease and overall mortality. One emerging concept refers to vascular dysfunction as an expression of early vascular ageing (EVA), through which a change in the life expectancy trajectory will increase the probability of a bad outcome in the future. Furthermore, the early reversion of this EVA process should allow for a shift in this trajectory towards a more favorable one, with benefits over the long-term.

Design and method: Hence, we designed a project to be implemented in a community setting based on the inter-play between Pharmacy Services, a Technology

Company and a Research center. The project is a national multicenter, observational and prospective project, comprising a two action structure: first phase: cross-sectional analysis to describe the epidemiologic burden of AS and EVA, to identify its main determinants, and to evaluate the concordance amongst the risk estimations provided by conventional CV risk charts and the non-invasive measures of AS obtained in the community pharmacies; second phase: cohort study, aimed at identifying the predictive value of AS when added to conventional risk factors, defining EVA based on the individual longitudinal trends of AS and cBP, and testing a model of pharmacy-based intervention as an Aggressive Decrease of Athero/Arteriosclerosis Modifier.

Results: Currently, 658 participants fulfilling the inclusion criteria were enrolled in the project. Clinical and demographic information was gathered, as well as the estimation of global cardiovascular risk, health related quality of life and dietary profile. Blood pressure (BP) and arterial function parameters were measured with a semi-automatic, validated device (Mobil-O-Graph®, IEM). A copy of the result was provided to each participant at the end of the evaluation, with an estimation of the participant's Vascular Age. Based on the data and the overall risk profile, a tailored intervention plan was designed and proposed to each participant, focusing on lifestyle, dietary counseling, and therapy adherence, and follow-up assessments were programmed for the prospective phase of the project.

Conclusions: The expected results will provide a major contribution to the understanding of the EVA process and to the definition of community-based preventive plans.

NON-INVASIVE MEASUREMENT OF AORTIC PULSE WAVE VELOCITY: A COMPARATIVE EVALUATION OF EIGHT DEVICES

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Objective: Several non-invasive devices purport to measure aortic pulse wave velocity (PWV), by applying different approaches and sensors, with the aim of evaluating cardiovascular risk. Purpose of this study is to compare the PWV measured by eight commercially available devices in patients with cardiovascular disease.

Design and method: In this study, 102 patients (70% males, mean age 65 ± 13 years) were enrolled among those who were going to undertake an elective cardiac catheterization study. For each patient, the following device was used to non-invasively evaluate aortic PWV, in a random order: BPLab, Complior Analyse, Mobil-O-Graph, pOpmètre, PulsePen-ET, PulsePen-ETT and SphygmoCor. Data were analyzed by computing the coefficient of the correlation (r) and determination (r^2) between measured values and with age of patients.

Results: The mean blood pressure, heart rate and PWV measured in the population were: 102 ± 16 mmHg, 65 ± 12 s⁻¹ and 11.2 ± 3.6 m/s. Comparative data are shown in Table 1. Devices evaluating carotid-femoral PWV (Complior Analyse, PulsePen-ET, PulsePen-ETT, SphygmoCor) presented a very strong agreement between each other ($r > 0.80$) and moderate correlation with the PWV measured by the Mobil-O-Graph (r 0.45 to 0.65), while a weak correlation was found between carotid-femoral PWV measurements and the BPLab or the pOpmètre ($r < 0.30$). A moderate-strong relationship was found between age and cf-PWV (r^2 0.20 to 0.38), whereas PWV measured by pOpmètre and BPLab showed a weak correlation with age (r^2 0.05 and 0.06 respectively). On the contrary, a very strong relationship was found between Mobil-O-Graph and age ($r^2 = 0.90$).

Conclusions: Devices measuring carotid-femoral PWV, considered the gold-standard measure for aortic PWV, present a very good agreement between each other, in our population of patients with cardiovascular disease. The Mobil-O-Graph, which estimates aortic PWV from age and blood pressure values, also present a good correlation with measures of carotid-femoral PWV. The two other measuring devices (BPLab, pOpmètre) does not provide a PWV measure in agreement with carotid-femoral PWV. Our results support the use of devices measuring carotid-femoral PWV for a proper and consistent evaluation of aortic PWV.

COMPARISON BETWEEN AORTIC PULSE WAVE VELOCITY MEASURED INVASIVELY AND NON-INVASIVELY BY EIGHT DIFFERENT DEVICES

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Objective: Aortic pulse wave velocity (PWV) is the best indicator of aortic viscoelastic properties. Aim of this study is to investigate if invasively measured aortic PWV is accurately estimated by non-invasive methods which purport to assess it.

Design and method: One-hundred and two patients (30% female, mean age 65 ± 13 years) planned to undertake a cardiac catheterization were enrolled in the study. Different non-invasive methods were evaluated for each subject by randomly alternating the following devices: BPLab, Complior Analyse, Mobil-O-Graph, pOpmètre, PulsePen-ET, PulsePen-ETT and SphygmoCor. Immediately after, aortic PWV was evaluated by aortic catheterization and simultaneous measurement of pressure wave above the aortic valve and at the aortic bifurcation (FS-Stiffcath). Invasive data were analyzed by proprietary software and compared with non-invasive PWV values by Bland-Altman analysis and paired parametric tests (for the whole population) and non-parametric tests (for quartiles of population according to PWV).

Results: Devices evaluating carotid-femoral PWV (Complior Analyse, PulsePen-ET, PulsePen-ETT, SphygmoCor) and the Mobil-O-Graph presented a strong agreement with aortic invasive PWV (respectively, Pearson $R = 0.64, 0.78, 0.71, 0.70, 0.66$), while a moderate agreement was present for the BPLab and the pOpmètre ($R = 0.23, 0.23$). In the whole population, a significant underestimation of invasive PWV was present for Complior Analyse (-0.73 m/s, $p = 0.016$), SphygmoCor (-0.61 m/s, $p = 0.024$), Mobil-O-Graph (-1.01 m/s, $p < 0.001$) and pOpmètre (-1.55 m/s, $p = 0.003$). A tendency toward the overestimation of aortic PWV for lower PWV values and the underestimation of PWV for higher values was present for all devices, and was significant for the PulsePen-ET and the BPLab in the lowest quartile ($PWV < 8.5$ m/s, $p < 0.05$) and for Complior Analyse, SphygmoCor, BPLab and Mobil-O-Graph for the highest quartile ($PWV > 13$ m/s, $p < 0.05$).

Conclusions: Devices measuring carotid-femoral PWV and the Mobil-O-Graph, which estimates aortic PWV from age and blood pressure values, present a good correlation with invasive aortic PWV in a large population with cardiovascular disease, while a less good agreement was found for other measuring devices (BPLab, pOpmètre). The underestimation of high PWV values may lead to erroneous estimation of cardiovascular risk by non-invasive devices.

SKIN FLUORESCENCE RESPONSE TO FOREARM ISCHEMIA AND REPERFUSION IS RELATED TO BODY MASS INDEX IN HEALTHY PEOPLE

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Objective: The reduced form of nicotinamide adenine dinucleotide (NADH) is involved in many redox reactions, including those related to the energy production in mitochondria when NADH is oxidized to NAD⁺. Live cell NADH content can be measured as a 460-nm autofluorescence after ultraviolet excitation. Hypoxia/anoxia during tissue ischemia ceases aerobic metabolism and leads to NADH accumulation – this effect is used by the flow-mediated skin fluorescence (FMSF) method measuring forearm skin fluorescence before, during and after short-lasting occlusion of the brachial artery caused by an inflated arm blood pressure cuff. There are many potential factors which might influence the NADH metabolism during ischemia and reperfusion. We aimed to study the relationship between body mass index (BMI) and the dynamic changes in the skin NADH during ischemia and reperfusion in healthy people.

Design and method: Fifty eight healthy people (36 women) within BMI range of $17.4\text{--}32.9$ kg/m² underwent measurement of skin fluorescence at the 460 nm light length (Angioexpert, Angionica, Poland) during 3-minute followed by a 100-second forearm ischaemia caused by inflation of the brachial pressure cuff to the pressure 60 mmHg above each participant's systolic blood pressure, and then a 3-minute reperfusion. The association between BMI and values quantifying areas under the fluorescence curve during ischemia (IAUC) and reperfusion (RAUC) as well as half-times of fluorescence increase during ischemia (tI) and fluorescence recovery during post-ischemic reperfusion (tR) was analyzed by the nonparametric Spearman correlation.

Results: Mean age of studied participants was 23.7 ± 7.9 years, their BMI 22.8 ± 3.0 kg/m², IAUC 5.7 ± 4.3 %, RAUC 5.7 ± 4.3 %, tI 36.8 ± 25.1 s, and tR 28.2 ± 11.2 s. BMI was significantly and positively correlated with IR ($\rho = 0.32$; $p = 0.0136$) and tR ($\rho = 0.39$; $p = 0.0026$), and negatively with tI ($\rho = -0.28$; $p = 0.0334$).

Conclusions: There is a significant correlation between BMI and NADH dynamic changes during transient, short-lasting ischemia and reperfusion of the

forearm skin. Healthy people with increased BMI present larger and faster increase of NADH content during ischemia, and a delayed NADH recovery during post-ischemic reperfusion. Further physiological and clinical investigations are required to explore these findings.

ASSOCIATION BETWEEN INCREASED ELASTIN TURNOVER AND LEFT VENTRICULAR HYPERTROPHY IN HYPERTONIC PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Objective: Left ventricular hypertrophy (LVH) and myocardial remodelling are signs of cardiac damage in arterial hypertension (AH). Elastin and collagen are the main proteins of the vascular wall. Arterial hypertension and diabetic vascular complications are connected with an elevated degradation of elastic tissue. As a result elastin derived peptides (EDP) are released in the circulated blood, which are a pathological stimulus for an increased production of antibodies to elastin (AEAbs). In the present investigation we studied whether the serum levels of antibodies (IgG, IgM and IgA) to elastin are related with left ventricular hypertrophy.

Design and method: To monitor the metabolism of the basement membrane protein elastin in hypertonic patients with type 2 diabetes mellitus (T2DM), serum levels of antibodies to elastin AEAbs IgG, IgM and IgA were measured using an ELISA method in 93 patients with arterial hypertension (AH) and diabetes mellitus (mean age 61.4 ± 11.3 years, diabetes duration 9.88 ± 3.12 years; hypertension duration 9.28 ± 4.98). These values were compared to serum antibodies to elastin in 42 age and sex matched controls. The Sokolow-Lyon index criteria was used to diagnose LVH via electrocardiography.

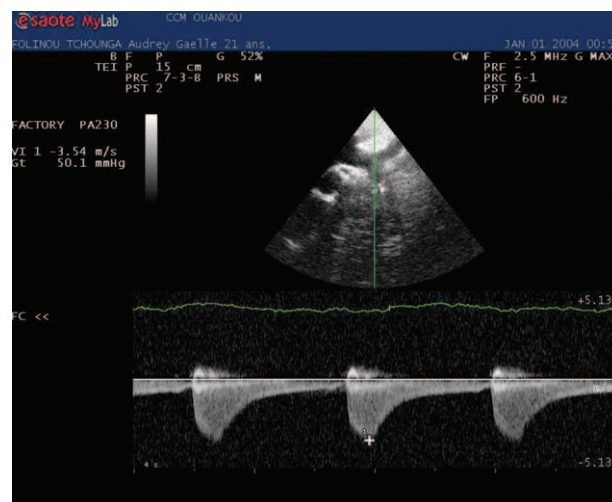
Results: Patients showed statistically significant higher levels of AEAbs IgA in comparison to healthy controls (0.41 ± 0.02 vs. 0.24 ± 0.08); ($p = 0.0003$). Serum AEAbs IgM and IgG levels in hypertonic patients with T2DM were lower than these in controls, but the differences are not statistically significant. AEAbs IgA correlated with electrocardiography estimated left ventricular hypertrophy ($r = 0.23$; $P = 0.04$).

Conclusions: We suggest that there is association between biological markers of extracellular-matrix: AEAbs IgA and clinically estimated left ventricular hypertrophy. Serum markers of elastin metabolism (AEAbs IgA antibodies) are elevated and might be valuable markers for progression of LV hypertrophy in hypertonic patients with T2DM.

COARCTATION OF AORTA IN A 21-YEAR-OLD FEMALE: A CASE REPORT

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Objective: It is a case report of a particular case of aorta coarctation associated to a superior vena cava duplicated on a 21 years old female.



Design and method: We describe a story of hypertension which lead to the diagnosis of aorta coarctation through cardiac ultrasound and confirm by angiography

Results: Three months ago, she was addressed for a cardiologist consultation after a routine check-up during which was noted elevated blood pressure values. She presented with no relevant past history. Physical examination showed blood pressures of 182/89 mmHg (left arm) and of 194/89mmHg (right arm), a bradycardia of 52 beats/minute. On cardiovascular physical assessment was recorded a systolic murmur of intensity 4/6, posterior over the thoracic spine and sub clavicular. Femoral pulses were palpable bilaterally but weak and delayed compared to the brachial pulses. Her ambulatory blood pressure measurement (ABPM) showed a permanent systolic and paroxysmic diastolic hypertension, with a daytime adrenergic component in a dipper. A regular sinus bradycardia on electrocardiographic examination with heart rate of 47 beats per minute. A mild enlarged cardiac silhouette without notching of the ribs were observed on the chest radiography. The echocardiogram showed.....(see figure below). Thoracic computerised tomographic (CT) angiography showed an aortic isthmus coarctation with a rounded arch, the presence of a duplicated superior vena cava, dilatation of collateral pathway below the coarctation to hypertrophied intercostal, internal mammary artery dilatation and Cardiomegaly with left ventricular dilatation; no lungs lesion. These findings are represented in figures below. Biological assessment done for renal function, glycaemia, lipid profile and blood uric acid level where normal. The patient was placed on Atenolol 50 mg and Nifedipine 20 mg daily then referred to cardiothoracic surgery for an angioplasty.

Conclusions: Through this case, we presented a young female with an aortic coarctation fortuitously discovered during the evaluation of an asymptomatic hypertension. Prior to surgical management, Blood pressure controlled was achieved on pharmacological treatment. The particular aspect in this case was the association of a duplicated superior vena cava.

ATTENUATION OF PULSE PRESSURE AMPLIFICATION IN ELEMENTARY SCHOOL-AGED PATIENTS WITH COMPLETE TRANSPOSITION OF GREAT ARTERIES AFTER ARTERIAL SWITCH OPERATION

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Objective: We previously reported damaged distensibility of ascending aorta in patients with complete transposition of great arteries after an arterial switch operation (ASO). It resulted in increase of pulse pressure in ascending aorta. Therefore, we examine the pulse pressure amplification in the patients.

TABLE. Blood Pressure Data

	ASO	Control	p
SBP in AAO (mmHg)	97.1 ± 9.8	92.4 ± 8.1	0.12
DBP in AAO (mmHg)	59.4 ± 8.2	58.9 ± 6.3	0.83
PP in AAO (mmHg)	37.7 ± 5.7	33.5 ± 5.3	0.04
SBP in DAO (mmHg)	100.9 ± 10.4	98.4 ± 9.9	0.48
DBP in DAO (mmHg)	61.4 ± 8.9	61.0 ± 7.4	0.88
PP in DAO (mmHg)	39.5 ± 5.1	37.4 ± 5.4	0.27
PPA (mmHg)	1.8 ± 1.6	4.0 ± 2.3	0.0052

Values are mean ± standard deviation. AAO, ascending aorta; ASO, arterial switch operation; DAO, descending aorta; DBP, diastolic blood pressure; PP, pulse pressure; PPA, pulse pressure amplification; SBP, systolic blood pressure.

Design and method: We enrolled 12 patients aged 4–9 years old, who had undergone ASO for complete transposition. A pressure sensor mounted catheter recorded pressure waveforms in ascending and descending aorta. The pressures were compared with those of age-matched 28 patients with a normal aortic arch.

Results: The patient's age was 6.4 ± 1.0 years and they underwent the ASO at 0.04 ± 0.02 years. Table demonstrated blood pressure data. The pulse pressure in ascending aorta is elevated and the pulse pressure amplification defined as pulse pressure in descending aorta minus pulse pressure in ascending aorta was significantly decreased in patients with complete transposition after ASO ($t = 2.97$, $p = 0.0052$).

Conclusions: Pulse pressure amplification is attenuated in patients after ASO and it could cause the future cardiovascular disease.

AORTIC STIFFNESS IS INCREASED IN NORMOTENSIVE PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

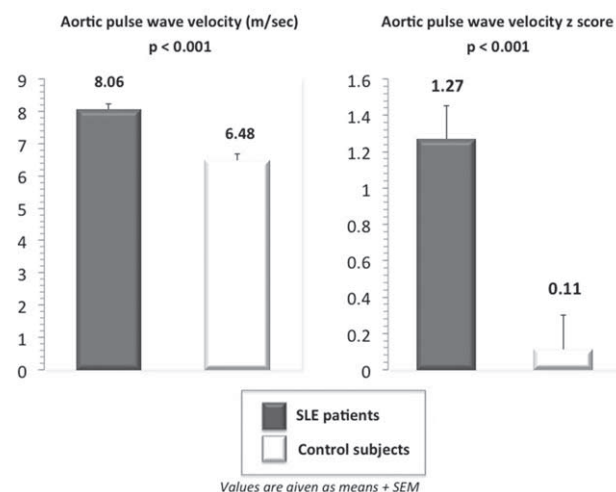
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Objective: Patients with systemic lupus erythematosus (SLE) have a 4- to 10-fold increased risk of developing cardiovascular (CV) events compared with the general population. The enhanced CV risk conferred by SLE may in part be mediated through preclinical CV damage. Large artery stiffness is usually assessed by measuring aortic pulse wave velocity (aPWV), a marker of early vascular aging (EVA) and an independent predictor of adverse CV prognosis. Several studies examined aortic stiffness in SLE with inconsistent results.

The aim of our study was to evaluate aPWV and the prevalence of EVA in a group of normotensive patients with SLE and to compare these values with those obtained in age- and gender- matched control subjects.

Design and method: Aortic PWV was measured by a validated oscillometric device (Arteriograph). EVA was identified when the age-adjusted z-score of aPWV exceeded +1.96 (EVA1). The aPWV z-score was calculated using the ratio "Observed PWV – Predicted PWV/SD Predicted", where the predicted PWV values were computed using a regression equation obtained from the healthy cohort of the European study of The Reference Values for Arterial Stiffness' Collaboration. We adopted also another definition of EVA (EVA2), wherein we included individuals with PWV values above the 90th percentile of aPWV distribution in the above mentioned population.

Results: We enrolled 57 patients with SLE, aged 37.6 ± 11 years (9% men) and 29 healthy controls, aged 37.6 ± 9 years (10% men). Aortic PWV, aPWV z score (see figure), as well as prevalence of EVA1 (12.3 vs 0%; $p = 0.049$) and EVA2 (19.3 vs 0%; $p = 0.011$) were significantly higher in SLE patients than in controls. The associations of aPWV and of aPWV z score with SLE were confirmed in multivariate models built in the overall study population, after adjustment for age, sex, BMI and mean blood pressure (both $p < 0.001$).



Conclusions: The impaired aortic distensibility we observed in patients with SLE may help to explain their increased CV risk.

VASCULAR NO AND SUPEROXIDE PRODUCTION IS INFLUENCED BY HIGH DIETARY SALT INTAKE IN TFF3-/- MICE

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Objective: Arachidonic acid metabolism and products are shown to affect vascular reactivity mechanism. TFF3-/- mice have protective phenotype of favorable ratio of w6/w-3 fatty acids and modified metabolism of arachidonic acid. However, the role of TFF3 peptide in hypertension and vascular function is still underinvestigated. The aim of this study was to assess the effect of high salt diet

on flow-induced endothelial NO and superoxide production in carotid arteries of wild type mice of mixed background C57Bl6/Sv/129 (WT) and TFF3^{-/-} knock out mice with the same background.

Design and method: Eleven weeks old male TFF3^{-/-} or WT mice were divided in 2 groups (N = 4 per group): low salt (LS) and high salt (HS; 4% NaCl for 7 days). Following dietary protocol, mice were anaesthetized with ketamine (75 mg/kg) and midazolam (2.5 mg/kg). Carotid arteries were isolated and cannulated on pressure myograph with or without flow (at delta 80 mmHg), in the absence/presence of the NOS inhibitor L-NAME. NO production was determined by DAF-2DA to DAF-2T conversion fluorescence assay. To assess the production of superoxide radicals, the carotid arteries were loaded with dihydroethidine (DHE, 20 mM). All experimental procedures conformed to the European Guidelines for the Care and Use of Laboratory Animals (directive 86/609) and were approved by institutional Ethical Committee. $p < 0.05$ was significant.

Results: Basal NO production in no-flow condition was similar among groups. L-NAME blocked the production of NO in all groups. Flow-induced NO production was decreased in HS-WT group compared to no-flow conditions in HS-WT group, and compared to LS-WT group and LS-TFF3^{-/-} group ($p < 0.05$). There were no changes in endothelial NO production in TFF3^{-/-} mice. Superoxide production was increased in LS-TFF3^{-/-} no-flow group compared to LS-WT in no-flow condition. Flow-induced superoxide production was increased in both HS-WT and HS-TFF3^{-/-} groups compared to corresponding LS groups.

Conclusions: HS intake decreases flow-induced vascular NO production in WT mice probably due to increased oxidative stress. However, HS intake does not affect NO production in TFF3^{-/-} mice even though superoxide levels are increased in basal levels and in flow conditions, suggesting protective role of this phenotype on NO bioavailability.

MODEST EFFECT OF HIGH SALT DIET ON INFLAMMATORY BIOMARKERS IN SPRAGUE-DAWLEY RATS

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Objective: A number of recent studies emphasize low-grade vascular inflammation as important pathophysiological mechanism underlying endothelial dysfunction in hypertension. Since high dietary salt intake is known causal factor of endothelial dysfunction even without increases in arterial blood pressure, the aim of this study was to assess the effect of 7-days high salt intake on serum proinflammatory cytokines' levels and their genes expression in cerebral blood vessels of normotensive Sprague-Dawley rats.

Design and method: 11-weeks old healthy male rats (N = 7–10/per group) were divided in two groups: low salt (LS) group fed 0.4% NaCl chow and HS group fed 4% NaCl chow for 1 week. After dietary protocol rats were anaesthetized with ketamin-chloride (75 mg/kg) and midazolam (2.5 mg/kg), blood pressure measured with intraarterial catheterization and rats were sacrificed. Serum samples for ELISA and all surface cerebral blood vessels for mRNA gene expression analysis of TNF- α , IL-1, IL-6, GRO- α , ICAM-1, VCAM-1 and MCP by real-time quantitative PCR (rtPCR; BioRad CFX96) were collected and analyzed by Student t-test. $p < 0.05$ was considered significant. All experimental procedures conformed to the European Guidelines for the Care and Use of Laboratory Animals (directive 86/609) and were approved by the local Ethical Committee.

Results: Serum level of TNF- α was significantly increased after high salt diet ($p = 0.021$) without significant changes of other parameters. Gene expression of investigated genes in cerebral blood vessels was not significantly changed ($p > 0.05$).

Conclusions: The results of the present study demonstrated that 7-days HS diet only modestly influences cytokine production in cerebral blood vessels.

POSTER SESSION

POSTERS' SESSION PS20:

ATHEROSCLEROSIS AND MOLECULAR FOUNDAMENTS

GENETIC POLYMORPHISM OF SURFACTANT PROTEIN D MAY BE ASSOCIATED WITH OBSTRUCTIVE SLEEP APNOEA

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Objective: Surfactant protein D (SP-D) are clinically established as potential serum biomarkers for in lung diseases including obstructive sleep apnea (OSA). Serum SP-D levels are affected by genetic variants. This case-control study was conducted to explore the association between genetic variations in SP-D gene and OSA.

Design and method: 169 patients with severe OSA and 176 patients without OSA were consecutively enrolled from the Hypertension center of the People's Hospital of Xinjiang Uygur Autonomous Region. Circulating SP-D in the serum were measured using an enzyme-linked immunosorbent assay, and two single-nucleotide polymorphisms (SNPs) in the SFTPD gene (rs721917 and rs2243639) were genotyped by KASP using genomic DNA extracted from blood samples.

Results: (1) Patients with severe OSA showed significantly greater body mass index ($P < 0.001$), neck circumference ($P < 0.001$) and abdominal circumference ($P < 0.001$) but lower concentration of serum SP-D ($P = 0.032$) compared with those in controls. (2) The distributions of genotypes and alleles of rs721917 showed significant differences between controls and severe OSA ($P < 0.05$) in total and overweight and obese subjects ($P < 0.05$), as well as genotypes of rs2243639 in overweight and obese subjects ($P < 0.05$). (3) Furthermore, logistic regression analysis revealed that the CT and TT genotype of rs721917 were protective factors for severe OSA patients, adjusting for sex, BMI, cigarette smoking and alcohol consumption [TT: OR (95% CI): 0.318 (0.126–0.802), $P = 0.015$; CT: OR(95%CI): 0.217 (0.107–0.439), $P < 0.0001$]. There was significant difference in apnea hypnea index (AHI), hypnea index (HI) and apnea index (AI) of the genotypes of rs721917 in the recessive gene model. Patients with TT+TC genotypes displayed significant higher AHI, HI and AI compared with patients with CC genotypes ($P < 0.05$).

Conclusions: Serum SP-D concentration were significantly lower in patients with severe OSA than in the patients without OSA, partly because of the different distributions of genotypes and alleles of rs721917 in SFTPD gene.

USING THE NEW DEFINITION OF HYPERTENSION FROM THE 2017 U.S. GUIDELINE FOR HIGH BLOOD PRESSURE (BP) IN ADULTS: CHANGES IN CONTROL OF HYPERTENSION IN A SAMPLE OF OUTPATIENT CLINICS

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Objective: The 2017 AHA/ACC Hypertension Guideline (HGL) lowers the threshold for defining hypertension (HTN) to BP > 130/80 mmHg and sets treatment targets for most to < 130/80 mmHg. We examined the impact of these changes on control rates compared to JNC-7.

Design and method: 16 Family Medicine clinics in South Carolina, U.S. participated in a six month hypertension quality improvement program in 2017. BP data from patients with at least one visit during the intervention period (16,344) were analyzed to compare changes in BP control using JNC-7 criteria (BP control < 140/90 mmHg) to those in the new HGL (BP < 130/80 mmHg).

Results: Applying the new HGL more than doubles prevalent uncontrolled hypertension, from 5,534 to 11,191 patients. These additional 5,657 adults with a visit during the intervention period would be reclassified as uncontrolled, and HTN control prevalence would decline more than one-half from 65.6% to 30.8%.

Among specific sub-groups, control rates decreased from 65.4% to 35.0% for patients greater than or equal to 65 years of age, from 68.4% to 31.8% for white patients, and from 59.4% to 23.7% for African Americans.

Conclusions: The impact of the new HGL compared with JNC-7 reduces control rates more than 50% in our sample. Variation exists among sub-groups, with the largest decrease in BP control of 60% occurring in African Americans.

ENDOTHELIAL DYSFUNCTION IN PATIENTS WITH ASYMPTOMATIC ATHEROSCLEROSIS AND RHEUMATOLOGIC DISEASES

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Objective: High cardiovascular morbidity and mortality in patients with rheumatologic diseases is well documented, while mechanisms of the development of cardiovascular complications in these patients are controversial. Endothelial dysfunction as a result of chronic inflammation is believed to be one of the major contribution factor. The present study was aimed to assess endothelial function in different rheumatologic diseases compared to subjects with early markers of atherosclerosis.

Design and method: The study included 50 patients with systemic sclerosis (SSc), mean age 52 ± 13.3 years, m/f - 1/49, 40 patients with rheumatoid arthritis (RA), mean age 54 ± 12.1 years, m/f - 6/34; 50 patients with asymptomatic atherosclerosis (patients with 3 or more traditional factors of cardiovascular risk, thickening of intima-media complex of carotid arteries more than 0.9 without clinical signs of CVD), mean age 52 ± 8.9 years, male/female 16/34. To determine normal reference levels of ADMA, a group of 10 healthy blood donors with no cardiovascular risk factors was included. Endothelial dysfunction was determined by two methods - serum ADMA measurement and instrumental technique (reactive hyperemia index (RHI) less than 1.6 measure by the EndoPat2000 device).

Results: Tab.1

	SSc N=50	RA N=40	Atherosclerosis N=50	Control N=10	P
Group number	1	2	3	4	
RHI (Me)	1,46 (1-1,84)	2,0 (1,6-2,3)	1,87 (1,61-2,3)	2,3 (1,9-2,6)	1 vs 2, 3, 4
RHI<1,6 n (%)	25 (50%)	11 (27,5%)	14 (28%)	0	1 vs 2, 3, 4
ADMA, $\mu\text{mol/L}$ (Me)	0,64 (0,50-0,7)	0,60 (0,55-0,7)	0,53 (0,48-0,6)	0,51 (0,45-0,58)	1 vs 4, p=0,03

Conclusions: SSc patients demonstrated endothelial damage both by vasomotor dysfunction and high ADMA level compared to patients with atherosclerosis and even RA. This fact can explain the accelerated rate of development of atherosclerosis in patients with SSc, shown in numerous studies.

SERUM ZINC VALUES AND ANKLE BRACHIAL INDEX IN HEMODIALYSIS PATIENTS

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Objective: Atherosclerosis is accelerated in hemodialysis patients. There is a proposed link between Zinc level and atherosclerosis, but this relationship remains unclear.

The aim of our study was to determine a possible relationship between serum Zinc values and ankle-brachial index as a non-invasive diagnostic marker for atherosclerosis in chronic hemodialysis patients.

Design and method: 62 hemodialysis patients were enrolled in our study (mean age 61.2 ± 13.8 years, ranged from 30 to 85 years). The ankle-brachial index was determined using a non-invasive, automated ankle-brachial index measuring device (ABPI MD, MESI[®], Slovenia), based on oscillometric method. Serum Zinc values were measured by standard laboratory methods. The patients were divided into two groups using the median value of Zinc (14.1 $\mu\text{mol/L}$) as a cut-off.

Results: The Zinc values ranged from 9.2 to 23.5 $\mu\text{mol/L}$ and the ankle-brachial index values ranged from 0.8 to 1.4; majority of enrolled patients (82.3%) had

arterial hypertension, 15 (24.2%) patients had diabetes and 23 (37.1%) of them were smokers or ex-smokers. Using t-test statistically significant difference of ankle-brachial index values between the groups was found ($p = 0.036$). The patients with lower Zinc values had lower ankle-brachial index.

Conclusions: The results of our study showed that lower serum Zinc levels are associated with lower ankle-brachial index in hemodialysis patients.

EVALUATION OF APOPTOSIS IN LYMPHOCYTES FROM PATIENTS WITH ACUTE CORONARY SYNDROMES

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Objective: The aim of our study was to evaluate apoptosis in lymphocytes from patients with acute myocardial infarction (AMI) and unstable angina pectoris (UAP).

Design and method: Our study has been done on 16 patients aged 43–88 years old 12 male and 4 female admitted in Cardiovascular Clinique for AMI: 7 patients and for UAP: 9 patients. Isolation of lymphocytes from peripheral blood of patients and controls has been done according with biochemical methods using RPMI 1640 medium.

Evaluation of protein concentration has been done by Lowry method. Suspension of cells from patients and controls for cell culture has been divided into: negative control (sample +PRMI complete) and suspension for apoptosis induced with cycloheximide for determination of Caspase3. CASPACE assay has been used for evaluation of Casp3 activity. In patients with AMI marker enzymes: LDH, CK, CKMB presented higher values than in controls. Verification of experimental results has been done by evaluation of Casp3 activity in tumoral K526 cells in the presence or absence of inducer.

Results: Our data have pointed out that the quantity of p nitroaniline liberated following enzyme activity was almost to 1/2 in patients with AMI and UAP, suggesting a decreased level of Casp.3 activity. A correlation has been made between basal proliferative capacity of lymphocyte and caspase 3 activity in AMI patients; the increase in basal proliferative capacity of lymphocytes is accompanied by a reduction in casp.3 activity in AMI patients, while in controls proliferative capacity of lymphocytes is decreased and apoptosis intensity is increased.

Conclusions: We can conclude that anti-inflammatory potential is strongly expressed in cardiovascular pathology while the apoptosis intensity is reduced.

ASSOCIATION OF TASK-3 GENETIC POLYMORPHISMS WITH OBSTRUCTIVE SLEEP APNOEA

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Objective: Objectives: To evaluate the relationship between human TASK-3 gene polymorphisms and obstructive sleep apnea (OSA), and to explore the genetic mechanism of OSA

Design and method: Methods: 176 subjects with non-OSA and 169 subjects with severe OSA by full night polysomnography were selected. We chose three represent single nucleotide polymorphisms (SNPs) such as rs2615374, rs3808403 and rs888345, according to principle of linkage disequilibrium ($r^2 > 0.8$) and minimum allele frequency (MAF) $> 5\%$. Blood samples were collected from all subjects and genotyping was performed on DNA extracted from blood cells by Kompetitive Allele Specific PCR.

Results: The significant differences in additive model (GG 39.2% vs 52.1%, AG 47.5% vs 39.9%, AA 13.3% vs 8.0%, $P = 0.047$), alleles (A 37% vs 27.9%, G 63% vs 72.1%, $P = 0.014$) and dominant model (GG 39.2% vs 52.1%, GA+AA 60.8% vs 47.9%, $P = 0.02$) of rs2615374 were observed between severe and non OSA subjects. The distributions of additive (CC 23.3% vs 35.9%, CT 61.6% vs 43.1%, TT 15.1% vs 21.0%, $P = 0.005$) and dominant model (CC 23.3% vs 35.9%, CT+TT 76.7% vs 64.1%, $P = 0.015$) of rs3808403 were also significantly different between two groups. CT+TT genotype of rs3808403 was considered as risk factors for Severe OSA (CT+TT: [OR] = 2.09, 95%CI: 1.16–3.78, $P = 0.014$). In addition, Mutant group of rs2615374 and rs3808403 showed significantly higher triglyceride levels than wild group.

Conclusions: Conclusions: The polymorphisms of rs2615374 and rs3808403 in the TASK-3 gene were associated with incidence of OSA, and CT+TT genotype of rs3808403 locus was a risk factor for severe OSA among the Chinese people. However, further studies should be conducted to confirm this association.

THE IMPLICATIONS FOR DIFFERING NATIONAL BLOOD PRESSURE GUIDELINES

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Objective: The scrutiny of volunteer donors, an ostensibly healthy group of adults, frequently includes blood pressure measurement before donation. Abnormal findings are an opportunity to counsel donors who might be unaware of a health risk. Against this background, we decided to compare the effect that the different European and American guidelines might have on the proportion of donors earning notification for being hypertensive.

Design and method: Blood pressure records for all volunteers presenting for donation during 2015 and 2016 were reviewed. Blood pressure was measured using automated (Welch Allyn, ProBP). Donors were categorized by blood pressure according to the 2016 guidelines of the European Society of Cardiology (ESC) and the 2017 guidelines of the American College of Cardiology/American Heart Association (ACC/AHA).

Results: There were 246,112 participants, 50.9% and 49.1% were female and male respectively. The average age for the entire group was 37 ± 16.9 years. Fewer individuals had normal blood pressure by the ACC/AHA guidelines. Results are shown in the table.

	Normal <120/<80	ACC/AHA Elevated 120-129/<80	Hypertension $\geq 130/\geq 80$	Normal $\leq 129/\leq 84$	ESC High Normal 130-139/85-89	Hypertension $\geq 140/\geq 90$
Male%	35.8	16.1	48.1	61.9	20.0	18.1
Female%	59.5	9.8	39.8	80.1	12.1	7.9

Blood pressures for each category are shown in mmHg

Conclusions: Blood donation is confirmed as a valuable opportunity to give donors information about health risk. However, given lack of concordance between the ESC and ACC/AHA guidelines for blood pressure, donors will not receive a consistent message. It will hinge on future long term studies of health outcomes to show if some individuals are left untreated when the European guidelines, which have a more generous upper limit of normal blood pressure, are followed or some individuals are treated needlessly by the American guidelines which define hypertension at a lower blood pressure.

RELATIONSHIP OF ENDOTHELIAL FUNCTION AND CIRCADIAN INDEX OF BLOOD PRESSURE IN PATIENTS WITH ARTERIAL HYPERTENSION AND CORONARY ARTERY DISEASE

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Objective: To study the relationship of vasomotor endothelial function, biochemical markers of endothelial dysfunction with circadian index (CI) of blood pressure (BP) in patients with arterial hypertension (AH) and coronary artery disease (CAD).

Design and method: 103 subjects were randomized into 2 groups: group I - 56 patients (mean age 56.1 ± 0.8 years) with AH, group II - 47 patients with AH and CAD (mean age 54.2 ± 1.3 years). Patients in both groups were matched for gender, body mass index (BMI), CI of BP (dippers with CI 10–20% and nondippers with CI $< 10\%$), level of endothelium-dependent vasodilation (EDVD) $> 10\%$ and $< 10\%$. 24-hour BP monitoring, EDVD, level of hsCRP and endothelin-1 were evaluated.

Results: The comparison of two groups revealed no significant difference in EDVD level. Male patients showed a decrease in EDVD in response to AH and CAD (males: I group – $6.42 \pm 0.91\%$, II – $8.21 \pm 1.23\%$; females: I group – $9.83 \pm 0.78\%$, II – $8.34 \pm 1.09\%$). In group with AH significant differences in EDVD between male and female patients were detected ($6.42 \pm 0.91\%$ vs $9.83 \pm 0.73\%$, $p < 0.05$). The lowest EDVD was observed in patients-nondippers of II group (I group: dippers – $12.73 \pm 2.30\%$, nondippers – $7.36 \pm 0.72\%$, $p < 0.05$; II group: dippers – $11.41 \pm 1.59\%$, nondippers – $6.32 \pm 1.40\%$, $p < 0.05$). Patients with AH and CI dippers and nondippers differed in the level of endothelin-1 in plasma (2.48 ± 0.89 fmol/l and 9.81 ± 2.65 fmol/l, $p < 0.05$). In group I in nondippers there was marked increase of hsCRP (3.47 ± 0.67 mg/l and 1.22 ± 0.35 mg/l, $p < 0.05$). In patients with AH and CAD no difference was revealed.

Conclusions: Relationship of CI of BP with indicators of vasomotor endothelial function and markers of inflammatory response of the vascular wall may be associated with the course of AH and determine the development of adverse events in patients with AH and AH combined with CAD.

THE EFFECT OF PCSK9 INHIBITION ON BIOMARKERS OF ATHEROSCLEROTIC PLAQUE DESTABILIZATION RELEASE IN HYPERTENSIVE PATIENT WITH DYSLIPIDEMIA

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Objective: The inflammatory processes play a crucial role in atherogenesis is reflected by the presence of large amounts of inflammatory cells, mainly monocytes/macrophages and T lymphocytes, within the atherosclerotic plaque. The aim of the study was to assess the effect of PCSK9 inhibitors on the serum levels of vulnerable plaque markers such as sCD40L, OPN, OPG, MMPs and MPO in hypertensive patients with dyslipidemia

Design and method: 12 hypertensive patients with dyslipidemia and ultrasound view of atherosclerotic plaque were included to the group of PCSK9 inhibitors treatment. Lipid profile and biomarkers level were determined at the beginning of the study and 90 days of treatment. In case of rupture plaque suspicion we decided to perform Carotid MRI and analyse structure of atherosclerotic lesions

Results: Compared to healthy subjects (n = 14), hypertensive patients exhibited higher baseline levels of all biochemical markers of atherosclerotic plaque progression. PCSK9 inhibitors decreased the level of all our markers, but this effect did not correlate with their lipid-lowering. Our study suggests that the beneficial effect of hypolipemic drugs involves their inhibitory action on the secretory function of macrophages and platelets potential.

Conclusions: This lipid-independent action is well known for statins than for PCSK9 inhibitors. The treatment-induced reduction in the release of cytokines and plaque destabilization markers may contribute to the clinical effectiveness of PCSK9 inhibitors in the therapy of atherosclerosis. Both method -Carotid MRI together with plasma marker levels can provide accurate information of plaque formation.

THE RELATIONSHIP BETWEEN OBSTRUCTIVE SLEEP APNOEA AND TASK-1 GENETIC VARIANTS

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Objective: Acid-sensitive K⁺ channels (TASK-1) are sensitive to changes in extracellular pH in the physiological range, which have been implicated in peripheral and central respiratory chemosensitivity. We sought to assess the association between the human TASK-1 gene and obstructive sleep apnea (OSA).

Design and method: 154 severe OSA patients and 156 non-OSA individuals were genotyped for 2 Single nucleotide polymorphisms (SNPs) of the human TASK-1 gene (rs1275988 and rs2586886) by a Kompetitive Allele Specific PCR genotyping system. The data was assessed for 3 groups: total, non-obese and obese groups.

Results: There were no significant differences in the genotype distribution, allele frequencies, Implicit model and dominant model of SNPs (rs1275988 and rs2586886) between severe OSA groups and non-OSA groups in the total. In further stratified analysis, For obese subjects, the distribution of SNPs (rs1275988 and rs2586886) genotype distribution, allele frequencies, Implicit model (GG+GA vs AA) and dominant model (GG vs AA+GA) showed a significant difference between severe and non OSA groups. The Multivariate logistic regression analysis showed that the AA genotype was a protective factor for OSA, The odds ratio (OR) of rs1275988 and rs2586886 were 0.340 and 0.283 respectively. Other factors, such as middle older age, BMI, abdominal circumference and triglyceride level were also independent risk factors for OSA in our multivariate logistic regression model.

Conclusions: AA genotype of rs1275988 and rs2586886 in TASK-1 may be a protective genetic markers to OSA for obesity patients

GENETIC POLYMORPHISMS OF SURFACTANT PROTEIN-B AND RISK OF OBSTRUCTIVE SLEEP APNOEA

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Objective: To investigate whether polymorphisms of the gene regulating surfactant protein B (SP-B) has any bearing on individual susceptibility to the development of obstructive sleep apnea (OSA).

Design and method: A total of 345 subjects (169 severe OSA patients, 176 controls), confirmed using polysomnography (PSG), were continuously recruited

from the Hypertension Center of the People's Hospital of Xinjiang Uygur Autonomous Region China from April to December 2016. Three candidate single nucleotide polymorphisms (SNPs) of the SP-B gene (rs1130866, rs2077079 and rs3024791) were selected and the genotype distributions were determined using the Kompetitive Allele Specific PCR genotyping system.

Results: The frequencies of rs1130866 genotypes CC, CT and TT were 60.87%, 32.3% and 6.83% in severe OSA group, and 42.35%, 49.41% and 8.24% in the non-OSA group respectively. The frequencies of polymorphic in additive, allele and recessive model showed statistically significant difference between severe OSA and non-OSA group (P < 0.05). After adjustment of age, gender, BMI, smoking and alcohol history, multivariate linear regression showed that OR of genotype CC in recessive model to OSA is 2.885 (95%CI, 1.657–5.023, P < 0.001). However the frequencies of polymorphic genotypes of rs2077079 and rs3024791 showed no significant difference between the two groups (P > 0.05).

Conclusions: SP-B polymorphism (rs1130866) may be involved in the process of the loss of a potential N-linked, amino-terminus glycosylation site of pro-SP-B and may be related to OSA by the surfactant dysfunction in severe OSA subjects.

CARDIOVASCULAR RISK STRATIFICATION IN YOUNG POPULATION: APPLICATION OF THIOL REDOX PROTEOMICS

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Objective: Cardiovascular (CV) diseases are the leading cause of death in developed countries and present high prevalence in developing countries. Nevertheless, there are no biomarkers available to detect the causal physiopathological process of the clinical illness, implying a high socioeconomic impact. Nowadays, CV risk estimators focus on age as the most important risk factor in CV events and mortality. The current study is focused on CV risk stratification attending to oxidative stress for the discovery of new markers for early detection of the physiopathological process.

Design and method: 24 blood samples from a cohort of patients in average age of life (30–50 years old) classified in 3 groups of study according to their CV risk (healthy controls, patients with CV risk factors and patients with reported CV event in the last 3 years) were analyzed using FASIOX, a novel strategy for analysis of the dynamic thiol redox proteome. To our knowledge, this study constitutes the first description of reversible Cys oxidation in human plasma according to CV risk stratification.

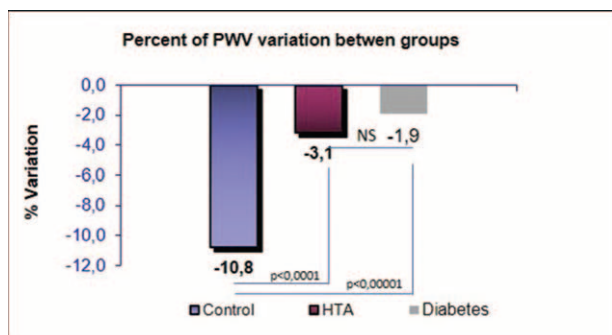
Results: We identified that reversible oxidations are decreased in CV events individuals compared with healthy subjects. Only proteins involved in coagulation cascade have reversible oxidations increased in CV events, biologic function directly linked with CV pathology, whose alteration could result in a CV event. We have also showed down-regulation of proteins involved in antioxidant respond, which is in line with the loss of redox homeostasis in CV events.

Conclusions: CV events present a severe oxidative stress, exceeding antioxidant mechanisms as reversible oxidations of Cys, generating irreversible oxidations that together with the down-regulation of redoxins, generate an increase of molecular damage. The present draft of redox targets together with the quantification of protein and oxidative changes may help to better

COMPARISON OF ENDOTHELIAL FUNCTION BY MEANS OF FLOW MEDIATED DILATION USING CAROTID-RADIAL PULSE WAVE VELOCITY IN HYPERTENSIVE SUBJECTS WITH AND WITHOUT TYPE II DIABETES

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Objective: To assess endothelial function in a cohort of hypertensive subjects with and without type 2 diabetes in comparison with normal subjects



Design and method: We studied carotid radial PWV in 881 subjects, 564 hypertensives aged 60 ± 12.5 years old (281 men aged 58.4 ± 12.8 years old & 283 women aged 61.5 ± 12.1 years old), 142 diabetic-hypertensives aged 62.9 ± 10.9 years old (74 men aged 63.3 ± 10.4 years old and 68 women aged 62.4 ± 11 years old) and 175 healthy subjects aged 54.7 ± 14.3 years old (61 men aged 49.2 ± 15.7 & 114 women aged 57.6 ± 12.9 years old) by means of Complior® before and after 3 min of brachial ischemia induced by sphygmomanometer cuff compression

Results: Healthy people reduced PWV 10.8% ($p < 0.0001$) (-8.0% among men and -14.1% among women) meanwhile hypertensives reduced 3.1% (-4.1% among men and -2.1% among women) and in hypertensive diabetics variation was -1.9% (-3.4% among men and -0.4 among women)

Conclusions: Hypertensive diabetics had more but non-statistically significant endothelial dysfunction in comparison with hypertensive non-diabetic subjects and this disturbance can be assessed easily by means of carotid-radial PWV after induced ischemia

THE IMPACT OF MASKED AND WHITE COAT HYPERTENSION ON APELIN AND RELAXIN PLASMA LEVELS

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Objective: Objective: Recent evidence demonstrates that masked hypertension (MH) is a significant predictor of cardiovascular disease, while white-coat hypertension (WCH) a common phenomenon is associated with impaired endothelial function, increased cardiovascular risk and is considered as a prognostic marker for the development of established hypertension. Hypoapelinemia and hyporelaxinemia may contribute to vascular damage accelerating atherogenesis.

Aim of our study was to examine the apelin and relaxin plasma levels in patients with MH and compare the findings to those with white coat effect matched for age, sex, body mass index and the rest of risk fact

Design and method: Our findings and the comparisons between the two groups are shown in the table below.

Results: Out off one hundred-thirty (60 M, 70 F) healthy subjects mean age 45 ± 12 underwent 24 hour ambulatory blood pressure monitoring (ABPM), 24 individuals (8 M, 16 F) had MH (daytime systolic blood pressure 135 mmHg or daytime diastolic blood pressure 85 mmHg - group A) and 32 healthy subjects (20 M, 12F) had WCH. Apelin and relaxin plasma levels were determined in both groups (ELISA method).

Results: Our findings and the comparisons between the two groups are shown in the table below:

Group A (n = 24)	Group B (n = 32)	p
Apelin (pg/ml)	200 ± 111	305 ± 127 < 0.01
Relaxin (pg/ml)	35.2 ± 6.7	46.8 ± 23.6 < 0.01

Conclusions: Our findings suggest that subjects with MH have significantly lower apelin and relaxin levels compared to WCH individuals. This observation may have prognostic significance for future cardiovascular events in subjects with MH compared to WCH subjects and needs further investigation.

RISK OF ATHEROSCLEROTIC PLAQUE RUPTURE IMAGING AND BIOCHEMICAL METHODS CHARACTERIZATION - PILOT STUDY

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Objective: Atherosclerosis imaging strategies can delineate characteristics of plaques at risk of rupture and thrombosis in hypertensive patients. Structural plaque imaging identifies high-risk plaque features including lipid pools, thin fibrous caps, and intraplaque hemorrhage, among others. New biochemical techniques complement structural imaging approaches such as concentration of osteopontin, osteoprotegerin, metalloproteinase 3 and sCD140.

Design and method: Study group consist of 10 patients with atherosclerotic plaque undergoing MR of the carotid arteries (or CT if contraindicated) before treatment. The concentration of plasma biomarkers of destabilization of the atherosclerotic plaque was marked using ELISA kits. The examination of the carotid arteries and IMT in the extracranial segment was performed using ultrasound with linear head with a frequency of 7.5–10 MHz. Carotid Magnetic Resonance exams was performed on the scanner with a field strength of at least 1.5 T with dedicated software to perform carotid artery and analysis of structure of atherosclerotic lesions. Statistical analysis was performed using ANOVA test, Wilcoxon or Kruskal-Wallis.

Results: The mean age of patients was 58.4 years. 7 were males. Before treatment all of plaque was characterized as vulnerable. Based on the predominant components of the plaque, plaques were characterized as lipid (3), lipid with recent hemorrhage (2), fibrous (2), fibrofatty (1), fibrofatty with some hemorrhagic components (2). Moreover, we observed increase in the concentration of osteopontin, osteoprotegerin, metalloproteinase 3 and positive correlation with sCD40L.

Conclusions: Based on preliminary data, it can be concluded that diagnostic Imaging methods together with biochemistry markers can provide complete information about the plaque characteristics in hypertensive patients.

POSTMENOPAUSAL FEMALE PATIENTS WITH ARTERIAL HYPERTENSION: INFLAMMATORY MARKERS IN THE PATHOGENESIS OF SUBCLINICAL ATHEROSCLEROSIS AND OSTEOPOROSIS

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Objective: To study the role of markers of vascular inflammation as a predictor of cardiovascular and degenerative bone complications in postmenopausal female patients with arterial hypertension (AH) and osteoporosis

Design and method: 113 patients (mean age 58.23 ± 6.45 years) were divided into three groups. Group 1 included 39 healthy female, Group 2 included 30 postmenopausal female patients with AH, Group 3 consisted of 44 postmenopausal females with AH and osteoporosis. The parameters of 24-hour blood pressure monitoring; pulse wave velocity (PWV) as a sign of subclinical atherosclerosis measured on sphygmography Vasera VS-1000 Series (Fukuda Denishi, Japan), osteodensitometry performed on the spiral computed tomography Siemens Somatom Emotion (calcium content CA-HA, standard deviation of the peak T – Score); lipid profile parameters, inflammatory markers (hs-CRP, TNF-alpha, homocysteine, interleukine (IL) 1 b, 6, 8, uric acid); endothelial dysfunction markers (endothelin-1, nitrites) and sex hormones like estradiol, progesterone and testosterone were measured.

Results: The levels of estradiol and progesterone were significantly higher in Gr.1 ($p = 0.0001$). The levels of mean 24-h and daytime systolic BP (SBP), time and square indices, in night time SBP and SBP variability; PWV/LR; total cholesterol, triglycerides, LDL cholesterol, APO-B, hs-CRP, TNF-alpha, IL 6, endothelin-1 and uric acid have been above the reference value in Gr. 2 and 3. Besides, in there groups positive correlations between mean 24-h SBP, SBP variability in the daytime, total cholesterol, IL6, homocysteine, endothelin-1 with PWV were registered ($p < 0.05$). With an increase of the levels of endothelin-1 and homocysteine on 1 fmol/l the risk of high rate PWV > 10 m/s increased by 2.6 times and 35%, respectively. In Gr.3 positive correlation between T – Score with the level of IL1 b, TNF-alpha, PWV, age and negative correlation with progesterone were detected ($p < 0.05$)

Conclusions: The markers of the inflammatory response can be a general link of pathogenesis, combining subclinical manifestations of atherosclerosis (pulse wave velocity) and osteoporosis in postmenopausal female patients with arterial hypertension.

POPULATION STUDY OF THE FREQUENCIES OF CYP17A1-NT5C3 RS11191548 AND PLEKHA7 RS381815 IN BULGARIANS (EASTERN EUROPEAN POPULATION)

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Objective: These are the preliminary results of a population study of the frequencies of the polymorphisms (SNP) rs11191548 of gene CYP17A1-NT5C3 (CC variant – higher risk) and SNP rs381815 of gene PLEKHA7 (higher risk for the T allele) in an Eastern European population (Bulgarian). Both genes are correlated with arterial hypertension and other cardiovascular diseases in the general population, but little is known for their distribution in the Caucasian population and especially in the Eastern European region – primarily a population with higher cardiovascular disease morbidity and mortality, and high cardio-vascular risk.

Design and method: We gathered 192 patients without known and documented cardiovascular disease. Mean age 41.12 ± 13.34 years. The males were 50 (26%) and the females 142 (74%). The studied variants were genotyped by using Taq-Man genotyping assays. Genotype and allele frequencies were calculated with SPSS 19.

Results: The frequencies for the rs11191548 of gene CYP17A1-NT5C3 were: for the CC variant – 3.12%, CT variant 22.92% and the TT variant – 73.96%. For the rs381815 of gene PLEKHA7 the frequencies were respectively: 53.12% for the CC variant; 36.98% for the CT variant and 8.33% for the TT variant.

Conclusions: The results are to serve as a basis and control group for further evaluation of the significance of rs11191548 of gene CYP17A1-NT5C3 and rs381815 of gene PLEKHA7 for the development of cardiovascular disease and primarily arterial hypertension and coronary heart disease in the Eastern European region (Caucasian population).

PERIOPERATIVE HYPERTENSION; WHAT IS ADEQUATE SCREENING ?

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Objective: In this presentation we would like to review the literature and the current guidelines on the pre-operative evaluation of a young hypertensive patient and highlight the areas where more research is needed.

Design and method: We herewith describe a case report of a young male, who was diagnosed with colonic malignancy and scheduled to undergo a partial colectomy by the general surgeons in two weeks time. He was also newly diagnosed to have a stage II hypertension with a blood pressure of 180/100 mm Hg and hence referred to the medical perioperative clinic for evaluation. Systemic review and examination was otherwise unremarkable. The question we are trying to answer here is - What would be the best strategy to manage his hypertension in the peri-operative period?

Results: The patient was started on calcium channel blocker, with which his blood pressure was well controlled to the target. However, the etiological workup was not comprehensively completed due to time constraints prior to surgery.

Conclusions: Hypertension management in the perioperative period is a special situation, as it significantly influences the perioperative outcomes. Most literature is either in the form of guidelines from societies or expert consensus focusing mainly on blood pressure targets in the perioperative period. However, there is a lot of ambiguity on the etiologic workup in the perioperative period. A clinician's apprehension, who is dealing with a young hypertensive is with regards to missing the diagnosis of conditions such as pheochromocytoma prior to surgery, as this may have significant implications on the choice of initial antihypertensive medication as well as on the peri-operative management and outcomes. Considering the time required for diagnostic evaluation, should evaluation for pheochromocytoma be carried out?

With this case report we would like to highlight the areas where the clinician is left at bay to navigate the perioperative landscape with blood pressure control and where more research is required.

POSTER SESSION

LATE-BREAKER POSTERS: SESSION 2

NOCTURNAL HOME VERSUS AMBULATORY BLOOD PRESSURE MONITORING IN CHILDREN AND ADOLESCENTS: A PILOT STUDY OF FEASIBILITY, PREFERENCE AND ASSOCIATION WITH TARGET-ORGAN DAMAGE

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

Design and method: Apparently healthy children and adolescents (age 6–18 years) referred for elevated BP were subjected to (i) 24-hour ABP monitoring using a validated upper-arm cuff oscillometric device (Microlife WatchBP O3), (ii) HBP monitoring during daytime (7 days, duplicate morning and evening measurements) and nighttime (automated measurements, ³nights, ³hourly measurements/night) using a validated upper-arm cuff oscillometric device (Microlife WatchBP HOME N), (iii) carotid intima-media thickness (cIMT) measurement (high resolution B-mode ultrasonography) at the level of common carotid and bulb bilaterally using automated software, (iv) carotid-femoral pulse wave velocity (PWV; Complior device; duplicate measurements), and (v) echocardiographic determination of left ventricular mass index (LVMI).

Results: 27 individuals were included (mean age 12.4 ± 3.2 years, 16 males, body mass index [BMI] 24.4 ± 5 kg/m², ⁶with office hypertension [BP > = 95th percentile] and 4 with high-normal office BP [$> = 90$ th to < 95th percentile]). Nighttime HBP monitoring was feasible in all subjects (average number of HBP monitoring nights 2.7 ± 0.7 and nocturnal HBP readings 7.6 ± 2.2). Daytime HBP and ABP values were similar (difference $-0.3 \pm 5.3/1.5 \pm 5.2$ mmHg, systolic/diastolic, $p = \text{NS}$), whereas nighttime HBP was slightly higher than the respective ABP value ($2.9 \pm 7.2/2.4 \pm 6.6$ mmHg, $p < 0.05/\text{NS}$ respectively). There was a strong association between daytime ABP and HBP ($r = 0.83/0.61$, systolic/diastolic), as well as between nighttime values ($r = 0.73/0.42$) (all $p < 0.05$). Both nighttime systolic ABP and HBP were associated with all indices of target-organ damage (LVMI: $r = 0.39$ versus 0.20 respectively; cIMT: 0.47 versus 0.46 ; PWV: 0.26 versus 0.39 ; $p = \text{NS}$ for comparisons of coefficients). Participants reported a higher score for inconvenience (questionnaire) with nighttime ABP than HBP (1.4 ± 0.8 versus 1.1 ± 0.7 respectively, $p < 0.05$) and 77% preferred nighttime HBP versus ABP.

Conclusions: These preliminary results suggest that in children and adolescents nocturnal HBP monitoring is feasible and preferred by users than nocturnal ABP, and similarly associated with preclinical target-organ.

SERUM BILIRUBIN LEVEL AT ADMISSION PREDICTS IN-HOSPITAL OUTCOME IN PATIENTS WITH ST-SEGMENT ELEVATION MYOCARDIAL INFARCTION UNDERGOING PRIMARY PERCUTANEOUS CORONARY INTERVENTION

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Objective: Serum Total Bilirubin (STB), the final product of the heme catabolic metabolism, has potent anti-oxidative and cytoprotective properties. STB concentration is inversely associated with hypertension, diabetes mellitus, and metabolic syndrome, and has been suggested to be protective against atherosclerosis and coronary artery disease (CAD) under normal conditions, but elevated in patients with ST-Segment Elevation Myocardial Infarction (STEMI) and pressure overload in the Myocardium.

Purpose: To evaluate prognostic value of STB during admission for in-hospital outcome in patients with STEMI undergoing Primary Percutaneous Coronary Intervention (pPCI).

Design and method: A total of 1495 patients with STEMI were admitted to our hospital and submitted to p PCI between December 2008 and December 2011. Exclusion criteria included treatment with thrombolytic drugs in the previous 24 hours, active infections, previously proven systemic inflammatory disease history and liver disease.

Results: Most of the patients were male, 65.2% (mean age = 61.47 ± 11.83 years). There was 65% patients with hypertension, 87.3% diabetics, 30.9% with hyperlipidemia and 43% with smoking habits. In-hospital mortality was 8.96% and significantly different with regards to gender (male 12.1% vs. female 7.32%, $p = 0.003$). There was statistically significant difference of STB mean value between survivors (8.0 mmol/l, range 6.5 – 10.3) and those with a lethal outcome (11.3 mmol/l, range 8.6 – 18.3) - $p < 0.0005$. Mean value of STB in male was 8.0 mmol/l (6.4 – 10.4) versus 8.8 mmol/l (7.0 – 11.6) in female, ($p < 0.0005$). Multivariate Cox regression analysis showed that STB was an independent predictor of in-hospital mortality (odds ratio 1.158, 95% confidence interval 1.124 to 1.194, $p < 0.005$). Receiver operating characteristic curve (ROC) analysis designated STB as a significant indicator of in-hospital mortality (ROC 0.736, $p < 0.005$), cut-off was 10.25 mmol/l, sensitivity 61.8%, specificity 74.8%. The patients were divided into four quartile groups according to STB value (1st quartile: 5.15–6.5 mmol/l, $n = 336$ patients; 2nd quartile 6.5–8.2 mmol/l, $n = 367$ patients; 3rd quartile 8.2–10.8 mmol/l, $n = 359$ patients; 4th quartile 10.8–19.4 mmol/l, $n = 368$ patients). Subsequent analysis showed markedly increased mortality rate in the 4th quartile group of patients (2.7%, 4.1%, 9.2% and 20.1%, respectively).

Conclusions: STB at admission is reliable biomarker of in-hospital outcome prediction in patients with STEMI submitted to pPCI.

CHRONIC HEART FAILURE PATIENTS WITH TYPE 2 DIABETES MELLITUS DETERIORATES 24 HOURS ABPM, VASCULAR RISK PROFILE AND VENTRICULAR FUNCTION

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Objective: To evaluate a possible negative influence of the presence of Type 2 Diabetes mellitus (T2DM) on 24 h. ABPM pattern, vascular risk profile and severity of left ventricular (LV) function in patients with Chronic Heart Failure (CHF).

Design and method: In 184 patients with CHF we compare clinical features of 64 (65 ± 9 years/87.5% males) with T2DM versus 120 (63 ± 11 years/68.3% males) non-T2DM. In addition to clinical examination and analytical parameters, all patients underwent a 24 h. ABPM and echocardiogram and evaluation of degree of severity LV Dysfunction.

Results: Patients with T2DM had higher ($p < 0.001$) prevalence (%) of Hypertension (75 vs 46.7), dyslipidemia (65.6 vs 28.3), obesity (47 vs 43), and worse renal function (fGe: 64.7 vs 72.3 ml/min/1.75m²). Etiology IC: Hypertensive and/or ischemic heart disease: 75% vs 60%. Mean Values of 24 h ABPM measurements are in table 1.

Table 1

Mean values (mmHg)	T2DM	P	T2DM
24 h. SBP	116 ± 16	<0.05	111 ± 15
24 h. DBP	117 ± 15	<0.05	112 ± 15
Nighttime SBP	114 ± 18	<0.05	108 ± 16
24 h. DRP	63 ± 7	ns	65 ± 8
Daytime DBP	67 ± 8	ns	67 ± 9
Nighttime DBP	63 ± 7	ns	69 ± 9
Nighttime DBP	50 ± 13	0.05	46 ± 11
Nocturnal PP	51 ± 15	0.05	47 ± 12

No significant differences in DBP between groups, but patient with T2DM present higher average values ($p < 0.05$) of SBP 24 h (mmHg): 116/111; daytime (117/112) and nighttime (114/108); higher 24 h Pulse Pressure (50 vs 46 mmHg) and non-dipper pattern frequency (84.7 vs 79.35), as well as a greater proportion of patients with moderate/severe LV dysfunction (87.6 vs 81.7%) ($p < 0, 05$).

We also observed worse NYHA functional class in T2DM patients: NYHA II-III 84,4 vs 58,3%, $p < 0,001$.

Conclusions: In patients with CHF, the presence of T2DM contributes to show greater hypertensive and/or ischaemic etiology, further deterioration of 24 h ABPM pattern and worse left ventricular myocardial function. T2DM can be considered as a risk factor and worsening of heart failure. 24 h ABPM may contribute to a better prognostic evaluation in these patients.

PREVALENCE AND CLINICAL FEATURES OF INCREASED URINARY STEROID RATIO OF CORTISOL TO CORTISONE METABOLITES (THF+ATHF)/THE IN PATIENTS WITH ESSENTIAL HYPERTENSION AND PRIMARY HYPERALDOSTERONISM

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Objective: A reduced conversion of cortisol to cortisone, due to an impaired activity of the enzyme 11 β -hydroxysteroid-dehydrogenase 2 (11 β -HSD2), measured calculating the ratio between active metabolites of cortisol (tetrahydrocortisol+ allotetrahydrocortisol) and of cortisone (tetrahydrocortisone) in 24 h urine sample $[(THF+aTHF = THFs)/THE] > 1.5$, has been related to hypertension. The eventual link between this index and primary aldosteronism (PA), the most frequent form of endocrine hypertension, has never been investigated.

The aim of the study is to evaluate the prevalence of increased urinary steroid ratio in patients with essential hypertension and primary aldosteronism and verify the specific clinical features of patients with THFs/THE $> 1,5$.

Design and method: We recruited 174 hypertensive patients investigated for secondary hypertension, and their urinary steroid panel was obtained. Most of patients (134) were affected by essential hypertension (EH), and in 40 patients PA was diagnosed.

Results: The prevalence of increased urinary steroid ratio was the same in EH and PA (24% vs 22%). Patients with THFs/THE $> 1,5$ were characterized by a male versus female prevalence (70% of patients with a high ratio were males vs 30% of females, $p < 0,01$) and lower aldosterone values (153 pg/ml vs 199 pg/ml, $p < 0.01$). Hypertensive cardiopathy was more frequent in the subgroup of patients with increased THFs/THE ratio (74% vs 56% in patients with THFs/THE < 1.5) and, analyzing separately the two subgroups of EH and PA patients, only in PA patients the difference was still statistically significant.

Conclusions: In some hypertensive patients, PA coexist with an impairment of the 11 β -HSD2 enzyme; this condition may lead to a greater activation of the mineralocorticoid receptor with consequent susceptibility to organ damage.

METABOLIC FLUX IN ATHEROSCLEROSIS REGRESSION

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Objective: Despite current lipid-lowering therapies, atherosclerosis prevalence in adulthood is still very high and reversal of disease is not observed. However, regression of the atherosclerotic plaque via diet manipulation is well established in experimental animals and may occur via immune cell exit from the plaque and cholesterol efflux, among other processes. Therefore, non-pharmacological lipid lowering is a powerful driver of disease reversal, yet plaque-specific metabolic molecular targets are not completely identified. The aim was to elucidate metabolic changes, including metabolic “flux” in atherosclerosis regression, and identify possible molecular targets beyond well-known lipid and inflammatory mediators.

Design and method: ApoE $^{-/-}$ mice were fed either a chow diet (Control), a high-fat diet (Progression), or a high-fat diet followed by a chow diet (Regression). Plasma glucose, cholesterol and triglycerides were determined at the end of the experiment, as well as lipid content in liver. Immune cell populations in bone marrow, spleen and blood were studied using flow cytometry. Metabolic changes in aorta were determined by stable isotope-resolved metabolomics, by incubating aortas with uniformly C13 labelled glucose.

Results: No differences in body weight or plasma glucose were observed between groups at the end of the experiment. However, higher levels of cholesterol were detected in both plasma and liver of Progression animals, whereas those under regression conditions presented control values. Interestingly, flow cytometry analysis revealed an increase in inflammatory cells in blood and spleen in Progression

group vs. Control, as well as a significant increase in spleen Ly6C $^{+}$ monocytes in Regression vs. Control; however, no change was observed between Progression vs. Regression. Intriguingly, extracellular metabolite analysis in atherosclerotic aorta showed no differences regarding glucose consumption and lactate production between groups, which suggests no differences in glycolysis. However, nuclear magnetic resonance revealed a decrease in both formate and phenylalanine in Progression aorta, whereas Regression animals maintained Control values.

Conclusions: Further work is being carried out in order to align single-cell genomic information with metabolomic data, with the aim to further contribute to the understanding of regression for a future therapeutic application.

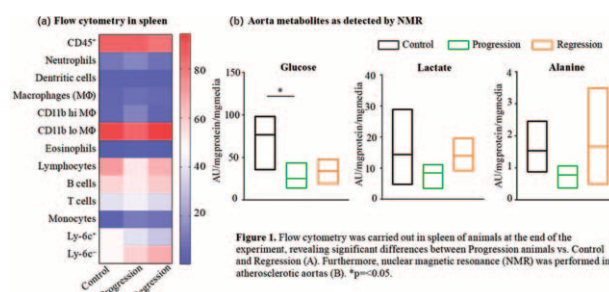


Figure 1. Flow cytometry was carried out in spleen of animals at the end of the experiment, revealing significant differences between Progression animals vs. Control and Regression (A). Furthermore, nuclear magnetic resonance (NMR) was performed in atherosclerotic aortas (B). * $p < 0.05$.

PREVALENCE OF BP ELEVATION IN A SCHOOL-BASED POPULATION SCREENING: THE KASTORIA STUDY

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Objective: We assessed the prevalence of high blood pressure (BP) in a school based screening study according to the ESH 2016 guideline diagnostic thresholds. Moreover, risk factors for BP elevation in childhood and adolescence, as well as geographic and seasonal risk factors, were investigated for their effect on BP population screening.

Design and method: We performed a school-based BP screening study in the municipality of Kastoria in north Greece an area with 50,322 inhabitants. All schools in the municipality were visited during 2013–2016. A trained physician measure BP thrice by a mercury sphygmomanometer according to ESH 2016 guidelines and the last two BPs of this single occasion were averaged for the analysis. Personal history was recorded. Anthropometric measurements were obtained and obesity was defined according to IOTF criteria.

Results: 2,832 children and adolescents aged 6–18 years participated in the study. The prevalence of high-normal BP and hypertension in the population was 3.7% and 0.9%, respectively, according to ESH 2016 BP classification. Thirty one % of the population was overweight (22.9%) or obese (9.5%). Among participants with BP elevation, 56.1% of the participants presenting high-normal BP, 55.5% hypertensive and 66.7% isolated systolic hypertensive BP levels were overweight or obese. High BP levels prevalence did not differ by sex, birth weight or gestation week. Prevalence rates were similar in city and surrounding rural areas. Higher prevalence of high normal or hypertensive BP levels was observed during the spring (57.1%) and winter (23.3%) period compared to about 10% at autumn and summer ($P < 0.05$). Both the highest prevalence of overweight/obesity and elevated BP levels were found in the 6–12 years-old group (62% vs. 38%, $P < 0.001$ for overweight-obesity, and 27.1% vs. 78.9%, $P = 0.05$ for high-normal/hypertensive BP levels). The highest prevalence of hypertensive BP levels (27.8%) was observed at 6th grade children.

Conclusions: In this European population a low rate of high-normal and hypertensive BP levels was found in single visit following the ESH 2016 guidelines protocol for BP measurement. Overweight and obesity was associated with higher BP levels, but there were also seasonal differences in the prevalence of high BP levels.

REFERENCE HYPERTENSION CLINIC FOR PATIENTS SENT BY PRIMARY CARE PHYSICIANS: IMPACT IN BLOOD PRESSURE CONTROL, CARDIOVASCULAR AND METABOLIC RISK

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Objective: A retrospective study was designed to evaluate the evolution of all patients sent to a hypertension and metabolic risk clinic, regarding blood pressure (BP) control, metabolic and cardiovascular risk.

Design and method: Out of 233 patients sent by primary care physicians in 2015–2016, 9 were excluded for missing the first appointment. Results were obtained at January 31st 2017. BP objectives for each patient were determined according to 2013 ESH/ESC Guidelines. Cardiovascular risk was assessed using the European Systematic Coronary Risk Evaluation (SCORE).

Results: Most common motives for consultation were suspicion of resistant (39.7%, n = 89) and secondary hypertension (29.9%, n = 67). 13.8% (n = 31) patients lost follow-up for failing consultations and 42.9% (n = 96) were discharged to primary care. The remaining 97 patients were still being followed (mean 588 days). Secondary hypertension was diagnosed in 13.0% (n = 25), although 13.0% (n = 25) were still under study. A third (33.3%, n = 70) had BP controlled at first consultation and 56.7% (n = 119) improved control, with mean decrease of 26 mmHg for systolic BP and 15 mmHg for diastolic BP. The number of anti-hypertensive drugs increased during follow-up ($p = 0.001$). Renin-angiotensin system inhibitors (76.8%) and dihydropyridines calcium-channel blockers (54.0%) were the most used drugs at admission and end of follow-up (81.7%, 60.3%, respectively). A shift from thiazides (41.1% to 29.9%) towards thiazide-like diuretics (18.3% to 24.1%) appears to exist. Regarding metabolic risk, 13.8% (n = 31) were smokers, with smoke cessation being achieved in 19.6% (n = 6). 34.8% (n = 78) were medicated with statin at admission, 17.0% (n = 38) started it during follow-up. Among all patients, there was a decrease in LDL, total cholesterol and triglycerides ($p < 0.001$, $p < 0.001$, $p = 0.018$, respectively). Patients with low-moderate SCORE risk increased from 144 to 160 (64.3 to 71.4%). If only patients whose risk could be improved are accounted for, 54.4% (n = 49) had a score decrease and 44.4% (n = 40) maintained it.

Conclusions: Our results support that an active attitude leads to improvements in hypertension and metabolic risk control, being effective and important in reducing cardiovascular risk. It is also important to notice that there is still room for improvement, particularly regarding smoking cessation and a high percentage of patient missing, with the latest probably attenuating the improvements reported.

MASKED UNCONTROLLED HYPERTENSION (MUCH) IN PRIMARY CARE: VALENTINE-GREECE HOME BLOOD PRESSURE MONITORING EPIDEMIOLOGICAL STUDY

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Objective: To assess the prevalence and features of MUCH in primary care.

Design and method: Primary-care physicians nationwide assessed consecutive treated hypertensives using office (OBP, 1 visit) and home blood pressure (HBP) measurements (7 days). All measurements were performed using validated oscillometric devices with Bluetooth capacity (Omron M7 Intelli-IT). Uncontrolled OBP was defined as $\geq 140/90$ mmHg and uncontrolled HBP $\geq 135/85$ mmHg. The study was sponsored by Servier Hellas.

Results: 128 doctors assessed 872 subjects and 749 with complete data were analyzed (age 62 ± 11 years, OBP $137 \pm 9/84 \pm 8$ mmHg, systolic/diastolic, HBP $130 \pm 11/80 \pm 8$ [difference $7 \pm 12/5 \pm 8$ mmHg, $p < 0.001$], diabetics 22%, smokers 21%, cardiovascular disease 8%, average number of antihypertensive drugs 1.6 ± 0.7). MUCH (low OBP, high HBP) was observed in 16%, white-coat hypertension (WCH) phenomenon (high OBP, low HBP) 23%, uncontrolled hypertension (high OBP/HBP) 29% and controlled hypertension (low OBP/HBP) 32%. Determinants of MUCH (multivariate logistic regression) were high-normal systolic OBP (odds ratio 5.9) and male gender (2.1). MUCH subjects received more drugs (average 1.8) than the other groups ($p < 0.01$). 36% of MUCH subjects had > 5 mmHg higher morning than evening HBP (systolic and/or diastolic), suggesting incomplete duration of antihypertensive drug action. 10% of MUCH subjects believed that they were overtreated and 32% reported that occasionally forgot drug dose.

Conclusions: In treated hypertensives in primary care, if OBP measurements are used alone the assessment of hypertension control is inaccurate in 39%, due to WCH and MUCH phenomena. HBP monitoring is mandatory to avoid overtreatment of subjects with WCH phenomenon, and to prevent undertreatment and subsequent excess cardiovascular disease in MUCH.

ALONE HYPERTENSION OR TOGETHER WITH HYPERTENSION?

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Objective: In our study, our aim was to examine the coexistence and frequency of chronic diseases.

Design and method: A total of 1117 middle and elderly patients were included in the study. Patients were grouped according to the presence or absence of diabetes mellitus, hypertension, chronic obstructive pulmonary disease (copd), osteoporosis.

Results: 331 (29.6%) of patients had diabetes. 198 patients (59.8%) of diabetic patients also had hypertension. At the same time, the presence of hypertension was statistically significant in diabetic patients ($p: 0.000$). Sixty (5.4%) of the patients had osteoporosis. Twelve (3.6%) of diabetic patients also had osteoporosis. The presence of osteoporosis at the same time in diabetic patients was not statistically significant ($p: 0.093$). There were 124 (11.1%) patients with copd. 38 (11.5%) of diabetic patients also had copd. At the same time, the presence of copd in diabetic patients was not statistically significant ($p: 0.793$). 530 patients (47.4%) had hypertension. 198 patients (37.4%) of hypertensive patients also had diabetes. At the same time, the presence of dm was statistically significant in hypertensive patients ($p: 0.000$). 38 (30.6%) of patients with copd also had diabetes. At the same time, the presence of diabetes was not found statistically significant in patients with copd ($p: 0.793$). Twelve (20.0%) of osteoporotic patients also had diabetes. The presence of diabetes at the same time in patients with osteoporosis was not statistically significant ($p: 0.093$).

Conclusions: Mortality and morbidity rates can be reduced by controlling frequent diseases.

THE MODULATION OF MYOCARDIAL (DYS)FUNCTION AND REMODELING IN ISOPROTERENOL-TREATED RATS BY TESTOSTERONE

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Objective: The adrenergic overstimulation may contribute to myocardial damage and heart failure. Testosterone replacement therapy improved symptoms in men with heart failure. We investigated the progression of isoproterenol-induced myocardial damage with and without endogenous testosterone in male adult Wistar rats.

Design and method: The animals were divided into control group and two heart failure groups: sham laparotomy and castrated. Heart failure was induced two weeks after sham/orchiectomy procedure by a single dose of isoprenaline (85 mg/kg, s.c.) or saline, respectively. After 8 weeks, MRI experiments and left ventricle catheterization in vivo and biochemical and histological evaluation ex vivo were performed.

Results: Orchiectomy completely suppressed endogenous testosterone levels. In both, testosterone + and – animals, isoproterenol administration was associated with necrosis and reparative fibrosis leading to increased absolute and relative ventricle weight. The hypertrophy was ex vivo characterized to be inward in sham and outward in the castrated group. In vivo, in testosterone + animals there was non-significant hypertrophy with increased end-diastolic volume and peak filling rate. Increased left ventricular peak ejection rate, stroke volume and heart rate produced an augmented cardiac output. Similar changes were observed in rats after castration; yet increase in peak ejection rate and stroke volume were less pronounced. Pro-collagen 1a formation was more augmented in the sham-operated group.

Conclusions: We conclude that in isoproterenol-induced damage, the akinetic myocardium was compensated by hyperkinetic activity of the unaffected heart muscle. The compensation of systolic function may be less pronounced in animals with lower testosterone levels tending to stiffness and diastolic dysfunction.

COMPARISON OF HOSPITALIZED AND AMBULATORY HYPERTENSIVE PATIENTS' PHARMACOTHERAPY IN THE PERSPECTIVE OF POLYPHARMACY

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Objective: Cardiovascular diseases cause 1/3 of all deaths, thus they represent a leading global cause of mortality. In Romania, 40% of the adult population

is hypertensive, and only three out of seven, among the patients that are being treated, are getting the appropriate pharmacotherapy. Our goal is the evaluation and comparison of the pharmacotherapy of adult hospitalized and ambulatory hypertensive population.

Design and method: The cross-sectional, observational, prospective, pharmac-epidemiological study targets the observation, analysis and comparison of pharmacotherapy of two groups of patients (hospitalized and ambulant patients), in the perspective of polypragmasy and self-medication, if it occurred.

Results: The average age of hospitalized patients was 70.65 ± 4.95 (SD) years, and 68.39 ± 10.49 (SD) years of the outpatients. A statistically significant difference has been found regarding the gender rate in the two groups of patients ($p = 0.0474$), whereas 59% of the hospitalized patients were women compared to only 45% of the outpatients. A statistically significant difference has been found between the two groups' angiotensin convertase enzyme inhibitors (ACEI) use: 44.86% in case of inpatients and 70.52% in case of outpatients ($p = 0.0006$), and also regarding the usage of beta-receptor blockers (63.83% hospitalized vs. 44.5% ambulatory). The incidence of polypragmasy of inpatients was 85.12% and in 4.26% of the cases a combination of more than ten drugs occurred. Compared to the ambulatory patients, where the incidence rate of polypragmasy was 61.84% and 6.93% of them used more than ten different drugs daily, the difference is statistically significant ($p = 0.0004$).

Conclusions: Female hypertensive patients are more likely to be hospitalized due to their complications. Beta-receptor blockers are more frequently used in hospitalized cases, and ACEI are more widespread in case of ambulatory patients. A possible explanation includes that the use of ACEI is safer and produce less side effects than beta-blockers, which are tested on hospitalized patients before the long-term introduction in their therapy. Polypragmasy is common in both groups of patients, but it seems to occur at higher rates in case of inpatients, due to the more intense monitoring possibilities.

ALTERATIONS IN METABOLIC PROFILE AND LIVER HISTOLOGY OF LEAN RATS UNDER HIGH FRUCTOSE DIET

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Objective: Diet and nutrition greatly influence in cellular metabolism. Consumption of sugars such as fructose has been linked with the appearance of several diseases as insulin resistance, inflammation, non-alcoholic fatty liver disease (NAFLD) and metabolic syndrome (MS). As previously described, fructose activates different metabolic pathways, including lipid biosynthesis. Thus, the objective of this study is to analyze the metabolic profile and the fat storage in hepatocytes of rats treated with a high-fructose diet.

Design and method: Male Wistar rats 4 weeks old were randomly divided into two groups, fed normally (CTL group) and with a high fructose diet (HFrD group) during 16 weeks. At the age of 20 weeks, animals were sacrificed. Livers were removed. A fragment of the liver was analyzed by nuclear magnetic resonance spectroscopy (NMR) using the high-resolution magic angle spinning (HR-MAS). Another part of the liver was fixed in formalin and embedded in paraffin. Sections of liver were stained with H&E and analyzed by ImageJ. Glucose was determined by a glucometer before the rat sacrifice. After the sacrifice, triglyceride, HDL and LDL/VLDL concentrations were measured in serum using a commercial kit based on spectrophotometry. Experimental results were analyzed for their significance (Student's t-test). Significance was established at the 95% confidence level ($p < 0.05$).

Results: High fructose diet (HFrD) does not develop overweight in young rats. Even if the weight remains the same, more visibly fat appears in the liver. HFrD produces a change in blood values of HDL and triglycerides in rats. However there is no differences in blood glucose. HFrD produces a change in liver metabolic profile of rats. Histology allows us to quantify the increase in fat storage. HFrD produces an increase in hepatic triglycerides but a decrease in liver mobile lipids in young rats.

Conclusions: Metabolomics is a powerful tool for determining subclinical liver damage. We demonstrate that HFrD increases hepatic intracellular fat and alters the liver lipid profile in the absence of clinical symptoms in young rats. These results may be specially relevant for monitoring health status in apparently healthy youngsters consuming large amounts of sugar.

INFLAMMATION RESOLUTION MEDIATORS IN ACUTE HEART FAILURE

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Objective: Acute heart failure (AHF) remains a major health concern, with high mortality and re-hospitalization rates and treatment being still largely opinion-based. Resolvins (Rvs), derived from omega-3-fatty acids, actively contribute to the resolution of inflammation and tissue regeneration and recent experimental findings suggest that their administration improves cardiac function after myocardial infarction. However, they remain scarcely explored in clinical settings of AHF. Therefore, we aimed to evaluate serum RvD1 and RvE1, and to determine their correlation with biomarkers of cardiac injury/dysfunction, proinflammatory/redox status and endothelial dysfunction in AHF.

Design and method: Patients with the diagnosis of AHF ($n = 10$) and cardiogenic shock (CS) ($n = 9$) were included and blood samples were collected at admission and at days 3 to 5. Blood donors were used as controls ($n = 10$). RvD1, RvE1, nitrotyrosine (redox dysfunction biomarker) and endocan (endothelial dysfunction biomarker) were measured with ELISA kits. C-reactive protein (CRP), B-type natriuretic peptide, high-sensitivity troponin I and leukocyte count were evaluated using automated analyzers.

Results: RvD1 values on admission were significantly higher in AHF than in CS (AHF: 2.98 ± 0.42 ng/mL vs CS: 1.39 ± 0.24 ng/mL, $p = 0.024$) although there were no significant differences compared to controls values (controls: 1.84 ± 0.34 ; $p = ns$ vs AHF or CS).

On the other hand, RvE1 concentration on admission was significantly increased in patients with AHF and with CS (controls: 0.076 ± 0.018 ; AHF: 0.19 ± 0.040 ng/mL; CS: 0.23 ± 3.8 ng/mL; controls vs AHF, $p = 0.048$; controls vs CS, $p = 0.007$). Furthermore, there was a significant trend for a linear increase between controls, AHF and CS ($p = 0.003$). There were no significant changes between Rvs values on admission and on later time points. We only observed positive correlations between RvE1 and CRP ($r = 0.342$, $p = 0.041$), neutrophil-to-lymphocyte ratio ($r = 0.472$, $p = 0.006$), nitrotyrosine ($r = 0.395$, $p = 0.007$) and endocan ($r = 0.346$, $p = 0.018$).

Conclusions: These Rvs have distinct profiles in AHF, with RvE1 increasing with the severity of the clinical/hemodynamical condition in CS patients and being significantly associated with inflammatory/redox status and endothelial dysfunction. In contrast, RvD1, whose administration has been shown to be cardioprotective in experimental myocardial infarction, appears to be exhausted or inactivated in worse clinical scenarios in the spectra of AHF.

EXERCISE IMPEDANCE CARDIOGRAPHY REVEALS IMPAIRED HEMODYNAMIC RESPONSE TO EXERCISE IN HYPERTENSIVES WITH DYSPNEA

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Objective: Patients with arterial hypertension (AH), especially women, often report exercise intolerance and dyspnea. However, subjective symptoms are frequently not reflected in standard, objective assessments. The aim of the study was to assess multiple parameters during controlled exercise in patients with AH, particularly the differences between subgroups identified based on sex and symptoms of reduced exercise tolerance.

Design and method: Ninety-eight patients with AH (52 women; age 54.5 ± 8.2 years) were evaluated for dyspnea, levels of the NT-proBNP, exercise capacity (with cardiopulmonary exercise testing (CPET) and a 6-minute walk test (6MWT)), and hemodynamic parameters (by means of impedance cardiography) during exercise. Patients with AH were stratified by sex and history of dyspnea, yielding four subgroups: males without dyspnea (MnD, $n = 38$); males with dyspnea (MD, $n = 8$); females without dyspnea (FnD, $n = 27$); females with dyspnea (FD, $n = 25$).

Results: In comparison with MnD, the FnD subgroup demonstrated higher NT-proBNP levels (29.5 ± 25.5 vs. 103.1 ± 71.6 pg/mL, $p < 0.001$); lower exercise capacity: shorter 6MWT distance (595.3 ± 91.5 vs. 522.9 ± 56.6 m, $p < 0.001$); lower peak oxygen uptake ($\dot{V}O_2$) (22.7 ± 5.2 vs. 17.0 ± 3.7 mL/min/kg, $p < 0.001$); higher peak stroke volume index (SVI) (52.4 ± 8.9 vs. 61.7 ± 11.2 mL/m², $p = 0.004$); and higher SVI at the anaerobic threshold (AT) (50.1 ± 10.4 vs. 59.5 ± 12.6 mL, $p = 0.011$). In comparison with FnD, the FD subgroup covered a shorter distance during the 6MWT distance (522.9 ± 56.6 vs. 466.1 ± 87.2 m, $p = 0.017$), had a steeper VE/VCO₂ slope (25.5 ± 2.4 vs. 29.0 ± 5.5 , $p = 0.004$);

lower values of peak stroke volume (SV) (117.4 ± 22.4 vs. 99.7 ± 18.1 mL, $p = 0.017$), peak cardiac output (CO) (17.0 ± 3.7 vs. 13.1 ± 2.9 L/min, $p = 0.002$) and lower change in CO(peak-rest) (10.5 ± 3.6 vs. 7.2 ± 2.7 L/min, $p = 0.004$). However, no other differences were identified (NT-proBNP, left ventricular diastolic dysfunction, or CPET parameters)

Conclusions: Exercise impedance cardiography revealed an impaired hemodynamic response to exercise in hypertensive females with dyspnea. In patients with unexplained exercise intolerance exercise impedance cardiography may complement traditional exercise tests.

CREATION OF AN INSTITUTIONAL COHORT OF PATIENTS WITH HEART FAILURE WITH PRESERVED EJECTION FRACTION (HFPEF) AND METABOLIC SYNDROME IN MEXICO

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Objective: Objective: To establish the baseline characteristics of this cohort from the demographic, clinical, echocardiographic and biochemical points of view. To know the correlation of BNP with clinical and echocardiographic findings of diastolic dysfunction.

Design and method: Methods: Prospective cohort, adults of any gender with Metabolic Syndrome, aged 45–70 years with diastolic dysfunction due to echocardiography captured in the cabinet service. They were selected by inclusion criteria, with prior authorization of the informed consent, and later blood sampling including BNP levels, blood pressure and somatometry.

Results: 159 patients were recruited, 3 excluded due to ischemic heart disease, chronic renal failure and oncological treatment. In total 156 patients two in rhythm of atrial fibrillation were excluded in the comparison of groups according to filling pattern (type 1 and 2). In the analysis of groups, $p = 0.003$ was observed in smoking with the highest prevalence in group 1. 95 were woman, 36% (56/156) were diabetics. 74/156 (48%) with hypertension. In the multivariate analysis, echocardiographic variables were correlated with BNP value > 200 pg/ml, obtaining only a significant OR for left atrium volume (OR, 12 IC95%, 3–20).

Conclusions: Conclusions: The cohort was predominantly female age of 64 years. The size altered of left atrial volume predicts 12 times a BNP higher than 200 pg/ml. Diabetes and hypertension were the most common risk factors. High prevalence of HFPEF into the patients with Metabolic Syndrome was detected

HAEMODYNAMIC PROFILE, BUT NOT TOTAL BODY WATER CORRELATES WITH AGE IN HYPERTENSIVE SINGAPOREANS: IMPLICATIONS ON TREATMENT CHOICES

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Objective: Impedance cardiography reliably assesses physiological parameters contributing to blood flow and pressure. In hypertension, three distinct hemodynamic profiles exist: vasoconstriction, mixed hemodynamics, and hyperdynamic state. Knowing the predominant profile allows for better informed treatment choices. We wanted to establish which hemodynamic profile correlated with different age groups in the local population, and discuss possible consequences.

Design and method: We assessed cardiac bioimpedance in 54 patients with hypertension using the NI Medical NICAS device. Patients were classified as “vasoconstricted” if Cardiac power index (CPI) < 0.75 W/m², “mixed hemodynamic” if CPI ≥ 0.75 W/m² and Total peripheral resistance index (TPRI) $< 2,650$ dynes \times sec/cm⁵ \times m², or hyperdynamic if TPRI $\geq 2,650$ dynes \times sec/cm⁵ \times m². Age distribution between classes was compared using one-sided ANOVA. Correlation between age and Total Body Water (TBW) was assessed using Spearman's test.

Results: The patients' age distribution showed highly significant ($p < 0.001$) differences between the distinct hemodynamic classes (Figure 1 A). Vasoconstricted patients were most frequent (23/54, 43%) and older (54.2 ± 18.8 years) than those with mixed hemodynamics (18/54, 33%; 47.1 ± 17.9 years) or hyperdynamic hypertension (13/54, 24%; 30.5 ± 11.2 years). TBW was not correlated with age ($r = 0.324$) (Figure 1 B).

Conclusions: Published data show that beta blockers are the most frequently used antihypertensive agent in Singapore. Given the high number of vasoconstricted hypertensives, this may not be appropriate. Diuretics are recommended specifically for elderly patients with isolated systolic hypertension. As their hydration status does not differ from younger patients, while thiazide induced hyponatremia is a clinical challenge particularly in the elderly, this recommendation should be reconsidered.

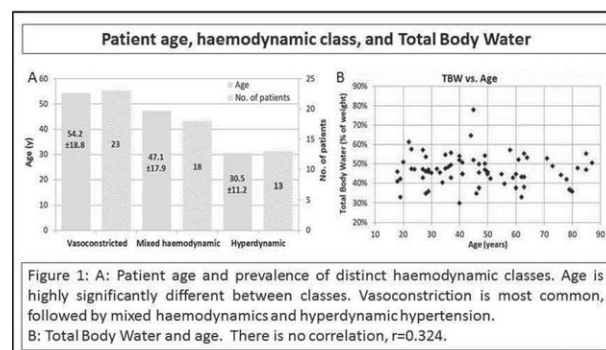


Figure 1: A: Patient age and prevalence of distinct haemodynamic classes. Age is highly significantly different between classes. Vasoconstriction is most common, followed by mixed haemodynamics and hyperdynamic hypertension. B: Total Body Water and age. There is no correlation, $r = 0.324$.

24-HOUR NIGHT-DAY BLOOD PRESSURE AND WAVE REFLECTIONS PATTERNS IN HEART TRANSPLANT AND HYPERTENSIVE INDIVIDUALS

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Objective: Heart denervation, a consequences of cardiac transplantation, results in increased resting heart rate (HR) with impact on blood pressure (BP) and on its 24hr pattern. A higher prevalence of non-dipping phenomenon has been reported in heart transplant recipients (HTX), but a specific analysis of night-day BP phenotypes is still lacking particularly regarding central hemodynamics. Aim of this study was to investigate 24hr changes of brachial and central BP, but also of 24 h steady state (stroke volume-SV, cardiac output-CO, peripheral resistance-PR) and pulsatile (antegrade and reflected waves) hemodynamics in HTX recipients, comparing them to treated hypertensives.

Design and method: We enrolled 25 HTX recipients and 25 hypertensives matched by age, sex and 24hr brachial BP. Ambulatory 24 h brachial and central BP, parameter were assessed with brachial oscillometry (Mobil-o-graph) and dedicated software for waveform analysis (ARCSolver).

Results: The two groups were well matched for age (58.5 ± 12.1 vs 58.5 ± 12.2 years, $p = 0.9$), sex (females 20% for group) and brachial and central 24hr BP ($125/82 \pm 11/8$ vs $127/81 \pm 11/9$ mmHg, $p = ns$). Mean time after HTX was 10.1 ± 9.5 years; and this group presented with higher 24hr (79.5 \pm 10.3 vs 71.4 \pm 8.3 bpm) and daytime HR (82.7 \pm 11.4 vs 74.4 \pm 8.5 bpm, $p < 0.05$ for both) compared to hypertensives. In both groups there were significant day/night decreases in systolic, diastolic and mean peripheral and central BP, as well as HR. In hypertensives CO decreased during nighttime, and PR remained constant. Due to the decrease in HR, SV increased, with a parallel increase in antegrade and a more pronounced increase in reflected waves. In HTX, PR decreased during nighttime, accompanied by an increase in SV and a stable CO. In turn, changes in wave reflections were less pronounced during nighttime.

Conclusions: In treated hypertensives, the day-night pattern consists of a BP decrease with changes in wave reflections that increase during the night and are related to HR decrease, but also to postural and PR changes. In HTX, differences are observed regarding CO, PR and wave reflections. Differences are probably related to heart denervation and autonomic nervous system relative changes but further studies are needed.

BLOOD PREASSURE AND HEART RATE VARIABILITY IN HYPERTENSIVE IN-TREATED PATIENTS

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Objective: The goal was to compare diurnal blood pressure and heart rate variability (HRV) in a series of patients being treated for essentials hypertension (EH) with different drug strategy.

Design and method: It was a retrospective, uncontrolled case study of hypertensive patients ($n = 49$, mean age 63 (9) years) presenting to Zaporizhzhia clinic 6. HRV

was recorded simultaneously with blood pressure (BP) monitoring using a bifunctional device (Incart, S.-P., R.F.). We analyzed average systolic and diastolic BP (SBP and DBP, respectively) for diurnal, daytime and nighttime periods. Time-domain, frequency-domain indexes of HRV were calculated for diurnal, daily (6:00–23:59), night (00:00–05:59) time periods. We compare different treated strategy in EHs included angiotensin converting enzyme inhibitors/angiotensin receptor blockers (ACE/ARB), beta-blockers (BB), calcium-channel blockers (CCB) and diuretics.

Results: In patients treated with ACE/ARB ($n = 38$), SBP decreased significantly during the diurnal and daytime periods ($p = 0.044$ and $p = 0.029$, respectively), while DBP decreased only in daytime ($p = 0.035$). No changes were observed in HRV data. Meanwhile, in EHs treated with BB ($n = 28$) only DBP parameters decreased significantly during the diurnal and nighttime periods ($p = 0.028$ and $p = 0.025$, respectively), while SBP had no significant differences. No changes were observed in HRV data. Furthermore, individuals who took CCB ($n = 15$) no BP parameters showed significant differences, while pNN50 for diurnal, as well as for daytime periods was significantly high in treated with CCB patients in comparison with the patients on other treatment strategy ($6.5 [3.0 - 11.0]$ vs $3.0 [1.0 - 7.0]$ % and $5.0 [2.0 - 9.5]$ vs $2.0 [1.0 - 5.0]$ %, respectively). And also subjects, who took diuretics ($n = 35$) SBP for daytime was significantly low to compare with the second group ($124 [116 - 126]$ vs $129 [122 - 130]$ mmHg; $p = 0.030$, respectively), while there was no statistical difference in HRV profile.

Conclusions: These data suggest that the antihypertensive drugs in most cases influence in the same way on the heart rate, however, in some differences on the BP profile in in-treated essential hypertensive patients.

A STUDY ABOUT ARTERIAL HYPERTENSION IN PATIENTS WITH AORTIC STENOSIS

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Objective: Aortic stenosis (AS) and arterial hypertension (HT) are two common disorders affecting predominantly the ageing population, both negatively impacting morbidity and mortality, and their association should require more attention in terms of diagnosis and management. The aim of this study is to assess the distinctive features of AS concerning the clinical presentation and the paraclinical parameters between hypertensive and non-hypertensive patients.

Design and method: The study was conducted by retrospective analysis of 144 cases of hospitalized patients, diagnosed with AS on a period of two years (01.01.2016–31.12.2017), with and without HT. We studied the differences between the two subgroups regarding the etiology, comorbidities, some echocardiographic parameters and laboratory findings.

Results: Among the patients studied with AS, the average age of presentation was 77 years for both the hypertensive and non-hypertensive patients, but a significantly higher age was found for the degenerative AS comparing to the congenital AS (78.22 years vs 63.6 years, $p < 0.05$); 88.2% of the cases had systemic hypertension, most of them being treated by a combination of at least three anti-hypertensive drugs (83.3%). The leading cause of AS in both hypertensive and non-hypertensive patients was degenerative, accounting for 80.5% and 94.1 % of the cases respectively, followed by rheumatic fever and bicuspid aortic valve disease. In terms of echocardiographic measurements, we found that the HT had an effect of reduction of the aortic pressure gradients (43.11 mmHg vs 57 mmHg in the non-HT subgroup), which is consistent with the literature data, even if the threshold for statistical significance was not attained. The laboratory findings revealed that half of the hypertensive patients were found to have anemia, compared to 5.8% of the normotensive patients and almost half of the HT subgroup appeared to associate chronic kidney disease as opposed to only 23.5% in the non-HT patients.

Conclusions: HT affects a high proportion of the patients admitted for AS, that is known to put population at risk for cardiovascular events, but the impact of their coexistence in terms of prognosis is yet to be clarified.

CORRELATION OF HEMODYNAMIC AND ARTERIAL STIFFNESS PARAMETERS WITH METABOLIC AND ANTHROPOMETRIC VARIABLES IN HYPERTENSIVE PATIENTS WITH AND WITHOUT DIABETES MELLITUS TYPE 2

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Objective: To correlate hemodynamic and arterial stiffness parameters with metabolic and anthropometric variables in patients with hypertension (HTA) with and without type 2 diabetes mellitus (T2DM)

Table 1
Correlation of hemodynamic and arterial stiffness parameters with anthropometric and metabolic variables (n=58).

	BMI, kg/m ²	Waist, cm	Fat, %	Fat, Kg	FFM, kg	Visceral fat, cm ²	Glucose, mg/dl	Cholesterol, mg/dl	Triglycerides, mg/dl	HbA1c, %
rA/Bi	r: -0.290*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*
iA/Bi	r: -0.290*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*
baPWV, cm/s	r: -0.290*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*
baPWV, cm/s	r: -0.290*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*
SBP, mmHg	r: -0.290*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*
DBP, mmHg	r: -0.290*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*
PP, mmHg	r: -0.290*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*
IAS, %	r: -0.290*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*
SYS 2, mmHg	r: -0.290*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*
cSBP, mmHg	r: -0.290*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*	r: -0.269*

A/Bi: right antihypertensive index; iA/Bi: left antihypertensive index; baPWV: right brachial/ankle pulse wave velocity; baPWV: left brachial/ankle pulse wave velocity; SBP: Systolic blood pressure; DBP: Diastolic blood pressure; PP: Pulse pressure; IAS: augmentation index; SYS 2: Percent at the peak of the reflected wave; cSBP: Central systolic blood pressure; BMI: Body mass index; Fat %: fat percentage; kilograms of fat; FFM: Fat free mass; HbA1c: Glycated hemoglobin. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. r: Pearson correlation.

Design and method: A cross-sectional study was carried out in 58 patients with HTA, 31 women and 27 men, aged of 54 ± 6.8 and 56.33 ± 10 respectively. 46.6% (27) had T2DM. Hemodynamics parameters and arterial stiffness were measured with the HEM 9000 AI; ABI and baPWV with VP-1000 Plus, and visceral fat with Dualscan HDS-2000, Omron. The body composition was measured with Tanita, TBF-300A, metabolic parameters by enzymatic colorimetric methods

Results: In the 58 patients, BMI, percentage of total body fat and visceral fat were negatively correlated to the right ankle/brachial index (rA/Bi), (r : -0.290, $p = 0.027$; r : -0.259, $p = 0.049$ and r : -0.260, $p = 0.049$), the iAX with the fat mass and fat-free mass (FFM) (r : -0.263, $p = 0.046$ and r : -0.541, $p = < 0.01$). HTA patients were divided in with and without T2DM. In the HTA patients without T2DM, a low correlation of rA/Bi with body fat percentage and PP (r : -0.350, $p = 0.054$ and $r = 0.336$, $p = 0.065$) was shown; as well as DBP with triglycerides (r : 0.352, $p = 0.052$); PP and SYS 2 correlated with the FFM (r : 0.339, $p = 0.062$ and r : -0.346, $p = 0.057$), and the iAx with the waist circumference (WC). In the HTA patients with T2DM it was negatively associated rA/Bi with BMI and WC (r : -0.390, $p = 0.044$ and r : -0.389, $p = 0.045$); left A/Bi (iA/Bi) positively with glucose and HbA1c ($r = 0.408$ $p = 0.034$ and $r = 0.448$ $p = 0.008$ respectively), the left brachial/ankle pulse wave velocity (lba PWV) with HbA1c (r : 0.406, $p = 0.036$). There was a negative correlation in iAX with FFM and visceral fat (r : -0.609, $p = 0.001$, and r : -0.387, $p = 0.046$, and positively with glucose (r : 0.389, $p = 0.045$).

Conclusions: Patients with HTA and T2DM shows a greater correlation with negative hemodynamics parameters and arterial stiffness.

IMPACT OF HYPERTENSION IN AORTIC VALVE STENOSIS ASSESSMENT

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Objective: Data about the influence of hypertension in the evaluation of the severity of the aortic valve stenosis are contradictory. Our aim was to evaluate the repercussion of blood pressure and gender on the assessment of the severity of aortic stenosis.

Design and method: We retrospectively analyzed patients with severe AS who were admitted to our Cardiology Department between 2013–2016. All patients underwent left catheterization with ventriculography and an Echocardiogram.

Results: 120 patients, 62 males (51.7%). 64 patients (53.3%) had blood pressure $> 130/85$. The mean of the maximum and mean gradients by echocardiography was 71.35 and 43.80 mmHg in males and 80.54 and 46.56 mmHg in females. Non-parametric Spearman correlation coefficient was applied. We obtained the following results: in the whole sample we obtained a value of r maximum gradient-peak gradient 0.578 and mean gradient-peak gradient 0.555, significant correlation at level 0.01 so there was positive correlation between maximum gradient and mean gradient with peak gradient, (statistically significant at a confidence level of 99%). In hypertensive patients we obtained a nonparametric Spearman correlation coefficient of 0.587 when analyzing maximum and peak gradient of 0.525 in the case of mean gradient and peak gradient, significant correlation at 0.01 level. In non-hypertensive patients: nonparametric Spearman correlation coefficient of 0.583 when analyzing maximum and peak gradient and 0.603 in the case of mean gradient and peak gradient, significant correlation at 0.01 level. Therefore, there is a positive correlation between maximum and mean gradient with peak gradient, (statistically significant at a confidence level of 99%). This correlation is maintained in both hypertensive and non-hypertensive patients. A multiple linear regression model was used to analyze the association between peak gradient and maximum gradient and mean gradient, for potential influence

of gender and/or hypertension as confounding variables. We obtained that neither hypertension nor gender were confounding factors in the association between these two variables.

Conclusions: In our sample, we didn't find influence of arterial hypertension and gender in echocardiographic and hemodynamic assessment of severe aortic stenosis.

ONE YEAR FOLLOW-UP ASSESSMENT OF PATIENTS WITH HEART FAILURE: PROGNOSTIC ROLE OF AMBULATORY BLOOD PRESSURE MONITORING

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Objective: Ambulatory blood pressure monitoring (ABPM) is routinely used in patients with high blood pressure. However, its use in patients with heart failure (HF) has been poorly reported. Our aim was to evaluate circadian variation in blood pressure in this group of patients and their prognostic role.

Design and method: We included 184 patients followed-up in a Heart Failure Unit. They underwent an echocardiogram, laboratory tests and a 24 hours ambulatory blood pressure monitoring. All patients were followed-up for 1 year. Primary event was defined as hospitalization or death due to HF.

Results: Mean age 63 ± 10 ; 75% males. BMI 30.1 ± 6 Kg/m². Cardiovascular risk factors: Hypertension 56.5%; diabetes 34.7%; dyslipidemia 40%; obesity 29.3%. Smokers 22.9%. Etiology of HF: Hypertensive 19.5%; ischemic 12%; ischemic-hypertensive 27.1%; enolic 9.8%; myocarditis 4.3%; valvulopathy 5.2%; idiopathic 21%. Therapeutic regimen: SRA blockers 93.4%; beta blockers 85.7%; diuretics 81%; spironolactone 42.3%; statins 68.4%; antiplatelets/anticoagulants 89%. Patients presented optimal blood pressure values (systolic BP: 112.63 ± 15.4 , diastolic BP: 65.1 ± 7.9), however, the vast majority (80.4%) had an altered circadian pattern. Table 1.

Table 1.

Circadian patterns	Global
Dipper n(%)	36 (19,6)
No-dipper n(%)	94 (51,1)
Riser n(%)	54 (29,3)
Dipper extremo n(%)	0 (0)

In 20 patients (10.9%) a major event occurred at 1 year follow-up, with higher proportion of events among patients with altered circadian pattern (non-dipper or riser: 12.2% vs dipper: 5.6%; 0.2).

Conclusions: In our area, patients with HF despite an optimal BP control, most of them presented an altered circadian pattern. In addition, this group of patients presents a tendency to a greater proportion of hospitalization and/or death due to HF. Longer-term studies are needed to confirm that finding.

HEART FAILURE UNIT: ASSESSMENT OF THE IMPROVEMENT OF THE QUALITY OF LIFE OF PATIENTS

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Objective: Chronic heart failure (CHF) is a clinical syndrome that carries a poor prognosis, both in survival, as in symptoms. Thus, quality of life is an important objective in the treatment of patients with chronic heart failure (CHF). The Minnesota Living With Heart Failure Questionnaire (MLWHFQ) is the instrument most widely used to evaluate quality of life in research studies. Our aim was to evaluate the effectiveness of health education of a Heart Failure Unit (HFU) in patients with CHF.

Design and method: We evaluate 154 patients after two 6-monthly visits to our Heart Failure Unit (HFU). Patients data obtained at the first visit was compared with those at the second visit. All patients completed on both visits the MLWHFQ.

Results: 154 patients. Mean age: 61.3 ± 11.6 . Males: 68.8%. Associated risk factors: hypertension 64.9%, dyslipidemia 53.2%, diabetes 32.5%, active smoking 20.8%, ex-smoking 40.3%. Mean ejection fraction (%): 31.8 ± 9 . Functional classification: NYHA class I 28.6%, II 49.4%, III:22.1%, IV:0%. The etiology of CHF: ischemic 37.7%; hypertensive 24.3%; dilated cardiomyopathy 22.1%; valvular 5.2%; others 10.7%.

Therapeutic regimen applied: RAS blockers 97.4%; betablockers 85.7%; loop diuretic 86.5%; spironolactone 51.9%; antiplatelet drugs 53.2%, nitrates 27.6%, digoxin 35.1%. In the first visit our patients had a mean BMI: 31.7 ± 5.7 Kg/m², without statistical significance differences at the 6 months follow-up: 31.3 ± 5.9 Kg/m². Regarding the MLKHF questionnaire, at the second visit, we observed significant improvements in the global results: 41.4 ± 22.4 vs 36.81 ± 21.2 ($p < 0.001$)

Conclusions: A significant improvement in quality of life of patients with CHF was demonstrated after health education.

With this study we highlights the importance of the role of the HFU team, to improve health care of our patients.

LEFT VENTRICULAR EJECTION FRACTION DEPRESSION CORRELATES WITH 24 HOURS BLOOD PRESSURE PATTERN IN PATIENTS WITH CHRONIC HEART FAILURE

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Objective: To analyze possible differences in 24 h BP pattern in patients with Chronic Heart Failure (CHF) and Moderate (VEF 45–30%) or Severe (VEF < 30%) Left Ventricular Dysfunction (LVD).

Design and method: In 154 patients with CHF, an echocardiogram and a 24-hour Ambulatory Blood Pressure Measurement were performed. We comparatively study patients with moderate and severe LVD

Results: Baseline characteristics of patients according to ventricular dysfunction: moderate: (82p 23.4% women, mean age 67.9, BMI 29.7 Kg/hm²) versus Severe (72 p, 16.6% women, age mean 62 and BMI 30.6). Prevalence (%) of hypertension (66 vs 56 (*)), diabetes (38.8 vs 34.1(**)), and dyslipidemia (55.5 vs 31.7(*)). Regarding the etiology: hypertensive (36.1 vs 31.7(**)), ischemic (30.5 vs 21.9(*)), and enolic (11.1 vs 7.3(**)) were significantly higher (* = $p < .001$) (** = $p < .05$) among patients with severe ventricular dysfunction. Despite the fact that patients with severe ventricular dysfunction received a higher percentage of drugs ($p < 0.001$):RAS blockers,beta-blockers,loop diuretics, and antialdosteronics.The comparative results between patients with moderate and severe ventricular dysfunction: 24 h BP (mmHg).Systolic (S): (114.4(*)110.8) and Diastolic (D): (64.7 (ns) 64.8); Daytime: PAS (116(**)108), and PAD(66(ns)66);Nocturnal SBP (111(*)108, and DBP (61 (NS) 61.5 mmHg) 24 h Pulse pressure (mmHg) (50(*)46) Variability BP systolic (mmHg): (15.3(*)12.9) Non-Dipper Patterns (%): 58.1 vs 50 (*); Riser: 19.4 vs. 27 (ns). (*) = $P < 0.05$;(**) = $p < 0.001$

In the logistic regression analysis, increased risk for severe left ventricular dysfunction were found for: Mean BP < 80 mmHg (OR 2,82; CI 95% 1,104- 7,392) and male gender (OR:3,62, CI 1,130 – 9,447. After correction for confounding variables, such as number antihypertensive agents)

Conclusions: Patients with severe LVD showed lower 24 hours BP levels. Despite the use of greater number of antihypertensive agents, lower BP levels in these patients seem to be related mainly to functional left ventricular depression. In patients with CHF male gender and lower BP levels could be considered as a marker for severe left ventricular dysfunction.

NOCTURNAL HYPERTENSION IN CHRONIC HEART FAILURE

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Objective: Ambulatory blood pressure monitoring (ABPM) is routinely used in hypertension patients. However, its importance in chronic heart failure (CHF) patients has been scarcely mentioned. The prognosis value of nocturnal hypertension has been demonstrated that is superior to diurnal blood pressure values. Our aim was to evaluate 24-h blood pressure patterns and the prevalence of nocturnal hypertension in patients with the diagnosis of chronic heart failure.

Design and method: We studied 184 patients with a clinical diagnosis of CHF. They were followed-up by the Heart Failure Unit. We performed a 24-h ambulatory blood pressure monitoring as well as an echocardiogram and analytical test.

Results: 184 patients. Mean age: 63 ± 10 . Males: 75%. Mean BMI: 30 ± 6 Kg/m². Mean time of follow-up of CHF: 70 ± 50 months. Associated risk factors: 56.6% hypertension, 40 % dyslipidemia, 34,7% Diabetes, 29,3% obesity, 22,9% smoking. The etiology of CHF: ischemic 41,2%;hypertensive 22,7%; dilated cardiomyopathy 20,9%;valvular 8,3%; others 6,9%.Therapeutic regimen applied: RAS blockers 93,4%; betablockers 85,7%; loop diuretic 81%; spironolactone 42,3%; statins 68,4%; antiplatelet/anticoagulant drugs 89%.

The 24 h ABPM measurements are in table 1.

Table 1. 24hours ABPM

Mean ABPM (mmHg)	24 hours	Daytime	Nighttime
Systolic BP	107,7 ± 13,8	109,6 ± 14,2	104,5 ± 14,5
Diastolic BP	64,4 ± 7,8	66,4 ± 8,8	60,4 ± 7,6

The majority of CHF patients (80,4%) have an abnormal pattern of ABPM: Dipper 19,6%, non-dipper 51,1%, riser 29,3%. The prevalence of nocturnal hypertension was 22,8%, and it was correlate with the NYHA functional class: NYHA I:13,3%, NYHA II:24%, NYHA III:41,7% ($p = 0,018$)

Conclusions: In our area, CHF patients have optimal control of BP, however, the normal circadian variation in blood pressure is altered in most of them. In addition, nocturnal hypertension is very common in heart failure patients, and it correlates with the patient functional class. Ambulatory blood pressure monitoring may be helpful in identified this altered patterns (which could be unrecognized) and may be used to optimise heart failure therapy, and could be a prognosis marker in this patient group.

COMPARISON OF FINGER-TOE PULSE WAVE VELOCITY (FTPWW) IN WOMEN WITH RHEUMATOID ARTHRITIS AND HEALTHY CONTROLS MEASURED WITH POPMÈTRE®

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Objective: The aim of this study was to describe the difference in finger-toe pulse wave velocity in patients with rheumatoid arthritis and healthy controls measured by pOpmètre®.

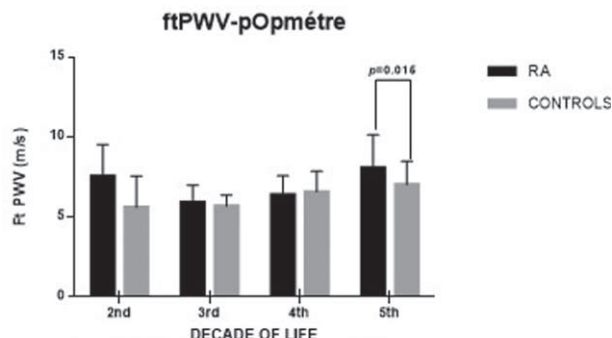


Figure 1. ftPWV by pOpmètre. Significant difference was observed in the velocity values in the fifth decade of life. RA (8.059±2.0621) VS HC (7.008±1.46).

Design and method: The pOpmètre is a new tool to evaluate arterial thickness as a way to prevent and approach cardiovascular disease. This was a cross-sectional and analytical study. We recruit women with RA according to the ACR 1987 criteria and healthy controls (> 18 years old and able to grant informed consent) without comorbidities. We made a complete medical and nutritional examination.

Afterward, we determined arterial stiffness by finger-toe pulse wave velocity technique (ftPWV) with pOpmètre. We collected all data and calculated mean and standard deviation.

Results: We recruited a total of 170 women, 81 RA patients and 89 healthy controls (HC). The data were analyzed using SPSS v.23. Continuous variables between groups were analyzed with t-student test. The normality of the data was evaluated with Kolmogorov-Smirnov. A two-tailed ($p < 0.05$) was considered statistically significant. No significant difference was observed in the rest of the measures. RA group showed worse parameters in weight and BMI than HC. Statistic differences of ftPWV were found in the 5th decade of life ($P = 0.015$) Figure 1.

Conclusions: pOpmètre might be a useful tool for a screening of arterial stiffness in RA patients of 5th decade of life. pOpmètre is fast to apply and do not require a special training.

PREVALENCE OF HYPERTENSION AND HYPERTENSION PHENOTYPES BY AGE AND GENDER AMONG SCHOOLCHILDREN IN SPAIN: THE MEPAFAC MADRID REGIONAL COMMUNITY STUDY

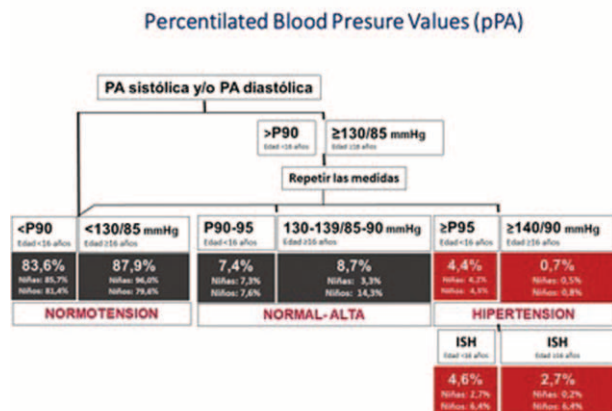
A. Martín Oliveros, A. Molinero, M. Cervero, M.C. Magro, Y. Ponte, T. Partearroyo. Spanish Society of Familiar & Community Pharmacist (SEFAC), Madrid, SPAIN

Objective: Childhood hypertension is a constantly increasing health problem. Data regarding its prevalence and particularly the prevalence of its phenotypes in the Spanish population are limited; therefore, the aim of the study was to determine them in a large sample of children from the central area of Spain

Design and method: A sample of 2772 schoolchildren (12–17 years) participated in the MEPAFAC Study. A school-based cross-sectional epidemiologic study conducted in 25 secondary schools in the center area of Spain. This study shows results on 2772 children (1.397boys), for whom full data on systolic and diastolic blood pressure indices were available, as well as BMI and physical activity data.

Results: The observed prevalence rates following the European Guidelines (Lurbe et al, 2016) were, for younger children (<16 years old): normal-high blood pressure 9,1%; stage 1 hypertension, 3,1%; and stage 2 hypertension, 2,7%. Boys had higher hypertension prevalence than girls (6,9% vs. 4,7%). The prevalence rates for Normal-High Blood Pressure were higher in older (>16 years) than younger children (9,8% vs. 9,1% respectively), while stage 1 & 2 hypertension was higher in younger children compared to older children (3,1% vs. 0,4% and 2,7% vs 0% respectively). Isolated systolic hypertension (ISH) was the most prevalent phenotype (4,8% vs 1,2%) in younger children. Moreover, presence of hypertension was positively associated with body mass index (BMI) in both genders, but not with sedentary behaviours.

Conclusions: In our knowledge the prevalence of hypertension in spanish children (12–17 years) from the regional community of Madrid remain high using the new guidelines (Lurbe, 2016), while the differences between genders in hypertension phenotype prevalence also provide valuable insight on this problem. The present data may guide future public health initiatives to tackle childhood hypertension in Spain



ORAL PRESENTATIONS IN POSTER AREA

COMPLICATIONS AND COMORBIDITIES

POSTOPERATIVE ATRIAL FIBRILLATION IN PATIENTS UNDERGOING ISOLATED CORONARY ARTERY BYPASS GRAFTING-THE INFLUENCE OF PREOPERATIVE PHARMACOTHERAPY

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Objective: Postoperative atrial fibrillation (POAF) is the most frequently encountered postoperative arrhythmia related to coronary artery bypass graft (CABG) surgery, with a reported incidence between 10% and 40%. With appearance in the early postoperative period following CABG and a peak incidence between second or third postoperative day, POAF is associated with hemodynamic instability, increased morbidity and mortality. Published studies have yielded conflicting results considering the association of preoperative pharmacotherapy with POAF. The aim of this study was to investigate the relationship of preoperative pharmacotherapy with the occurrence of POAF in patients undergoing isolated CABG.

Design and method: Retrospectively, we studied 226 consecutive patients without prior history of AF, undergoing CABG from September to December 2014. All patients underwent continuous telemetry for at least five postoperative days, and POAF was documented using 12-channel electrocardiography. We used univariate and multivariable Logistic regression analyses (adjusted for demographics, cardiovascular risk factors, and the CABG procedure type) to analyse the relationship of preoperative pharmacotherapy with the occurrence of POAF.

Results: Of 226 consecutive patients undergoing isolated CABG (mean age: 63.9 ± 7.9 years), 54 patients were female (23.9%). During the in-hospital monitoring 53 patients (23.5%) experienced at least one episode of POAF. Patients with POAF were older (65.8 ± 7.3 vs. 63.4 ± 8.0 ; $p = 0.049$) and less often were taking statins preoperatively compared to non-POAF patients ($n = 39$, 73.6% vs. $n = 137$, 87.2%; $p = 0.030$). There were no significant differences between the groups considering other preoperative factors or medications in POAF vs. non-POAF patients. In addition, there was no difference in the use of on-pump or off-pump surgery in the POAF vs. non-POAF group ($p = 0.450$). In a multivariable analysis, adjusted for demographic characteristics (age, sex), cardiovascular risk factors (HTA, DM, HLP, COPD, preoperative TIA/CVI, PAD and smoking), and the type of CABG procedure (off-pump, on-pump), preoperative statin use was associated with a 60% risk reduction in POAF incidence (Odds Ratio 0.41; 95% CI 0.19–0.87; $p = 0.020$).

Conclusions: We found that preoperative use of statins may reduce the incidence of POAF with a 60% risk reduction in POAF incidence in patients undergoing isolated CABG.

AORTIC VISCOELASTIC PROPERTIES AND ALTERED ELECTROMECHANICAL CARDIO-AORTIC CONNECTION IN PATIENTS WITH CARDIAC AMYLOIDOSIS

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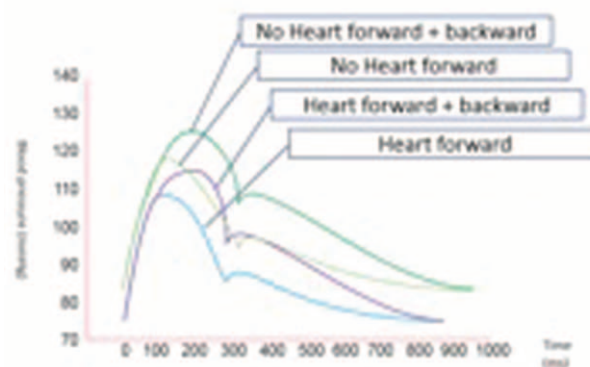
Objective: Cardiac amyloidosis (CA) is an infiltrative disorder caused by deposition of amyloid fibrils in the myocardial extracellular matrix. Although there is a wide scientific literature regarding amyloid heart disease, no data about aortic viscoelastic properties in these patients are available. This study has the aims to start filling this gap.

Design and method: 113 outpatients attending the Pavia Amyloid Center either with suspected or already diagnosed amyloidosis were enrolled; 58 of them were affected by cardiac amyloidosis. Arterial applanation tonometry (PulsePen, DiaTecnica, Milan, Italy) was performed in carotid and femoral arteries to calculate carotid-to-femoral pulse wave velocity (PWV) as index of aortic stiffness.

Carotid pressure wave was calibrated with oscillometric brachial blood pressure (BP) to obtain central BP, pulse pressure amplification (PPA) and augmentation index (AIx). Tonometric data were related to biochemical parameters, clinical data and treatment. Populations with and without cardiac involvement (NCA) were compared.

Results: Carotid-femoral PWV was not significantly higher in CA subjects compared to NCA ($p = 0.462$). PPA was significantly reduced in subjects with CA ($26.9 \pm 10.6\%$ in NCA, $19.8 \pm 12.4\%$ in CA, $p = 0.0014$). Multivariate Regression Analysis highlighted that the presence of cardiac involvement is the main element in determining a reduction in PPA. CA subjects had lower both peripheral pressure values and central ones. There were no significant differences in central pulse pressure (42.6 ± 12.3 in NCA vs 39.5 ± 12.6 mmHg in CA, $p = 0.187$), and AIx. The morphological analysis of the central pulse wave in its components (direct and reflected wave) did not show significant differences in the parameters studied, with the exception of Ti, detecting an early wave overlap in CA.

Conclusions: Although there were no significant differences in aortic stiffness evaluated by PWV in subjects with CA, a reduced PPA was found. An altered electromechanical cardio-aortic connection, with preserved aortic properties, may be an explanation for this finding. In other words, amyloid cardiopathy strongly impairs cardiac function without significantly alteration in aortic function. Significantly reduced central and peripheral pressure values could be caused by the inability of the diseased heart to develop a post load compared to that of subjects without cardiac involvement.



FACTORS RELATED TO CENTRAL HEMODYNAMICS OF HEART TRANSPLANT RECIPIENTS: A CROSS-SECTIONAL STUDY

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Objective: Central hemodynamics such as central pressures or pulse wave velocity are known to reflect arterial stiffness and can predict cardiovascular prognosis. It may change physiologically with age or pathologically in disorders. However, there are paucity of knowledge regarding central hemodynamics of heart transplant (HT) recipients.

Design and method: We assessed central hemodynamics, using applanation tonometry (SphygmoCor, AtCor Medical) in 90 HT recipients. We analyzed differences in central hemodynamic parameters of HT recipients, compared with age- and sex-matched 90 hypertensive subjects (set 1: HT recipients + Hypertensive subjects) or 90 kidney transplant (KT) recipients (set 2: HT recipients + KT recipients) from Cardiovascular and Metabolic Diseases Etiology Research Center High Risk Cohort.

Results: The median time after HT was 422 days (IQR, 45–1305 days). Central systolic pressure was not different, but central pulse pressure (CPP) and augmentation pressure (AP) were lower in HT compared to hypertensive subjects (CPP: 30.5 ± 9.9 vs 37.9 ± 9.2 , $p < 0.001$; AP: 4.0 ± 5.3 vs 9.2 ± 6.8 , $p < 0.001$) or KT recipients (CPP: vs 36.1 ± 4.3 , $p = 0.015$; AP: vs 8.3 ± 7.5 , $p < 0.001$). Pulse wave velocity was not different in HT recipients compared to other groups. After adjustment of age, gender, BMI, estimated glomerular filtration rate, diastolic blood pres-

sure and antihypertensive agents, multivariable linear regression model showed HT was independent factor related to AP (set 1: $p < 0.001$; set 2: $p = 0.010$). In addition, HT was significantly associated with CPP (set 1: $p = 0.001$; set 2: $p = 0.126$). However, multivariable linear regression model including heart rate showed that HT was no longer independent factor for AP or CPP.

Conclusions: AP and CPP were lower in HT recipients compared to age- and sex-matched hypertensive subjects or KT recipients. These differences of central hemodynamic parameters after HT might be attributed to increasing heart rate due to denervated heart. Further study for hemodynamic parameters after HT over the time should be needed.

PARA-PERIRENAL DISTRIBUTION OF BODY FAT IS ASSOCIATED WITH REDUCED GLOMERULAR FILTRATION RATE REGARDLESS OF OTHER INDICES OF ADIPOSITY

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Objective: Background. Obesity is a well-known risk factor for the development and progression of chronic kidney disease. Recently, para-perirenal ultrasonographic fat thickness (PUFT) has shown to correlate with both total and visceral fat better than body mass index (BMI), waist circumference (WC) and other indices of obesity. Moreover, a local paracrine and mechanical action of the PUFT on kidney has been described in recent studies. Aim of our study is to assess the relationship between glomerular filtration rate (GFR) and PUFT in comparison to other anthropometric and ultrasonographic indices of adiposity.

Design and method: Methods. Two hundred ninety-six hypertensive patients were enrolled. PUFT, cutis-rectis thickness and rectis-aorta thickness were obtained by ultrasonography. Anthropometric measures of adiposity were also measured. Estimated GFR was calculated using the CKD-EPI equation.

Results: Results. Higher PUFT values were observed in patients with impaired renal function ($p < 0.001$), whereas no differences in BMI and WC were shown between groups divided by GFR. PUFT significantly correlated with GFR in all subjects ($r = -0.284$; $p < 0.001$), with no differences in groups divided by gender, diabetes or BMI. This association held in multivariate analyses also after correction for confounding factors, including other adiposity indices ($p < 0.001$). When receiver-operating characteristic curves were built to detect a $eGFR < 60$ ml/min/1.73 m², a PUFT value < 3.725 cm showed a negative predictive value of 94.0%, with the largest area under the curve (AUC: 0.700) among the variables considered.

Conclusions: Conclusion. The relationship between PUFT and GFR seems to be more accurate and less influenced by the bias affecting traditional indices of adiposity.

SERUM NEPRILYSIN CONCENTRATION AS A DIAGNOSTICS TOOL IN HEART FAILURE PATIENTS IN ROUTINE CLINICAL PRACTICE

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Objective: Neprilysin is a zinc metallopeptidase that cleaves and inactivates several signalling peptides and peptide hormones including natriuretic peptides (NPs). Plasma concentration of NT-proBNP (which is not cleaved by neprilysin) is one of principal diagnostic tests in heart failure (HF) diagnostics. We hypothesized that neprilysin levels might provide additional diagnostic performance in treated chronic HF patients when a mineralocorticoid antagonist (MR) is added.

Design and method: Patients treated for chronic HF with addition of MR (duration of therapy 37 months in average) because still symptomatic following angiotensin-converting enzyme inhibitor (or angiotensin receptor blocker) and beta-blocker therapy

were enrolled ($n = 19$) and compared to healthy individuals ($n = 11$). Besides standard diagnostic tools (left ventricular ejection fraction - LVEF, laboratory biochemical diagnostic tests, NT-proBNP concentrations), we analysed serum levels of neprilysin by using commercially available ELISA kit. Additionally, we tested the diagnostic performance of other experimental markers including hepatocyte growth factor, stromal cell derived factor-1, angiotensin (1-7) and angiotensin II by using ELISA kits and cardiospecific microRNAs (miR-208a and miR-208b) by using qRT-PCR technique.

Results: Serum neprilysin concentrations were significantly elevated in HF patients (5.56 ± 1.25 ng/ml) when compared to controls (2.43 ± 0.70 ng/ml; $P < 0.05$) while none of the other tested markers was able to discriminate between healthy controls and HF patients. Moreover, HF patients with LVEF equal or less than 35% ($n = 10$) tended to have higher neprilysin concentration (6.03 ± 1.29 ng/ml) when compared to those with LVEF $> 35\%$ (5.04 ± 1.47 ng/ml; $n = 9$; NS) but we found a lack of relationship between neprilysin levels and clinical markers of cardiac dysfunction in overall group of HF patients.

Conclusions: Conclusively, neprilysin concentrations were significantly elevated in treated HF when compared to controls and tended to be higher in HF patients with LVEF equal or less than 35% when compared to patients with LVEF $> 35\%$. In contrast to other experimental markers, neprilysin levels showed certain diagnostic performance but its prognostic information must be proven in further studies.

IL-10 GENE POLYMORPHISM AND STROKE RISK IN PATIENTS WITH CORONARY ARTERY DISEASE

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Objective: The purpose of our work was to analyze the possible association of clinical and genetic factors with the development of strokes in patients with coronary heart disease.

Design and method: We included in to the study 1193 patients with acute coronary syndrome (63,2% men, mean age $61,1 \pm 0,34$ yaers). 81,5% of patients had essential hypertension, 14,6% - diabetes, 38,5% were smokers, 16,4% had anamnesis of atrial fibrillation. Follow up was started on day 10 of stable state after index event. Inclusion into the study was performed in 2004–2007. Mean duration of follow up was 664,9 days, maximum - 1999 days. To determine the allele and genotype of polymorphic markers of candidate genes isolation of genomic DNA from the venous blood was performed by the method of phenol-chloroform extraction. Polymorphisms of ApoB, FGB, PROC, CRP, IL-6, IL-10, TNF, LTA and KIF6 were detected by PCR.

Results: A total of 37 strokes occurred during the follow-up period (3.1%), 17 (45.9%) were fatal, and 20 (54.1%) were nonfatal. The shortest period before the development of a stroke from inclusion of a patient into the study was 22 days, the largest - 1433 days, the average - 389 ± 56.6 days. Patients who were observed to have strokes were older, had a history of CHD prior to index event, were more likely to have high BP level, more likely to have recurrent MI, or repeated episodes of severe ischemia and atrial fibrillation during hospitalization, they had a lower GFR.

Patients who observed stroke development were less likely to get statins (46.5% of cases compared to 64.9% of cases, $p = 0.021$) and antithrombotic (81.1% vs. 93.3%, $p = 0.004$) therapy. Only carriage of A allele of G(-1082)A polymorphism of IL-10 gene was associated with risk of stroke: OR 1,54 [1,02–2,65], $p = 0,043$.

Conclusions: Multifactorial Cox analysis showed that carriage of A allele of IL-10 gene, high BP level, history of MI, recurrent severe ischemia and atrial fibrillation during index hospitalization and absent of antithrombotic therapy were independently associated with stroke risk.

ORAL PRESENTATIONS IN POSTER AREA

DIAGNOSIS AND TREATMENT

IN-HOSPITAL BLOOD PRESSURE VARIABILITY AS A PREDICTOR OF CARDIO-RENAL OUTCOMES IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

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Objective: Data are scarce regarding the possible prognostic role of blood pressure variability (BPV) in the setting of acute coronary syndrome (ACS). The aim of this study is to determine the impact of in-hospital short-term BPV on cardiovascular outcomes and renal function in patients suffering an acute myocardial infarction (AMI).

Design and method: A total population of 150 AMI patients (78.7% male; mean age: 63.57 years; 68% hypertensives) underwent 24hr ambulatory BP measurement during their hospitalization. Systolic BPV was derived by coefficient of variability (CV). The study population was divided into a STEMI group (n = 72) and a non-STEMI (n = 78) one. Cardiovascular outcomes included: new onset of ACS, pulmonary edema, hypertensive emergency, life threatening arrhythmias, whereas worsening of renal function (WRF) was defined as a reduction of GFR $>$ or $=$ 25% according to the RIFLE criteria. No deaths or strokes occurred during the study.

Results: In the total study population a significant positive association was demonstrated between SBP CV and the incidence of total cardiovascular outcomes [odds ratio, 1.240; CI, 1.023–1.503 ($P = 0.028$)] as well as WRF [odds ratio, 1.394; CI, 1.109–1.753 ($P = 0.004$)]. Results for the STEMI group were similar regarding both cardiovascular outcomes [odds ratio, 1.38; CI, 1.066–1.794 ($P = 0.015$)] and WRF [odds ratio, 1.666; CI, 1.126–2.465 ($P = 0.011$)]. However, the non-STEMI group failed to demonstrate any significant associations. Finally, we conducted a multinomial logistic regression model for the STEMI group, where SBP CV showed relative significance as a predictor of cardiovascular outcomes [odds ratio, 1.317; CI, 0.994–1.746 ($P = 0.056$)], independently of age, gender and history of hypertension, diabetes mellitus or coronary heart disease.

Conclusions: In the setting of STEMI, assessment of systolic BPV using systolic BP CV could have a prognostic role of in-hospital cardio-renal outcomes suggesting a clinical need for further individualization of BP regulation in the integrative ACS management.

BILATERAL SPHENOPALATINE GANGLION BLOCK REDUCES BLOOD PRESSURE IN NEVER TREATED PATIENTS WITH ESSENTIAL HYPERTENSION. A RANDOMIZED CONTROLLED SINGLE-BLINDED STUDY

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Objective: Sympathetic fibers connect sphenopalatine ganglion (SPG) area with the central nervous system. We aimed to study the effect of SPG block in blood pressure (BP) in never treated patients with stage I-II essential hypertension.

Design and method: We performed bilateral SPG block with lidocaine 2% in 34 hypertensive patients (mean age 48±12 years, 25 men) and a sham operation with water for injection in 11 patients who served as the control group (mean age 51±12 years, 8 men). All patients have been subjected to 24 hour ambulatory blood pressure monitoring prior and a month after the SBG block in order to estimate any differences in blood pressure parameters. We defined as responders to SBG block those patients with a 24 h SBP decrease $>$ 5 mmHg

Results: We found that 24 h ($p = 0.01$) and daytime DBP ($p = 0.005$) as well as daytime DBP load ($p = 0.008$) were decreased in the study group a month after SPG block. In addition, a significant response was noted in 12/34 responders (35%) regarding: a. SBP and DBP during overall 24 h and daytime ($p < 0.001$) and night-time periods ($p = 0.001$ and $p = 0.01$, respectively), b. pre-awake SBP and DBP ($p = 0.01$ and $p = 0.03$, respectively) and c. SBP (daytime and night-time) and DBP (daytime) load ($p < 0.001$). No differences regarding BP were found in the sham operation group.

Conclusions: SPG block is a promising, minimally invasive option of BP decrease in hypertensives, probably through SNS modulation. Additionally, due to its anesthetic effect, SPG block might act as a method of selection for those hypertensive patients with an activated SNS before any other invasive antihypertensive procedure.

THE VALUE OF ATTENDED AND UNATTENDED AUTOMATED OFFICE BLOOD PRESSURE (AOBP) IN CLINICAL PRACTICE: COMPARISON WITH CONVENTIONAL OFFICE BLOOD PRESSURE (OBP) MEASUREMENTS AND 24-HOUR

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Objective: To compare attended and unattended AOBP with conventional OBP and daytime 24-hour ABP.

Design and method: We evaluated patients referred for suspected hypertension (HTN) using conventional OBP, measured by a nurse with a semi-automated oscillometric device, and by two physicians using both the oscillometric and auscultatory techniques, blinded to each other's recordings. AOBP measurements were also performed, attended and unattended by a nurse, during the 5 minutes of rest and during the following 3 BP readings. In order to examine if AOBP was subject to order effect, AOBP was performed in 60 subjects before the conventional measurements and in 86 subjects after them. 24-hour ABP monitoring was also attained. Exclusion criteria were severe systematic disease that limits survival, secondary HTN, renal dysfunction and severe heart failure.

Results: A total of 146 patients were enrolled, mean age \pm SD, 56 \pm 12, 68 women. The mean unattended systolic AOBP was 129 \pm 15 mmHg, and the mean attended AOBP was 129 \pm 5 mmHg, $p = 0.89$ (95% CI -1.33 to 1.52). Furthermore, the value of AOBP compared to conventional BP oscillometric, measured by both the nurse and the physician, as well as to auscultatory BP measured by a physician was found to be lower (AOBP 129 \pm 15 mmHg, 136 \pm 17 mmHg, 135 \pm 17 mmHg, 32 \pm 16 mmHg, $p < 0.005$ for all comparisons, 95% CI 4.26 to 9.81, 5.5 to 11.1, 0.9 to 6.2, respectively). No statistically significant difference was observed among the 2 AOBP groups, $p = 0.624$ (95% CI -3.532 to 5.871). Moreover, there was no statistically significant difference between AOBP and daytime 24-hour ABPM (128 \pm 71 and 128 \pm 13 mmHg, respectively, $p = 0.864$ (95% CI -1.87 to 2.23)).

Conclusions: AOBP readings compared favorably with daytime ABPM and their values were lower than conventional OBP. Interestingly, AOBP has similar values independently of the order of AOBP measurements, underlining the usefulness of AOBP in clinical practice.

PROSPECTIVE EXTERNAL VALIDATION OF THE PREDICTING OUT-OF-OFFICE BLOOD PRESSURE (PROOF-BP) ALGORITHM: AN OBSERVATIONAL COHORT STUDY

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Objective: The PROOF-BP algorithm, which combines change in clinic blood pressure over multiple readings on a single occasion with patient characteristics, has been shown to predict a patient's out-of-office blood pressure (BP) level and hence determine whether subsequent ambulatory blood pressure monitoring (ABPM) is likely to affect decision making in the diagnosis of hypertension. The present study aimed to collect diagnostic data from routine practice to prospectively validate this new approach.

Design and method: This study used a Prospective observational cohort design. Ten Primary Care practices and one hospital in the UK enrolled consecutive patients aged > 18 years, referred for ABPM. All participants underwent clinic BP monitoring, with the PROOF-BP algorithm applied, as well as daytime ABPM. Pre-specified outcomes included the proportion of true/false positive/negative results for detecting hypertension using the PROOF-BP strategy (algorithm + ABPM) compared to the reference ABPM. The sensitivity and specificity of the PROOF-ABPM strategy for detecting hypertension was compared to existing approaches including those recommended in the UK and US. Area under the receiver operator characteristic curve (AUROC) statistics were used to examine model performance.

Results: A total of 887 patients (mean age 52.8 ± 16.2 years) were enrolled during the study period across all sites. PROOF-BP had a sensitivity of 97% which was better than existing approaches recommended in the UK (78%) and US (86%). However, PROOF-BP had a specificity of 76% which was worse than both UK (97%) and US (100%) approaches. AUROCs were highest in those strategies utilising ABPM. Overall, PROOF-BP resulted in more patients having their hypertensive status correctly classified (difference vs. UK 6%, $p_{0.001}$).

Conclusions: Prospective validation of the PROOF-BP approach suggests it is possible to accurately classify an individual's hypertensive status with comparable or better accuracy and less utilisation of ABPM compared with existing strategies. The PROOF-BP strategy can be recommended for use in routine practice for patients where ambulatory blood pressure monitoring is being considered.

KINO-CARDIOGRAPHY, A NEW WEARABLE MONITORING TECHNIQUE: A RANDOMIZED DOUBLE-BLIND CROSSOVER VALIDATION WITH ECHOCARDIOGRAPHY

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Objective: Kino-cardiography (KCG) is a non-invasive and non-obtrusive technique based on the measure of body vibrations produced by the myocardium contraction and movements of the blood through the aorta. It is based on accelerometers/gyroscopes placed on the thorax (Seismocardiography) and in the lumbar region (Ballistocardiography). It measures the total heart kinetic energy (HK), which is hypothesized to be a proxy measure of Stroke Volume (SV). This study compares KCG to Echocardiography.

Design and method: The study is a double blind cross-over setting where infusions of Dobutamine and placebo were performed on 34 healthy volunteers (18 females). Mean age was 25 years (± 2), mean BMI was 22 kg/m^2 (± 2). A baseline record was followed by 3 sessions of increasing doses of Dobutamine or saline solution (5, 10, 20 mg/kg.min). During each of the 8 sessions, a classical Echocardiography was followed by a 90 s recording of KCG. The subjects were randomly assigned to group 1 (18 subjects) receiving the Dobutamine injections first, or group 2 (16 subjects) receiving the injections in the opposite order.

Linear and rotational kinetic energies were measured on KCG and summed to obtain total heart kinetic energy (HKtot); SV and CO were assessed through Echocardiography.

Results: Analysis was done in full blind: for each subject, the total HK was sorted in ascending order; the 3 highest HK were then supposed to correspond to the 3 doses of Dobutamine. A global sensitivity of 96.91% and a specificity of 98.01% are found. Furthermore, a significant ($p < 0.0001$) correlation of 0.59 is found between Cardiac Output (CO) measured by Echocardiography and Kinetic Energy (HKtot) measured by KCG. Moreover, interesting trends of HKtot and SV is observed, on Figure 1, as they increase with Dobutamine levels and remain stable with placebo (saline solution).

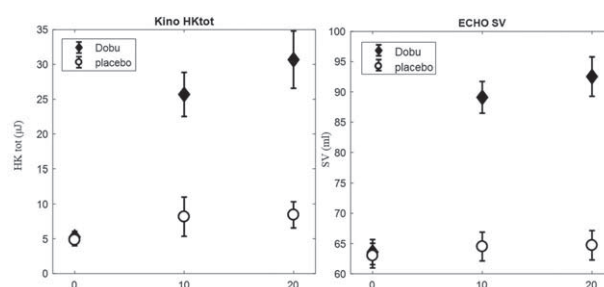


Figure 1: Total Heart Kinetic energy (HKtot) from the Kino-Cardiograph device compared to the changes in stroke volume from Echocardiography.

Conclusions: The promising results of this study allow us to believe that Kino-Cardiography could be a powerful tool to monitor and screen different pathologies characterized by inotropic cardiac state impairments. Additional clinical validations are also planned with patients suffering from hypertension or heart failure.

ORAL PRESENTATIONS IN POSTER AREA

EPIDEMIOLOGY AND MANAGEMENT

NON-ADHERENCE TO ANTIHYPERTENSIVE TREATMENT IS A MAJOR DETERMINANT OF THE CLINIC-AMBULATORY BP DIFFERENCE IN PATIENTS WITH RESISTANT HYPERTENSION

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Objective: Attended clinic SBP (cSBP) is usually higher than daytime ambulatory SBP in patients with resistant hypertension (RHTN), and the cSBP-dASBP difference is influenced by various factors. We investigated whether this difference was influenced by non-adherence to antihypertensive treatments (AHT) in a post-hoc analysis of the French Renal Denervation for Resistant Hypertension (DENERHTN) trial.

Design and method: 86/106 patients with RHTN to 4 weeks of indapamide 1.5 mg/d, ramipril 10 mg/d (or irbesartan 300 mg/d), and amlodipine 10 mg/d confirmed by ABPM were included in this post-hoc study. Non-adherence was defined as the absence of at least one AHT by drug screening (LCMSMS and AcSDKP) in urine/plasma samples collected before ingestion of any AHT, ABP or cBP measurements. After the start of ABPM, patients were given their AHT and were asked to return to the study center the next morning without having taken their treatment to undergo cBP measurements.

Results: 32/86 patients (37.2 %) were non-adherent to the triple therapy after 4 weeks. cSBP (171 ± 26 mmHg) was significantly greater than dASBP (158 ± 20 mmHg) in the non-adherent group ($p < 0.0001$) with a median cSBP-dASBP difference of 8.7 mmHg (IQR:3.5;22.3). In contrast, cSBP (150 ± 16 mmHg) did not significantly differ with dASBP (149 ± 13 mmHg) in the adherent group, with a median cSBP-dASBP difference of 1.5 mmHg (IQR:-7.0;9.0). The Bland-Altman plots showed a significant bias between cSBP and dASBP in the non-adherent group only. In univariate analysis, greater age, non-adherence to AHT and African origin were significant determinants of the cSBP-dASBP difference whereas BMI, gender, plasma creatinine were not. In the multivariate analysis, only age and non-adherence to AHT remained significantly related to the cSBP-dASBP difference.

Conclusions: Non-adherence to AHT impacts greatly the cSBP-dASBP difference in patients with RHTN.

THE ANGIOTENSIN CONVERTING ENZYME-INHIBITORY EFFECTS OF THE PEPTIDE ISOLEUCINE-TRYPTOPHAN AFTER ORAL INTAKE VIA WHEY HYDROLYSATE IN MEN

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Objective: Angiotensin-Converting Enzyme (ACE)-inhibitors are treatment of choice in hypertensive patients. In former studies we revealed the ACE-inhibitory activity and antihypertensive effect of the natural dipeptide isoleucine-tryptophan

(IW) and its effect on cardiac remodelling and coronary flow reserve in spontaneously hypertensive rats.

The aim in this project was to determine in volunteers the ACE-inhibiting effect and the bioavailability of IW after oral intake of whey hydrolysate. A second aim was to study the influence of combined intake of IW-containing hydrolysate with further food ingredients.

Design and method: 8 fasted normotensive volunteers received IW containing whey hydrolysate in different doses, intact whey protein, or water. Compounds were applied alone or with parallel intake of specific food ingredients (fiber, protein, carbohydrates and fat). Blood samples were taken at fixed time points for analysis of ACE activity and assessment of IW concentration in plasma by LC-MS/MS method.

Results: Baseline concentrations of IW differed individually ranging from 1.2 to 2.1 nM. The intake of 10 g hydrolysate (equivalent to 50 mg IW) induced a significant increase in plasma IW concentrations (maximum values 8.5–27.5 nM after 25–30 min). The activity of plasma ACE was significantly reduced to 72–87% of baseline activity during this time interval. The maximum of ACE inhibition coincided with the peak of IW concentration. Increasing the applied hydrolysate to 50 g caused IW concentrations to increase to 18–159 nM after 29–65 min. In parallel, ACE activity was decreased to 62–77%. However, after intake of intact whey protein IW concentrations increased only slightly to 2.3–4.9 nM and ACE activity was 88–91% of baseline activity. No changes in IW concentration and ACE activities were observed following placebo application. Combined intake of either protein, fiber or fat delayed IW resorption and extended IW rise of plasma concentration and ACE inhibition. Carbohydrates did not affect IW resorption, however, ACE inhibition was diminished compared to the single application of hydrolysate.

Conclusions: In healthy volunteers oral intake of IW via whey hydrolysate shows a marked increase of IW plasma concentration and inhibition of plasma ACE activity. In addition, effects are retarded by parallel intake of food ingredients.

ELEVATED SYSTOLIC BLOOD PRESSURE AT MIDDLE-AGE REMAINS A SIGNIFICANT CARDIOVASCULAR RISK FACTOR THROUGHOUT LIFE

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Objective: Systolic blood pressure, prevalence of smoking, family history of coronary heart disease, cholesterol and cardiorespiratory fitness are well established as cardiovascular risk factors. In the present study we aimed to investigate how one measurement these variables at middle-age influenced risk of cardiovascular death during the first, intermediate and late part of a 35-year observation period, respectively.

Design and method: Systolic blood pressure, prevalence of smoking, family history of coronary heart disease, cholesterol and cardiorespiratory fitness were measured in 2014 apparently healthy, middle-aged Caucasian men by clinical examination, blood tests and an ECG-monitored, symptom-limited bicycle test. End points were registered after 35 years in a nationwide scrutiny of charts in all hospitals, and from the national Cause of Death registry. Early cardiovascular death was defined as event before 12 years of observation, intermediate event between 12 and 23 years of observation and late event between 23 and 35 years of observation. Impact of predictors and relative risks were estimated using Cox proportional hazards models. When estimating risks of intermediate and late cardiovascular death, men who died within 12 and 23 years were excluded.

Results: We found 80 events of early, 207 events of intermediate and 241 events of late cardiovascular death. Age, systolic blood pressure, smoking status, and cholesterol were significant predictors of early, intermediate and late cardiovascular death. Baseline physical fitness was a significant and independent predictor of early and a borderline significant predictor of intermediate cardiovascular death but had no predictive impact on late cardiovascular death. Family history of coronary heart disease was a significant and independent predictor of early and intermediate, but not late cardiovascular death (Table1).

Conclusions: Systolic blood pressure, smoking, and cholesterol measured at a median age 49 years were strong predictors of early, intermediate and late cardiovascular death during 35 years. Physical fitness at middle age and family history of coronary heart disease were only associated with risk of cardiovascular death before reaching 72 years. Risk factors for CV death have different persistence throughout life and systolic blood pressure at middle-age remains a significant cardiovascular risk factor until old ages.

Table 1 Impact of risk factors on early, intermediate and late cardiovascular death risk

80 events of early CV death (before 12 yrs observation, n = 2014)			
	Multivariate	X ²	P
Age	1.50 (1.36-1.64)	66.5	<0.0001
Smoking status	1.40 (1.17-1.67)	14.2	0.0002
Systolic blood pressure	1.16 (1.07-1.26)	12.3	0.0005
Cholesterol	1.15 (1.06-1.25)	10.3	0.0013
Family history CHD	1.36 (1.12-1.64)	9.4	0.0021
Physical fitness	0.89 (0.79-1.00)	3.9	0.0505
207 events of intermediate CV death (between 12 and 23 yrs of observation, n = 1934)			
	Multivariate	X ²	P
Age	1.73 (1.57-1.92)	116.9	<0.0001
Systolic blood pressure	1.22 (1.11-1.33)	17.5	<0.0001
Smoking status	1.50 (1.24-1.81)	17.3	<0.0001
Cholesterol	1.15 (1.05-1.26)	9.1	0.0026
Family history CHD	1.28 (1.03-1.58)	5.1	0.0239
Physical fitness	0.91 (0.81-1.01)	2.9	0.0885
241 events of late CV death (between 23 and 35 yrs of observation, n = 1727)			
	Multivariate	X ²	P
Age	2.01 (1.75-2.31)	98.2	<0.0001
Systolic blood pressure	1.21 (1.06-1.37)	8.2	0.0042
Cholesterol	1.20 (1.06-1.36)	8.2	0.0043
Smoking status	1.46 (1.13-1.89)	8.0	0.0046
Physical fitness	0.91 (0.78-1.10)	1.5	0.2236
Family history CHD	1.20 (0.88-1.60)	1.3	0.2460

Table 2: Values are hazard ratios (HR) of one standard deviation increase in Survey 1 value for continuous variables, and HR for yes vs. no for Survey 1 status of nominal variables, 95% confidence interval in parenthesis. Ranked by chi square in multivariate model with all possible predictors included. CV; cardiovascular, CHD; coronary heart disease.

PREDICTIVE PERFORMANCE AND CLINICAL UTILITY OF A NEW PREDICTIVE MODEL OF CARDIOVASCULAR RISK FOR YOUNG AND MIDDLE-AGED WORKING POPULATION

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Objective: Identifying people at high cardiovascular risk is challenging, especially at young age. The main objective of the IberScore study was to derive a mathematical model for risk prediction of fatal and non-fatal cardiovascular events from a relatively young and healthy working population.

Design and method: A predictive function for fatal and non-fatal CV events was derived from a cohort of 774,404 workers (70.4% of the target population), free of CV disease at entry, who were followed during 10 years. Workers ages ranged 16–65 years (mean 35.7, SD 10.7). 71.7% were men, which represented the real proportion in the target population. Cardiovascular ageing was estimated (independently by genders) based on the effects of well-known cardiovascular risk factors as: smoking; cholesterol; blood glucose; HDL; systolic blood pressure (SBP); obesity; history of dyslipidemia, diabetes and hypertension.

Results: Along the 10-year follow-up we found 3,762 first cardiovascular events (6%) in derivation cohort. Most of them (80.3%) were non-fatal ischemic events. We derived a logistic flexible parametric model to predict 10-year cardiovascular

risk. 82% of those who suffered a cardiovascular event during the follow-up span had been previously classified as “high risk” or “very high risk” using our model, whereas only 12% of them were classified in the same groups using SCORE. The latter also showed a weak discrimination power for risk stratification while IberScore clearly distinguished the four risk categories. IberScore was well calibrated and showed outstanding predictive performance and clinical utility even at young and middle-age workers. Cut-off points were fixed taking on account their discriminatory capacity and the balance between costs and benefits of the treatments that will be prescribed based on them.

Conclusions: IberScore worked much better to estimate cardiovascular risk in a relatively young and healthy Spanish working population when compared to other models. Cardiovascular ageing, as the result of the effects of risk factors, should be at the core of CV risk estimation. Cut-off points should be set considering the benefit we seek with the treatments we have in mind.

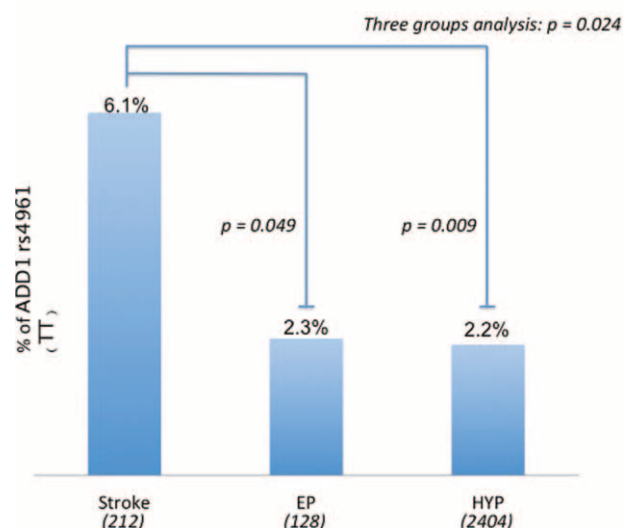
ALPHA-ADDUCIN POLYMORPHISM'S INFLUENCE ON ISCHEMIC STROKES

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Objective: rs4961 Gly460Trp variant of the alpha adducin gene (ADD1) has been associated with renal sodium retention and salt sensitive hypertension. Previous studies indicated that carriers of the 460Trp allele have a higher risk of hypertension and cardiovascular (CV) diseases compared to wild-type homozygotes (Gly-460Gly). The aim of this study is to assess whether there is a correlation between this ADD1 variant and the development of ischemic strokes in an Italian population.

Design and method: 212 patients with ischemic stroke (IS) were recruited from the Stroke Unit of San Raffaele Hospital in Milan and divided into four categories according to Oxford Classification. These patients were compared to a cohort of elder general population (EGP, 128 patients) and a cohort of hypertensive patients (HYP, 2404 patients), both with no history of strokes. All patients analysed were genotyped for adducin family (ADD1, ADD2, ADD3) and other hypertension-related genes. Scientific data: in IS group mean age at strokes' diagnosis was 72.34 ± 11.9, 61% men, 39% women. The incidence of CV risk factors was: hypertension 66%, diabetes 22%, hypercholesterolemia 40% and hypertriglyceridemia 13%, previous stroke 14%. Mean creatinine value was 1.07 ± 0.66 mg/dL. Two comparable populations were selected with similar age (71.28 ± 6.9 years for EGP) and with the same incidence of risk factors (for HYP population). Notably, the presence of subjects homozygous for ADD1 mutated allele (rs4961 TrpTrp) is more than double in patients bearing ischemic stroke than in the two other (6.1% IS vs. 2.3% EP, p = 0.049; 6.1% IS vs. 2.2% HYP, p = 0.009; fig. 1). There was no statistically difference among the various types of stroke. No other significant associations were identified with other gene variations.

Prevalence of α-adducin rs4961 double mutation (TT)



Results: These data suggest a correlation between mutated alpha-Adducin and the increased incidence of all types of ischemic stroke. No correlation was found with the other hypertension-related genes analysed.

Conclusions: rs4961 alpha-Adducin polymorphism should be considered as an independent risk factor for ischemic strokes. Furthermore, ischemic stroke does not appear directly linked to hypertension. Finally, alpha-Adducin polymorphism itself might be a candidate gene in the pathogenesis of stroke.

A BIBLIOMETRIC ANALYSIS OF THE EUROPEAN RESEARCH IN HYPERTENSION

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Objective: By using bibliometric indicators, we have analyzed the scientific production of European countries in the field of hypertension.

Design and method: Articles were extracted from the PubMed database using a query based on Mesh Terms, titles and journals. Publications were then analyzed in Web of Science and InCites (©Clarivate Analytics) in order to extract citations and addresses. Two indicators were analyzed: total number of articles, and percentage of articles in the Top 1% (articles among the 1% of the most cited articles worldwide). Guidelines and general reviews were excluded after reading all abstracts.

Results: The worldwide number of research papers in Pubmed increases from nearly 400 000 articles in 1996 to nearly 1 000 000 in 2015. For hypertension,

it increases from 4000 to 6500. During the period 2006–2015, the worldwide research production in hypertension increased from 4644 to 6451 articles (+ 39%). From 2006 to 2015, contribution of the Asian region increased from 22.8 % to 36.3 % (3.9% to 16.0% for China), that of the USA decreased from 31.9 % to 30.2 %, and that of the 25-European Union countries from 40.4 % to 33.4 %. In Europe, contribution of United Kingdom was 7.0 % of the total number of articles, followed by Italy (6.5%), Germany (6.4%), France (4.1%), Netherlands (3.7%), Spain (3.4%) .. During 2006–2015, 436 articles among 55,868 were in the top 1% most cited (0.78% instead of the expected 1%), respectively 0.57% for the Asian region (0.54% for China), 1.42% for USA, and 1.18% for EU25. Percentages of participation in the European Top 1% articles were respectively 39.8% for United Kingdom, 25.1% for Germany, 19.3% for Italy, 15.2% for The Netherlands and 13.5% for France, 12.3% for Spain. The European Top 1% included 53 randomized controlled trials, 16 meta analysis, and 40 clinical, 34 epidemiological, 19 experimental and 9 genetic studies.

Conclusions: Bibliometric analysis, if performed with a 5 to 10 years periodicity, could help each country to take strategical decisions about their own research in hypertension and look for optimal cooperation with other countries.

ORAL PRESENTATIONS IN POSTER AREA

MECHANISMS OF HYPERTENSION

ADAPTIVE OPTICS CAMERA ENABLES TO DESCRIBE DIFFERENT PATTERNS OF RETINAL VASCULATURE IN HYPERTENSION AND TYPE 2 DIABETES

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Objective: Retinal vasculature is a well-known target of early organ damage in hypertension and diabetes. Adaptive optics, a totally noninvasive, accurate method, allows the precise evaluation of retinal arteriolar and venular networks. The aim of this study was to describe arteriolar and venular vasculature in hypertensive and diabetic subjects by comparison to controls using adaptive optics camera.

Design and method: Hypertensive patients (group H), diabetic subjects without overt diabetic retinopathy (group D) and non-hypertensive non-diabetic control subjects (group C) were recruited. Adaptive Optics RTX1[®] Camera was used to capture three consecutive images along the supero-temporal arteriole and vein (avoiding any arterio-venous nicking) and measure arteriolar and venular internal diameter (ID) in order to calculate AVR. For arteries, Wall Thickness (WT) was also measured to calculate Wall-to-Lumen Ratio (WLR) and Wall Cross-Sectional Area (WCSA). Hypertension was defined according to the presence of any antihypertensive treatment, diabetes was defined by any antidiabetic treatment or HbA1c > 6.5% on two samples.

Results: 129 patients were included (53 group H, 38 group D and group C). Despite the same BP levels in groups H and D, Hypertensive patients had a significant arteriolar narrowing and diabetics patients an arteriolar dilation (group H 85.4 ± 13 mm vs group D 97.7 ± 12 mm and group C 93.3 ± 12 mm, p = 0.015) but a similar venular ID was observed in all groups (group H 126.2 ± 17 mm vs group D 124.5 ± 18 mm vs group C 124.4 ± 18 mm). Hypertensive subjects had a lower AVR (0.68 vs group D 0.77 vs group C 0.76, p = 0.004) and a higher WLR (0.283 ± 0.04 group H, 0.258 ± 0.03 group D and 0.257 ± 0.04 group C). In diabetics, an increased WCSA was also observed (4327.2 mm² group D vs 3823.7 mm² group H vs 4008.0 group C), no differences were found in WT (23.6 ± 3 mm group H vs 24.9 ± 3 mm group D vs 24.2 ± 4 mm group C).

Conclusions: Two different microvascular patterns were observed in this study: arteriolar inward remodeling characterizes hypertension and arteriolar eccentric hypertrophy is observed in diabetes. Adaptive Optics represents a powerful source of new microvascular markers and may contribute to a revival of the funduscopy in hypertension and diabetes.

THE RESULT OF FLOW MEDIATED DILATION TEST IS NOT A DICHOTOMOUS – THE INITIAL STUDY

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Objective: The flow mediated dilation test (FMD) is a standard of examination of an endothelial activity. Positive result is defined as an augmentation of diameter of brachial artery in reaction to hyperaemia estimated for more than 7% of initial value. According to the different methodologies the measurement is performed in a one defined time-point from 2. to 5. minute after the cuff deflation.

The aim of the study was to analyze a multipoint time sequential measurements of brachial artery diameter during FMD test.

Design and method: In a 70 volunteers (33% men, 50+/-14 y.o.) without previous cardiovascular history, FMD test was performed. Cuff of a manometer was placed in a medium of a forearm. Cuff was inflated to a value of 50mmHg higher than systolic blood pressure for a 5 minutes. Brachial artery diameter was measured in a standard acquisition's point before the cuff inflation, just after the

deflation (0€) and in every one minute during 5 consecutive minutes (1€ – 5€) period. According to the percentage changes of a brachial artery's diameter the models of the reaction were estimated.

Results: According to a differences in a direction of changes and time dependent arterial reactivity a six models of FMD reaction was proposed (fig.1)

Type 1. – “standard reaction” - the highest diameter observed in a 2. minute after deflation

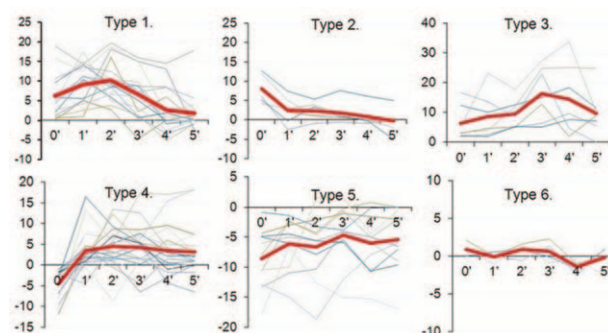
Type 2. – “early reaction” – the highest diameter observed just after deflation

Type 3. – “late reaction” – the highest diameter observed between 3. and 5. minute after deflation

Type 4. – “early constrictive reaction” the initial constrictive reaction observed before a dilation

Type 5. – “constrictive reaction” – constriction of artery observed during the whole post-dilation period

Type 6. – “lack of reactivity” lack or a relative changes (lower than 2% of a diameter) observed during the whole post-dilation period.



Conclusions: Multipoint time sequential measurements during FMD provides additive cognitive value to the standard FMD test. Clinical relevance of different types of vascular reaction needs a further evaluation.

ENDOTHELIAL CELLS EXPOSED TO UREMIC TOXINS SECRETE INTERLEUKIN-8 WHICH PROMOTES VASCULAR CALCIFICATIONS

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Objective: Vascular calcifications (VC) contribute to arterial stiffness and atherosclerosis and are amplified during chronic kidney disease (CKD), in part due to the accumulation of uremic toxins such as phosphate (Pi) and indoxyl sulfate (IS). We hypothesized that the activation of endothelial cells (ECs) by uremic toxins promotes vascular smooth muscle cells (SMCs)-induced calcification.

Design and method: HUVECs were treated with uremic concentrations of Pi, IS or both for 48 hours, then ECs conditioned media (EC-CM) was collected. Human aortic SMCs (hASMCs) were treated with the same uremic conditions, with or without EC-CM supplementation, and then viability and calcification were assayed. To identify factors secreted from ECs exposed to uremic toxins, a cytokine array (CA) was used to screen for 40 cytokines involved in osteogenic metabolism. Next, ELISA and RT qPCR were performed to evaluate IL-8 secretion and expression from ECs, since it was modulated in the CA. The IL-8 effect on hASMCs calcification was also examined by addition of human IL-8 in the media or by evaluating the procalcifying effect of EC-CM collected from ECs transfected with IL-8 siRNA. RT qPCR was also performed to examine the osteochondrogenic switch of hASMCs.

Results: Pi+IS significantly decreased the viability of hASMCs by 30% that was not affected by EC-CM. Conversely, Pi+IS significantly increased the calcification of hASMCs and this effect was aggravated by EC-CM supplementation (wrt control, 3 ± 0.9 without EC-CM vs. 4.8 ± 0.7 with EC-CM, P < 0.0001).

Compared to control, Pi+IS induced IL-8 gene expression in ECs (3.4 ± 1.2 fold increase, $P = 0.0144$) and IL-8 release from ECs (17.5 ± 7.9 pg/ml for control vs. 1.3 ± 0.2 pg/ml for Pi+IS, $P = 0.0164$). IL-8 addition to hASMCs under uremic exposure significantly promoted calcification in a concentration-dependent manner. Furthermore, uremic EC-CM induced hASMCs calcification was prevented by silencing of IL-8 gene in ECs. Finally, IL-8 prevented the Pi+IS-induced increase of osteopontin gene in hASMCs (wrt control, 2.2 ± 0.2 without IL-8 vs. 1.3 ± 0.3 with IL-8).

Conclusions: These results strongly suggest, for the first time, that IL-8 secreted from ECs during uremic exposure may play a critical role in vascular calcifications and thus in the cardiovascular complications of CKD.

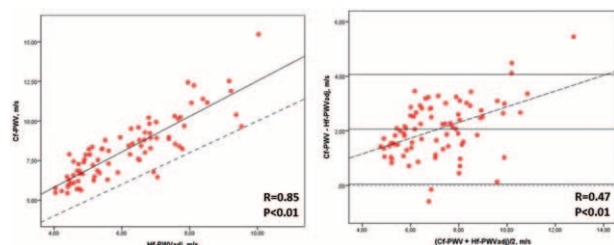
NON-INVASIVE MEASUREMENT OF HEART-FEMORAL PULSE WAVE VELOCITY: CORRELATES, REPRODUCIBILITY AND COMPARISON WITH CAROTID-FEMORAL PULSE WAVE VELOCITY

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Objective: Heart-femoral pulse wave velocity (hf-PWV), estimated from the Cardio-Ankle Vascular Index device (VaSera-1500) by combining phonocardiogram with pulse signals detected by thigh cuffs, as opposite to carotid-femoral pulse wave velocity (cf-PWV), includes the stiffness of the ascending aortic segment. We sought to investigate the repeatability and main correlates of hf-PWV, and to compare the results with cf-PWV.

Design and method: Hf-PWV and cf-PWV were obtained in 85 volunteers ($n = 30 < 30$ years, $n = 30$ 30–60 years, $n = 25 > 60$ years), according to ARTERY society guidelines for validation of non-invasive devices (Artery Research 2010;4:34–40). Heart-femoral transit time was calculated as the time lag between aortic opening to pulse arrival to the thigh cuff. Distance was taken as $0.8 \times$ direct distance between the carotid and femoral pulses. For comparison with cf-PWV, heart-femoral transit time was re-calculated after subtracting the transit times needed to travel: (1) the distance from the femoral pulse to the top of thigh cuff; (2) the distance from the aortic valve to the carotid pulse. These two transit times were derived from age- and sex-specific values published elsewhere (Sugawara J et al, J Hypertens 2014;32:881–889).

Results: Cf-PWV and hf-PWV were closely correlated ($R = 0.85$, $p < 0.01$) and showed similar degrees of association with age ($R = 0.75$ and $R = 0.83$), height ($R = 0.20$ and $R = 0.26$) and mean arterial pressure ($R = 0.53$ and $R = 0.54$). In absolute terms, after re-calculation of transit time, hf-PWV was significantly lower than cf-PWV (mean difference -2.06 ± 1.0 m/s, $p < 0.01$), and showed a tendency toward increasing difference at increasing PWV values (Figure 1). Hf-PWV showed high within- (coefficient of variation (CV) 4.6%) and between-observer (CV 6.0%) reproducibility.



Conclusions: Hf-PWV, measured through a semi-automated device which combines phonocardiogram with pulse detection with a thigh cuff, showed high reproducibility, was closely correlated with cf-PWV, and showed similar associations with variables classically associated with arterial stiffness. In absolute terms, hf-PWV was significantly lower than cf-PWV; such difference increased at increasing age, potentially reflecting the lower age-dependency of stiffness of the ascending aorta. Further studies aiming at evaluating the clinical and prognostic significance of hf-PWV are warranted.

PACED BREATHING REDUCES BLOOD PRESSURE AND ARTERIAL STIFFNESS: IMPACT OF THE AUTONOMIC NERVOUS SYSTEM

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Objective: The autonomic nervous system (ANS) plays an important role in regulating blood pressure (BP), but its action on arterial stiffness (AS) is still a subject of debate. Device-guided paced breathing (DGB) has been proposed as a non-pharmacological strategy to control BP – via the effects on ANS – but its effect on AS are unknown. Therefore, we examined if DGB would affect AS in hypertensive (HT) subjects.

Design and method: Brachial BP (OMRON-705IT, Omron Corporation, Kyoto, Japan), central BP (pulse-wave analysis of the radial artery, SphygmoCor, AtCor Medical, Sydney, Australia), AS (carotid-femoral pulse wave velocity (cfPWV), Sphygmocor) and ANS activity (high resolution heart rate variability (HRV) as log-ratio of low-frequency/high-frequency range (LF/HF), Schiller Medilog AR-12plus, United States) were determined in HT subjects. All measurements were performed in supine position after 15 min of rest and subsequently repeated during supervised DGB therapy which slows breathing < 10 breaths/min.

Results: 25 HT patients (11 male), age (mean \pm SD) 47 ± 12 years, systolic BP (SBP) 142.8 ± 19.4 mmHg, diastolic BP (DBP) 86.6 ± 8.7 mmHg and heart rate (HR) 72.4 ± 12.5 bpm were recruited. DGB decreased LF/HF by 0.09 ± 0.12 ($p < 0.05$) and reduced both brachial (-10.19 ± 7.89 mmHg) and central (-8.47 ± 6.80 mmHg) SBP, DBP (-3.6 ± 3.0 mmHg for brachial, $p < 0.01$) as well as HR (-3.48 ± 6.25 bpm, $p < 0.05$). cfPWV decreased from 9.81 ± 1.66 m/s to 8.66 ± 1.60 m/s ($p < 0.01$) and bivariate correlation showed no associations with changes in SBP, DBP or mean BP (MBP) ($\beta = 0.117, 0.107, 0.216$ respectively; all $p > 0.1$). Finally, using the regression coefficient from meta-analysis and the observed decrease in MBP, we calculated the predicted reduction of cfPWV attributed to reduction in BP to be 0.48 m/s, less than 50% of the observed reduction 1.04 (95%CI 0.65, 1.28) m/s.

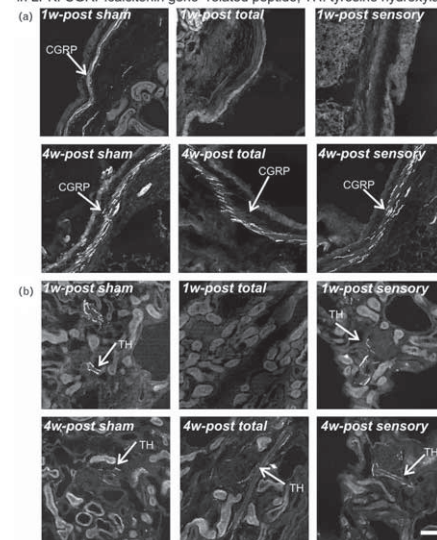
Conclusions: DGB decreased central/brachial BP, an effect likely to be mediated by the reduction of sympathetic activity as indicated by HRV. Effects to reduce cfPWV were greater than those predicted from the change in BP suggesting that the ANS may play an independent role in modulating AS in HT subjects.

RENAL SYMPATHETIC AND SENSORY NERVES DO NOT DRIVE HYPERTENSION IN A POLYCYSTIC KIDNEY DISEASE RAT MODEL

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Objective: Catheter-based renal denervation (RDN) is used to treat hypertension however recent clinical trials have cast doubt on previously reported effects. This study aims to determine if RDN improves systolic blood pressure, renal function and autonomic dysfunction in a hypertensive rodent model due to polycystic kidney disease (PKD).

Figure 1. Pelvic CGRP (A) and cortical TH (B) labelling after sham, total or sensory renal denervation in LPK. CGRP: calcitonin gene-related peptide, TH: tyrosine hydroxylase. scale bar=100µm



Design and method: Lewis polycystic kidney rats (LPK) underwent total, selective sensory or sham RDN by periaxonal application of phenol, capsaicin or normal saline, respectively, at 6-weeks-old. Animals then underwent 1) euthanasia at 7-weeks-old, 10-weeks-old or 14-weeks-old or 2) repeat procedure at 10-weeks-old and euthanasia at 14-weeks-old. Blood pressure was measured by radiote-

lemetry and treatment efficacy determined using renal immunohistochemistry for sensory [calcitonin gene-related peptide [(CGRP)] and sympathetic nerve [tyrosine hydroxylase (TH)] markers. Renal function was determined by plasma creatinine and urea. Autonomic function was assessed using baroreflex sensitivity (BRS at low frequency, α LF and high frequency, α HF).

Results: Cortical TH labelling was significantly depleted at 1-week, but returned to ~23% and ~32% of control levels by 4-week and 8-week post-total RDN respectively. Pelvic CGRP labelling was largely abolished by 1-week, but returned to ~43% and ~80% of control levels by 4-week and 8-week post-total RDN, and to 67% and 97% by 4-week and 8-week post-sensory RDN. Neither total RDN nor sensory RDN reduced SBP in the LPK rats (total vs. sensory vs. sham, 202 ± 22 vs. 213 ± 7 vs. 205 ± 12 mmHg, $P = 0.5$) between 7–10 weeks. Repeat total RDN did not have any additional impact on SBP compared to a single procedure or shams between 11–14 weeks ($P = 0.48$). Neither total nor sensory RDN affected α LF (total vs. sensory vs. sham, 1.1 ± 0.1 vs. 1.1 ± 0.0 vs. 1.2 ± 0.0 ms/mmHg, $P = 0.6$) or α HF (total vs. sensory vs. sham, 2.2 ± 0.2 vs. 1.8 ± 0.1 vs. 2.1 ± 0.1 ms/mmHg, $P = 0.1$) between 7–10 weeks. Between 11–14 weeks, there was no significant difference in BRS between all groups. Neither procedure worsened plasma creatinine or urea.

Conclusions: We conclude that renal sympathetic and sensory nerves do not drive hypertension or autonomic dysfunction in the LPK model of PKD. Furthermore, PKD patients as a cohort might not benefit from the RDN procedure.

IS THERE AN INTRINSIC ALTERATION OF AORTIC MECHANICAL PROPERTIES IN BICUSPID AORTIC VALVE PATIENTS? REGIONAL COMPARISON WITH TRICUSPID AND MARFAN PATIENTS THROUGH 4D FLOW MRI

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Objective: Ascending aorta (AAo) dilation is highly prevalent in bicuspid aortic valve (BAV) patients. The etiology of dilation in BAV patients is widely discussed, with strong evidence for a role for both altered local hemodynamics (due to aortic valve morphology), and genetic factors. Current guidelines suggest to use a threshold of AAo diameter for the indication of prophylactic aortic resection. Nonetheless, as 40 % of dissection happen in non-dilated or mildly-dilated aorta, there is a clear need of new biomarkers. We aim to investigate whether regional aortic biomechanics are altered in BAV patients with respect to TAV and MFS individuals.

Design and method: We prospectively included 136 BAV, 44 Marfan and 54 TAV patients (including 18 with AAo aneurysm) without severe valvular disease. The 1.5T CMR protocol comprised a 4D flow MRI study to assess regional PWV, and cine CMR to compute AAo and DAo distensibility (AD). Three-dimensional geometry of the aorta were reconstructed from non-contrast-enhanced MR angiography and 100 analysis planes were identified. For each plane the average velocity waveform was extracted. The aorta was divided in AAo and descending aorta (DAo). The transit time between velocity waveforms was calculated with wavelet analysis of the systolic upslope. BAV population was divided in quintiles for maximum AAo diameter.

Results: Once adjusted for age, blood pressure and local diameter, PWV and AD were similar in BAV and TAV subjects both in the presence (table 1) and in

the absence (table 2) of AAo dilation. Differently, MFS patients presented lower distensibility and higher PWV in the AAo and DAo.

PWV in BAV patients presented a biphasic trend with respect to the AAo diameter (see figure 1). There was a decrease of its value from 30 until 45 mm (first three quintiles). From this point the PWV increased with diameter. Differently, AD was conserved in the first three quintiles and decreased at larger diameters.

Conclusions: Aortic biomechanics in BAV patients did not differ from TAV patients but are markedly different in Marfan patients. AAo PWV showed an initial decrease followed by a marked increase with respect to AAo diameter.

					BAV Vs TAV		BAV Vs MFS		
		NON-DILATED TAV	NON-DILATED BAV	NON-DILATED MFS	Unadjusted	Adjusted for age, DBP and AAO diameter	Unadjusted	Adjusted for age, and AAO diameter	
		N	36	30	27	p value	p value	p value	p value
AAo	PWV	5.4	4.35	6.81	0.121	0.353	<0.001	0.035	
	AD	4.2	1.8	2.0	0.001	0.418	0.572	0.015	
DAo	PWV	7.4	8.2	10.1	0.207	0.157	0.240	0.015	
	AD	3.1	2.1	2.3	0.001	0.422	0.869	0.041	

Table 1: Unadjusted and adjusted analysis of AAo and DAo aortic mechanical parameters in healthy volunteers and non-dilated BAV and MFS patients. PWV [m/s]. AD [10⁻⁶ cm²/dyne]

					BAV Vs TAV		BAV Vs MFS	
		DILATED TAV	DILATED BAV	DILATED MFS	Unadjusted	Adjusted for age, DBP and AAo diameter	Unadjusted	Adjusted for age, BSA, DBP, SBP and AAo diameter
		N	18	106	17	p value	p value	p value
AAo	PWV	2.9	3.0	8.6	0.922	0.952	<0.001	0.001
	AD	0.9	1.7	1.9	0.016	0.450	0.928	0.032
DAo	PWV	11.6	10.9	12.4	0.159	0.710	0.219	<0.001
	AD	1.1	1.9	2.2	0.004	0.352	0.620	0.011

Table 2: Unadjusted and adjusted analysis of AAo and DAo aortic mechanical parameters in dilated BAV, TAV and MFS patients. PWV [m/s]. AD [10⁻⁶ cm²/dyne]

