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P.009: THE EFFECT OF SPIRONOLACTONE ON PULSE WAVE CHARACTERISTICS IN HYPERTENSION: INFLUENCE OF THE ALDOSTERONE TO RENIN RATIO (ARR)

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Caucasians there were significant positive correlations between DBP and MAP and PWV ($r=0.37$; $r=0.35$). This was not observed in the African group. When the groups were divided in tertiles according to SBP, the PWV was significantly higher in the third tertile in the Caucasians, but not in the Africans.

Conclusions: In the Caucasians the PWV increased with increasing BP, but no such increase was observed in Africans. Increased PWV in the Africans point to vascular changes independent of BP.

[1] Safar ME. *Hypertension*. 1998;156-161.

P.005

INCREASED ARTERIAL WALL STIFFNESS IN RESISTANT HYPERTENSIVE PATIENTS IN COMPARISON WITH ESSENTIAL HYPERTENSION

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Background/Aims: Arterial wall stiffness is considered as independent cardiovascular risk factor. Aim of this study was to compare arterial stiffness assessed by use of Pulse Wave Analysis (PWA) and carotid - femoral Pulse Wave Velocity (PWV) in resistant hypertensive patients to essential hypertensive patients and to normotensive control subjects (NCS).

Methods: 29 patients with resistant hypertension (RH), 35 patients with moderate to severe essential hypertension (EH) and 29 NCS were investigated. PWA and PWV were obtained using SphygmoCor applanation tonometer.

Results: PWV was significantly higher in RH group when compared to EH group and to NCS group while clinical blood pressure was comparable between RH and EH groups. However, 24h ABPM values were significantly higher in RH group than in EH group. There were no significant differences in age, duration of hypertension, body mass index (BMI), lipid profile, fasting glucose levels and creatinine levels between RH and EH groups. Carotid ultrasound and echocardiographical findings were comparable between RH and EH groups. PWV correlated with the presence of the diagnosis of RH, age, clinical SBP, brachial pulse pressure, mean 24h SBP, mean day SBP and mean night SBP. After multiple regression analysis, PWV remains significantly correlated only with the presence of the diagnosis of RH, age and with brachial pulse pressure. **Conclusions:** Patients with RH have increased arterial wall stiffness, represented by carotid-femoral PWV, when compared to EH patients. The greatest determinants of PWV are the presence of RH, age and brachial pulse pressure.

P.006

MEASUREMENT OF ARTERIAL PULSE WAVE VELOCITY SUPPORT THE SUSPICION OF ASYMPTOMATIC LEFT VENTRICULAR DYSFUNCTION IN HYPERTENSIVE PATIENTS WITH METABOLIC SYNDROME OR DIABETES MELLITUS

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Background: The aim of this study was to evaluate myocardial function and vascular wall elasticity using pulse wave velocity (PWV) between aorta and femoral artery in patients with hypertension and metabolic syndrome (MS) or type 2 diabetes mellitus (HT +DM).

Methods: Fifty – three patients (pts) with MS (age: 45,6 years body mass index (BMI): 31,75, blood pressure (BP) 150/94 mmHg and 57 pts with HT and DM type 2 (HT + DM) – (age: 62,9 years, BMI : 30,34, BP 156/101 mmHg and normal renal function were studied. LV function was assessed by brain natriuretic peptide plasma levels (BNP and NT pro BNP), echocardiographically detected ejection fraction (EF), pulsed doppler assessment of transmitral blood flow velocities (E, A, E/A ratio) and pulsed doppler tissue imaging (TDI) of velocities of mitral annular movements (Svm, Evm, Avm).

Results: Pts in both groups revealed normal systolic function of the LV (EF 65 % versus 61%) , pts with HT + DM had higher values of the LV mass than the group with MS (44,9 v.s. 54,0 g/height^{2,7}, $p=0.005$) Average values of PWV were lower in the group with MS than in HT + DM group (11,38m/s vs 12,79 m/s, $p=0.002$) as well as BNP (54,7 vs 141,12 pg/l, $p=0.005$) and NT pro BNP(66,5 vs 279,6 pg/l). In both groups of pts increased PWV was significantly correlated with TDI measurements indicating reduced diastolic function (PWV and E/Evm $r = 0,698$, $p<0,001$) and values of natriuretic peptides (PWV versus NT pro BNP $r = 0,776$, $p<0,001$).

Conclusions: Arterial stiffness in hypertensive pts revealed some relation to the LV dysfunction. The measurement of the PWV may contribute to the prediction of LV diastolic dysfunction in hypertensive pts with metabolic syndrome or diabetes mellitus.

P.007

REFERENCE VALUES FOR ARTERIAL STIFFNESS IN A SUB-SAHARAN AFRICAN POPULATION

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Objective: Unlike Caucasians, African subjects react with pronounced peripheral activation in response to stressors. To shed more light into the peripheral arterial characteristics of African people the current study was undertaken. Furthermore diagnostic thresholds for increased arterial stiffness were to be determined.

Methods and results: Pulse pressure (PP) and carotid-radial pulse wave velocity (PWV) was determined in normotensive men (N=383) and women (N=616) of African descent. PP and PWV was higher in men than women. Age had only a marginal effect on both parameters. Based on 95th prediction bands the following sex-specific thresholds for increased arterial stiffness at age 50 y were determined: men, 63 mmHg for PP and 16.5 m/s for PWV; women, 59 mmHg for PP and 14.9 m/s for PWV. These thresholds need adjustment by 0.7 mmHg and 0.2 m/s for men and 1.9 mmHg and 0.2 m/s for women for each decade that age differs from 50 years.

Conclusion: Normotensive men of African descent have stiffer arteries compared to their female counterparts. The determined thresholds can be used to diagnose increased arterial stiffness in middle-aged adults of African descent.

P.008

COMPARATIVE STUDY OF AUGMENTATION INDEX MEASURED BY TWO DIFFERENT DEVICES

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Background: Recent studies emphasize the significance of vessel wall properties estimations of large arteries not only for research purposes, but even in clinical practice already. The newly launched OMRON device measures the radial augmentation index (AIx) automatically. The aim of this study was to compare intra-individually this device to the long-term established Sphygmocor device in patients with manifest coronary heart disease and in addition to do an intra-device comparison of the OMRON device.

Methods: The investigated sample was one hundred randomly selected patients with manifest coronary heart disease, a random sub-sample of the Czech EuroAspire III study series. The measurements of the radial augmentation index were done in virtually similar conditions, in 60% twice using the HEM9000AI (OMRON) device and once the Sphygmocor (ATCor Systems) device, the rest of the sample was measured once by both devices.

Results: The OMRON device measured in average a higher AIx than the Sphygmocor device and this intraindividual difference is highly statistically significant. The median intraindividual difference between both devices was 17.4%. Both estimations significantly correlate, however, the correlation coefficient is for this kind of comparison rather low (about 0.44). In the OMRON intradevice comparison the median intraindividual difference was 1.9%.

Conclusion: The OMRON and Sphygmocor device estimations were in coronary patients not biologically equivalent. In conclusion, the OMRON device showed a very low variability and is applicable for estimation of the radial augmentation index in clinical use. However, the result from one device does not seem to be transferable to the other.

P.009

THE EFFECT OF SPIRONOLACTONE ON PULSE WAVE CHARACTERISTICS IN HYPERTENSION: INFLUENCE OF THE ALDOSTERONE TO RENIN RATIO (ARR)

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Background: Several lines of evidence suggest that aldosterone can have an adverse blood pressure independent effect on heart and blood vessels

including hypertrophy, vascular inflammation, myocyte necrosis and fibrosis. This study set out to evaluate whether spironolactone had a beneficial effect on arterial stiffness (in comparison to bendrofluthiazide) and to what extent this could be predicted by the aldosterone renin ratio (ARR).

Methods: This is a substudy of a double-blind, randomised, crossover, trial in hypertensive subjects with either a high ARR (> 750 and a plasma aldosterone > 250pmol/l), or low ARR (< 300 and a plasma renin activity <10ng/ml/h). Each group underwent 12 weeks treatment with spironolactone 50mg OD and bendrofluthiazide (BFZ) 2.5mg OD in random order, separated by a 2-week washout. Brachial pulse wave velocity (Br-PWV) and pulse wave analysis for central blood pressure, augmentation index (Alx) and time of reflection (Tr) measurements using Sphygmocor technique was conducted at the end of each treatment.

Result: 98 subjects (59 high and 39 low ARR) completed the sub-study. Reduction in central SBP was significantly greater after spironolactone compared with BFZ for both the high and low ARR groups (Delta (Δ) -3.39 mmHg $P < 0.035$) with no difference between the groups in relative response to spironolactone and BFZ. There were no differences in Br-PWV, Alx or Tr between treatments or the ARR groups ($P > 0.05$ for all).

Conclusion: The result of this study suggests that the benefit of spironolactone on blood pressure is not influenced by the prevailing state of activation of the RAAS. There was no convincing evidence that mineralocorticoid antagonism had a beneficial effect on arterial stiffness independent of blood pressure lowering.

P.010

RENAL ARTERY STENOSIS AND ITS DIAGNOSTICS IN TYPE 2 DIABETIC PATIENTS

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Aims: The purpose of this study was to evaluate sensitivity and safety of several techniques for renal artery stenosis (RAS) detection in subjects with type 2 diabetes and coexistent hypertension.

Materials and methods: We studied 157 patients. All of patients underwent duplex sonography (DS). Patients with RAS detected by DS underwent magnetic resonance angiography (MRA) or multislice computed tomography (MSCT) of the renal arteries. We used 1.5 T MR scanner and 16 slices MSCT. **Results:** We found that DS detected RAS in 58 (36.3%; 28.7% unilateral, 7.6% bilateral) type 2 diabetics (specially in smoking males) with myocardial dysfunction and rheological abnormalities. 10 patients with glomerular filtration rate (GFR) <60 ml/min but >30 ml/min underwent MRA of renal arteries and abdominal aorta with bolus injection of 20 ml gadolinium (Gd) based contrast agent. The diagnosis was confirmed in 8 cases, (6 subjects had unilateral RAS, 2 subjects had bilateral RAS) (sensitivity 80%). 28 patients with GFR >60 ml/min underwent MSCT of renal arteries and abdominal aorta with bolus injection of 50 ml "iso-osmolar" non-ionic contrast agent. The diagnosis was confirmed in 22 cases (16 subjects had unilateral RAS, 6 subjects had bilateral RAS) (sensitivity 78,6%). Serum creatinine, was recorded for three consecutive days after procedures. There was no change from the baseline in both groups.

Conclusions: DS is a valid routine method of investigation of diabetics at risk for RAS. MRA and MSCT are safe methods of RAS verification.

P.012

THE ASSOCIATION BETWEEN FREE THYROXINE, AORTIC RIGIDITY AND GENETIC POLYMORPHISM OF ANGIOTENSIN II TYPE 1 RECEPTOR IN A POPULATION SAMPLE*

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Background: Thyroid hormones showed direct proliferative properties on cardiovascular system also by modulating the expression of renin-angiotensin axis. The aim of our study was to establish, whether interaction between mutation of angiotensin II, type 1 receptor (AGTR1) and mild changes in free thyroxine (fT4) may influence the aortic rigidity.

Methods: 249 euthyroid subjects (m121, f128, mean age 48.03 \pm 0.70) was selected from population based-study. Aortic pulse wave velocity (PWV) was measured using Sphygmocor, A1166C mutation of AGTR1 by PCR. The

sample was stratified according to fT4 quintiles for optimal (2nd to 4th quintile), low-normal (1st quintile) and high-normal (5th quintile) fT4 strata. **Results:** [mean \pm SEM; optimal vs. low-normal (p_1) or high-normal (p_2), *adjusted for age and gender]

fT4 strata:	optimal	low-normal	p_1	high-normal	p_2
A1166C mutation absent:					
n	72	32		32	
age	47.7 \pm 1.29	49.0 \pm 2.17	0.45	51.34 \pm 1.91	0.10
systolic blood pressure	122.6 \pm 1.72	128.4 \pm 3.40	0.12	130.6 \pm 3.21	0.07*
diastolic blood pressure	79.2 \pm 1.06	81.4 \pm 1.93	0.43*	81.5 \pm 1.57	0.50*
aortic PWV [m/sec]	7.80 \pm 0.24	7.87 \pm 0.41	0.40*	8.06 \pm 0.75	0.57*
A1166C mutat. present:					
n	75	23	0.17	15	0.26
age	46.0 \pm 1.31	49.6 \pm 1.98	0.33*	49.4 \pm 2.68	0.09*
systolic blood pressure	123.5 \pm 1.82	128.7 \pm 3.19	0.34*	133.5 \pm 4.27	0.89*
diastolic blood pressure	79.3 \pm 1.14	82.4 \pm 2.50	0.88*	81.3 \pm 2.85	<0.004
aortic PWV [m/sec]	7.26 \pm 0.20	7.46 \pm 0.42		8.63 \pm 0.72	

Conclusion: In our sample of general population we found, that high-normal fT4 was associated with increased aPWV, however significantly expressed only in patient with A1166C mutation of AGTR1.

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P.013

BLOOD PRESSURE, ARTERIAL RIGIDITY AND ALCOHOL INTAKE IN A POPULATION SAMPLE*

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Objectives: Increased alcohol intake impaires the control of hypertension in treated patients. The aim of this study was to evaluate the relation between weekly alcohol intake, blood pressure and arterial stiffness.

Methods: 257 subjects (m126, f131 mean age 48.04 \pm 0.66) were selected from population- based postMONICA study. Arterial stiffness was measured using Sphygmocor device as aortic pulse wave velocity (APWV) and radial augmentation index (RALx), the one-week alcohol intake was ascertained by diet recall.

Results: The sample was divided according to reported weekly intake of pure alcohol into 3 categories: none or minimal intake (0-42g), mild drinkers (43-154 g) and moderate to heavy drinkers (> 154g). Among these categories, significant increasing trend in blood pressure and aortic rigidity were found (see table). These trends remained significant even after adjustment for age, current smoking, body mass index, antihypertensive treatment, LDL and glyceamia as potentially confounding factors of hypertension and/or increased arterial rigidity.

weekly alcohol intake:	0-42g	43-154 g	> 154 g	p for trend
N	131	72	54	-
age [years]	47.9 \pm 0.99	48.3 \pm 1.30	48.1 \pm 1.45	0.83
gender [% of males]	21.4	65.3	94.4	<0.0001
body mass index [kg/m ²]	26.1 \pm 0.36	26.9 \pm 0.45	27.2 \pm 0.56	0.14
systolic BP [mmHg]	122.8 \pm 1.46	128.0 \pm 2.03	130.3 \pm 1.77	<0.003
diastolic BP [mmHg]	78.2 \pm 0.88	82.0 \pm 1.43	83.1 \pm 1.28	<0.03
antihypertensives [%]	18.3	23.6	13.0	0.31
APWV [m/sec]	7.36 \pm 0.18	7.44 \pm 0.24	8.24 \pm 0.46	<0.02
RALx [%]	73.8 \pm 1.89	71.2 \pm 2.51	66.9 \pm 2.99	0.35

Conclusion: Moderate to heavy drinkers showed in our general population sample gradually higher blood pressure, probably because of increased aortic stiffness.

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