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P6.17: CARDIOVASCULAR RISK FACTORS CONTRIBUTE TO THE VARIANCE OF WALL-TO-LUMEN RATIO

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method of BP measurement was more strongly associated with LVM in a young healthy normotensive population.

Methods: Forty-one adults (23±4yrs, 27% male) took part in the study. LVM was measured using 2-D echocardiography (Vividq, GE) and indexed to body surface area (LVMI). Both office and 24-hour pSBP and cSBP were measured using the Mobil-O-Graph system (IEM, Germany). cSBP's were calculated using brachial mean and diastolic pressures (MAP-cal).

Results: Participants had normal office pSBP (117 ±10 mmHg) and LVMI (79 ±17 g/m²) values. On average, office cSBP (128 ±19 mmHg) was significantly higher than 24cSBP (123 ±14 mmHg, P<0.05). LVMI was not associated with pSBP (r=0.275, P=0.82) and weakly associated with 24pSBP (r=0.320, P=0.041). However the strongest associations with LVMI were with cSBP MAP-cal (r=0.506, P=0.001) and 24cSBP MAP-cal (r=0.556, P<0.0001).

Conclusion: In the current young normotensive population, both office cSBP and 24cSBP were more closely associated with LVMI than peripheral measures of SBP. These findings may have implications for the progression and potential treatment of hypertension-induced target organ damage.

P6.14

THE EFFECT OF PHYSICAL ACTIVITY ON 24-HOUR AUGMENTATION INDEX

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Introduction: Augmentation Index (AIx) is a surrogate measure of systemic arterial stiffness and wave reflections. Clinic measures of AIx are considered to be a sensitive measure of risk in young adults and are lower in individuals who take part in high levels of physical activity (PA). The development of an ambulatory blood pressure monitoring (ABPM) system, which also calculates AIx, now allows usual AIx to be assessed. The aim of this study was to assess the association between 24-hour AIx and levels of physical activity in a young healthy cohort.

Methods: Forty-six adults (23±5years, 28% male) took part in the study. 24-hour AIx@75 (AIx at heart rate 75bpm) was measured using the ABPM device (Mobil-O-Graph, IEM). Weekly PA levels were recorded using a detailed PA questionnaire (total minutes per week).

Results: An inverse association between 24-hour AIx@75, Night-time AIx@75 and levels of PA (r = -0.420, P<0.01 and r = -0.403, P<0.01, respectively) were observed. Interestingly, no associations were observed between 24-hour blood pressure and levels of PA.

Conclusion: These novel data, in a young normotensive cohort illustrate the beneficial effect of increased PA on 24-hour AIx. 24-hour measurements of vascular function may provide a more robust tool to understand the chronic effects of PA on vascular health. Further studies are needed to understand the use of ABPM for 24-hour monitoring of vascular stiffness.

P6.15

ATTENUATION OF ARTERIAL STIFFNESS GRADIENT WITH AGE AND ITS IMPACT ON CENTRAL PULSE WAVE PROFILE IN DIALYSIS PATIENTS

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Background: Arterial stiffness has been considered as an index of vascular ageing. However, the relationship between age and stiffness of various segments of the arterial tree is heterogeneous. Moreover, the hemodynamic impact of vascular stiffness is thought to be related to the attenuation or even reversal of the physiological arterial stiffness gradient. The objectives of the present study were to evaluate the impact of age on aortic (central elastic artery) and brachial (muscular conduit artery) stiffness and to assess hemodynamic correlates of the arterial stiffness gradient.

Method/results: In 310 dialysis patients (67 years [25th-75th percentiles: 56-76], 185(60%) men, 134(43%) diabetes and 162(52%) cardiovascular disease), we measured aortic and brachial stiffness by pulse wave velocity of carotid-femoral (cf-PWV) and carotid-radial (cr-PWV) using direct distances (Complior). Arterial stiffness gradient was determined by cf-PWV/cr-PWV (PWV ratio). Central pulse wave parameters were obtained through generalized transfer function applied to the radial artery pulse profile (Sphygmocor). Mean cf-PWV, cr-PWV and PWV ratio were respectively of 13.52 ±4.07m/s,

8.76 ±1.68m/s and 1.59 ±0.52m/s. Cr-PWV decreased with age (β=-0.031, R=-0.274, P0.001), while cf-PWV (β=0.144, R=0.529, P0.001) and PWV ratio (β=0.021, R=0.613, P0.001) increased. In contrast to cf-PWV and cr-PWV, PWV ratio was not associated with MBP (P=0.997).

Conclusion: The use of PWV ratio may be a more logical choice for risk determination than aortic stiffness as it provides a better estimation of the loss of arterial stiffness gradient and is not influenced by MBP in this population.

P6.16

LEFT VENTRICULAR GEOMETRY AND CAROTID VASCULAR DAMAGE IN PATIENTS UNDERGOING CORONARY ANGIOGRAPHY

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Background: Vascular structural(intima-media thickness, IMT) and functional(carotid stiffness, cPWV)alterations are related to different pattern of left ventricular (LV) geometry in general populations and in hypertensives. The relationship between vascular damage and LV geometry has not been analyzed prospectively in patients undergoing coronary angiography.

Methods: 399 consecutive patients with clinical indication to coronary angiography, prospectively underwent standard ultrasound examination for the evaluation of LV mass index(LVMI g/m².7), relative wall thickness(RWT), distal anterior descending coronary artery flow velocity(LADd_vel), carotid ultrasound with real time echotracking system for measurement of central blood pressure(cSBP, cDBP), common carotid intima media thickness(cIMT) and carotid pulse wave velocity(cPWV) (Esaoe MyLab 70). The noninvasive evaluations were performed blindly to clinical information, before coronary angiography.

Results: cIMT and cPWV were higher in patients with concentric LVH(LVMI≥49 g/h2.7 in men and ≥47 g/h2.7 in women and RWT≥ 0.42) as compared to N (normal LV mass and geometry) and CR (concentric remodeling, normal LVMI and RWT>0.42). LADd_vel was greater in patients with concentric LVH than in others groups. The prevalence of coronary stenosis(>50%) was greater in patients with concentric LVH and CR as compared to N. Patients with concentric geometry (RWT≥0.42) showed higher values of cIMT(773±169 vs 729±162, p<0.005), cPWV(8.9±2.7 vs 9.6±2.6, p<0.05) and LADd_vel(40±22 vs 48±31, p<0.05) and a greater prevalence of coronary stenosis(>50%)than patients with RWT<0.42(53 vs 69%, p<0.005).

Conclusions: Our results confirm that in patients undergoing coronary angiography concentric geometry is associated with structural and functional carotid alterations, with increased central blood pressure and anterior descending coronary artery flow velocity. In this large group of patients, concentric geometry is associated with a greater prevalence of coronary stenosis, as assessed by coronary angiography.

P6.17

CARDIOVASCULAR RISK FACTORS CONTRIBUTE TO THE VARIANCE OF WALL-TO-LUMEN RATIO

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Background: Common carotid artery intima-media thickness (cIMT) is an accepted ultrasound marker of subclinical atherosclerosis. It is argued that increase in cIMT may also reflect nonatherosclerotic thickening, thus, lumen diameter could be taken into account. A common approach to account for lumen diameter is wall-to-lumen ratio (WLR), however, its precise relations

to cardiovascular risk factors remain unclear. We attempted to compare the contribution of cardiovascular risk factors to the variance in cIMT and WLR. **Methods:** Noninvasive measurements of cIMT and WLR were made with high-resolution ultrasonography in 5,983 subjects. They were male aged 40 to 55 and female aged 50 to 65 without previous cardiovascular events, participating in the Lithuanian High Cardiovascular Risk primary prevention program. We performed a multiple linear regression on cIMT and WLR incorporating traditional and less traditional cardiovascular risk factors.

Results: Mean left and right cIMT was 0.66 ± 0.12 mm and 0.65 ± 0.11 mm respectively, whereas mean WLR was 0.092 ± 0.015 . We found that cardiovascular risk factors could explain 8.9% of left cIMT and 8.3% of right cIMT. Strikingly, traditional and less traditional factors (namely age, male sex, LDL/HDL ratio, mean arterial blood pressure and triglyceride) contributed to a significantly larger proportion of WLR variance, amounting to 14.2%.

Conclusions: Adjustment for carotid lumen diameter in analyses evaluating common carotid artery intima-media thickness should be considered. The precise role of WLR as an ultrasound marker of subclinical atherosclerosis remains a topic of interest for future research.

P6.18

CARDIOVASCULAR TARGET ORGAN DAMAGE IN PREMENOPAUSAL SYSTEMIC LUPUS ERYTHEMATOSUS PATIENTS AND IN CONTROLS; ARE THERE ANY DIFFERENCES?

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Background: In patients with Systemic lupus erythematosus (SLE) a greater prevalence of structural and functional cardiovascular (CV) alterations has been described, possibly explaining the higher incidence of CV events, as compared to subjects matched for age and sex.

Aim of this study was to analyze the presence of target organ damage in premenopausal women with SLE and in controls matched not only for demographic characteristics but also for other cardiovascular risk factors.

Subjects and methods: 4 patients with SLE clinically stable (SLEDAI score 2.5 ± 1.5) (age 32 ± 7 years, range 19-44) and 34 controls matched for sex, age, BMI, clinic blood pressure (BP) and antihypertensive treatment (if present), underwent 24 hours BP monitoring, echocardiography with tissue Doppler analysis (TDI) for the evaluation of left ventricular (LV) structure and of systolic and diastolic function, carotid ultrasound for intima-media thickness (IMT), carotid distensibility measurement, and pulse wave velocity measurement (PWV).

Results: By definition no difference was observed for age, sex, BMI and clinic BP values and a similar Framingham risk score was observed between SLE and controls (1.3 ± 2.7 vs 1.5 ± 2.3 , $p = ns$). No significant differences were observed for all echocardiographic parameters except LV longitudinal systolic function (Sm), an early index of LV systolic dysfunction (see Table). Carotid IMT and distensibility, as well as PWV and the prevalence of an abnormal aortic stiffness were both similar in the two groups. At the logistic analysis, PWV was independently associated with LV mass in controls and with the steroid weekly dose in SLE patients.

Conclusions: In patients with SLE and low activity index of the disease we did not observe significant vascular alterations as compare to controls with similar cardiovascular risk. The early LV systolic impairment observed in this group of patients needs confirmation in larger cohorts.

P6.19

GENDER DIFFERENCES OF ARTERIAL STIFFNESS AND CENTRAL BLOOD PRESSURE IN PATIENTS WITH ARTERIAL HYPERTENSION AND THE INFLUENCE OF MENOPAUSE

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Introduction: In general population women seems to have greater arterial stiffness and central blood pressure (BP), measured by augmentation index (Alx), than men, but in hypertension this condition is poorly studied.

Objectives: To evaluate differences of central BP and arterial stiffness between men and women with arterial hypertension and the influence of postmenopausal status.

Methods: We studied 128 subjects with stage 1-3 arterial hypertension, mean age 51.1 ± 11 years, 48% males, BP = $141 \pm 24 / 87 \pm 13$ mmHg, hypertension duration 10.1 ± 8 years. Noninvasive central aortic BP and wave form characteristics (Alx and Alx corrected by heart rate of 75 bpm – Alx75) were synthesized from radial arterial pressure waves (applanation tonometry) by SphygmoCor®. Brachial BP was obtained by an automatic device (OMRON®).

Results: Brachial systolic BP was higher (145 ± 26 vs. 136 ± 20 mmHg, $p = 0.04$) and, weight (76.2 ± 14 vs. 86.4 ± 13.2 , $p < 0.01$) and height (1.59 ± 0.06 vs. 1.72 ± 0.08 , $p < 0.01$) were lower in females than in males. Central systolic BP (137 ± 30 vs 125 ± 23 mmHg, $p < 0.01$), Alx (32.7 ± 9.8 vs 19.5 ± 11.7 , $p < 0.01$), Alx75 (29.6 ± 6.9 vs 18.0 ± 9.3 , $p < 0.01$) were higher in females, even after adjustments for weight, height and systolic BP. Postmenopausal status was present in 70% of females and mean age of menopause beginning was 47.8 years. Women at postmenopausal status older than 48 years showed worse Alx (35.3 ± 9.4) than younger women (26.8 ± 8.9) and also than men (23.2 ± 12.4) at same age ($p < 0.05$).

Conclusions: Hypertensive females have higher brachial and central systolic BP than hypertensive males. Arterial stiffness is higher in hypertensive females than in men, at all ages, and in postmenopausal status is worse than in fertile period.

P6.20

ROLE OF ALTERED VASCULAR REACTIVITY IN THE PATHOPHYSIOLOGY OF ACUTE MOUNTAIN SICKNESS

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Purpose: The aim of this study is to explore the physiological vascular adaptation to exposure to high altitude and to test the hypothesis that its impairment might play a role in the pathophysiology of acute mountain sickness (AMS).

Methods: 34 healthy volunteers (age 38 ± 11 years, 13 women) were studied at the sea-level and after passive ascent to 3842 m (Aiguille du Midi, France). Blood pressure (BP), O₂ saturation (SO₂), endothelial function (flow-mediated dilation, FMD), carotid distensibility coefficient (DC), carotid-femoral pulse wave velocity (PWV), peak systolic velocity in the middle cerebral artery (MCA-PSV) were performed at sea level (T0) and after 4-h hypobaric hypoxia (T1). AMS was defined as a Lake-Louise Score > 5 after 24-h hypobaric hypoxia (T2).

Results: At T2 12 individuals developed AMS (AMS+). AMS+ had a greater SO₂ worsening at T1 as compared to AMS- (AMS+: 97.2 ± 1.2 to 79.3 ± 5.8 %; AMS-: 97.3 ± 1.2 to 83.1 ± 5.7 %, $p = 0.03$), with similar heart rate increase and unchanged BP. FMD was significantly reduced in AMS+ (5.75 ± 3.01 to 3.27 ± 1.87 %, $p = 0.04$), but not in AMS- (4.74 ± 2.47 to 4.02 ± 2.36 %). Mean carotid diameter was increased at T1 in both groups. DC tended to be increased in AMS- but not in AMS+, while PWV was unchanged. MCA-PSV was increased in AMS-, but not in AMS+.

Conclusions: In healthy asymptomatic individuals exposed to high altitude, conduit artery endothelial function is preserved in the cerebral district vasodilatation, increased elasticity and blood flow occurs. This compensatory response is early blunted in AMS+, before symptoms onset, thus suggesting a pathogenetic role.

P7.1

INCREASED PLATELET REACTIVITY IS RESPONSIBLE OF MODIFICATIONS OF THROMBIN GENERATION IN PATIENTS WITH UNCONTROLLED ARTERIAL HYPERTENSION

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Background: Hypertensive crisis is an extreme phenotype of increased blood pressure that can lead to organs failure and thrombotic complications. Recently, we were able to show an angiotensin II driven FXI-thrombin amplification loop leading to vascular injury in experimental hypertension.