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### **P1.6: CAROTID-RADIAL PULSE TRANSIT TIME COMPARED TO THE PULSE ARRIVAL TIME TO THE CAPILLARY BED OF THE FINGER TIP DURING AND AFTER AEROBIC EXERCISE IN YOUNG HEALTHY SUBJECTS**

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femoral pulse wave velocity (PWV) and carotid intima-media thickness (IMT) evaluation. Dietary habits were evaluated through a special diet score (Med-Diet score, range 0-55), which assesses adherence to the Mediterranean dietary pattern. Higher values indicate greater adherence to this pattern.

**Results:** Based on the Med-Diet Score, three groups were formed (high  $\geq 30$ , intermediate: 21-29 and low  $\leq 20$ ) with no significant differences in main risk factors between them. Patients with low score had significantly higher LVM, LVMI and E/E' compared to others. Regarding vascular parameters, aortic stiffness and IMT were inversely correlated to the Med-Diet score. Associations between cardiac and vascular parameters remained significant after adjustment for age and cardiovascular risk factors. **Conclusion:** Low adherence to the Mediterranean type of diet is significantly associated to impaired left ventricular and vascular structure and performance. Physicians should advise for healthier dietary habits and identify those who may need more intensive follow up.

### P1.3

#### CAN ARTERIAL STIFFNESS AND AORTIC PULSE PRESSURE BE REDUCED BETTER IF ANTIHYPERTENSIVE TREATMENT IS PERFORMED ACCORDING TO LARAGH AND ALDERMAN IDEA?

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The aim of the study was to check if plasma renin activity (PRA) is helpful for reduction of arterial stiffness. According to PRA value hypertensive patients should be divided into two subtypes low and high renin (PRA over/below 0.65ng/ml/h). According to Laragh and Alderman algorithm high renin "R" hypertension should be treated by RAA-system antagonists. Low renin "V" hypertension should be treated by diuretics or calcium channel blockers (anti-"V" drugs).

PRA was measured in 95 never treated patients, with HT stage 1 or 2. 59 patients were "high renin", 36- "low renin". Irrespectively of PRA patients were randomized to 6 months monotherapy with: quinapril, amlodipine, hydrochlorothiazide, losartan, bisoprolol. Finally four groups were compared for mentioned above subclinical organ damage: group1 (high renin, anti-RAA drugs), group2 (high renin, anti-V drugs), group3 (low renin, anti-RAA drugs), group4 (low renin, anti-V drugs). Before and then after 1, 3 and 6 months of treatment pulse wave velocity (PWV) by using COMPLIOR, SPHYGMOCOR and ARTERIOGRAPH devices were performed. Moreover aortic pulse pressure (AoPP) was analysed from pulse wave in applanation tonometry by using SPHYGMOCOR device.

**Results:** At the baseline no differences between groups were observed in PWV. ANOVA for repeated measurements revealed for all groups significant decrease in PWV ( $p=0.0007$ ). No differences appeared between groups 1-4 in mentioned above effect.

AoPP decreased significantly during observation period in all examined groups ( $p=0.0003$ ), with no any between-groups difference.

**Conclusions:** Irrespectively of chosen drug and initial PRA value we observed similar effect for PWV and AoPP drops, therefore PRA value and chosen antihypertensive drug don't affect the magnitude of arterial stiffness and AoPP decrease.

### P1.4

#### THE INFLUENCE OF REGULAR INTERVAL TRAINING ON BLOOD PRESSURE, ARTERIAL STIFFNESS AND ENDOTHELIAL FUNCTION AMONG HYPERTENSIVE SUBJECTS

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**Aim:** The aim of the study was to evaluate the influence of 6 months regular IPT on blood pressure, carotid femoral pulse wave velocity (PWV), central aortic pulse pressure and selected indices of endothelial function among previously pharmacologically treated subjects with mild or moderate arterial hypertension.

**Methods:** Study group consisted of 60 hypertensive subjects (31 males, 29 females) (age  $54.5 \pm 8.8$  years) previously treated for at least 3 years, with well controlled hypertension, i.e. below 140/90 mmHg, using combined hypertensive therapy. Treatment has not been changed during study period. Study group was randomly subdivided into 2 subgroups. In the first group (G1) IPT was applied for 6 months (40 professional IPT sessions performed two times per week, for 50-60 minutes each time) accordingly to specially developed program. In the second, control group (G2) there were no training sessions, only medical advice to maintain physical activity accordingly JNC hypertension guidelines. At the baseline visit and then

after six months (final visit) in both groups office BP, PWV and central pulse blood pressure (PP) using SphygmoCor device, as well as plasma high selective C-reactive protein (hsCRP) and albuminuria in the daily collection (ALB) were obtained.

**Conclusions:** In relatively short time period regular IPT among treated hypertensive subjects decreased significantly not only blood pressure but also pulse wave velocity and central pulse pressure without changing selected endothelial function markers.

### P1.5

#### AGE-BASED COMPARISON OF THE ACUTE EFFECT OF MAXIMAL AEROBIC RUNNING EXERCISE ON ARTERIAL STIFFNESS IN CHILDREN AND ADULTS

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**Purpose:** Compare the effects of a bout of maximal aerobic running exercise (MARE) on local, central, peripheral and whole body arterial stiffness in children and adults.

**Methods:** Thirty-five children (girls:49%) aged 5 (n=18) and 9 (n=17) years-old and 45 adults (women:53%) aged 19 (n=21) and 30 (n=24) years-old performed a single bout of MARE on a treadmill. Local (LO) pulse wave velocity (PWV) was performed on the carotid artery with technology based on radio frequency signals. Central (carotid-femoral; CF), peripheral (carotid-radial; CR) and whole body (carotid-distal posterior-tibial; CD) PWV (m/s) were obtained using applanation tonometry before and 10min after MARE. Univariate analysis of variance were used to detect age-group differences between pre-post changes (%) with exercise ( $p<0.05$ ), adjusted for sex, mean brachial arterial pressure (bMAP) and %body fat by DXA.

**Results:** Children had lower baseline LO (5: 3.11; 9: 4.37), CF (5: 3.50; 9: 6.11), and CD (5: 4.88; 9: 7.11) PWV than adults. Children at the age of 9 had the highest changes in CF (27.17%) and CR (18.02%) PWV with exercise and changes were significantly different from those at the age of 30 (CF: 3.91%; CR: -4.95%). PWV of 5 year-old children decreased after exercise in LO (-8.30%) and CD (-4.06%) and the changes were significantly different from those of 20 year-old subjects (LO: 13.56% and CD: -6.55%). Changes in LO, CF, and CD PWV with exercise were not significantly different between either adult's groups or children's groups.

**Conclusions:** Children had lower PWV than adults at rest. MARE elicited different site dependent arterial responses between children and adults that could not be explained by bMAP and sex.

### P1.6

#### CAROTID-RADIAL PULSE TRANSIT TIME COMPARED TO THE PULSE ARRIVAL TIME TO THE CAPILLARY BED OF THE FINGER TIP DURING AND AFTER AEROBIC EXERCISE IN YOUNG HEALTHY SUBJECTS

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**Objectives:** Measurement of the propagation times of cardiac-induced pulses along the arterial tree provides an important tool for studying arteries. The aim of our study was to measure the carotid-radial pulse transit time (c-rtT) in young healthy subjects before, during and 20 minutes after aerobic exercise and to compare it with the pulse arrival time to the capillary bed of the finger tip (PATc).

**Methods:** Following ethical approval eight men ( $20.8 \pm 0.4$  years old) were recruited. We measured ECG, arterial blood pressure using Finapres Ohmeda, laser Doppler skin blood flow on the finger pulp and carotid or radial pulse with a tonometer (Millar SPT 30). After 5 minutes supine rest subjects mounted the cycloergometer and started a graded exercise until 85% of their maximal heart rate was reached. They recovered for 20 minutes. c-rtT and PATc were calculated.

**Results:** Our results revealed that c-rtT exhibited no statistically significant differences before and 20 minutes after exercise ( $111.3 \pm 4.1$ ms and  $109.7 \pm 3.5$ ms), but was significantly decreased at highest workload ( $90.1 \pm 0.2$ ms). On the other hand PATc was increased 20 minutes after exercise compared to resting values ( $130.3 \pm 8.1$ ms and  $120.7 \pm 5.5$ ms) and significantly decreased at highest workload ( $104.5 \pm 1.6$ ms). A linear correlation between c-rtT and corresponding RR interval duration during exercise was found ( $p<0.001$ ) but no correlation between PATc and RR.

**Conclusions:** During exercise increased sympathetic tone could be the main reason for the decreased c-rT, but other mechanisms should contribute to the regulation of the finger tip skin microcirculation, where thermoregulation plays a major role.

**P1.7**  
**PARAMETERS OF ARTERIAL STIFFNESS DIFFER BETWEEN ATRIAL, VENTRICULAR, AND ATRIAL-VENTRICULAR CARDIAC PACING MODES**

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An interrelation between heart rate and arterial stiffness is established. However, the relationship between cardiac pacing mode and the stiffness of arterial vessels is not. This study investigated arterial stiffness parameters such as carotid-femoral pulse wave velocity (cfPWV) and aortic augmentation index (Alx) in pacemaker subjects (n=46) paced via atrial (Ap), ventricular (Vp), or atrial ventricular (ApVp) modes at 60, 70, 80, 90 and 100 bpm in the supine position. At each heart rate, brachial blood pressure was measured, the central aortic pressure waveform derived using a validated transfer function applied to brachial cuff waveforms (SphygmoCor XCEL), and cfPWV measured using simultaneous acquisition of the carotid (tonometer) and femoral (thigh cuff) pulse. Aortic and brachial systolic, diastolic, and mean pressure did not differ between pacing modes. However, Alx was lower with ApVp (24±9 %) and Vp (19±11 %) pacing than Ap pacing (34±10 %, p<0.001), with Vp being lower than ApVp (p<0.01). Ejection duration followed the exact pattern of Alx. Aortic pulse pressure was also lower with ApVp (37±9 mmHg) and Vp (36±11 mmHg) pacing than Ap pacing (42±12 mmHg, p<0.01). However, cfPWV was greater with ApVp pacing (10.6±1.9 m/s, p<0.05) and Vp pacing (11.0±2.1 m/s, p<0.01) than Ap pacing (9.8±1.7 m/s). This study showed differences in vascular stiffness with cardiac pacing modes. Further research is required to investigate the opposing changes in Alx and cfPWV and to determine if pacing mode drives differences in arterial stiffness or differences are characteristic of the subjects assigned to different pacing modes.

**P1.8**  
**ANTIHYPERTENSIVE MEDICINES OF UP TO 4-DRUG COMBINATIONS IN A LARGE, COMMUNITY-BASED STUDY: DIFFERENTIAL RELATIONSHIPS WITH BRACHIAL BLOOD PRESSURE AND AORTIC WAVEFORM PARAMETERS**

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**Background:** Comparing relationships that antihypertensives have with brachial blood pressure (BP) and aortic waveform parameters helps clinicians to predict the effect on the latter in brachial BP-based antihypertensive therapy. We aimed to make such comparisons with new waveform measures and a wider range of antihypertensive regimens than examined in previous research.

**Methods:** Cross-sectional analysis of 2915 adults (61% male; aged 50-84 years): 1619 on antihypertensive treatment and 1296 untreated hypertensives. Sixteen medicine regimens of up to 4 combinations of drugs from six antihypertensive classes were analysed. Aortic systolic BP (SBP), augmentation index (Alx), excess pressure integral, reflection index (RI), backward pressure amplitude (Pb) and pulse wave velocity (PWV) were calculated from aortic pressure waveforms derived from suprasystolic brachial measurement.

**Results:** For all regimens, brachial SBP was lower with antihypertensive use. However, while brachial SBP did not differ across the 16 regimens (P=0.17), RI (P<0.0001), Pb (P=0.0001) and Alx (P<0.0001) did. This was predominantly due to beta-blocker associations: forest plots of single-drug class comparisons across regimens with the same number of drugs (for between 1- and 3-drug regimens) revealed that Alx, Pb and RI were higher with the use of a beta-blocker compared with vasodilators and diuretics, despite no differences in brachial SBP. Compared to those untreated, beta-blocker use was associated with greater percentage differences in brachial BP than aortic waveform parameters.

**Conclusions:** Beta-blocker use has weaker associations with wave reflection measures than brachial SBP, suggesting that effects on these may be overestimated with brachial BP-based antihypertensive therapy.

**P1.9**  
**EVALUATION OF AFFECTIVE TEMPERAMENTS AND ARTERIAL STIFFNESS IN TREATED HYPERTENSIVE PATIENTS**

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**Background:** Hypertension has widely studied psychosomatic connections, there are, however, only limited data about the influence of affective temperaments. The aim of our study was to evaluate arterial stiffness in hypertensive patients with dominant (DOM) or subdominant affective temperaments (SDOM).

**Methods:** 152 hypertensive patients, free of treated psychiatric diseases, completed the TEMPS-A, Beck Depression Inventory and Hamilton Anxiety Scale in two GP practices. Of those 11 DOM and 11 SDOM patients and 22 hypertensive controls (matched for age, sex and the presence of diabetes) were included for arterial stiffness measurements.

**Results:** Pulse wave velocity and augmentation index did not differ significantly among the groups studied. Compared to controls, in the combined DOM+SDOM group brachial systolic (130.5 (121.9-138.5) vs. 122.8 (114.4-129.6) mmHg), diastolic (72 ± 1.5 vs. 66.9 ± 1.8 mmHg) and mean blood pressure (91.9 ± 1.4 vs. 86 ± 1.9 mmHg) as well as central diastolic (69 ± 1.45 vs. 64.98 ± 1.83 mmHg) and mean blood pressure values (89.4 ± 1.58 vs. 84.65 ± 1.99 mmHg) were significantly lower. Beck and Hamilton scores were significantly higher in the DOM+SDOM group.

**Limitations:** The cross-sectional design of the study precludes the evaluation of causality.

**Conclusion:** The similar arterial stiffness parameters besides lower blood pressure values and the increased depression and anxiety scores in the DOM+SDOM group might refer the presence of increased cardiovascular risk. Affective temperaments may play a substantial role in such health-related behaviours, therefore they may be an important factor in developing strategies related to cardiovascular health management.

**P1.10**  
**LONGITUDINAL CHANGES IN GEOMETRIC AND FUNCTIONAL ARTERIAL PROPERTIES IN VASCULAR EHLERS-DANLOS SYNDROME WITH CELIPROLOL**

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**Objective:** Vascular Ehlers-Danlos (vEDS) syndrome is a rare disease (1/100,000), due to mutations in the collagen type III (COL3A1). vEDS is characterized by early spontaneous arterial rupture or dissection. Celiprolol, a beta1 antagonist beta2 partial agonist conferred protection against CV events with paradoxical stiffening effects (Ong et al, Lancet 2010). Our aim was evaluate celiprolol effect on arterial properties during a long term longitudinal follow-up of a large population of patients.

**Methods:** 63 patients (age 35±10, 57% females) having at least 2 visit were followed 5 years during 6±3 visits. Carotid internal diastolic diameter (Di), intima-media thickness (IMT), arterial wall cross-sectional (WCSA), circumferential wall stress, distensibility and Young's elastic modulus (Einc) were measured. The evolution over time in response to celiprolol was studied using mixed models.

**Results:** 46 patients were exposed to celiprolol. SBP increased with time under celiprolol (0.79 mmHg/y, p<0.001), so did central SBP (0.89 mmHg/y; p=0.002) and central PP (1.24 mmHg/y, p<0.001), without changed heart rate. Di and IMT increased (+36µm/y, p<0.001 and +4.4 µm/y, p<0.001, respectively). Einc increased (29.92 kPa/y, p<0.001) and distensibility decreased (-0.003 kPa-1/y, p<0.001). In unexposed patients (n=17), brachial BP did not change significantly, whereas changes in arterial wall properties were similar to those exposed to celiprolol.

**Conclusion:** The effect of time on large arteries properties seems similar whether patients are treated with celiprolol or not. Changes might thus be due to aging process rather than to pharmacologically induced changes.