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P1.2: ATHEROMATOSIS, ARTERIOSCLEROSIS AND DETERIORATION OF CARDIAC STRUCTURE AND PERFORMANCE; THE PIVOTAL CONTRIBUTION OF MEDITERRANEAN DIET IN CARDIOVASCULAR HEALTH

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Methods: In this prospective, single center observational study, 61 patients with cancer were included. Peripheral blood pressure and aortic pulse wave velocity (PWV) were performed at baseline and then every two weeks for two months after the initiation of treatment by sunitinib or sorafenib (V0 to V4). Blood samples were obtained from V1 to V4 for the pharmacokinetic study. Concentrations were determined by HPLC and standardized to combine both drugs (Z-score, mean=0, SD=1). Statistical analysis was performed through a robust stepwise regression analysis and Cox regression analysis.

Results: Mean age was 59(14), mean SBP 127(20) mmHg. At V2, mean BP increased by 5(14) mmHg. Determinants of PWV increase were high AAD blood concentration and mean BP increase (for 1 SD, +0.4 m/s and +0.3m/s respectively, $p<0.01$). High concentration of AAD during follow-up was associated with a lesser cancer progression and mortality (for 1SD increase, HR: 0.60 [0.38-0.97] and HR: 0.38 [0.19-0.79] respectively, $P<0.05$, figure1). High AAD and low PWV increase are associated with the lowest cancer progression.

Conclusion: Large arteries stiffening observed under AAD is proportional to the intensity of exposure to AAD independently of blood pressure increase. Patients under exposed to AAD are at higher risk of disease progression and mortality.

5.6

AORTIC IS SUPERIOR TO BRACHIAL AMBULATORY BLOOD PRESSURE MONITORING FOR THE DETECTION OF EARLY DAMAGE AT THE HEART AND THE CAROTID ARTERY BUT NOT AT THE RETINAL MICROCIRCULATION: THE NON-INVASIVE AORTIC AMBULATORY BLOOD PRESSURE MONITORING FOR THE DETECTION OF TARGET ORGAN DAMAGE (SAFAR) STUDY

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Introduction: Preliminary evidence suggests the superiority of office aortic (a) blood pressure (BP) over brachial (b) in the management of arterial hypertension. The 24-hour ambulatory blood pressure monitoring (ABPM) is regarded as the optimal method for assessing cardiovascular (CV) risk. The non-invasive 24-hour aABPM is now feasible with validated operator independent brachial cuff-based oscillometric devices.

Objective: To examine whether aABPM is superior to bABPM for the early detection of cardiac and/or arterial damage in hypertensives.

Design and method: The SAFAR study is an ongoing cross-sectional observational study assessing heart function and structure, arterial (carotid, femoral and lower limb) atheromatosis, arterial stiffness (carotid and aortic), arterial hypertension (carotid) and retinal microcirculation in individuals' referred for BP evaluation.

Results: In consecutive individuals referred for BP evaluation the aABPM had greater ability than bABPM to detect both left ventricular hypertrophy and diastolic dysfunction ($n=229$, area under the curve: 0.74 versus 0.69, $p=0.004$ and 0.69 versus 0.63, $p=0.001$, by c-statistics respectively), common carotid intimal-medial thickness greater than 0.9 mm ($n=490$, 0.69 versus 0.62, $p=0.009$), but not narrowed retinal arteries assessed by central retinal arteriolar equivalent in fundus photography, ($n=402$ eyes, 0.62 versus 0.61, $p=ns$).

Conclusions: aABPM is able to detect better than bABPM an early local damage at the heart and the nearby conduit arteries, but not at the distal retinal microcirculation.

5.7

AORTIC PULSE WAVE VELOCITY INCREASES AFTER 2 YEARS IN PATIENTS WITH COPD: DATA FROM THE ARCADE STUDY

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Objectives: Patients with COPD have increased risk of cardiovascular (CV) events and mortality beyond that attributable to smoking. However, there have been no longitudinal studies of arterial stiffness in COPD. The Assessment of Risk in Chronic Airways Disease Evaluation (ARCADE) aims to study CV risk factors in COPD and controls, free from respiratory disease, longitudinally. We hypothesised that patients with COPD would have increased Aortic pulse wave velocity (AoPWV) over 2 years.

Methods: At baseline, AoPWV was measured using the SphygmoCor device in 525 patients with COPD and 150 controls. Lung function (Forced expiratory

volume in 1 second (FEV1) and Forced vital capacity (FVC)), BMI, blood pressure (BP) and systemic inflammation (HsCRP) was also measured. These were repeated after 2 years.

Results: At baseline, patients and controls were similar in age, gender and BMI, but patients had greater PWV, systolic and mean arterial BP, heart rate and HsCRP (all $p<0.05$). Thus far 200 patients with COPD have completed the 2 year follow-up assessment. Patients had a mean AoPWV increase of 0.5 m/s (95%CI 0.25-0.71, $p<0.001$), despite no change in central mean arterial BP. In addition, lung function declined ($p<0.05$) and HsCRP remained high.

Conclusions: The 2 year AoPWV increase in COPD was independent of traditional risk factors suggesting an alternative mechanism for aortic stiffness in COPD. Further longitudinal assessments of a control group will inform the understanding of the development of arterial stiffness and may indicate possible therapeutic targets.

Poster Abstract Presentations

P1.1

ANTI-ANGIOGENIC TREATMENT IN CANCER PATIENTS CAUSES ARTERIAL DILATION AND STIFFENING BEYOND THE BLOOD PRESSURE EFFECT

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Introduction: Anti-angiogenic treatment (AAT) prescribed in cancer patients often induces hypertension and is associated with increased pulse wave velocity (PWV). PWV is known to depend on blood pressure (BP). Therefore, we assessed whether AAT changes PWV beyond an estimated first-order BP effect.

Methods: We obtained carotid artery systolic and diastolic cross-sectional areas (echo-tracking) and corresponding BPs in 17 cancer patients with metastatic solid tumours at baseline, and after 3 weeks of treatment (22.1 ± 3.2 days) with sorafenib, sunitinib or bevacizumab. For each patient, we derived local PWV (Bramwell-Hill) and a single-exponential P-A curve. Based on baseline P-A curves and measured follow-up pressures, we estimated the BP-induced PWV change at follow-up. By comparing estimated and measured changes in PWV at follow-up, we assessed the PWV increase beyond the BP effect. In the same way, we assessed whether diastolic cross-sectional area (A_d) changed beyond the BP-induced amount.

Results: Based on the increase in SBP/DBP from (mean±SD) 115±15/70±8mmHg at baseline to 126±13/78±10mmHg at follow-up, follow-up PWV was an estimated 7.2±1.0m/s, whereas measured PWV was higher at 7.8±1.7m/s ($p=0.068$). Measured follow-up A_d markedly increased beyond the estimated pressure dilation (from 38.1±9.5mm² to 41.1±10.6mm², $p=0.034$).

Conclusion: AAT increases carotid PWV and cross-sectional area beyond the BP effect. While AAT is known to cause peripheral arterial vasoconstriction, this is not the case in the carotid artery. This finding may be explained by the deleterious influence of AAT on carotid vasa vasorum, possibly causing smooth muscle cell hypoxia and thereby wall stiffening (Stefanadis et al., Circulation 1995).

P1.2

ATHEROMATOSIS, ARTERIOSCLEROSIS AND DETERIORATION OF CARDIAC STRUCTURE AND PERFORMANCE; THE PIVOTAL CONTRIBUTION OF MEDITERRANEAN DIET IN CARDIOVASCULAR HEALTH

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Purpose: Atheromatosis and arteriosclerosis applied to changes in the intima and media vessel wall respectively, as part of the atherosclerotic process. Mediterranean diet, promoting olive oil and fruits consumption, contributes to cardiovascular disease prevention. Aim of our study is to investigate whether left ventricular (LV) and peripheral vascular parameters associate to adherence to the Mediterranean dietary pattern.

Methods: 75 males (56±11 years) underwent cardiac ultrasound examination. Doppler diastolic parameters (E/A, E/ E'), LV mass (LVM) and LV mass index (LVMI) were obtained. Diameter of the ascending aorta was assessed and aortic distensibility was calculated. All patients underwent carotid-

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 ≥ 30 , intermediate: 21-29 and low ≤ 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 ± 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-rT) 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 ± 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-rT and PATc were calculated.

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