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### **P.026: CLINICAL AND VASCULAR EFFECTS OF SWITCHING PATIENTS WITH CORONARY ARTERY DISEASE TO NEBIVOLOL**

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hypertension (HT). The examination of arterial stiffness in this group has a chance to become a routine procedure. This indicates how important will be the choice of the optimal method for PWV measurement.

**The aim** of this study was to compare aortic PWV obtained in patients with primary HT using three different types of devices: Complior<sup>®</sup>, SphygmoCor<sup>®</sup> and Arteriograph.

**Method:** In 64 pts with mild or moderate primary HT (age  $54 \pm 13.6$  yrs), 39 males and 25 females we measured PWV using the three aforementioned devices at the same clinical visit.

**Results:** PWV obtained with Complior<sup>®</sup> ( $10.2 \pm 2.3$  m/s), SphygmoCor<sup>®</sup> ( $8.1 \pm 1.2$  m/s) and Arteriograph ( $8.6 \pm 1.8$  m/s) were significantly different (ANOVA,  $p < 0.001$ ), due to higher Complior-PWV values than those obtained with the remaining devices. A comparison of such PWV determinants as traveled distance and transit time revealed a significant difference in distances between the methods, but no differences in transit times. The Bland-Altman analysis for each pair of devices indicated that PWV values were measured with similar accuracy when considering the mean of differences.

**Conclusions:** The methodological differences in traveled distance, but not in transit time measurement are responsible for higher pulse wave velocity obtained with the Complior than SphygmoCor and Arteriograph devices. Taking into account this differences, all devices are accurate and valuable for PWV measurement.

### P.023

#### INCREASED CARDIOVASCULAR RISK IN FIRST-DEGREE RELATIVES (WITHOUT ABDOMINAL AORTIC ANEURYSM, AAA) TO AAA PATIENTS?

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**Background:** Patients affected by AAA have a tendency to generalized dilatation, increased vascular stiffness and cardiovascular risk. There is a pronounced genetic predisposition for AAA, but it is unknown whether first-degree relatives without AAA, have a generalized dilating diathesis, or defect arterial wall mechanics. The aim of the study was to investigate the arterial diameter and wall properties in first-degree relatives without AAA, and compare them with controls without a family history of AAA.

**Methods:** 71 non-smoking relatives to patients with AAA (41m/30f; 41-70years) and 66 age and sex-matched controls were included. The abdominal aorta, carotid, common femoral, and the popliteal artery were investigated by ultrasound.

**Results:** No arterial dilatation was found, but rather a tendency of narrowing. The relatives had higher heart rate (HR) ( $P < .01$ ) and diastolic blood pressure (DBP) than controls. The males had also higher systolic blood pressure (SBP). After adjusting for HR, the difference in SBP in males disappeared but the DBP remained increased ( $P < .05$ ), and MAP became increased in males ( $P < .05$ ).

The distensibility coefficient (DC) and the compliance coefficient (CC) were decreased in all arteries in the males but only in the aorta in females ( $P < .05$ ). After adjusting DC and CC for MAP and HR, stiffness was normalized.

**Conclusion:** No general arterial dilatation in AAA relatives without aortic aneurysmal disease can be found, supporting the hypothesis that the dilating diathesis is linked to the aneurysmal manifestation in the abdominal aorta. Although the threat of aneurysmal dilatation and rupture seems to be lacking, BP, HR and arterial stiffness are increased, indicating raised cardiovascular risk in this population.

### P.024

#### CARDIAC FUNCTION, LARGE ARTERIES PROPERTIES AND MORTALITY IN OLDER PATIENTS WITH ATHEROSCLEROSIS

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**Objective:** We assessed predictive power of large arteries properties for mortality among older subjects with symptomatic atherosclerosis.

**Methods:** We assessed 100 patients above 70 years of age with present atherosclerosis, stabilised at the time of assessment. Follow up averaged 31 months. Apart from standard clinical examination, echocardiography and assessment of large arteries by the Sphygmocor device were performed. The vital status of subjects was obtained from National health registry.

**Results:** During follow up 31 patients died. Survivors and non-survivors did not differ significantly in prevalence of standard risk factors, as well as in the arterial properties. Left heart insufficiency was more frequent in non-survivors.

	Survivors	Non-survivors	P value
Systolic Blood Pressure (mmHg)	141,3 ± 22,0	135,9 ± 21,5	0,4317
Pulse Wave Velocity (m.s <sup>-1</sup> )	13,2 ± 4,6	12,9 ± 3,5	0,7401
Peripheral Augmentation Index (%)	87,7 ± 15,2	77,7 ± 31,4	0,5899
Central Augmentation Index (%)	142,7 ± 21,0	133,2 ± 38,2	0,9951
Heart Failure	31 ( 44,9 %)	23 ( 74,2 %)	0,0197
Ejection Fraction of Left Ventricle (%)	61,9 ± 13,0	55,1 ± 14,9	0,0461

**Summary:** In patients with present atherosclerosis large arteries properties lost partially its prognostic value, as well as standard risk factors. Prognosis was mainly determined by the level of left ventricle dysfunction.

### P.025

#### INCREASED ARTERIAL STIFFNESS AMONGST HEALTHY SOUTH ASIANS IN THE UNITED KINGDOM IN THE ABSENCE OF RAISED BLOOD PRESSURE

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**Background:** The pathophysiology of increased coronary heart disease (CHD) risk affecting South Asians(SA) living in Britain remains unclear. For a given blood pressure SA have a higher risk of CHD than the indigenous European Caucasian(EC). We hypothesised that measures of arterial stiffness would be greater amongst healthy SA compared to EC counterparts specifically ,in the absence of raised blood pressure and established CHD risk indices.

**Methods:** Arterial stiffness was measured by digital volume pulse photoplethysmography(Micromedicals PCA 2) in 90 healthy SA (and compared to age-gender matched 62 EC in a temperature controlled environment using a standard protocol.

**Results:** SA and EC's were comparable for CVD risk profile (Table 1). South Asians had an increased Stiffness Index compared to European Caucasians (9.43(0.22) vs. 8.53(0.23) m/s,  $P = 0.007$ ). In linear regression waist hip ratio and mean blood pressure were independent predictors of arterial stiffness ( $\beta = 0.26$ ,  $P = 0.03$ ).

**Conclusion:** South Asians have an increased wave reflection and systemic arterial stiffness compared to European Caucasians. Pathophysiological differences in vessel wall characteristics in South Asians may explain their increased susceptibility to higher cardiovascular risk and further work is warranted.

Risk factor Mean (SD)	South Asian (n=90)	European Caucasian (n=62)	P Value
Mean age (years)	45.21(13.45)	46.76(11)	0.13
Body Mass Index(BMI)Kg/m2	25.9(3.2)	27.4(4.5)	0.08
Waist Hip Ratio(WHR)	0.94(0.08)	0.93(0.08)	0.53
Systolic blood pressure(mmHg)	134.56(20.3)	135.31(15.33)	0.82
Diastolic blood pressure(mmHg)	83.64(12.35)	83.58(10.09)	0.97
Serum cholesterol (mmol/l)	4.45(1.4)	4.66(0.72)	0.94
Fasting blood sugar(mmol/l)	4.99(1.4)	4.56(0.92)	0.43

P values using unpaired ttest comparing two groups

### P.026

#### CLINICAL AND VASCULAR EFFECTS OF SWITCHING PATIENTS WITH CORONARY ARTERY DISEASE TO NEBIVOLOL

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The problem of inadequate efficacy of standard antianginal therapy in patients with stable angina requires new pharmacotherapeutic solutions.

**Aim:** Evaluating efficiency of antianginal therapy with  $\beta$ -adrenoblockers (BAB) in patients with stable angina during the switch to nebivolol; evaluating the dynamics of vasculature functional state and concentration of NO metabolites during the nebivolol treatment.

**Materials and Methods:** Open-label observational study was conducted on 30 patients with II-III FC angina. Prior to the nebivolol administration and also after 12 weeks of treatment, in addition to the evaluation of clinical state and nebivolol tolerance. The assessment of arterial stiffness was done by way of measuring brachial-ankle pulse wave velocity (baPWV). A new parameter presenting stiffness of the vascular wall independent on the BP dynamics. Endothelial function was calculated based on flow-mediated dilatation (FMD) parameters. Serum nitrate and nitrite as NO metabolic products were measured.

**Results:** After 12 weeks of the nebivolol therapy, the rate of anginal attacks significantly decreased by 60%, and nitroglycerin (NG) intake reduced by 75% as compared to the previous treatment. Switching the patients to nebivolol was associated with a significant decrease in baPWV by 6.1% while FDV increased by 27%. Serum level of NO metabolites increased by 47%.

**Conclusion:** The nebivolol treatment was generally well tolerated and lead to significant patient condition improvement. This effect of nebivolol of should be attributed to baPWV lowering and endothelial function bettering.

#### P.027

##### ARTERIAL STIFFNESS IN RELATION TO URINARY ALDOSTERONE EXCRETION AND COLLAGEN METABOLISM IN ESSENTIAL HYPERTENSION

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**Background:** In animal experiments, aldosterone has been shown to substantially contribute to the accumulation of collagen fibres in the arterial wall, which can increase arterial stiffness. The aim of the study was to examine the above relationships in human hypertension.

**Methods:** The study group included 50 hypertensive patients (mean age = 56.8 years, 16/34 M/F) and 29 normotensive controls (mean age = 54.6 years, 15/14 M/F). A Sphygmocor device was used to measure the carotid, radial and aortic augmentation index (AIx) of systolic blood pressure, as well as the aortic pulse wave velocity (PWV). 24-hour urinary aldosterone excretion was assessed. The plasma levels of collagen synthesis marker - procollagen type III amino-terminal peptide (PIIINP) were evaluated.

**Results:** Hypertensive patients as compared to normotensive controls had higher carotid AIx ( $142.8 \pm 25.2$  vs  $124.2 \pm 24.7\%$ ;  $p = 0.004$ ), higher aortic AIx ( $39.4 \pm 10.1$  vs  $30.8 \pm 13.5\%$ ;  $p = 0.005$ ), and higher PWV ( $9.57 \pm 2.86$  vs  $8.58 \pm 1.51$  m/sec;  $p = 0.05$ ). With adjustments applied for age, gender, body height, mean arterial pressure and current smoking, 24-hour urinary aldosterone excretion correlated positively with carotid AIx ( $r = +0.22$ ;  $p = 0.05$ ) and aortic AIx ( $r = +0.19$ ;  $p = 0.09$ ). We observed also positive correlations between plasma level of PIIINP and carotid AIx ( $r = +0.20$ ;  $p = 0.06$ ) and aortic AIx ( $r = +0.24$ ;  $p = 0.05$ ).

**Conclusion:** In our study group, aldosterone excretion tended to correlate to carotid and aortic, but not radial, augmentation index. The increased arterial stiffness in hypertensive patients could be caused by the deleterious effects of aldosterone excess on the fibrosis and remodeling of the arterial wall, as assessed by circulating PIIINP.

#### P.028

##### EPIGENETIC INTERACTION BETWEEN $\alpha$ -ADDUCIN AND RENIN-ANGIOTENSIN-SYSTEM GENES IN RELATION TO THE ELASTIC PROPERTIES OF THE FEMORAL ARTERY

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**Background:** We previously demonstrated that epigenetic interaction between the  $\alpha$ -adducin (ADD1) Gly460Trp and the ACE I/D polymorphism modulates the properties of the femoral artery. Here, we investigated multiple-gene interactions between ADD1, ACE and other genes of the renin-angiotensin system: angiotensinogen (AGT) C-532T, G-6A, and angiotensin II receptor type 1 (AGTR1) A1166C.

**Methods and results:** We assessed the properties of the femoral artery with a wall-track system in a family-based random sample of 1064 subjects (participation rate 64.3%, mean age 43.6 years, 50.4% women). In population-based analyses, we computed phenotype-genotype associations, while adjusting for confounders, life style, and family clusters. In family-based analyses, we used a multivariate-adjusted quantitative transmission disequilibrium test (QTDT).

**Results:** In ADD1 Trp allele carriers, but not in ADD1 GlyGly homozygotes, AGTR1 AA subjects had lower femoral cross-sectional compliance ( $0.649 \pm 0.030$  vs  $0.742 \pm 0.029$  mm<sup>2</sup>/kPa,  $P = 0.027$ ) and a lower distensibility coefficient ( $10.18 \pm 0.43$  vs  $11.27 \pm 0.41$  10<sup>-3</sup>/kPa,  $P = 0.067$ ) than AGTR1 C allele carriers. QTDT confirmed these associations. The between-family component of phenotypic variability was not significant, suggesting that there was not population stratification. None of the gene-gene interactions involving AGT was statistically significant ( $P \geq 0.088$ ).

**Conclusions:** The ADD1 Gly460Trp, AGTR1 A1166C and ACE I/D jointly influence the functional properties of the femoral artery.

#### P.029

##### MECHANICAL CHARACTERISTICS OF CAROTID ARTERY WALLS IN RELATION WITH PREVALENT CARDIOVASCULAR DISEASES

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**Background:** Cardiovascular diseases (CVD) modify the mechanical characteristics of arteries. A better understanding of the corresponding changes will improve diagnostic possibilities.

**Methods:** With a 7.5 MHz linear array ultrasound system, the left and right common carotid artery of 97 subjects (54m; age 36-95y, average 65y) were assessed. The displacement of the arterial walls was calculated for half-overlapping windows of 20 ms by 0.3 mm, at maximum wall deformation rate, together with their standard deviations across the echo lines. The ultrasound images were separately processed to measure manually intima media thickness (IMT) and IMT-inhomogeneity.

**Results:** 82% of the patients were hypertensive, 37% of the patients were diagnosed with CVD, all patients had high cholesterol and LDL with low HDL levels. 64% of the patients presented an inhomogeneous posterior wall structure. The maximum strain rate varied between 0.5%/ms and 4.3%/ms with an average of 2%/ms. Distension at peak acceleration varied between 0.04 and 0.5 mm (average 0.24 mm). Patients with a high standard deviation of strain rate and distension had an increased IMT ( $560$  mm vs  $475 \pm 10$  mm), with an inhomogeneity between 2 and 19%.

**Conclusions:** The present investigation shows that the standard deviations of distension and strain rate are indicative for an irregular wall-lumen transition. The results underline the necessity of detailed analysis of arterial wall characteristics in patients with increased CVD risk.

#### P.030

##### ARTERIAL STIFFNESS IS PREDICTOR CARDIOVASCULAR EVENTS IN MEN WITH CORONARY ARTERY DISEASE

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Measuring of brachial-ankle pulse wave velocity (baPWV) is a valid and viable method by which to assess arterial stiffness, a potential surrogate marker of atherosclerosis. The AIM of the study was to for the first time ever establish whether baPWV is a predictor of major adverse cardiovascular events (MACE) in patients already diagnosed with Coronary Artery Disease (CAD) while all previous studies dealt solely with those having the risk factors.

**Methods and Results:** baPWV measurement was performed on 178 men with CAD aged 39-72 years (mean age  $54.5 \pm 7.7$ ). The examination comprised body mass index, blood pressure, blood glucose, total cholesterol. During