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### **P.034: THE INFLUENCE OF GENDER, CYCLOOXYGENASE-2 INHIBITION, AND HYPERGLYCEMIA ON VASCULAR FUNCTION IN UNCOMPLICATED TYPE 1 DIABETES MELLITUS**

D.Z.I. Cherney, J.A. Miller, J.W. Scholey, M.G. Dekker, E.B. Sochett, C. Slorach, T.J. Bradley

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the 3-year follow-up period 38 patients experienced MACE (acute myocardial infarction, coronary intervention, or cardiac death). A receiver operating characteristic curve demonstrated that the best cut-off point of a baPWV for predicting a MACE was 13.35 m/s. A univariate binary logistic regression model demonstrated that only the baPWV had a significant odds ratio for MACE: 2.30 (1.10-4.81),  $p=0.024$ . Other risk factors including BP and age (with the cut-off point at the lowest tercile - 49.0 years) were not significantly associated with prognosis.

**Conclusions:** baPWV is the only significant predictor of MACE for middle aged men with CAD.

#### P.031

##### CHRONIC COFFEE CONSUMPTION HAS A LESS POTENT EFFECT ON AORTIC STIFFNESS THAN CAFFEINE

N. Ioakeimidis, C. Vlachopoulos, N. Alexopoulos, I. Dima, P. Xaplanteris, A. Grivos, K. Baou, C. Stefanadis. *1st Department of Cardiology, Athens Medical School, Hippokraton Hospital, Athens, Greece*

**Purpose:** Aortic stiffness is an independent marker of cardiovascular risk. Caffeine, which is the strongest compound of coffee, has been associated with an acute, unfavorable effect on aortic elastic properties. Whether there is a differential chronic effect of coffee and caffeine on aortic stiffness has not been defined.

**Methods:** The chronic effect of coffee and caffeine were studied in 9 healthy volunteers. The study was carried out on four separate arms: a) triple espresso, b) decaffeinated triple espresso, c) 240mg of caffeine alone (amount contained in a triple espresso) and d) placebo. Each treatment period of two weeks was separated by wash-out periods of one week. Carotid-femoral pulse wave velocity (PWV) was measured as an index of aortic stiffness.

**Results:** The effect of daily caffeine and coffee intake on PWV is described as response of each variable, where response is defined as net caffeine or coffee minus placebo and decaffeinated coffee respectively values at each time point. PWV was significantly increased with caffeine compared to placebo ( $P<0.05$ , responses of 0.40 m/sec at 14 days). Furthermore PWV was significantly increased with coffee compared to decaffeinated coffee ( $P<0.05$ , responses of 0.43 m/s at 7 days and 0.57 m/s at 14 days). Both caffeine and coffee increased PWV, however, the effect of caffeine was more pronounced ( $P=0.07$ , response of 0.31 m/sec at 14 days).

**Conclusions:** Both coffee and caffeine increase PWV, however caffeine intake leads to a more potent chronic response. These findings indicate that substances other caffeine may partially counterbalance the chronic unfavorable effects of caffeine on the cardiovascular system.

#### P.032

##### GRADED ASSOCIATION BETWEEN LARGE ARTERY STIFFNESS AND ERECTILE DYSFUNCTION SEVERITY AND DURATION IN ESSENTIAL HYPERTENSIVE MEN

N. Ioakeimidis, C. Vlachopoulos, A. Samentzas, A. Tsokanis, G. Antoniou, K. Rokkas, A. Askitis, C. Stefanadis. *1st Department of Cardiology, Athens Medical School, Hippokraton Hospital, Athens, Greece*

**Purpose:** Erectile dysfunction (ED) is very common in men with hypertension. Increased arterial stiffness and clinical evidence of ED are both associated with atherosclerosis process. We examined the possible correlations between large artery stiffening and ED severity in essential hypertensive patients.

**Methods:** Our population of 140 non-diabetic patients with vasculogenic ED and stage I to II essential hypertension was divided into three groups according to carotid-femoral pulse wave velocity (PWV) values, by means of an automated non-invasive device. Group A ( $PWV<8.1$  m/sec), group B ( $PWV=8.2-9.4$  m/sec) and group C ( $PWV>9.5$  m/sec). Pharmacologically stimulated peak systolic velocity (PSV) of cavernous arteries was used to assess penile vascular damage.

**Results:** Patients in group C ( $n=42$ ) compared to subjects in group A ( $n=55$ ) and B ( $n=43$ ) had higher systolic BP ( $P<0.01$  for all) and longer duration of essential hypertension ( $P<0.05$  for all). Moreover, patients in group C had longer duration of ED ( $3.3 \pm 1.7$  vs  $2.8 \pm 1.5$  vs  $1.7 \pm 1.2$  years, respectively;  $P<0.05$  for all) and lower PSV ( $29 \pm 8$  vs  $32 \pm 10$  vs  $36 \pm 10$  cm/s, respectively;  $P<0.05$  for all). In the total population, PWV was correlated with PSV ( $r=-0.29$ ,  $P<0.01$ ), while PSV was associated with systolic BP ( $r=-0.18$ ,  $P<0.05$ ) and pulse pressure ( $r=-0.23$ ,  $P<0.05$ ). Analysis of covariance revealed that PSV and ED duration remained significantly different between groups after adjustment for confounding factors ( $P<0.05$ ).

**Conclusions:** In men with ED and essential hypertension, there is an augmentation in penile inflow insufficiency and longer duration of ED throughout increasing PWV tertiles. These findings suggest that arterial stiffening is closely related to ED processes, in this setting.

#### P.033

##### ASSOCIATION BETWEEN ARTERIAL WAVE REFLECTIONS AND PENILE DOPPLER FINDINGS IN HYPERTENSIVE MEN WITH VASCULOGENIC ERECTILE DYSFUNCTION

C. Vlachopoulos, N. Ioakeimidis, K. Rokkas, K. Aznaouridis, A. Tsokanis, A. Samentzas, C. Fassoulakis, C. Stefanadis. *1st Department of Cardiology, Athens Medical School, Hippokraton Hospital, Athens, Greece*

**Purpose:** Hypertension is the most common comorbidity in patients with erectile dysfunction (ED). Wave reflections (WR) are an important predictor of cardiovascular risk. The association of ED with WR in hypertensive patients has not been investigated.

**Methods:** 88 consecutive non diabetic treated hypertensive patients ( $61 \pm 8$  yrs) affected by non-psychogenic and non-hormonal ED for more than 6 months were evaluated for penile vascular disease severity by penile Doppler ultrasound. Augmentation index (Alx) and augmented pressure (AP) were measured as an estimate of WR. Subendocardial-viability ratio (SVR) which is the ratio of diastolic pressure time interval/systolic pressure time interval was evaluated as a sensitive measurement of the adequacy of sub-endocardial muscle perfusion in response to myocardial oxygen demand.

**Results:** In univariate analysis, a negative correlation between Alx, AP and mean peak systolic velocity (PSV) of cavernous arteries ( $r=-0.33$ ,  $P<0.01$  and  $r=-0.24$ ,  $P<0.05$ , respectively) and a positive correlation between SVR and PSV ( $r=0.28$ ,  $P<0.05$ ) was observed. Furthermore, in a multiple regression model, Alx was significantly associated with penile vascular disease severity ( $P<0.01$ ) after controlling for age, heart rate, height, body-mass index, mean pressure, lipid profile, C-reactive protein, intensity of smoking (pack-years), antihypertensive agents and statines, (adjusted  $R^2$  of model: 0.42).

**Conclusions:** Our study shows that in hypertensive patients with ED, WR correlate significantly with increasing severity of penile vascular disease as measured by penile Doppler. This finding provides further insights into the pathophysiology of ED and may have implications for the cardiovascular risk in these patients.

#### P.034

##### THE INFLUENCE OF GENDER, CYCLOOXYGENASE-2 INHIBITION, AND HYPERGLYCEMIA ON VASCULAR FUNCTION IN UNCOMPLICATED TYPE 1 DIABETES MELLITUS

D.Z.I. Cherney<sup>1</sup>, J.A. Miller<sup>1</sup>, J.W. Scholey<sup>1</sup>, M.G. Dekker<sup>2</sup>, E.B. Sochett<sup>2</sup>, C. Slorach<sup>2</sup>, T.J. Bradley<sup>2</sup>. <sup>1</sup>Toronto General Hospital, Toronto, Ontario, Canada, <sup>2</sup>Hospital for Sick Children, Toronto, Ontario, Canada

**Purpose:** We have previously shown that young women vs. men with uncomplicated type 1 diabetes mellitus (DM-1) exhibit a deleterious renal vasoconstrictive response to clamped hyperglycemia. Since the cyclooxygenase-2 (COX2) system has important systemic hemodynamic effects in DM-1 and is activated by hyperglycemia, we hypothesized we would find a similar gender-based systemic vascular response to selective COX2 inhibition and accentuation during clamped hyperglycemia.

**Methods:** Outpatient ambulatory blood pressure monitoring and inpatient vascular function assessment (applanation tonometry and brachial artery reactivity) during clamped euglycemia and hyperglycemia were assessed before and after COX2 inhibition (celecoxib 200mg daily for 14 days).

**Results:** Before COX2 inhibition, women [ $n=9$ ] vs. men [ $n=12$ ] with DM-1 exhibited a lower ambulatory systolic BP ( $114 \pm 3$  vs.  $124 \pm 3$  mmHg,  $p=0.029$ ), which was no longer present after COX2 inhibition. Radial augmentation index was higher before (euglycemia  $11.5 \pm 4.2$  vs.  $0.8 \pm 3.1\%$ ,  $p=0.048$ ; hyperglycemia  $10.8 \pm 4.5$  vs.  $-3.1 \pm 3.6\%$ ,  $p=0.024$ ) and after COX2 inhibition (euglycemia  $13.1 \pm 2.3$  vs.  $-1.3 \pm 3.5\%$ ,  $p=0.005$ ; hyperglycemia  $9.1 \pm 2.7$  vs.  $1.1 \pm 4.0\%$ ,  $p=0.045$ ). No differences in pulse wave velocity were detected. Endothelial-dependent FMD responses were also not different, but endothelial-independent GTN response was higher before (euglycemia  $14.0 \pm 0.2$  vs.  $10.8 \pm 1.0\%$ ,  $p=0.045$ ; hyperglycemia  $16.6 \pm 2.3$  vs.  $11.5 \pm 1.1\%$ ,  $p=0.045$ ) and then no different after COX2 inhibition.

**Conclusions:** COX2 inhibition in women with DM-1 results in a loss of gender-based systolic BP protection. Increased augmentation index in women with

DM-1 does not appear to be COX2 mediated or acutely affected by hyperglycemia. Endothelial-independent vascular smooth muscle response in women may be sensitive to COX2 inhibition and warrants further investigation.

### P.035

#### BIOLOGICAL VARIABILITY OF THE ULTRASONOGRAPHIC ASSESSMENT OF ENDOTHELIAL DYSFUNCTION IN CHILDREN WITH HIGH RISK OF MANIFESTATION OF ATHEROSCLEROSIS<sup>☆,☆☆</sup>

P. Jehlicka, F. Stozický, J. Varvarovská, J. Racek, O. Mayer jr., J. Filipovský, L. Trefil. *Charles University Hospital, Pilsen, Czech Republic*

**Background:** Subclinical atherosclerosis should be detected before clinical symptoms of vascular complications occur. Varying reproducibility of currently used ultrasonographic methods makes diagnosis of endothelial dysfunction (ED) in children difficult.

**Aim of the study:** To assess flow mediated dilation (FMD) and deceleration index (DI), based on postocclusion changes in arterial bed in children with familiar hypercholesterolemia (FH) and diabetes mellitus of type 1 (DM1). Evaluation of the intraindividual variability of FMD and DI should then validate a predictive importance of these methods.

**Methods:** FH group, n=32, age 14.7(±2.9) years, DM1 group, n=30, mean age 14.6 (±1.68) and group of healthy children, n=30, mean age 15.1(±1.74) years were enrolled. The measurements were performed twice during the same day period one month apart from each other to assess intraindividual variability of FMD and DI with respect to possible diurnal and ovarian cycles.

**Results:** No significant differences in FMD and DI were found between the FH, DM1 and control groups, the corresponding mean FMDs were 7.31, 7.30 and 6.34% respectively, while DIs 19.78, 16.51 and 21.49 %, respectively. Variability coefficients [median (interquartile range)] were in FMD and DI 1.77 (55-179) and 1.02 (0.68-1.53) respectively.

**Conclusion:** Statistically nonsignificant difference of FMD and DI between study groups could be partly explained by therapeutic interventions and short duration of DM1. Nevertheless, FMD and DI showed very high intraindividual variability, which decrease markedly its reliability to quantify the degree of endothelial dysfunction in children.

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### P.036

#### ASYMMETRIC DIMETHYLARGININE AND OXIDIZED LDL – SENSITIVE BIOCHEMICAL MARKERS OF ENDOTHELIAL DYSFUNCTION IN CHILDREN WITH FAMILIAR HYPERCHOLESTEROLEMIA<sup>☆</sup>

P. Jehlicka, F. Stozický, J. Racek, O. Mayer jr., L. Trefil, J. Filipovský. *Charles University Hospital, Pilsen, Czech Republic*

**Background:** Endothelial dysfunction (ED) as a sign of preclinical atherosclerosis should be detected early in children with familiar hypercholesterolemia (FH). Varying sensitivity of many biochemical and ultrasonographic markers makes diagnosis of ED difficult.

**Aim of the Study:** To assess specific biochemical markers of ED and correlate them with flow mediated dilation (FMD) and deceleration index (DI) in children with FH.

**Methods:** FH group, n=32, age 14.7 (±2.9) years and group of healthy children, n=30, age 15.1 (±1.7) years were enrolled. The high sensitive CRP (hsCRP), oxidized LDL (oxLDL), malondialdehyde (MDA), asymmetric dimethylarginine (ADMA), FMD and DI were assessed.

**Results:** ADMA levels in the FH group was higher than in healthy controls - 0.94 μmol/l (±0.18) versus 0.77 μmol/l (±0.14), p<0.001. Levels of oxLDL were significantly higher in the FH group - 73.7 mU/l (±24.9) versus 55.7 mU/l (±30.5), p<0.01. FMD and DI did not show significant differences between the FH and control groups. No correlations between ADMA, oxLDL, hsCRP and ultrasonographic markers were found.

**Conclusion:** ADMA and oxLDL appear to be more sensitive markers in detection of ED in children with FH than FMD and DI. The absence of correlation between biochemical and ultrasound markers could be explained by high biological variability of FMD and DI. The combination of ADMA, oxLDL and advanced imaging methods could improve the prediction of cardiovascular risk in children with FH.

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### P.037

#### PRESSURE WAVEFORM ESTIMATION IN THE COMMON CAROTID ARTERY – DIFFERENT METHODS IN COMPARISON

I. Zaccari<sup>1</sup>, A.C. Rossi<sup>2</sup>, E.M.H. Bosboom<sup>3</sup>, P.J. Brands<sup>2</sup>. <sup>1</sup>Tor Vergata University, Rome, Italy, <sup>2</sup>Esaote Europe B.V., Maastricht, Netherlands, <sup>3</sup>Department of Biomedical Engineering, University Hospital Maastricht, Maastricht, Netherlands

Non-invasive blood pressure waveform estimation in the common carotid artery (CCA) would yield an indirect estimation of its mechanical properties. Assuming both diastolic ( $P_d$ ) and mean arterial pressure (MAP) to be constant over the arterial tree and considering arteries as rotationally symmetrical, CCA pressure waveform ( $P_{CCA}(t)$ ) can be estimated by rescaling the diameter waveform in the CCA ( $D_{CCA}(t)$ ) on the radial artery (RaA) blood pressure waveform ( $P_{RaA}(t)$ ), using either a linear or an exponential estimation method.

11 normotensive volunteers were included. For each subject, 3 repeated measurements over three days with a weekly interval were performed in the RaA and the CCA simultaneously.  $P_{RaA}(t)$  was measured using applanation tonometry, whereas  $D_{CCA}(t)$  was measured with ultrasound.

**Linear Estimation:**  $D_{CCA}(t)$  was linearly rescaled over  $P_{RaA}(t)$  by equalizing diastolic and mean values of both waveforms:  $P_{CCA}(t) = \delta \cdot D_{CCA}(t) + P_d$ . **Exponential Estimation:** the CCA cross sectional area waveform,  $A(t)$ , was exponentially rescaled over  $P_{RaA}(t)$  according to:  $P_{CCA}(t) = P_d \cdot \exp(\alpha \cdot (A_{CA}(t)/A_{d,CCA} - 1))$ , iteratively adjusting  $\alpha$  (stiffness index) to equalize RaA and CCA mean pressures.

The difference between systolic pressure values estimated by means of the two methods in the CCA is on average  $2.6 \pm 1.1$  mmHg, approximately pressure-independent. The mean difference between the systolic pressure in the RaA and the CCA, using the exponential method, is  $17.6 \pm 6.3$  mmHg. The difference between the radial MAP computed as integral mean and the one estimated with  $[1/3 \cdot P_s + 2/3 \cdot P_d]$  is  $-0.3 \pm 3.4$  mmHg. Estimation quality is not depending on the MAP value.

### P.038

#### INTERRELATION BETWEEN DYNAMICS OF CHANGES ENDOTHELIUM-DEPENDENT DILATATION AND LOCAL RIGIDITY OF THE BRACHIAL ARTERY IN PATIENTS WITH HYPERLIPIDEMIA ON A BACKGROUND OF RECEPTION STATINS WITHIN 6 MONTHS

B.D. Koulev, N.V. Sankova, Nuraliev E. Yu, F.T. Ageev. *Cardiology Research Center, Moscow, Russian Federation*

**Aim:** To estimate and contrast the marks of a flow-mediated dilatation (FMD) and distensibility coefficient (DC) of the brachial artery in patients with primary hyperlipidemia on a background of statins within 6 months.

**Materials and Methods:** 25 patients, age 58 (51;64) years, with drug-controllable hypertension and not received lipid-lowering therapies at least 4 weeks prior to the beginning of research. Patients accepted the statins (6 months) in doses which were defined by titration before achievement of target levels of low density lipoprotein.

**Results:** FMD of the right brachial artery has been increased significantly after 3 and 6 months of therapy. DC and Blood pressure level changes were not significant within 6 months. Positive dynamics of FMD has been noted in 16 patients (64%), among them in 8 person (50%) negative dynamics DC is noted. The correlation analysis has revealed statistically significant negative interrelation between dynamics FMD and DC ( $r=-0.47$ ;  $p=0.043$ ). Significant correlation between marks of FMD and DC it has not been revealed.

**Conclusion:** Improvement endothelial functions can be accompanied by increase local rigidity the main arteries of muscular type in the early period of therapy of statins in consequence of decrease basal tone and carry of loading on stiffness layers of an arterial wall, which demands the further researches.

### P.039

#### THE NUMBER OF CD34+ CELLS IN PATIENTS WITH STABLE ANGINA PECTORIS: INFLUENCE OF ABNORMAL GLUCOSE METABOLISM AND CORONARY ANGIOPLASTY

M. Ruda, O. Vyborov, T. Arefieva, Yu. Karpov, Ye. Parfyonova. *Russian Cardiology Research Center, Moscow, Russian Federation*

**Background:** Circulating progenitor cells (CPCs) play an important role in endothelial repair. We evaluated numbers of CD34+ cells in patients with