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P3.09: IMPACT OF BIRTH WEIGHT ON BLOOD PRESSURE AND ARTERIAL STIFFNESS

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P3.07

INCREASED ARTERIAL STIFFNESS IN PATIENTS WITH AUTOSOMAL DOMINANT POLYCYSTIC KIDNEY DISEASE

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Autosomal dominant polycystic kidney disease (ADPKD) is characterized by the development of renal cysts related to polycystin mutations in the tubular wall leading to renal failure. Moreover, patients with ADPKD also display early cardiovascular complications including hypertension and aneurysms before the development of renal manifestations. Because an underlying arteriopathy related to the deficit in polycystin which is also present at the vascular level may be involved in these complications, the aim of this study was to evaluate whether arterial stiffness is increased or not in ADPKD patients independently from other cardiovascular risk factors.

We measured carotid-to-femoral pulse wave velocity (PWV, Complior) in 23 ADPKD patients without renal dysfunction (mean age: 42 ± 3 yrs) and 19 control subjects (46 ± 2 yrs) matched for sex, BMI and lipids.

Creatinine clearance was similar in ADPKD patients and controls (Cockcroft: 90 ± 6 vs. 95 ± 6 ml/min/1.73 m²). Brachial systolic (129 ± 3 vs. 128 ± 3 mm Hg) and diastolic (79 ± 2 vs. 81 ± 2 mm Hg) blood pressure and the number of treated hypertensive subjects (42% vs. 48%) were similar in ADPKD patients and controls. However, ADPKD patients have higher PWV (9.4 ± 0.3 vs. 8.6 ± 0.3 m.s⁻¹, $P < 0.05$). This increase in PWV is still observed in ADPKD patients without treated hypertension as compared to the normotensive controls (9.0 ± 0.3 vs. 7.9 ± 0.1 m.s⁻¹, $P < 0.05$).

This study demonstrates that ADPKD patients have an increase in aortic stiffness which is already present before the development of hypertension and renal failure. The impact of arterial stiffening on cardiovascular coupling and on the development of extrarenal complications in ADPKD patients needs further investigations.

P3.08

EFFECTS OF REGULAR LEISURE EXERCISE ON ARTERIAL PRESSURE AUGMENTATION. THE MONICA/KORA AUGSBURG STUDY

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Background: Exercise influences pulse wave morphology, but the mechanisms are unknown.

Methods: We measured radial arterial pulse wave contour (SphygmoCorR) in 1005 adults from a cohort follow-up examination in 2004/5 and compared individuals who, by self report, were sedentary (NPE, of less than one hour of aerobic exercise per week, $n = 130$) or who practiced irregular physical exercise (IPE, irregularly at least one hour of aerobic exercise per week, $n = 204$) or regular physical exercise (RPE, regularly at least two hours of aerobic exercise per week, $n = 111$). Aortic augmentation was evaluated using multivariate regression modeling. Individuals with intake of antihypertensive or hormonal medications were excluded.

Results: After adjustment for concomitant factors, like gender, age, height, total body weight, heart rate, central mean blood pressure and number of cigars consumed per day, lack of regular physical exercise was significantly associated to aortic augmentation, with 8.68 mmHg among NPE versus 7.68 mmHg in the IPE ($p = 0.035$) and 6.84 mmHg in the RPE group ($p = 0.001$). Likewise, the respective augmentation indexes were 22.9% ($p = 0.003$), 22.5% ($p = 0.004$) and 19.6%. Moreover, the RPE group presented the highest reflected wave travel time (RTT = 144.9 msec vs. 141.7 msec in IPE and 141.3 msec in NPE; $p = 0.012$ and 0.014, respectively).

Conclusions: Leisure exercise seems to be related to less aortic pressure augmentation and a longer reflected wave traveling time, an effect that potentially enhances ventricular-vascular coupling and reduces the after-load of the left ventricle.

P3.09

IMPACT OF BIRTH WEIGHT ON BLOOD PRESSURE AND ARTERIAL STIFFNESS

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Objective: Accumulating evidence suggests that low birth weight is associated with increased risk of future cardiovascular risk and increased systolic blood pressure. However the relationship between birth weight and arterial stiffness is controversial. We examined this relationship in the ENIGMA study, a longitudinal study examining the natural history of blood pressure in young adults.

Design and Methods: Data from 882 participants were analysed. The mean age was 21, all were free from cardiovascular disease and medication. Measurements included anthropometric parameters, blood pressure, aortic pulse wave velocity and wave reflections (SphygmoCor) and cardiac output (Innocor). Analyses were conducted in males and females separately, by subdividing into quartiles of birth weight.

Results: There was a positive association between birth weight and adult height in males and females and adult weight and waist circumferences in females. In males lower birth weight was associated with systolic pressure and wave reflections. These associations disappeared after adjustment for height, heart rate and mean pressure.

In females lower birth weight was associated with an increased cardiac output and stroke volume. These associations disappeared when body surface area was taken in to account. There was no association between birth weight and aortic pulse wave velocity.

Conclusion: Our data suggest that the relationship between birth weight and increased augmentation index in healthy, young adults is confounded by other factors such as height and mean pressure. Further studies are required to establish whether low birth weight is associated with an adverse cardiovascular profile in young adults.

P3.10

PULSE WAVE VELOCITY AND AUGMENTATION INDEX ARE ASSOCIATED WITH 10-YEAR GENERAL CARDIOVASCULAR RISK AND HEART/VASCULAR AGE IN NEWLY DIAGNOSED, NEVER-TREATED HYPERTENSION

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Background: The Framingham Heart Study group has proposed an algorithm for calculating the 10-year risk of developing cardiovascular disease (CVD) and heart/vascular age. The predictors used are age, diabetes, smoking, systolic blood pressure, total and high density cholesterol. We investigated the association of 10-year CVD risk, heart/vascular age with indices of arterial function, which are not currently included as predictors in the algorithm, in a cohort of newly diagnosed, never-treated hypertensive subjects.

Methods: 1145 patients with a new diagnosis of mild to moderate arterial hypertension for which they had never received treatment were enrolled in the study (mean age 54 years, 670 men). Carotid-femoral pulse wave velocity (cfPWV) and augmentation index (Alx) were measured. The general cardiovascular risk profile algorithm proposed by the Framingham Heart Study group was used in order to calculate the 10-year risk of developing CVD. Heart/vascular age was similarly calculated.

Results: cfPWV positively correlated with 10-year general CVD risk ($r = 0.451$, $P < 0.001$) and heart/vascular age ($r = 0.401$, $P < 0.001$). This was also the case for Alx, as it correlated with 10-year general CVD risk ($r = 0.173$, $P < 0.001$) and heart/vascular age ($r = 0.414$, $P < 0.001$).

Conclusion: Aortic stiffness and wave reflections are associated with 10-year general CVD risk and heart/vascular age in never treated hypertensives. This finding underscores the importance of cfPWV and Alx assessment in the setting of newly diagnosed, never treated hypertension, as predictors of future CVD events.