P3.08: EFFECTS OF REGULAR LEISURE EXERCISE ON ARTERIAL PRESSURE AUGMENTATION. THE MONICA/KORA AUGSBURG STUDY


To link to this article: https://doi.org/10.1016/j.artres.2009.10.037

Published online: 14 December 2019
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, Compilo) 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, 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, 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.

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

Methods: We measured radial arterial pulse wave contour (SphygmoCor®) 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, 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, height2.7, total body weight, heart rate, central mean blood pressure and number of cigarettes 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 msc vs. 141.7 msc in IPE and 141.3 msc 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.