Sport medicine

Acute and chronic effects on central hemodynamics and arterial stiffness in professional rowers.

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BACKGROUND: Controversial data exist on acute and chronic effects of competitive sports on central hemodynamics and arterial stiffness. We investigated chronic as well as acute training effects in professional rowers. The trial was planned as a non-randomized, controlled pilot-study comparing athletes and controls.

MATERIALS AND METHODS: 13 German national team rowers (24.1 ± 1.5 years) and 12 controls (23.8 ± 0.8 years) participated. Aortic, brachial hemodynamics and arterial stiffness were measured (Arteriograph, TensioMed(®), Hungary) before and after a standardized exercise test.

RESULTS: Chronic heart rate (49 [Formula: see text] 2 bpm versus 70 [Formula: see text] 2 bpm, $p < 0.05$) as well as brachial diastolic pressure (65 [Formula: see text] 2 mmHg versus 74 [Formula: see text] 2 mmHg, $p < 0.05$) was significantly lower in rowers. Physical power (305 [Formula: see text] 63 versus 158 [Formula: see text] 60 W, $p < 0.001$) was better. Chronic aortic pulse pressure (41.6 [Formula: see text] 6.0 versus 35.2 [Formula: see text] 3.8 mmHg; $p < 0.01$) and AIx (9.1 [Formula: see text] 5.4 versus 7.0 [Formula: see text] 10.2; $p < 0.01$) were significantly higher in athletes. After the all-out test (acute effects) pulse wave velocity (rowers: 6.6 [Formula: see text] 1.2 m s(-1) versus 7.8 [Formula: see text] 1.6 m s(-1), $p < 0.001$; control group 6.0 [Formula: see text] 0.4 m s(-1) versus 8.0 [Formula: see text] 1.4 m s(-1), $p = 0.005$) and heart rate (rowers: 49 [Formula: see text] 2 bpm versus 91 [Formula: see text] 3 bpm, $p < 0.001$; control group 70 [Formula: see text] 2 bpm versus 92 [Formula: see text] 4 bpm, $p < 0.001$) increased significantly in both groups. The controls' aortic AIx (7.0 [Formula: see text] 10.2 versus 2.0 [Formula: see text] 6.0; $p < 0.01$) decreased significantly after exercise. Professional rowers showed higher chronic aortic pulse pressure and arterial stiffness.

CONCLUSIONS: Given the risk associated with elevated aortic pulse pressure and AIx for development of cardiovascular diseases, longterm observations of professional rowers are needed with respect to arterial stiffness and prognosis. Furthermore the acute effects need additional research.

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The effect of physical exercise on arterial stiffness parameters in young sportsmen.

Rátgéber L, Lenkey Z, Németh Á, Hidvégi E, Husznai R, Verzár Z, Illyés M, Bódis J, Cziráki A.

OBJECTIVE: This study aimed to determine the effect of single-bout exercise on aortic stiffness parameters in young basketball players.

METHOD AND RESULTS: A total of 108 young male subjects (mean age 14.2 ± 3.4 years) were enrolled into the study. Simultaneous measure- ment of aortic pulse wave velocity (PWVao) and augmentation index (Alxao) were performed with the oscillometric, occlusive device. Echocardiographic parameters of left ventricular systolic and diastolic function at rest were also measured in sportsmen. We did not find significant differences of resting PWVao in comparison with young sportsmen (S) and age-matched healthy volunteers (V): 5.82 ± 0.14 m/s vs 5.83 ± 0.12 m/s for S and V groups, respectively. The values of PWVao measured after dynamic exercise, isometric exercise, and rest were 8.0 ± 0.5 m/s, 5.86 ± 0.1 m/s and 5.82 ± 0.1 m/s, respectively. We confirmed that values after dynamic exercise are significantly different from those after isometric exercise ($P < 0.01$) and those after rest ($P < 0.01$). The Alxao values exhibited a considerable, but statistically non-significant, decrease during dynamic exercise in the three groups (11.7 ± 7% vs 3.8 ± 3% vs- 0.9 ± 0.9% for groups 1, 2, and 3, respectively).

CONCLUSION: We applied a feasible, clinically useful method which allowed us to measure changes in aortic PWV and Alx during acute, single-bout exercise on the basketball court in young sportsmen.

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Comment from the author (MI) of the Website: In this study Arteriograph was used.

Benefits of exercise training during hemodialysis sessions: a prospective cohort study.

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BACKGROUND: End-stage renal disease patients can be considered as ‘cardiovascular time bombs’ due to their tremendous cardiovascular risk. Our study has determined the impact of 3 months of exercise training during dialysis on some of the cardiovascular risk factors (arterial stiffness, body composition and physical performance) in a chronic hemodialyzed population.

PATIENTS AND METHODS: The study group (n = 19) and control group (n = 16) of chronic hemodialysis patients from Timisoara, Romania, were enrolled in a prospective cohort study. The intervention–40 min of exercise training (with non-fistula hand and both lower limbs) during each hemodialysis session for 3 months–was applied only to the study group. The measurements made before and after intervention were aortic pulse wave velocity (PWV), aortic augmentation index, return time and both central and peripheral blood pressure for arterial stiffness evaluation, using the Arteriograph Tensiomed system, body composition by multifrequency bioimpedance and physical performance (Myotest PRO system and hand dynamometer).

RESULTS: We found a significant 1-m/s reduction in PWV, a 12-second increase in return time and a 10-mm Hg reduction in both central and systolic blood pressure driven only by the exercise training. Exercise training significantly increased the skeletal muscle mass and the soft lean mass of the study group patients. Physical performance significantly improved in the study group jumping height by 1 cm, lower limbs explosive power by 3 W/kg and non-fistula hand strength prehension by 0.06 bar.

CONCLUSIONS: Exercise training during dialysis has a positive effect on arterial stiffness, body composition and physical performance of chronic hemodialyzed patients.

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