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P5.02: EFFECT OF ACUTE INTENSE EXERCISE ON ARTERIAL STIFFNESS

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Conclusions: PR improves the haemodynamic profile of subjects with COPD. Longer term CV effects of PR should now be investigated.

Mean (SD)	Control	COPD - Pre PR	COPD - Post PR
Aortic PWV (m/sec)	8.5 (1.4)	9.82 (3.0)†	9.26 (2.7)*
Systolic BP (mmHg)§	130.0 (15.9)	137.6 (20.0)	127.9 (23.6)**
Diastolic BP (mmHg)§	78.7 (8.4)	82.8 (9.5)	78.4 (11.8)**
MAP (mmHg)§	96.0 (10.0)	100.9 (11.9)	94.9 (14.1)**
Heart Rate (bpm)	67.8 (11.0)	76.1 (12.1)††	75.9 (14.1)
Cholesterol (mmol/L)	5.2 (1.2)	5.6 (1.2)	5.4 (1.2)*
Glucose (mmol/L)	5.2 (0.5)	5.0 (0.7)	4.8 (0.8)
ISWT (m)	-	190.4 (69.8)	273.6 (75.5)**

§ Peripheral pressures; †p < 0.05; ††p < 0.001 difference from controls.
*p < 0.05; **p < 0.001 difference with PR.

P5.02

EFFECT OF ACUTE INTENSE EXERCISE ON ARTERIAL STIFFNESS

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Purpose: Aortic stiffness and wave reflections are determinants of left ventricular performance and independent predictors of cardiovascular risk. Though it is well recognized that regular aerobic exercise can affect arterial stiffness and wave reflections, the acute effect of intense aerobic exercise has not been defined. In this study we examined the acute effect of the extreme exertion of marathon race on the arterial elastic properties in highly trained athletes.

Methods: We studied 20 healthy, regularly trained (5 ± 2.5 hours/week for 12.4 ± 7.4 years) marathon runners (mean age: 36 ± 10 yrs, 16 M/4F) before and after the race. Aortic stiffness was evaluated with pulse wave velocity (PWV) and wave reflections with augmentation index (Alx) of the aortic pressure waveform.

Results: Marathon race led to a significant fall in Alx corrected for the heart rate (6.96 ± 13.3 vs. 0.04 ± 10.9 , $P = 0.01$) indicating reduced heart afterload. Mean pressure (94 ± 14 vs. 85 ± 9 , $P < 0.05$), systolic brachial (127 ± 16 vs. 122 ± 11 , $P < 0.05$), systolic aortic pressure (113 ± 16 vs. 102 ± 10 , $P = 0.01$), as well as diastolic brachial (78 ± 12 vs. 70 ± 8 , $P < 0.01$), diastolic aortic pressures (79 ± 12 vs. 73 ± 8 , $P < 0.05$), were also decreased, whereas heart rate was significantly increased (62 ± 9 vs. 90 ± 9 , $P < 0.01$). PWV did not differ before and after marathon race (6.65 ± 0.9 vs. 6.74 ± 1.2 $P = NS$).

Conclusions: Our findings demonstrate that marathon race results in an acute decrease of wave reflections. This indicates reduced afterload that facilitates left ventricular performance. Since there is no effect on PWV, it is caused most likely by peripheral vasodilation. These findings elucidate the interrelations between biophysical properties of the arteries and exercise capacity.

P5.03

ACUTE VASCULAR EFFECTS OF RECOMBINANT HUMAN TSH IN YOUNG SUBJECTS FROM CHERNOBYL AREA FOLLOWED-UP FOR PREVIOUS DIFFERENTIATED THYROID CANCER

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Objectives: To evaluate the effect of recombinant human TSH (rhTSH) on endothelial function, aortic and carotid stiffness, and wave reflection in a population living in the Chernobyl area at the time of 1986 blast, treated with thyroidectomy for thyroid cancer.

Methods: 23 subjects (age 26 ± 3 years, 10 men) underwent evaluations at baseline and after rhTSH administration, 0.9 mg daily on 2 consecutive days. A real time contour tracking algorithm was applied to B-mode scans for assessing brachial artery endothelium-dependent (flow-mediated dilation, FMD), and -independent dilation (glycerol trinitrate, GTN, $25 \mu\text{g}$ sublingual) and carotid stiffness (CS) by Bramwell-Hill equation. Carotid blood pressure (BP) waveform, augmentation index (Alx), and carotid-femoral PWV were assessed by applanation tonometry.

Results: rhTSH decreased diastolic BP (from 79 ± 11 to 72 ± 9 mmHg, $p < 0.01$), but not systolic BP, increasing pulse pressure (from 38 ± 7 to 43 ± 10 mmHg,

$p < 0.01$). FMD tended to decrease (from 9.0 ± 4.4 to $6.9 \pm 2.2\%$, $p = 0.09$), while GTN was unchanged (from 10.5 ± 4.0 to $10.6 \pm 3.4\%$, $p = ns$). Aortic PWV tended to decrease (from 5.78 ± 1.32 to 5.44 ± 1.02 m/s, $p = 0.057$); carotid stiffness (from 5.07 ± 0.73 to 5.20 ± 0.82 m/s, $p = ns$) and Alx (from -5.5 ± 11.0 to -8.7 ± 16.7 , $p = ns$) were unchanged. Augmentation pressure (AP) decreased (from -2.7 ± 4.7 to -5.8 ± 9.6 mmHg, $p < 0.05$), while time to wave reflection was unaffected (from 164 ± 22 to 167 ± 21 ms, $p = ns$).

Conclusions: In a population of environmental radiation-exposed thyroidectomized young patients, rhTSH influences magnitude of wave reflection, possibly through microcirculatory vasodilation, as suggested by diastolic BP and AP decrease. A reduction of aortic stiffness and an impairment of endothelial function was also observed.

P5.04

RELATIONSHIP BETWEEN ENDOTHELIAL FUNCTION, INTIMA-MEDIA COMPLEX THICKNESS AND BILIRUBIN LEVELS IN PATIENTS WITH METABOLIC SYNDROME

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Endothelial dysfunction (ED) and carotid artery intima-media complex thickening (IMT) are regarded as predictors for the progress of atherosclerosis. The anti-oxidant properties of bilirubin and its ability to prevent oxidation of lipids of low density lipoproteins, and thus, development of vascular atherosclerosis have also been described.

Our aim was to assess bilirubin levels in patients with metabolic syndrome and various levels of brachial artery flow-mediated dilatation (FMD) registered during reactive hyperaemia test and different carotid artery IMT. **Methods:** We examined 181 male subjects, age 31-52 years, with different levels of FMD and IMT, using standard protocol which included physical examination, ECG, carotid arteries ultrasound, brachial arteries ultrasound with reactive hyperaemia test, blood biochemistry tests.

Results: After initial examination patients were divided into two groups in regard to their FMD: 89 patients comprised the group with lower FMD (less than 5%) and 92 subjects who had normal FMD (more than 5%). Performing the ultrasound examination of the carotid arteries we found out that IMT was higher in patients with impaired FMD ($p = 0.02$). On the contrary, in this group we found lower total bilirubin levels comparing to those with normal FMD (8.5 ± 3.2 vs. 16.8 ± 4.5 $\mu\text{mol/L}$, $p < 0.01$, respectively).

Conclusions: Patients with metabolic syndrome and lower total bilirubin levels present higher IMT and lower FMD and more significant signs of vascular atherosclerosis (as seen in carotid arteries) comparing to those with higher bilirubin levels.

P5.05

INTERICTAL ARTERIAL WALL PARAMETERS IN WOMEN WITH MIGRAINE

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Objective: According to data of epidemiological and clinical studies, migraine with aura (MA) is associated with cardiovascular disorders, and migraine without aura (M0) is linked to carotid artery dissection. The aim of this cross-sectional study was to evaluate and compare arterial wall parameters – intima-media thickness, distensibility and stiffness of common carotid artery (CCA), augmentation index and pulse wave velocity – in female patients with two types of migraine: MA and M0.

Methods: Arterial wall structural and functional properties were measured using echo-tracking method (Art.Lab system) and applanation tonometry (SphygmoCor device) in 63 patients with M0 (age 35.32 ± 7.83 years, migraine duration 17.25 ± 8.44 years), 37 with MA (age 36.57 ± 9.10 years, migraine duration 19.62 ± 9.17 years) and 50 age-matched controls. Groups were compared using one-way ANOVA test. To explore the relationship between arterial wall parameters and type of migraine stepwise linear regression was applied.

Results: MA patients had highest values of augmentation index ($16.65 \pm 13.23\%$), comparing with M0 patients ($15.41 \pm 10.62\%$) and controls ($12.42 \pm 13.32\%$). Distensibility of CCA was lowest in M0 patients ($443.78 \pm 106.99 \mu\text{m}$), comparing with MA patients ($449.99 \pm 113.50 \mu\text{m}$)