Myocardial insulin resistance in aging rats and its reversal by exercise

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This study was to determine whether exercise can reduce aging-associated myocardial insulin resistance (IR), with the focus on the role of endothelial Nitric oxide synthase (eNOS) cascade and its relation to mitochondria. Aging male SD rats (24-month-old) were subjected to swimming training (60 min/day, 5 day/week, 10 weeks). The insulin-stimulated glucose uptake, mitochondria function and the expression of eNOS in young (3-month-old) and aging rats were measured. Compared with young rats, aging rats showed myocardial IR as evidenced by decreased insulin-stimulated glucose uptake and an attenuated myocardial contractile response to insulin (57% in LVDP in young hearts vs. 8.4% in aging hearts, $n=8$, $P<0.01$), which is accompanied by decreased eNOS phosphorylation by insulin ($P<0.01$) and mitochondrial dysfunction ($P<0.01$). Exercise increased eNOS expression by 72% ($P<0.01$), thus facilitated NO production by insulin ($P<0.01$), and reduced aging-induced myocardial IR. Following exercise, insulin-activated mitochondrial function w as potentiated in aging hearts ($P<0.01$). Foremost, selective inhibition of eNOS with cavtratin blocked the exercise-induced improvement in myocardial glucose uptake and contractile function in response to insulin and in mitochondrial function ($P<0.01$). These results show that aging-associated myocardial IR is due to the impaired eNOS-activated mitochondrial function, and that exercise improves myocardial insulin sensitivity by potentiating eNOS activated mitochondrial function.

Keyword: Resistance

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The stage and treatment effectiveness of obesity

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Introduction: Effective obesity treatment can reduce that risk and improve patients quality of life.

The aim of the study: The aim of the study is the analysis of obesity treatment according to its stages progress.

Materials and methods: The clinical data of 71 patients (average age 52.2±13 years, 86% women, 14% men) were analyzed, who were admitted to the Obesity Treatment Outpatients Clinic. The patients were divided to subgroups according to Body Mass Index (BMI): 1st stage of obesity (30–35 kg/m^2), 2nd stage of obesity (35–40 kg/m^2), giant obesity (>40 kg/m^2). In the subgroups the effectiveness of obesity treatment was analyzed in 1,3,6,12 months after beginning.

Results: In research group in 20 patient (28.2%) 1st stage of obesity was diagnosed, in 23 (32.4%)—2nd stage of obesity and in 28 (39.4%) giant obesity. The most popular treatment were: orlistat—63.4%, low calorie diet (1200 kcal, 30% of fat per day)—15.5%, chitosan—14.1%. After 1 month treating the higher percentage of patient at the second admission was from the subgroup with the 2nd stage of obesity—82.6%, with giant obesity—78.5%. The biggest body weight reduction was observed in patients with BMI in range 35–40 kg/m^2 after 6 month treating −15.1±8.3 kg and after 1 year treating −12.1±7.33 kg.

Conclusions: The highest effectiveness of obesity in the investigation group was observed in patient with BMI in range 35–40 kg/m^2. There was no satisfied compliance in the giant obesity treatment, in the group with the highest risk of the chronic complications.

Keywords: Metabolic syndrome; BMI; Cardiology

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The obesity stages and elements of metabolic syndrome

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Introduction: Overweight or obesity and concomitant disorders being the elements of the metabolic syndrome.

The aim of the study: The aim of the study is the analysis of the prevalence of the metabolic syndrome factors according to Body Mass Index (BMI).

Materials and methods: Clinical data of 134 patients (average age 58.3±15 years, 99 women, 35 men) were analyzed. They were divided to subgroups according to Body Mass Index (BMI). On the base on the newest criteria of metabolic syndrome diagnosis according to IDF 2005 the elements such as: abdominal adiposity, HDL-cholesterol and triglycerides concentration, arterial hypertension, diabetes or prediabetes state were in the subgroups analysed.

Results: Metabolic syndrome were diagnosed in the higher percentage in patients with giant obesity −87.09%, and in the lowest with correct BMI 31.25%. All patients (100%) with obesity have abdominal adiposity. Low HDL-cholesterol concentration (<40 mg/dl in women, <50 mg/dl in men) were estimated the most frequent in patients with overweight—$n=25$ (75%), such as arterial hypertension—$n=25$(75%) and diabetes or (IFG)—$n=21$ (75%). High triglycerides concentration (>150 mg/dl) the most frequent in patients with 1st stage of obesity was observed.

Conclusions: Abdominal adiposity always is associated with obesity, but was observed in 1/3 cases with correct body weight, as well. The prevalence of others elements of the