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The effectiveness of the individual approach in physical rehabilitation of men with metabolic syndrome to improve atherogenic lipid profile

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Purpose: *evaluation of the effectiveness of individual approach in physical rehabilitation of men with metabolic syndrome based on the dynamics of the atherogenic lipid profile.*

Materials and methods: *theoretical analysis and compilation of scientific and methodical literature and internet providers; biochemical methods; methods of mathematical statistics. To study involved 60 men with metabolic syndrome.*

Results: *Application of individual approach in the long-term form of rehabilitant-rehabilitation interaction at the outpatient rehabilitation stage of men with the metabolic syndrome improves lipid profile, significantly reduces total cholesterol, low-density lipoprotein, triglycerides and increases high-density lipoprotein.*

Keywords: *metabolic syndrome, rehabilitation, individual approach, interaction, lipoproteins, man.*

Introduction

Metabolic syndrome (MS) is characterized by a set of interrelated risk factors: obesity, insulin resistance, hypertension, hyperglycemia, hypertriglyceridemia, reduction high-density lipoprotein, the presence of proinflammatory and thrombogenic background [2; 4; 9]. Individual components of metabolic syndrome may be present or absent in each individual case, but each of them is a major risk factor for cardiovascular disease [1; 10].

Given that the disturbance of lipoprotein metabolic is a recognized factor risk for cardiovascular disease, it is an important rehabilitation's task in normalization of the lipid status by non-drug means.

The risk of cardiovascular complications significantly increased with increasing levels of triglyceride (TG), concentrations of low density lipoprotein (LDL) and decrease the concentration of high density lipoproteins (HDL). A characteristic feature of dyslipidemia in MS is to increase the number of small dense lipoproteins, which have great potential atherogenic [1; 4].

Today our country is recognized as a priority strategy for the prevention of vascular diseases and their complications, which involves the stratification of risk factors, combating and identification of barriers to implementation of modern standards. So MS within which combined multiple vascular high risk factors, can not attract the attention of healthcare professionals and specialists in physical rehabilitation.

In most patients, all of these manifestations of the metabolic syndrome are in a complex, requiring a multidisciplinary approach in rehabilitation involving physical rehabilitators, therapists, surgeons, cardiologists, sociologists, neurologists, psychologists, physiotherapists, occupational therapists.

This demonstrates the need for an individual approach in the rehabilitation of patients nosology on the one hand, and the difficulty of selecting the most appropriate methods of physical rehabilitation for the full recovery of the patient – on the other hand.

Convincing data of many randomized studies demonstrate the ability of influence dosed exercise on pathogenetic atherosclerosis links, reduce systemic inflammation, correct insulin resistance, make favorable effects on metabolic parameters [3, 5–8] that requires attention from the rehabilitation.

However, the theoretical analysis of scientific papers suggests that the problem of physical rehabilitation of patients with a metabolic syndrome is not almost solved, and existing programs of physical rehabilitation of this group do not include differentiation of modes of motor activity that requires development and scientific substantiation.

Relationship with the academic programs, plans, themes

The selected research direction corresponds to the research topic of Classic Private University "Personalization of physical rehabilitation for persons with special needs and athletes" (state registration 0113U000580).

Purpose: evaluation of the effectiveness of individual approach in physical rehabilitation of men with metabolic syndrome based on the dynamics of the atherogenic lipid profile.

Material and Methods of the research

To achieve this goal at different stages of scientific research has been used a number of methods: theoretical analysis and synthesis of scientific-methodical literature and global infor-

Table 1

The dynamics of biochemical parameters (M±m) in the main group of men (MG) with metabolic syndrome

Indicator	MG (n=30)		
	beginning	six months	year
Total cholesterol, mmol/L	7,46±0,19	7,12±0,22***	6,33±0,19•••
Triglycerides, mmol/L	2,78±0,14	2,53±0,16**	2,00±0,13•••
High-density lipoprotein, mmol/L	1,91±0,10	2,20±0,12***	2,43±0,12•••
Low-density lipoprotein, mmol/L	4,71±0,31	4,10±0,25***	3,38±0,12•••

Notes: *** – p<0.01; *** – p<0.001 compared with the data after 6 months; ••• – p <0.001 compared with the data after 12 months.*

Table 2

The dynamics of biochemical parameters (M±m) in the comparison group of men (CG) with metabolic syndrome

Indicator	CG (n=30)		
	beginning	six months	year
Total cholesterol, mmol/L	7,14±0,24	6,84±0,23	6,32±0,22••
Triglycerides, mmol/L	2,89±0,15	2,76±0,13*	2,72±0,12••
High-density lipoprotein, mmol/L	2,00±0,11	1,96±0,11	1,96±0,12
Low-density lipoprotein, mmol/L	4,83±0,35	5,74±0,38	5,78±0,40

Notes: ** – p<0.05 compared with the data after 6 months; •• – p <0.01 compared with the data after 12 months.*

mation on the Internet; biochemical methods; methods of mathematical statistics.

Organization of the research. The study was conducted at the cardiology department of Zaporizhzhya City hospital № 7. The study involved 60 men, that were randomly divided into groups (MG, n = 30) and the comparison group (CP, n = 30).

The criteria for inclusion in the experiment were age from 36 to 65 years (average age of participants was 41,53±1,29 years), the presence of the first and second stages of obesity, waist circumference over 94sm, blood pressure level ≥135/90, fasting hyperinsulinemia ≥5,6 mmol/L or impaired glucose tolerance ≥7,8 mmol/L, increase an initial triglyceride level ≥1,7 mmol/L, decrease in HDL < 1.0 mmol/L increase in LDL> 3.0 mmol/L.

Given that lifestyle significantly influences on the metabolic syndrome components, recommendations for lifestyle modification (diet, refusal of bad habits, increased physical activity) and medication were similar in both groups. Men of the main group additionally engaged by the authors rehabilitation program that included differentiation forms and amounts of physical activity, depending on the clinical manifestations of metabolic syndrome characteristics, functional status, level of cardiorespiratory system, compliance. The study of the dynamics of blood biochemical parameters was performed after 6 and 12 months of using physical rehabilitation.

Results of the research and their discussion

At the beginning of the study in most patients biochemical parameters observed elevated levels of triglycerides, total cholesterol and low density lipoprotein, which exceeded the recommended target values.

Using individual approach in physical rehabilitation of men with metabolic syndrome in the MG (Table 1) contributed to the possible decline total cholesterol by 0.34 mmol/L (p<0.001), triglycerides – by 0.25 mmol/L (p<0.01), low density lipoprotein – by 0.61 mmol/l (p<0.001) in six months of training; in a year – above indicators decreased from baseline to 1.13 mmol/L (p<0.001), 0.78 mmol/L (p<0.001), 1.33 mmol/L (p<0.001) respectively. Target level of LDL, which should be below 2.5 mmol/L, as a result of the measures failed to achieve.

In assessing the level of HDL in men of the main group it was found probable increasing by 0.29 mmol/L (p<0.001) after six months and by 0.52 mmol/L (p<0.001) – after year. Target values for HDL male were not found in comparison group. After six months of research 30% of patients of MG achieved target levels of total cholesterol (<4.5 mmol/L), 58% – high density lipoprotein cholesterol (>1.0 mmol/L), 35% – triglycerides (<1.7 mmol/l).

Men of comparison group was observed statistically significant positive changes of lipid metabolism, which in six months were pronounced by triglycerides and in twelve months – by total cholesterol and triglycerides (Table 2). In the comparison group, only 10% of patients achieved target levels of total cholesterol, 23% – triglycerides, 12% – low-density lipoprotein.

Analysis of the final results of biochemical parameters (in 12 months) showed statistically significant superiority by (p<0,05-<0,01) in the main group compared to the comparison group. In particular, the men of MG noted significantly better performance of triglycerides – by 0.72 mmol/L (p<0.001), HDL – by 0.47 mmol/L (p<0.01), LDL – by 2,4 mmol/L (p<0.01) compared to the CG.

Conclusions

At the beginning of the study the majority of patients, despite regular follow a cardiologist, had indices of lipid metabolism that exceed the recommended target values. The results of the pilot study found that the conditions of the individual approach in physical rehabilitation of men with metabolic syndrome can achieve significant changes in blood biochemical parameters.

Prospects for further research lies in determining the effectiveness of the proposed individual approach in physical rehabilitation of men with metabolic syndrome to improve anthropometric indicators.

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