

The maximum muscle strength of the right hand in Belarusian boys was at a high level in all subjects (100 %). However, MMS of the left hand in 53.3 % of students in this group was low, the normal level of this indicator was observed in 26.7 % of Belarusian boys, and a high level of MMS of the left hand was observed only in 20.0 %.

The distribution of MMS of the right and left hands depending on the level in the examined girls was different from the boys. So, the majority of foreign and Belarusian girls had a low level of MMS of the right hand at 53.3 %, a normal level of this indicator was detected in 46.7 % of foreign girls and in 26.7 % of Belarusian girls. Foreign girls did not have a high level of MMS of the right hand, and only 20.0 % of Belarusian girls were characterized by a high level of this indicator. The maximum muscle strength of the left hand was at a low level for all examined foreign and Belarusian girls (100 %).

### **Conclusions**

Thus, as a result of studies, it was found that the indicator of maximum muscle strength of both the right and left hands in foreign and Belarusian boys of a medical university was significantly higher compared to girls ( $p < 0.01$ ). Most foreign (80.0 %) and Belarusian (100 %) young men had a high level of maximum muscle strength in the right hand, while most foreign and Belarusian girls (53.3%) had a low right hand indicator. A low level of maximum muscle strength of the left arm was detected in the majority of examined students. This level was revealed in 100 % of foreign and Belarusian student girls, 60.0 % of foreign and 53.3 % of Belarusian boys.

The data obtained can be used in developing a set of measures aimed at improving the level of students' physical fitness and increasing their adaptive capabilities.

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**STUDY OF LIPID SPECTRUM IN TEENAGERS WITH ARTERIAL HYPERTENTION**

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### **Introduction**

Hyper- and dyslipoproteidemia (DLP) have been found to be the main risk factors for cardiovascular diseases (CVD). It should be considered proven that leptin takes direct or indirect (via insulin) action in the regulation of lipid metabolism [1]. The level of leptin in the blood serum is directly related to the content of triglycerides (TG) in the blood and is inversely related to the level of high-density lipoprotein cholesterol

(HDLCH), but it does not correlate with other lipoprotein fractions. According to the Framingham Epidemiological Study, a high correlation was found between the concentration of total cholesterol (TCH) in the blood and cardiovascular diseases (CVD) [1].

There is evidence that the development of arterial hypertension (AH) is associated with metabolic disorders in the lipid spectrum of the blood of middle-aged and older people [2]. These works indicate the relevance of the study of the nature of changes in the lipid spectrum of blood in childhood and adolescence.

#### **Goal**

The aim of the study is to identify the nature of changes in the lipid spectrum of the blood of children and adolescents suffering from arterial hypertension.

#### **Material and Methods of research**

Data were provided from Gomel school and they included 15 children with hypertension and 10 children with normal blood pressure (BP) (control group). The average age of children in the main group was  $14.5 \pm 3.7$  years, in the control group -  $13.2 \pm 2.9$  years. There were 8 girls and 7 boys in the main group, 4 girls and 6 boys in the control group. The examination program included a survey, measurement of blood pressure by the Korotkov method, anthropometry (measurement of height, body weight (MT), waist and hip volume), determination of total cholesterol (TCH), high-density lipoprotein cholesterol (HDLCH), low-density lipoprotein cholesterol (LDLCH) in blood serum, triglycerides (TG), beta-lipoproteins.

The atherogenicity coefficient (AC), the percentage of TCH in fractions — % of HDLCH, TCH, the LDLCH / HDLCH index, which characterizes the ratio of the level of the atherogenic class of lipoproteins to the non-atherogenic class, was calculated [2]. The atherogenicity coefficient was calculated by the formula A.N.Klimova:  $AC = (TCH - HDLCH) / HDLCH$ .

Statistical processing of the obtained data was carried out by standard methods of variational analysis using the Student's statprogram packages. Statistically significant was the difference between the averages of 5 % or less, i.e.  $p < 0.05$ .

#### **The results of the research and their discussion**

It was found that the frequency of dyslipoproteidemia in children and adolescents is 9.7–12.6 %, at which the TCH reached 4.6 mmol/L or more [3]. The level of total cholesterol (TCH) in children with hypertension was equal to  $3.96 \pm 0.77$  mmol/l, in children with normal blood pressure it was  $4.28 \pm 0.25$  mmol/l;  $p < 0.05$ . In 22 % of children with AH, the TCH level exceeded normal values, in children with normal blood pressure, the TC level was equal to the average indicators.

In children with hypertension, the indicators of antiatherogenic HDLCH were 2.2 times lower ( $0.678 \pm 0.29$  mmol/l) than in children with normal blood pressure ( $1.55 \pm 0.07$  mmol/l;  $p < 0.05$ ).

A decrease in HDLCH was observed in 69.2 % of children with hypertension and in 50 % of children with normal blood pressure.

Table 1 — Indicators of lipid metabolism in children with arterial hypertension and normal blood pressure

Parameters	Group with arterial hypertension	Control group
TCH (mmol/L)	$3,96 \pm 0,77$	$4,28 \pm 0,25$
HDLCH (mmol/L)	$0,678 \pm 0,29^*$	$1,55 \pm 0,07$
LDLCH (mmol/L)	$2,13 \pm 0,4$	$1,82 \pm 0,2$
Atherogenicity index	$5,4 \pm 1,85^*$	$1,92 \pm 0,25$
LDLCH/HDLCH index	$1,51 \pm 0,26^*$	$0,91 \pm 0,23$
% HDLCH/TCH	$17,1 \pm 0,38^*$	$36,2 \pm 0,41$
Triglycerides (mmol/l)	$1,51 \pm 0,26^*$	$0,91 \pm 0,23$
Beta-lipoproteins (Un)	$41,6 \pm 11,2^*$	$39,4 \pm 3,12$

Note: The data are presented in the form (M ± SD), where M is the arithmetic mean, SD is the standard deviation; \* — the difference is statistically significant in comparison with the corresponding indicator of this group of teenagers.

The level of atherogenic LDLCH in children with hypertension did not differ significantly from similar indicators in children with normal blood pressure and was respectively  $2.13 \pm 0.2$  mmol/l;  $p < 0.05$ .

The atherogenicity index (IA) in children with hypertension exceeded 2.8 times the identical indicators in children with normal blood pressure ( $5.4 \pm 1.85$  and  $1.92 \pm 0.25$ , respectively,  $p < 0.05$ ). There was an increase in the LDLCH/HDLCH index (3.12 and 1.55, respectively,  $p < 0.05$ ) by 2 times in children with hypertension compared with children with normal blood pressure. In children with normal blood pressure, the percentage of HDLCH fraction from TCH (36.2 %) exceeded 2.1 times the same indicators in children with hypertension (17.1 %;  $p < 0.05$ ). The level of triglycerides (TG) in children with hypertension was 1.6 times higher ( $1.51 \pm 0.26$ ) than in children with normal blood pressure ( $0.91 \pm 0.23$  mmol/l;  $p < 0.05$ ). The level of  $\beta$ -lipoproteins in children with hypertension ( $41.6 \pm 11.2$ ) did not differ from the identical indicator in children with normal blood pressure ( $39.4 \pm 3.12$ ;  $p > 0.05$ ). A combined increase in TG and  $\beta$ -lipoproteins was observed in 33.3 % of children with high blood pressure and was absent in children with normal blood pressure.

### **Conclusions**

In children and adolescents with arterial hypertension, changes in the blood lipid spectrum were revealed: a decrease in HDLCH and % of HDLCH from TCH, an increase in atherogenicity indices and the gradient of LDLCH/ HDLCH, an increase in triglyceride levels, which corresponds to high atherogenic level.

Children with hypertensive reactions should be considered at risk of early atherosclerosis and requires early diagnosis and subsequent treatment of the disease.

### **LITERATURE**

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