THE STUDY OF THE CHARACTERISTICS OF CARDIOMETABOLIC RISKFACTORS IN YOUNG PEOPLE WITH ARTERIAL HYPERTENTION

[1]Minovarova Charrazkhon Anvarovna, [2]Atakhodjaeva Gulchekhra Abdunabievna
[1]PhD doctoral student, "Department of Internal Medicine,nephrology and hemodialysis", Tashkent Pediatric Medical Institute
[2]DSc., Associate Professor, Department of Internal Medicine, nephrology and hemodialysis, Tashkent Pediatric Medical Institute
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Abstract. *Cardiometabolic risk factors were studied in young patients with arterial hypertension against the background of abdominal obesity. The study involved 54 young patients with arterial hypertension of I-III degree, aged 18-44 years. It was found that the most pronounced cardiometabolic disorders, including changes in carbohydrate and lipid metabolism, were found in the group of young patients with abdominal obesity. In overweight young people, as well as in obese people, cardiometabolic changes can be detected, which makes it possible to diagnose these disorders in a timely manner and implement effective strategies for the primary prevention of cardiovascular and metabolic diseases.*

Keywords: *arterial hypertension, young age, abdominal obesity, components of the metabolic syndrome.*

Arterial hypertension (AH) retains its leading position as one of the main causes of death and disability in the population, which is associated both with the prevalence of the disease and the high frequency of its complications, and with the insufficient effectiveness of treatment [4; five]. The situation is complicated by the fact that hypertension is often associated with obesity and DM2, while the prognosis is significantly worse [12].

Data from studies conducted over the past decades have shown that against the background of a high prevalence of hypertension, the prevalence of abdominal obesity significantly increases, especially among young people especially. The degree of risk of hypertension in overweight and obese young people is variable. This indicates the existence of additional prognostic factors for the development of this pathology. Population studies suggest that the overall likelihood of developing hypertension is higher in young males, although gender does not affect the relationship between BMI and elevated BP [8].

A sedentary lifestyle, psychological factors (depression, low self-esteem) and lack of sleep at night also contribute significantly to weight gain. Probably, obesity is the result of the influence of a combination of factors, including genetic ones, that affect the implementation of satiety mechanisms and the rate of metabolic processes [9, 11].

It is known that the metabolic syndrome includes several risk factors for coronary heart disease (CHD), including arterial hypertension, abdominal obesity, dyslipoproteinemia and insulin resistance, often manifested by impaired glucose tolerance. The combination of metabolic syndrome components is due to metabolic and physiological relationships between them, which exacerbates their pathogenicity not only in relation to type 2 diabetes mellitus, but also in relation to coronary artery disease and other diseases caused by atherosclerosis [3, 7, 9, 15]. At the same

time, the development of insulin resistance and associated metabolic disorders is promoted by obesity with a predominant localization of fat in the abdominal cavity - abdominal or android obesity [5, 15].

The purpose of the study: to study cardiometabolic risk factors in young patients with arterial hypertension on the background of abdominal obesity.

Material and research methods.

We examined 69 young patients with arterial hypertension of I-III degree, aged 18-44 years. All patients were hospitalized in the cardiological department of the State Institution "RSNPMCTiMR" of the Ministry of Health of the Republic of Uzbekistan. The examined patients were divided into 3 study groups: group 1 - metabolically healthy phenotype with normal body weight (body mass index 18.5-24.9 kg/m2) - 22 people (age 24.5 [22-31] years; 10 men and 12 women); group 2 - patients with overweight (body mass index ≥25 kg/m2) - 23 people (age 30 [24-36] years; 12 men and 11 women); group 3 - patients with obesity (WC (>94 cm for men and >88 cm for women; body mass index ≥30 kg / m2 - 24 people (age 32 [28.5-41] years; 13 men and 11 women) [10].

Waist circumference (WC) (>94 cm for men and >88 cm for women) was considered as the main components of abdominal obesity (AO); overweight (BMI ≥25 kg/m2) and obesity (BMI ≥30 kg/m2).

Inclusion criteria: young age 18–44 years; AG I-III degree.

Exclusion criteria: symptomatic (secondary) hypertension; AH-associated clinical conditions, including stage C4–C5 chronic kidney disease (glomerular filtration rate less than 30 ml/min/m2) and/or DM with target organ damage; diffuse connective tissue diseases; acute or chronic diseases in the stage of exacerbation or decompensation; abuse of alcohol and other psychoactive substances; pregnancy, lactation.

All patients were examined with an assessment of waist circumference, calculation of body mass index [11], measurement of blood pressure in accordance with national clinical guidelines [1, 2]. All patients in the presence of a doctor filled out a specially designed questionnaire, which included blocks of questions about hereditary history, smoking, the presence of concomitant diseases, and behavioral factors [12]. At the time of the examination, none of the patients included in the study was taking antihypertensive drugs, as well as drugs that affect carbohydrate and lipid metabolism, on a regular basis.

The criterion for the metabolic syndrome was the deviation of at least one of the listed laboratory parameters: total cholesterol ≤5 mmol/l; triglycerides ≤1.7 mmol/l; high-density lipoprotein cholesterol (HDL-C) ≥1.0 mmol/l in men and ≥1.2 mmol/l in women; low-density lipoprotein cholesterol (LDL-C) ≤3 mmol/l; HOMA-IR insulin resistance index (Homeostasis Model Assessment of Insulin Resistance) ≤2.8 [10].

Statistical processing was carried out using Microsoft Excel, including the use of built-in statistical processing functions. Methods of variational parametric and nonparametric statistics were used with the calculation of the arithmetic mean of the studied indicator (M), standard deviation (SD), relative values (frequency, %), the statistical significance of the measurements obtained when comparing the average values was determined by Student's t test (t) with the calculation of the error probability (R). Comparison of three or more independent groups was carried out by one-way analysis of ANOVA variations. Significance level $P<0.05$ was taken as statistically significant changes.

Research results

General characteristics of patients and features of the distribution of cardiometabolic risk factors are presented in Table 1.

Table 1.

General characteristics of patients and distribution of cardiometabolic risk factors

Indicator	Group 1 (n=22)	Group 2 (n=23)	Group3 (n=24)
Age, years	**27,7 ±4,5**	**30,3±5,1**	**36,8±7,4**∞**
Men, abs (%)	**10 (58,8%)**	**9 (50%)**	**11 (57,8%)**
Body mass index, kg/m^2	**21,4±2,2**	**28,4±2,7****	**31,8±4,8 ***∞**
SBP, mm Hg Art	**114,8±12,4**	**138,3±11,9****	**146,1±10,1*****
DBP, mm Hg Art.	**76,1±7,5**	**89,3±5,4****	**98,1±6,8*****
Burdened heredity for hypertension, abs (%)	**10 (58,8)**	**11 (61,1)**	**14 (73,6)**
AH, abs (%)	**6 (35,3)**	**10 (55,5)**	**13 (68,4)**
Tobacco smoking, abs (%)	**5 (29,4)**	**7 (38,9)**	**7 (36,8)**

Note: **(p>0.01), ***(p>0.005) in relation to the data of the 1st group;
∞ (p>0.05) between the 2nd and 3rd study groups.

Patients in the obesity group (Group 3) were significantly older than those in other groups, with no significant gender differences. Patients of the 3 study groups differed in the level of systolic (SBP) and diastolic (DBP) blood pressure. Thus, in the 2nd and 3rd groups of the study, there were high rates of SBP by 20.5% (p>0.01) and 28.1% (p>0.005), as well as DBP levels by 17.1% (p>0.01) and 28.9% (p>0.005).

In the overweight and obese groups, AH (55.5 and 68.4% versus 35.3%) and tobacco smoking (38.9 and 36.8% versus 29.4%) were more often detected compared with the 1st study group. .

Despite the high frequency of aggravated heredity for hypertension, no intragroup differences were found. Differences in BMI values were determined by the characteristics of the distribution by groups (the data are presented in Table 1).

Table 2.

Metabolic profile indicators among patients in study groups

Indicator	Group 1 (n=22)	Group 2 (n=23)	Group 2 (n=24)
Blood glucose, mmol/l	4,96±0,4	5,3±0,6	5,7±0,6**
IR, HOMA-IR	1,7±0,4	2,4±0,6*	4,17±1,16***∞
Total Chs, mmol	4,4±0,6	5,36±0,6**	6,34±1,1***∞
LDL cholesterol, mmol/l	2,2±0,6	2,6±0,7	3,82±1,1***∞

HDL cholesterol, mmol/l	2,2±0,5	1,98±0,5	1,54±0,5**
TG, mmol/l	0,8±0,3	0,99±0,2	1,6±0,8**∞
Leptin, ng/ml	10,9±4,5	25,7±7,2 ***	33,8±9,4*** ∞
Adiponectin, µg/ml	9,1±2,2	7,5±2,4 *	6,49±2,92**

Note: *(p>0.05); **(p>0.01); ***(p>0.005) in relation to the data of the 1st group;
∞ (p>0.05) between the 2nd and 3rd study groups.

The highest concentrations of glucose, insulin and the HOMA-IR insulin resistance index were found in groups with a metabolically unhealthy profile (groups 2 and 3) compared to other groups. Thus, in the 3rd group with obesity, high blood glucose levels were noted by 19.9% and IR by almost 2.5 times (p> 0.005). In the 2nd group with overweight, as well as in the 3rd group with obesity, changes were also observed in the blood lipid profile. The highest concentrations of triglycerides and LDL-C, as well as the lowest HDL-C values were found in the group with metabolically unhealthy obesity (group 3) compared to other groups. It was noted the level of total cholesterol by 21.8% and by 41.4% in the 2nd and 3rd groups in relation to the data of the 1st study group with a normal BMI (p>0.005). In the 3rd group with obesity, there were significantly high values of LDL 73.6% and blood TG (almost 2 times). At the same time, there was also a significant difference in the above-described blood parameters between the 2nd and 3rd groups of the study (p>0.05). The data obtained are consistent with similar data of foreign and domestic authors [9, 13, 14], however, most similar studies include older patients.

Along with the identified disorders of carbohydrate and lipid metabolism, the highest concentration of leptin and a lower concentration of adiponectin were found in groups with metabolically unhealthy phenotypes (groups 2 and 3 by 15.1% (p>0.05) and 40.2% (p> 0.01) compared with the 1st group with normal BMI.

Thus, the results obtained complement the current understanding of metabolic disorders in young people. The results of our study revealed that the most pronounced cardiometabolic disorders, including changes in carbohydrate and lipid metabolism, were found in the group of young patients with abdominal obesity. In young people with abdominal obesity, a higher frequency of the combination of obesity with arterial hypertension and lower concentrations of adiponectin in the blood serum were determined compared to patients with normal body weight. In overweight young people, as well as in obese people, cardiometabolic changes can be detected, which makes it possible to diagnose these disorders in a timely manner and implement effective strategies for the primary prevention of cardiovascular and metabolic diseases.

Conclusions:

1. It was found that the most pronounced cardiometabolic disorders, including changes in carbohydrate and lipid metabolism, were found in the group of young patients with abdominal obesity.

2. In young people with abdominal obesity, a higher frequency of combination of obesity with arterial hypertension and lower concentrations of adiponectin in blood serum were determined compared to patients with normal body weight.

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