RISK FACTORS FOR THE DEVELOPMENT OF OBESITY IN CHILDREN

Abstract: Obesity is one of the most urgent problems of modern medical science. While 43 million children were overweight and obese in 2010, the disease is now reaching epidemic proportions. The combination of obesity and hyperuricemia is the two main factors in the progression and spread of arterial hypertension in children.

Research has been carried out to identify risk factors for the development of obesity in children. 55 patients with arterial hypertension and exogenous constitutional obesity were examined. Patient selection was based on body mass index (BMI) and waist circumference in obese children. Waist-to-hip ratio was an indicator of abdominal obesity. The results of the study showed that both low birth weight and overweight at birth are risk factors for obesity. Heredity is one of the main risk factors for obesity and cardiovascular disease. A relationship has been established between body mass index, lipid and carbohydrate metabolism with previously identified risk factors, as well as an inverse relationship between birth weight and body mass index.

Key words: obesity, risk factors, patients, body mass index, arterial hypertension.

1. INTRODUCTION

According to the World Health Organization, obesity is one of the most critical problems of modern medical science. In 2010, forty-three million children suffered from overweight and obesity, at present the pathology is becoming epidemic. There is a clear trend towards a steady increase in the conditions of children and adults with obesity. So arterial hypertension (AH) among children and adolescents ranges between 0.4% and 8%. The combination of obesity and hyperuricemia are two main factors in the progression of arterial hypertension (AH).

Intrauterine hypoxia and malnutrition beget neuroendocrine disorders in the fetus, including the hypothalamic-pituitary-adrenal axis, which can serve as a mediator of this effect.
2. PURPOSE OF THE STUDY

To identify risk factors for the development of obesity in children.

Characteristics of children and research methods. Fifty-five patients with arterial hypertension and exogenous constitutional obesity were examined. The selection of patients was carried out according to body mass index (BMI) and waist circumference in children with obesity above 97 percentiles, twenty-five girls (45%), thirty (55%) boys, the average age of which was 14.35 ± 0.21 years (from ten up to eighteen years of age). Waist circumference was 99.82 ± 1.3 cm; the ratio of waist volume to hip volume was 0.92 ± 0.009. Twenty of them had normal blood pressure (BP) (group IIA) and eighteen children had a confirmed diagnosis of arterial hypertension (AHII) (group IIB). Differences in the ratio of waist to hip volume in groups I and II were significant (P<0.05). The comparison group consisted of twenty non-obese children aged 14.31 ± 0.63 years, with a waist circumference of 64 ± 1.51 cm, the ratio of waist to hip volume was 0.81 ± 0.02 cm, while the difference in the ratio of waist to hip volume was significant in groups I (P<0.01) and II (P<0.001).

In obese children, serum levels of triglycerides, total cholesterol, and high and low density lipoproteins were determined by enzymatic colorimetric method.

3. RESULTS AND DISCUSSION

The body mass index in group I patients reached 19.5±0.2 kg/m^2; it was significantly higher than 20.1±0.5 kg/m^2 (p<0.01) in group 2a while it was 21.1±0.2 kg/m^2 (P<0.01) in group 2b. The average body mass index in the comparison group was 19.44±0.47 kg/m^2 (P<0.001).

Thus, in the total sample of children with exogenously constitutional obesity, eighteen children were diagnosed with arterial hypertension, who formed group 2b. At the same time, blood pressure in children of this group was systolic blood pressure (SBP) 138.7±7.2 mm. rt. Art. and diastolic blood pressure (DBP) 94.5±6.5 mm. rt. Art. (P<0.05).

The waist to hip ratio is an indicator of abdominal obesity. With values of the ratio of waist to hip volume > 0.85 in girls and > 0.9 in boys, it is regarded as abdominal obesity.

It was found that one of the risk factors for the development of obesity is low birth weight, as well as excess weight of more than 4000 g., while in the control group, the average body weight of children was in the range of 10430 ± 108.2 g. These facts were confirmed by the body mass index, which was in the range of 20.3 ± 0.5 kg/m^2, in children at the age of 1 year, which characterized the body weight as overweight compared to the control group. The body mass index was 16.02±0.7 kg/m^2. The data obtained are presented in the table 1.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Weight</th>
<th>Height</th>
<th>Body Mass Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>13560 ±125.2 g</td>
<td>81.4±2.1 cm</td>
<td>20.5±0.5 * kg/m^2</td>
</tr>
<tr>
<td>Group 1</td>
<td>12452 ±108.7 g</td>
<td>80.4±2.1 cm</td>
<td>19.5±0.2 kg/m^2</td>
</tr>
<tr>
<td>Group 2a</td>
<td>12960 ±155.1 g</td>
<td>80.5±2.1 cm</td>
<td>20.1±0.5 kg/m^2 *</td>
</tr>
<tr>
<td>Group 2b</td>
<td>13980.3±101.5 g</td>
<td>81.1±0.9 cm</td>
<td>21.1±0.2 kg/m^2 **</td>
</tr>
<tr>
<td>Control</td>
<td>104300.8±108.2 g</td>
<td>79.1±1.3 cm</td>
<td>16.02±0.7 kg/m^2</td>
</tr>
</tbody>
</table>

* reliability P<0.05 in relation to control, ** P<0.05 in relation to the group with a uniform type of obesity.
often accompanied by type 2 diabetes, in 2 (11.1%) of mothers had impaired glucose tolerance. Also, 19 (34.5%) mothers of children with obesity noted a significant increase in body weight during pregnancy. Twenty (36.3%) children were exclusively breastfed up to 6 months, and 32 (61.6%) were mixed and artificial. In the control group, 15 (75%) children received natural feeding up to 6 months and 5 (25%) were mixed and artificial.

When analyzing the feeding of children by groups, it was found that the frequency of children on exclusive breastfeeding up to 6 months of life was 8 (47%), while in the group of children with abdominal obesity (AO), the frequency of children on breastfeeding was 7 (35%).

Heredity is one of the main non-modifiable risk factors for obesity and cardiovascular disease. It was revealed that the frequency of obesity and overweight in relatives of the first degree of kinship of patients in the main group was 54.5%, and in the control groups 20% of cases. Essential arterial hypertension occurred in 55.5% of relatives of the 1st degree of kinship in groups 2a and 2b, as well as in 75% and 77.7% of relatives of the 2nd degree of kinship (in 2A and 2B groups, respectively).

Identification of cases of diabetes mellitus in families of patients with abdominal obesity, so cases of type II diabetes in relatives of the 1st degree of kinship was 10% and 11.1% in groups 2A and 2B.

An increase in fasting glucose was detected in 17.6%, 20% and 27.7% of children in groups 1, 2A and 2B, while in 5.8%, 15%, 22.2% of children (in 1, 2A and 2B group) there was an increase in postprandial glycemia.

When analyzing the level of triglycerides, it was found that 29.4%, 30% and 38.8% of patients had triglyceridemia. The average level of thyroid-stimulating hormone (TG) was 1.56±0.25, 1.92±0.16 and 2.3±0.23 mmol/l (in groups 1, 2A and 2B). Thus, an increase in the level of total cholesterol above the norm or its borderline values was observed in 35.2%, 35% and 44.4% of cases (in groups 1, 2A and 2B), while the level of total cholesterol was significantly increased in groups with abdominal obesity in comparison with control 4.56±0.58; 5.01±0.33 and 5.76±0.52 mmol/l (in groups 1, 2A and 2B).

In the study of cholesterol fractions, it was found that the level was 3.04±0.23; 3.66±0.18 and 4.14±0.39 mmol/l, while an increase in this indicator was observed in 29.4%, 35% and 44.4% of cases (in groups 1, 2A and 2B).

Analysis of the concentration of uric acid (UA) in the children of the main group showed that it did not exceed the norm, but was significantly higher than in the control group, and had a direct proportional relationship with the degree of obesity (r=0.592, p<0.001) and the level of blood pressure (r=0.446; and r=0.369; p<0.001). In children with uniform obesity, there was an increase in uric acid up to 0.324±0.011 mmol/l; compared with the control group 0.180±0.013 mmol/l (P<0.01).

Studies of high-density lipoprotein (HDL) showed a decrease in the level in obese patients in 17.6%, 25% and 22.2% of cases (in groups 1, 2A and 2B, respectively), its average values averaged 1.22 ± 0.12; 1.13±0.09 and 1.03±0.07 mmol/l.

Thus, the analysis of the concentration of uric acid in children of the main group showed that it did not exceed the norm, but was significantly higher than in the control group, and had a direct proportional relationship with the degree of obesity (r=0.592, p<0.001) and the level of blood pressure (r=0.446; and r=0.369; p<0.001).

4. CONCLUSION

A relationship has been established among body mass index (BMI), lipid and carbohydrate metabolism with risk factors identified earlier, as well as an inverse correlation between body mass index and birth weight. These facts characterize low birth weight as a significant risk factor for the evolvement of obesity and subsequent metabolic syndrome.
5. REFERENCES:


