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Metabolic Disorders of Various Types of Feeding in Adolescence

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Abstract Children at puberty have classic objective metabolic and functional signs characteristic of obesity. However, most of them are functional in nature with the possibility of their reverse transformation. Recently, the literature provides convincing data on the regression of retinal angiopathy, the normalization of endothelial function and markers of fat and carbohydrate metabolism with the optimal organization of therapeutic and preventive measures for children with obesity.

Keywords Breast-feeding, Nursing, Metabolic disorders

1. Introduction

In recent years, changes in the practice of feeding and caring for children in a number of countries require a medical - and biological justification of the feasibility of these measures [1,9].

Rational feeding and care of a child is an important factor contributing to the optimal realization of its genetic potential for morphological and functional development both at the early stages and in subsequent periods of life [2,7,8].

An indisputable advantage in this regard belongs to natural feeding with mother's milk, which has a unique composition and biological properties that ensure optimal parameters of physical, psychomotor, intellectual development and immunological reactivity of children [3,4,10].

Under artificial feeding, the frequency of allergic manifestations, dyspeptic and metabolic disorders, iron deficiency anemia and other alimentary-dependent conditions in children is higher than under natural feeding [5,6,11]. A relationship has been established between the metabolic disorders that occur in children under artificial feeding and the risk of obesity, hypertension, diabetes, and developmental disorders in children. the cardiovascular system [12].

Objective: To study the features of metabolic disorders in adolescents depending on the types of feeding.

2. Research Material and Methods

To achieve this goal были изучены к, clinical and laboratory research methods were studied: general blood analysis, biochemical blood analysis: blood lipid spectrum: low-density cholesterol, high-density lipoprotein, triglycerides, as well as diagnostic observations of children for 14 years.

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3. Research Results

Depending on the type of feeding in children, we have established the following patterns. As can be seen from the content of hemoglobin, glucose and lipid profile parameters in children, depending on the type of feeding in children who were on IGV, indicators are observed within the standard values, with GH, a tendency to an imbalance of laboratory parameters of the metabolic process is established. Severe violations in laboratory parameters are noted in children who were on GH and IV feeding.

When assessing blood glucose indicators, it was found that the level of glycemia in children in all study groups was within the standard values and the data did not differ statistically. The study of hemoglobin content showed the lowest parameters in the group of children with IV, although the difference was not statistically significant. As for the level of triglycerides, their level in the group with IGV was 0.74±0.08 mmol/l versus 0.78±0.08 mmol/l (in the PHV group), 0.89±0.09 mmol/l (in the group with AHV) and 1.2±0.08 mmol/l (in the IV group, $p<0.05$). The LDL level was highest in the group of children with IV and was 3.4±0.11 mmol/ l compared to 2.0±0.01 mmol/L in children with IV ($p<0.05$). The HDL level was within the standard values and did not significantly differ in all groups of children. Cholesterol levels were highest in the group of children with IV and amounted to 5.7±0.33 mmol/l versus 3.6±0.08 mmol/l in children with IGV ($p<0.05$), cholesterol values in the groups of children with PHV and GH were

3.8±0.05 mmol/l and 3.4±0.09 mmol/l, respectively. and did not significantly differ from the values obtained in children with IGV.

По According to the researchers, аналогично взаимосвязаны early accelerated прибавка weight тела gain and the risk of developing obesity in the future are logically interrelated. We studied birth weight and weight gain on a quarterly basis for 1 year in the same children, depending on the type of feeding in the anamnesis.

The analysis performed indicates that there are no significant differences in the birth weight of children in all the examined groups. However, in the future, as a result of various types of feeding, significant changes in body weight were revealed in children with PHV 1800±130.1 g compared to children on IGV – 2855±28.7 (P<0.001), in children with GH similarly compared to IGV-1161±51.6 g (P<0.001) and in children with GH with IV - 2033±86.8g (P<0.01). In the second quarter, a different picture was observed, which consisted in the maximum weight gain in children with IV.

Thus, in children with IV, the body weight gain for the second quarter was 2665±109.5g compared to 1585±17.7g in children with IV (P<0.01). A similar pattern was observed in children with PHV and GH, and body weight gain was lower than in the group of children with IGV, 1270±115.2g and 1280±51.9 g, respectively, compared with 1585±17.7 (P<0.01 and P<0.01, respectively). In Q3 and Q4, the greatest weight gain was observed in children with IV and amounted to 1555±60.3g compared to children on IV 1004±27.4g (P<0.01) and 1749±90.4g versus 1644±26.2g, respectively.

A further stage of our research is the analysis of clinical and metabolic changes in children depending on the method of care and the age of children.

The main group with the proposed method of care included 54 children, the control group -70 children, including children who received traditional methods of care.

As can be seen from the table, children of the main group aged 4-6 years have a tendency to decrease hemoglobin indicators, in the comparison group these data were significantly, although not reliably (P>0.05).

The blood glucose level in children aged 4-6 years in the main group was within the normal range, in the comparison group the indicators were also within the normal range, but in many children it was at the upper limit.

The average triglyceride levels triglyceride not differ significantly in children aged 4-6 years in both study groups. (P<0.05).

LDL and HDL values in some cases increased, but did not go beyond the standard values, while HDL values tended to decrease. (P<0.01).

The average cholesterol level also did not differ in the study groups in children aged 4-6 years.

Children aged 7-14 years have a more pronounced picture of the imbalance of indicators of metabolic disorders. Thus, the average hemoglobin values in children in the main group were not significantly increased compared to the comparison group (115.6±0.12 and 111.9±0.15 g/l, respectively) and had a difference compared to children aged 4-6 years. The average glucose level increases, and in the comparison group it is higher than in the main group, although not significantly, but in comparison with children aged 4-6 years, these indicators are significantly higher, regardless of the methods of care. Triglyceride values in the comparison group increased by 1 order of magnitude, which was 1.3±0.05 and 1.5±0.05 mmol/l, however, the data are not reliable, but they were significantly increased in the comparison group in relation to children aged 4-6 years (P<0.05). There was also an increase in LDL in children aged 7-1-44 years in relation to the age of 4-6 years in both the main and comparison groups (2.1±0.1 mol/l vs. 3.2±0.4 mol/l (P<0.05). Changes in HDL in children did not differ significantly by age and by care methods. There was a significant increase in cholesterol with age, so if in the main group at the age of 4-6 years, its indicators were 5.4±0.1 mol/l, then at the age of 7-14 years, they significantly increased (5.7±0.10 mol/l; P<0.05). A similar pattern is observed in the comparison group.

Table 1. Specific weight of disorders in the indicators of hemoglobin, carbohydrate and lipid metabolism among children aged 4-6 years with increased body weight, depending on the type of feeding

Parameters	Of The IGV Group							
	n=28		PGV n=15		SGV n=34		IV n=47	
	Abs.	%	Abs.	%	Abs.	%	Abs.	%
Arterial hypertension	2	7,1±5,0	2	14,3±9,7	3	8,8±4,9	9	18,8±5,6
Hemoglobin <110 g / l	5	17,9±7,4	3	21,4±11,4	8	23,5±7,3	15	31,3±6,7
Glucose> 5.6 (mmol / l)	2	7,1±5,0	1	7,1±7,1	3	8,8±4,9	6	12,8±4,9
Cholesterol> 5.0 (mmol / l)	2	7,1±5,0	1	6,7±6,7	3	8,8±4,9	5	10,6±4,5
Triglycerides >1.7 (mmol / l)	1	3,6±3,6	1	6,7±6,7	4	11,8±5,5	5	10,6±4,5
LDL> 1.7 (mmol / l)	0	3,6±3,6	1	6,7±6,7	4	11,8±5,5	4	8.5±4.1
HDL <0.83 (mmol / l)	0	3,6±3,6	1	6,7±6,7	4	11,8±5,5	3	8,5±4,1
Total	12	42,9±9,5	10	71,4±12,5	29	85,3±6,1*	47	97,9±2,1*

Note: * the significance of the difference in indicators between the IGV group and other groups with probability (P <0.05) was noted

Analyzing the frequency of detection of laboratory parameters indicating a violation of fat and carbohydrate metabolism, depending on the methods of care, we found that in children in the main group there is a less pronounced dynamic in the frequency of occurrence of violations of metabolic parameters in laboratory parameters. Thus, the frequency of occurrence of a decrease in hemoglobin below 110 g/l was observed in 25.9% of children in the main group, which is 1.3 times less than in the comparison group. An increase in glucose was observed in 16.7% of cases in the main group and 21.4% in the comparison group. A similar trend is observed in the interpretation of cholesterol, triglycerides, and HDL.

4. Conclusions

Thus, the metabolic characteristics of children in different periods of life reflect the general patterns of protective and adaptive processes and are manifested in different directions and varying degrees of changes, depending on the type of feeding and the principles of care. Metabolic changes in different age periods were characterized by heterogeneity, so in children aged 4-6 years, laboratory indicators were characterized by a stable state of fat and carbohydrate metabolism, as well as the absence of segments of maximum metabolic stress, which cannot be said about children in подростковом adolescence.

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