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TRANSCRANIAL MAGNETOSTIMULATION IN METABOLIC DISORDERS IN CHILDREN

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Annotation
Developing metabolic disorders in adolescent children persist throughout life and form the basis for metabolic disorders in the next generation. For a long time, metabolic changes are asymptomatic and before clinical manifestations occur, changes in the body begin to form long before. The study of the relationship between the development of metabolic syndrome and iron metabolism disorders has aroused particular interest in modern medicine today. The occurrence of two different diseases at the same time, such as obesity and anemia in one patient, is not considered an accidental condition.

Keywords: children, metabolic syndrome, ferritin, transcranial magneto stimulation.

Аннотация
Развивающиеся нарушения обмена веществ у детей подросткового возраста сохраняются на протяжении всей жизни и формируют основу для нарушений обмена в следующем поколении. Длительное время метаболические изменения протекают бессимптомно и до проявления клинических проявлений изменения в организме начинают формироваться задолго. Изучение связи между развитием метаболического синдрома и нарушения обмена железа на сегодняшний день вызвало особый интерес в современной медицине. Возникновение одновременно два разных такого заболевания, как ожирение и анемия у одного пациента, не считается случайным состоянием.

Ключевые слова: дети, метаболический синдром, ферритин, транскраниальная магнито стимуляция

Introduction

According to WHO, overweight by 2016 amounted to 5 million in 19-year-old children 340 years old., of which girls accounted for 18%, and boys 19%. Excess weight was determined in 2009-2012 by NHANES (National Health and Nutrition Examination Survey) in 20% of male children and 18.9% of female children aged 12 to 19 years in the USA[36].

Obesity in both children and adolescents among the population of Uzbekistan is 50-66%, occurs 1.5 – 2 times more often than in adults. During the period of the study, it was found that obesity among children in the republic is 1.5 – 2 times more common than in adults, in 2012 this indicator was 50.5%, in 2013 – 59.4% and in 2014 – 65.7%, and 3 years later -30% of this indicator[7,8].

The negative consequences of physical, emotional, mental and attention disorders, as well as stigmatization and poor social situations, a decrease in reading levels under the influence of changes in the body observed with obesity in children, have attracted the attention of many scientists. Especially in modern medicine today, a special place is given to a non–invasive method of treatment - Transcranial magnetic stimulation (TcMS), which penetrates deep through the bones of the skull and reaches the brain tissues inducing an electromagnetic pulse in neurons.

The indicator of iron metabolism in the blood serum is determined by incorrect correlations with an increase in the amount of ferritin in the blood serum, and it has been proven that a decrease in the ferritin index is regarded as a poor prMGnostic factor of damage to the nervous system in metabolic disorders in children. The purpose of the study: To study the effectiveness of transcranial magneto stimulation in metabolic disorders in children against the background of iron metabolism deficiency.

Materials and Methods of Research

140 adolescents with overweight (MG - the main group) and 40 (KG – the control group) with normal body weight participated in our study, sorted during the next preventive examination at No. 29 secondary school of the city of Samarkand, MG adolescents were sorted by an endocrinolMGist at the reception of complainants of overweight based on exclusion and inclusion criteria. Anthropometric indicators were studied in all children: weight, height, waist circumference, hip circumference, BMI. All participants of the study underwent a standard neurolMGical examination, a

detailed examination of the vegetative status, laboratory studies and neurophysiolMGical studies. The activity of the autonomic nervous system was checked by the initial vegetative status using the Vane questionnaire and vegetative reactivity by the Dagnini-Aschner reflex. From laboratory data, a general blood test, insulin in the blood, glucose, lipidMGram and serum ferritin index were checked.

The obtained data were developed in an EXCEL package using statistical functions in a software personal computer Centium-4.

The results of the study: According to the analysis of the results of anthropometry, overweight was determined by 10.7%, obesity of the I degree 37.4%, II degree 41.4%, III degree 10% and morbid obesity 0.5%. According to the gender distribution, the number of boys prevailed in the MG, which manifested itself in the ratio of girls 68 (48.5%) and boys 72 (51.5%). In the control group, this indicator was 52% and 48%, where there were also more boys with a difference of 4%. According to the analysis of lipidMGram indicators, inactive obesity (NO) 86 (61.4%) and active obesity (AO) 54 (38.6%) were detected in obese adolescents. In the AO group, metabolic syndrome (MS) was detected in 21 (34.89%) and metabolic risk (MR) in 30 (65.11%) cases.

When studying the anamnestic data of children of both groups, as a risk factor, we studied whether the parents were obese. When analyzing the anamnestic data obtained, it showed that the incidence of maternal obesity prevailed in MS children (46%). In the control group, this indicator was determined in 19% of cases. The incidence of obesity in both parents was 28% in MG and 3% in KG. Only in fathers, the occurrence of this factor was 21% and 37% in the ratio of OH and KG. Of the results obtained, only the presence of obesity in mothers exceeded other indicators.

Of the complaints received from participants, dizziness in the MG 11%, in the KG group 6%, headache was 28% in the MG, and in the KG 5%, attention disorders in the MG was 71%, in the KG 14%, as well as fatigue 8%, which was not detected in the KG. From the above analysis of complaints, it can be seen that in the main group, all complaints occur 3-4 times more often in the MG with a comparison of KG.

During neurol MGical examination, no particularly focal signs were found. The revealed diffuse neurolMGical micro-symptoms in the MG were manifested in the form of convergence disorder 11%, asymmetry of the nasolabial folds 21%, general hypotension 74%, lively tendon reflexes 46% and tremor of the fingers 84%. To study the state of the autonomic nervous system, the initial vegetative status was assessed according to the Vane questionnaire (table No.1).

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Table No. 1. Comparative analysis of the initial vegetative tone

Initial vegetative tone	MG (n=140)				CG n=40
	MS, n=21	MR, n=33	MH, n=86	n=140	
Normosteniya	1 / 4.76	6 / 18,18	12 / 13,95	19 / 16,43	13 / 32,5
Sympathicotonia	19 / 90,48	25 / 75,76	59 / 68,60	103 / 73,57	12 / 30,0
Vagotonia	1/ 4,76	2 / 6,06	15 17,45	18 / 10,0	15 / 37,5
Total	21/ 100	33 / 100	86 / 100	180 / 100	40 / 100

Note: * differences between indicators in groups (p<0.05)

According to the analysis of the results, normosthenia, sympathicotonia and vagotonia in the MS group were revealed 4.76% - normosthenia, and 90.48% - sympathoconia and 4.76% - vagotonia. And in the MR group, these indicators were:18.18%,75,76% and 6.06% and in the MN group 18.18%,75,76% and 6.06%.In children of the control group, these indicators were different, the results of 33% normosthenics, 31% sympathotonia and 46% vagotonia were obtained. Based on the results obtained, we determined the predominance of the sympathetic system in the MG was especially prevalent in adolescents of the MS group. Vegetative reactivity was assessed using the Dagnini-Aschner ocular cardiac reflex, according to which normal, excessive, reverse reactivity and areactivity were assessed in different correlations in the studied groups. These indicators are in the MS group 2(9,53%),1(4,76%),17(80,95%) and 1(4.76%); in the MR group 8(24,24%),2(6,06%),17(80,95%) and 1(3,03%); 26(30,23%),1(1,16%),39(45,35%) and 20 (23.26%) in the MN group.In KG, the ratios of these responses were manifested in the form of 18(45,0),13(32,5%),1(2,5%) and 8 (20.0%). From the above results, it can be said that the reverse reactivity of the applied action prevails with a big difference, which once again emphasized the activity of the sympathetic nervous system in metabolic disorders, when normal reactivity prevailed as in KG.

The stability of attention was assessed mainly by the time of completion of tasks, by quantitative and qualitative errors carried out using the Schulte table. The results showed that the performance of the first task in adolescents in 27 cases was determined by the errors of this task in the form of quantitative errors (8%) and qualitative errors (10). The average execution time of this task is 67.39+2.85 seconds. The average execution time of the second task is 72.39+3.42 seconds.

The amount of ferritin, as an indicator of iron metabolism in blood serum, was studied in all participants, in the MR group was ~37.5 mmol\l, while in children of the MS group lower indicators were found: ~25.2 mmol\ l, in the MN group ~56.8 mmol\ l, while this indicator in KG it was equal to ~81.4 mmol \l. Analysis of the results of

ferritin quantity indicators showed an inverse correlation between the amount of ferritin and blood metabolic parameters.

To determine the effectiveness of our proposed complex therapy, the participants were divided into 2 groups: group A (n = 45) who received complex therapy: transcranial magneto-stimulation, antioxidant and iron therapy who received (n = 45) and group B (n = 45) standard basic treatment of an endocrinolMGist. The standard basic treatment included a diet, an active lifestyle, physical therapy as usually recommended by an endocrinolMGist. For antioxidant therapy, we used mexiprim 0.125(ethylmethylhydroxypyridine succinate) in tablet form, from Ferrum lek iron preparations (iron (III) hydroxide polymaltosate) 400 mg. TcMS was carried out 5 days a week for two weeks, making up 10 procedures performed in a private STD clinic. Follow-up and repeated examinations were carried out in dynamics 1 and 3 months after treatment. The state of the autonomic nervous system in both groups was evaluated and analyzed. The initial vegetative tone in group A improved due to a decrease in the amount of normostenia by seven times compared to before treatment. Whereas in Group B it improved only by a few figures. A comparative analysis of the EEG data before and after treatment between the groups was also carried out and revealed normalization of the main cortical rhythm in group A. A comparative analysis was carried out according to serum ferritin indicators before and after treatment. After the therapy, ferritin in group A showed 74.3mmol/l indicating normative data, while in group B 45.3mmol/l remained low. Thus, the results of the study revealed the high effectiveness of the complex of TcMS, neurotropic therapy of ethylmethylhydroxypyridine succinates (mexiprim) and polymaltosate hydroxide of gland(III) (Ferrum lek) pathMGenetically justified for improving and normalizing compensatory - adaptive capabilities in metabolic disorders. Literati

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