THE USE OF CHOLECALCIFEROL IN THE TREATMENT OF BRONCHIAL ASTHMA IN CHILDREN

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Summary. *The results of evaluation of the clinical efficacy of cholecalciferol in the complex treatment of bronchial asthma in children are presented. 60 children with bronchial asthma were examined. All patients were prescribed cholecalciferol in addition to basic therapy. In all children, the level of the 25(OH)D metabolite was determined in the blood serum. The study of clinical efficacy after treatment showed an increase in the content of vitamin D, in children there was an improvement in the course of the disease: the number of exacerbations per year, the number of night attacks decreased, the length of stay in the hospital was reduced, attacks stopped in a shorter time, the duration of dry and wet cough significantly decreased, it was noted reduction in the duration of shortness of breath, cyanosis of the nasolabial triangle, oral wheezing.*

Key words*: cholecalciferol, bronchial asthma, treatment efficacy, clinical evaluation, children.*

Among the known risk factors for the development of asthma in children, such as family history of allergies, manifestations of atopy, eosinophilia, leading to frequent episodes of bronchial obstruction, the role of vitamin D (25 (OH) D) and the significance of its deficiency in the tendency to frequent respiratory diseases are being actively studied today. In recent years, the interest of a number of researchers has increased in the possible role of vitamin D and disorders of its metabolism in the pathogenesis of pulmonary diseases [6, 7]. The conducted studies made it possible to identify a statistically significant correlation between vitamin D deficiency and the prevalence of a number of chronic diseases, including pathology of the pulmonary sphere. It should be noted that in chronic

bronchitis in children, rickets occurs 2.5 times more often. In general, vitamin D stimulates specific immune defense mechanisms, including phagocytosis, production of superoxide radicals, natural killer cell activity, and suppresses the antigen-specific immune response [11, 12].

World statistics show that today there is a tendency towards an increase in the incidence of bronchial asthma among the population of most countries of the world, including Uzbekistan.

For the treatment of children with bronchial asthma (BA) during the period of exacerbation of the disease and remission, various groups of drugs are used. The most effective in the treatment of allergic diseases are glucocorticosteroids of systemic or local action. Taking into account many -sided activity of vitamin D, it is advisable to use it for the treatment of allergic pathology, in particular bronchial asthma.

The aim of the study was to evaluate the clinical efficacy of cholecalciferol in the complex treatment of bronchial asthma in children.

Materials and methods.

The study was carried out in 2020–2023. in the Department of Pulmonology and Allergology of the Regional Children's Multidisciplinary Medical Center in Samarkand. The study included 60 children with bronchial asthma. Of them, 13 (21.6±3.5%) had severe persistent bronchial asthma (group I), 33 (55.0±6.4%) had asthma of moderate severity (group II), 14 (23 ,3±5.7%) children had a persistent course of mild severity (group III). One of the criteria for inclusion in the study was absence of conditions requiring intensive therapy. The control group consisted of 50 children with acute obstructive bronchitis of moderate severity, who did not have allergic diseases at the time of examination and history taking. Informed consent for the study was obtained from the parents of all groups. Children with bronchial asthma and acute obstructive bronchitis were aged 5 to 17 years. To study the level of vitamin D supply in the blood serum of children, the level of the 25(OH)D metabolite was determined. There were no diseases in

which the synthesis of the intermediate (transport) form of vitamin D could be disturbed among the studied children vitamin D level 25(OH) D in blood serum vas analyzed before and after treatment using enzyme immunoassay. Vitamin D content was assessed according to the recommendations of the US Institute of Medicine, vitamin D deficiency is established at a level of 25(OH)D in the blood serum below 20 ng /ml, vitamin D deficiency is diagnosed at levels of 25(OH)D between 21–30 ng / ml. ml, the concentration of 25(OH)D 31-85 ng / ml is considered within the normal range.

When adiagnosing asthma, we used the classification adopted by the National Program “Bronchial Asthma in Children. Treatment strategy and prevention” in Russia in 1997, which was supplemented in 2014 by the GINA program. The basis for the diagnosis was: complaints, anamnesis data, results of general clinical and functional examination methods . The data were processed by the Fisher-Student method of variation statistics using personal computers and using an application package.

Results and discussion.

The study of clinical efficacy showed that before treatment in children with persistent severe asthma, the average value of 25(OH)D was 9.8±1.4 ng /ml. In children with persistent BA of moderate severity - 12.6±1.2 ng /ml, with persistent BA of mild severity, the average value of 25(OH)D was 19.2±1.5 ng /ml. In children from the control group, the average 25(OH)D in the blood serum was 21.6±1.2 ng /ml. When comparing the levels of 25(OH)D in children of groups I and II, a significant difference was established ($p<0.05$), between groups II and III ($p<0.05$), when analyzing data from group IV ($p<0, 01$). The children of all three groups, in combination with basic therapy, were prescribed cholecalciferol at a dosage depending on the content of vitamin D in the blood serum. With a content of vitamin D in the blood serum of 20-30 ng / ml, the therapeutic dose of the drug was 2000 IU daily for a month, with a content of 10-20 ng / ml - 3000 IU daily for a month, with a content of less than 10 ng / ml - 4000 IU daily within

a month. After the course of treatment, patients switched to prophylactic doses depending on age: 1–12 months - 1000 IU daily, from 1 year to 18 years - 1500 IU daily. The control group did not receive vitamin D. In addition to vitamin D, children with asthma received treatment according to the standards of medical care for patients with bronchial asthma, in particular, children from group I received basic treatment in the form of a combination of inhaled glucocorticosteroids (IGCs) (fluticasone) in high doses and inhaled long-acting β2-agonists (salmeterol), children from group II received a combination of IGCS in medium doses and long-acting β2-adrenergic agonists, children from group III received IGCS in low doses, children in the control group were treated according to the standards of medical care for patients with acute obstructive bronchitis. Children with asthma who were in remission of the disease were prescribed monotherapy with vitamin D3.

The dynamics of vitamin D levels in patients with BA of groups I, II and III under the influence of this treatment showed a significant increase in indicators compared with the data of group IV ($p<0.01$) (figure).

The results of the study revealed an existing relationship between vitamin D levels and the course of BA (table).

When a complex treatment was carried out in patients with BA, attacks were stopped in a shorter period of time, the duration of dry and wet cough was significantly reduced compared to group IV children who were on traditional treatment ($p<0.01$). There was a reduction in the duration of shortness of breath ($p<0.01$), cyanosis of the nasolabial triangle ($p<0.01$), oral wheezing ($p<0.05$). Under the influence of a complex therapy, lethargy decreased ($p<0.01$) and appetite normalized ($p<0.01$). During percussion, the box tone of percussion sound in patients of groups I, II and III on the background of complex therapy was determined by a significantly smaller number of days ($p<0.05$) than in the control group. On auscultation against the background of hard breathing in patients with BA who received a complex therapy, wet and dry rales were heard

for significantly fewer days compared to group IV ($p<0.01$). The length of stay in the hospital of patients of groups I, II and III, who received a complex treatment, decreased ($p<0.01$). X-ray studies of patients in the control group showed that after basic therapy, improvement in radiological changes in the lungs was noted in 30 (60.0%) patients, while this indicator in children of groups I, II and III was 48 (80.0%).

Indicator	**Group I (n=13)**		**Group II (n=33)**		**Group III (n=14)**		**Control group (n=50)**	
Number of exacerbations per year	18±0.3	11±0.5	14±0.1	10±0.5	11±0.2	5±0.4	10±0.3	9±0.2
Number of exacerbations in patients who need hospitalization per year	13±0.1	8±0.2	1±0.4	7±0.2	6±0.1	6±0.1	4±0.2	3±0.1
Number of night attacks per month	9±0.3	6±0.2	5±0.2	4±0.3	3±0.4	1±0.2	2±0.2	1±0.3
Duration of disease exacerbation, days	12±0.5	7±0.1	10±0.4	10±0.4	10±0.4	4±0.4	8±0.3	7±0.5

Length of stay in hospital, days	14±0.2	9±0.3	11±0.4	7±0.1	8±0.3	6±0.4	7±0.4	6±0.2

5 children of group I, 12 of group II and 6 from group III moved to lower doses of inhaled glucocorticosteroids used as basic therapy for bronchial asthma. Simultaneously with the relief of the course of the underlying disease, there was also an improvement in the general condition of patients, which was manifested in an increase in physical and mental activity, a decrease in the manifestations of fatigue and weakness, a decrease in episodes of headache and dizziness, and an improvement in appetite and sleep.

Conclusions:

1. With the combined use of basic therapy and vitamin D , the effectiveness of treatment was noted, leading to a decrease in the risk of developing exacerbations of BA.

2. The combined use of vitamin D in complex therapy has a positive effect on the clinical course of the disease, its dynamics, which makes it possible to improve therapeutic and preventive measures and prevent an unfavorable outcome.

3. The data obtained indicate sufficient digestibility of cholecalciferol, which leads to the normalization of the content of its active metabolites in the blood of children, which, in turn, is accompanied by a decrease in the number of attacks of bronchial obstruction.

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