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Role and Place of Vitamin D in the Development of Broncho-Obstructive Syndrome in Children

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Abstract: This article describes the clinical course of acute obstructive bronchitis against the background of rickets in young children. The effectiveness of including vitamin D in the complex treatment of children with acute obstructive bronchitis due to rickets has been shown. To prove the effectiveness of the drug Akvadetrim plus We studied the clinical manifestations of 60 children with acute obstructive bronchitis against the background of rickets, who were divided into 2 subgroups: IIA - 30 patients who were on traditional therapy, IIB subgroup - 30 children who received the drug Aquadetrim plus in addition to traditional therapy. Application of Aquadetrim plus orally in a traditional treatment complex has proven its clinical effectiveness, faster elimination of bronchial obstruction and elimination of complications of the disease.

Keywords: broncho-obstructive syndrome, rickets, acute bronchitis, vitamin D, hypovitaminosis D.

Relevance of the problem. Rickets is one of the most common diseases in the world among children in the first years of life. Infant rickets is both a pediatric and medical and social problem [5].

Currently, the generally accepted norms of recommended daily intake of vitamin D for children are 400–500 IU/ day and only in the autumn-winter period [1,2]. At the same time , data from modern fundamental and clinical studies indicate that these doses of vitamin D are insufficient to compensate for its deficiency in the child's body and prevent the pathology associated with it [5,14, 15,18] . In order to prevent rickets, the most rational is to use cholecalciferol preparations , in particular, an aqueous solution of vitamin D3 (Aquadetrim), taking into account its good digestibility, especially in conditions of transient immaturity of the gastrointestinal tract of a child in the first months of life.

Therapy for rickets should be carried out taking into account possible risk factors for the development of the disease, and one should focus on low but sufficient doses of cholecalciferol . The maximum benefit for maintaining a child's health when taking vitamin D is achieved by increasing daily intake to 2000 IU/ day [4,6].

an increased need for vitamin D in cases of long-term and frequent illnesses, gastrointestinal disorders, rapid growth, and pigmented skin.

For specific prevention of rickets, an aqueous solution and oily forms of vitamin D $_3$ are used. An aqueous solution of vitamin D $_3$ is absorbed more quickly from the gastrointestinal tract, especially if the child has a syndrome of impaired intestinal absorption in the small intestine, cholestasis syndrome .[12,16]

Treatment of rickets should be comprehensive, aimed at eliminating the causes of vitamin D deficiency.

Therapeutic measures for rickets include organizing the correct daily routine for the child, rational feeding with a sufficient amount of protein, vitamins A, C and group B, calcium salts, phosphorus and microelements (magnesium, copper and zinc), drug therapy with alternative prescription of vitamin D and calcium preparations , hygienic and therapeutic baths, rubdowns, douches, massage, physical therapy, gymnastics.

The purpose of the study is to optimize the treatment of acute obstructive bronchitis against the background of rickets, by prescribing the drug Aquadetrim plus.

Materials and methods of research. We studied the clinical manifestations of 60 children with acute obstructive bronchitis against the background of rickets, who were divided into 2 subgroups: IIA - 30 patients who were on traditional therapy, IIB subgroup - 30 children who received the drug Aquadetrim plus in addition to traditional therapy .

The patients underwent a study of medical history, clinical, laboratory and instrumental data.

Special research methods.

1. The level of vitamin D in blood plasma was determined using chemiluminescent immunoassay. With base 411)
2. Bronchoobstruction was assessed using the RDAI and SShO scales.
3. Pulse oximetry.

Results and its discussion. An analysis of the main clinical manifestations of acute obstructive bronchitis upon admission is presented in Table 1. The general condition of patients in group I was assessed as moderate in 2.5% of patients, severe in 20.0%

Table 1. Main clinical manifestations of acute obstructive bronchitis upon admission

No.	Clinical symptoms	OOB without rickets		OOB against the background of rickets	
		N	%.	N	%.
1.	Moderate general condition	2	2.5	10	12.5
2.	Severe general condition	16	20.0	44	55.0
3.	Extremely severe general condition	2	2.5	6	7.5
4	Pallor	16	8.7	35	26.3
5	Cyanosis	20	16.3	48	48.7
6	Respiratory failure stage II .	14	17.5	57	71.3
7	Respiratory failure stage III .	-	-	3	3.7
8	Tachypnea	eleven	13.7	60	75.0
9	Paroxysmal cough, non-productive	7	8.7	41	51.3
10	Viscous, difficult to separate sputum	13	16.3	19	23.7
elev en	Skin rashes	14	17.5	17	21.3
12	Anxiety	6	7.5	7	8.7
13	Mild biofeedback	2	2.5	6	7.5
14	Moderate biofeedback	15	18.8	38	47.5
15	Severe biofeedback	3	3.7	16	20.0

children and extremely severe in 2.5% of cases, while in children of group II , against the background of rickets, moderately severe was in 12.5% of children, severe in 55.0% and extremely severe in 7.5%, which indicates that that in children with rickets, the underlying disease is more often severe.

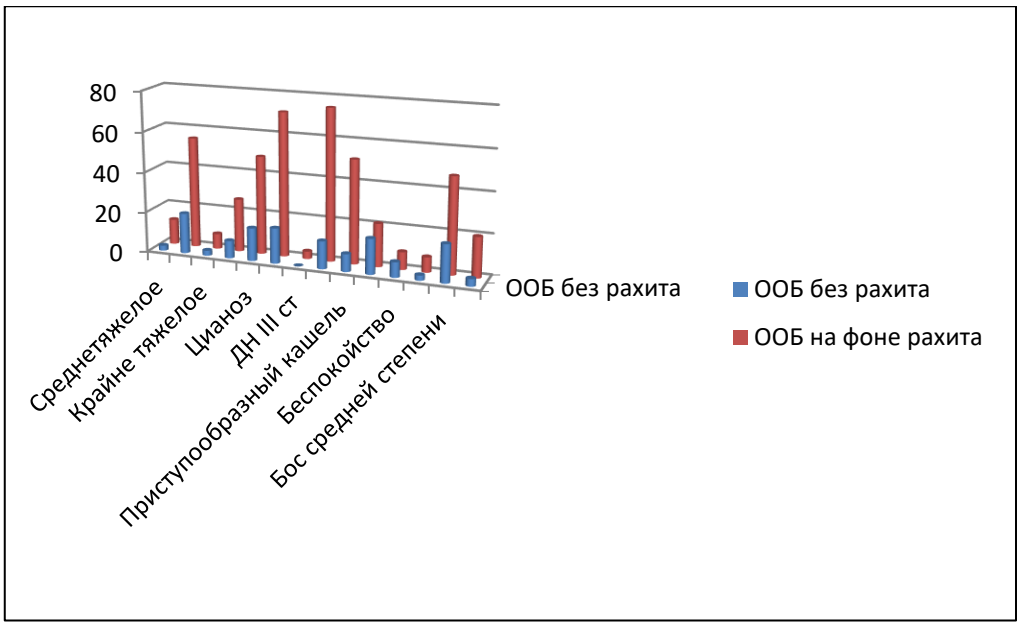

Figure 1. Main clinical manifestations of acute obstructive bronchitis upon admission

Severe cyanosis, respiratory failure of II and III degrees, tachypnea , paroxysmal cough, viscous difficult to separate sputum were also found in patients of group II more often than in group I. Skin rashes occurred equally often in patients of both groups. The main pathological syndrome causing the severity of the condition in all patients was bronchial obstruction syndrome.

The clinical symptom complex of broncho-obstructive syndrome was characterized by a combination of symptoms of acute hypoxia and characteristic signs of acute respiratory failure: cyanosis of varying severity from perioral to generalized cyanosis, noisy wheezing, participation of auxiliary muscles in the act of breathing, flaring of the wings of the nose, paroxysmal cough, impaired consciousness from excitement up to coma , signs of peripheral circulatory disorders. Characteristic physical findings in the lungs were also noted: boxed sound during percussion and diffuse expiratory wheezing.

An analysis of the dynamics of the elimination of clinical and physical symptoms of bronchial obstruction in patients showed (Table 12) that the trend of the disease had significant positive dynamics and could be traced in the form of the disappearance of disease symptoms in patients of group IIB who were on traditional therapy using Aquadetrim plus orally , compared with IA group that did not receive vitamin D , faster by 1 - 3 days ($P<0.01$; $P<0.001$).

In patients of group II B, the general condition improved earlier by an average of 1.6 ± 0.2 days, cyanosis of the skin and mucous membranes disappeared by 1.2 ± 0.2 days, which was significantly different from the indicators of group I IA.

Table 2. Dynamics of disappearance of the main clinical symptoms in patients of group II B in comparison with indicators in group I IA (in days, M ± m)

No.	Clinical symptoms	I I Group (n =60)		R
		I IA (n =30)	I IB (n =30)	
1.	Improvement of general condition	5.7±0.4	4.1±0.3	<0.05
2.	Temperature	2.7±0.2	2.5±0.2	>0.5
3.	Cough	4.9±0.4	3.7±0.4	<0.05
4.	Cyanosis of the skin and mucous membranes disappeared	3.8±0.3	2.6±0.2	<0.05
5.	Respiratory failure	4.1±0.3	3.3±0.3	<0.01
6.	Percussion changes in the lungs	4.6±0.3	3.9±0.4	>0.2
7.	Expiratory dyspnea	3.6±0.3	3.0±0.2	<0.01
8.	Auscultatory changes in the lungs	5.1±0.3	4.1±0.3	<0.02

9.	Normalization of cardiac activity	2.0±0.1	1.8±0.2	>0.5
10	Average length of hospital stay	5.9±0.4	4.8±0.3	<0.05

Note: P - significance of differences between groups I and II .

Relief of respiratory failure in patients of group II A who received a complex of traditional therapy manifested itself on 4.1 ± 0.3 days, and heart failure by 2.0 ± 0.1 days, in comparison with the indicators of group II B showed that the use of Aquadetrim plus leads to significant improvement in respiratory and cardiac functions (3.3±0.3 and 1.8±0.2, respectively) (P <0.01).

Expiratory shortness of breath, which is one of the pathognomic signs of broncho-obstructive syndrome, was relieved in group I IB on average by 3.0 ± 0.2 days, whereas in group I IA by 3.6 ± 0.3 days (<0.01).

Physical changes in the lungs, which are the most demonstrative clinical symptoms of acute obstructive bronchitis, were normalized according to percussion changes in the respiratory system - by 3.9 ± 0.4 and 4.6 ± 0.3 days, and by auscultation - by 4.1 ± 0.3 and 5.1±0.3 days in groups I IB and I IA, respectively.

Conclusions:

The study revealed the clinical effectiveness of the use of vitamin D as part of the drug Aquadetrim plus for acute obstructive bronchitis in children against the background of rickets, which indicates the advisability of including the drug in the complex therapy of the disease in order to accelerate the elimination of bronchial obstruction , improve the trend of positive changes in the dynamics of the disease, and prevention of complicated course.

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