ASSESSMENT OF VITAMIN D IN YOUNG CHILDREN WITH COMMUNITY ACQUISITED PNEUMONIA

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ABSTRACT

Respiratory diseases are widespread among the child population and have a large share in the structure of morbidity. Conditionally hyporesponsive course of the disease, characterized by mild clinical manifestations of the disease. Indicators of Vitamin D in 44.4% of children have insufficiency, and 11.2% of children have a vitamin D deficiency. It is advisable to determine vitamin D in the blood serum in children suffering from pneumonia, with dynamic dose adjustment until reference values are achieved to improve the prognosis of the disease and quality of life of this category of patients.

Keyword: Pneumonia, vitamin D, blood, children, early age, cough.

INTRODUCTION. In our country, special attention is paid to the health of children from birth, which is reflected in the large-scale reforms carried out in the field of health care. But it is worth noting that respiratory morbidity will remain the most pressing problem among nosological structures that frequently encounter pathologies in children of any age, and requires optimization in diagnostics and treatment. Among the pathologies of the respiratory system, various types of pneumonia undoubtedly occupy a leading position, despite modern approaches to early diagnosis, treatment and prevention. The study of community-acquired pneumonia over the past decades, both in our country and abroad, has made it possible to significantly change the understanding of many aspects of this problem, optimize diagnostic and therapeutic tactics [1-5]. The course of pneumonia in children differs from typical "classical" manifestations by the disproportion between the volume and nature of lung tissue damage and indicators of nonspecific reactivity of the body in response to the inflammatory bacterial process in the lungs, the number of recurrent forms of respiratory diseases increases. Data from recent years of scientific achievements indicate a deepening awareness of the multifaceted effect of vitamin D in the human body. Evidence from large-scale studies contributes to the understanding that vitamin D deficiency is a risk factor for many diseases. Currently, an active search is underway for new predictors of the severity of these diseases to understand the pathogenetic basis and form a personalized approach to therapy. Researchers are particularly interested in the pleiotropic effects of vitamin D on the inflammatory system [7]. It is known that

1,25-dihydroxycalciferol D3 is involved in the activation of monocytes, stimulation of the cellular link of immunity, suppression and proliferation of lymphocytes, production of immunoglobulins and synthesis of cytokines, while at the same time it has an indirect ability to bind extracellular actin and endotoxin [5,6,7]. The diversity of immunological interference allows us to consider the status of vitamin D as a factor influencing the transformation of the clinical picture of inflammatory diseases, including pneumonia, bronchial asthma (BA) and many other pathologies. The potential effect of vitamin D on the course of pulmonary infection is due to its ability to affect cellular and humoral immunity, thereby reducing the inflammatory process.

Of particular interest is the effect of vitamin D on the regulation of the immune response due to its powerful anti-inflammatory potential. The effect of the active metabolite on cell nuclei has been proven, which determines the gene level of regulation. The non-genomic mechanism of influence on plasma membranes is actively studied. Taking into account the diversity of vitamin D interference on the active and passive immune system, it is important to determine the phenotypic characteristics of diseases, including in the group of various acute and chronic diseases of the upper and lower respiratory tract [8]. After the pandemic in our country, at the present stage, the effect of vitamin D status on the course of respiratory tract diseases in children of all ages is being deeply studied, which showed the effect of vitamin D deficiency on the health of children in any age category. The fight against this deficiency will help to significantly reduce the incidence of pneumonia and thereby reduce not only pathologies of the bronchopulmonary system, but also in medicine as a whole [7,8].

STUDY DEGREE AND METHODS. To achieve the set goal, a study was conducted on 50 patients and their case histories in young children aged 1 to 3 years undergoing inpatient treatment with a diagnosis of Acute Community-Acquired Pneumonia at the Tashkent Pediatric Medical Institute, in the pulmonology department and the young children department. All patients upon admission to the department underwent a comprehensive examination, including a clinical blood and urine test, a biochemical blood test, including Vitamin D and VD deficiency was defined as a 25 (OH) D concentration in the blood serum < 20 ng / ml, insufficiency - from 20 to 30, adequate levels - 30-100 ng / ml, an X-ray examination of the chest organs. Analysis of the child's development in subsequent years included: identification of the frequency of colds (according to the age period with calculation of the infection index), the presence of concomitant diseases and chronic foci of infection, as well as attendance at a preschool educational institution. Statistical processing of the obtained results was carried out using application programs for statistical data processing Statistica® version 6.0. The reliability of differences between the compared groups was assessed using Student's criteria. Differences in the compared values were recognized as statistically significant at $p<0.05$.

RESULTS OF THE STUDY . Among the examined children, there were 61.7% boys and 38.3% girls, which corresponds to the known pattern of prevalence of bronchopulmonary pathology among males. Of these, children aged 1 year accounted for 22.2%, children aged 2 years - 33.3%, children aged 3 years - 44.5%.

The average hospitalization period of children from the onset of the disease was 8.53±0.7 days, with almost half of them admitted within 4 to 7 days (54.2%). In 21.3% of cases, the patient sought treatment more than 1 week after the first complaints appeared, and in 5.3% of cases, more than 10 days. The main complaints of patients admitted to hospital were cough (productive in 76% of cases, dry in 22.7%) and fever (100%). Dry cough was significantly more common in 3-year-old children, while productive cough was more common in the younger age group. An increase in body temperature at the onset of the disease to febrile levels was recorded in 50.7% and subfebrile in 16% of observations; the remaining patients had normal body temperature, mainly one-year-old children. Complaints of decreased appetite, weakness, fatigue were presented by children in 62% of cases, while in 38% of cases these complaints were mild. Inspiratory dyspnea was observed in 77.8% of children, and mixed dyspnea was observed in 22.2%. All children had catarrhal syndrome in the form of hyperemia of the posterior wall of the oropharynx, runny nose. During auscultation, dry and moist rales were heard in all children against the background of harsh breathing. When analyzing hematological parameters, most children with community-acquired pneumonia did not reveal any deviations from the norm. Of all the examined children, only 55.6% had leukocytosis, 15% had leukopenia, in the remaining cases, the leukocyte counts did not exceed the normal values (20.4%). According to laboratory data, 66.7% of children had grade 1 anemia, 27.8% had grade 2 anemia, and 5.5% had grade 3 anemia. C-reactive protein (CRP) is a serum marker of inflammation [3] and is widely used in the differential diagnosis of infectious and non-infectious inflammation, to assess the severity of the disease, and as an indicator for prescribing antibacterial therapy. C-reactive protein is an acute phase protein of inflammation and is a criterion for the activity of bacterial infection. In the study, the CRP level was increased in all groups (100%). The results of our work indicate the direct participation of active metabolites of vitamin D in regulating inflammation processes through the effects on the frequency and severity of exacerbations in patients with various forms of acute community-acquired pneumonia. According to medical literature, vitamin D is involved in the proliferation and differentiation of immunocompetent and blood cells, stimulates the production of endogenous antimicrobial peptides in the bronchial epithelium and phagocytes, limits inflammatory processes by regulating the production of cytokines, modulates the innate immune system and the adaptive response, which leads to the control of chronic inflammation in the lung tissue and helps to reduce the number and severity of exacerbations [7].

Taking into account the hormone-like effect and the immunomodulatory effect of active metabolites of vitamin D on the cells of the immune system, the association of VD status and the characteristics of the clinical course of community-acquired pneumonia was analyzed. Vitamin D levels in 44.4% of children are normal and above 70 ng / ml, in 44.4% of children there is insufficiency, and in 11.2% of children, vitamin D deficiency was detected.

According to the literature, the VD level provides protection against infection due to genes whose activity is regulated by 25(OH)D3. Such regions are called VDRE (vitamin D response elements), they are adjacent to the genes encoding the peptides cathelicidin and β2-defensin of antimicrobial peptides (AMP) with antimicrobial activity. Cathelicidins are the main protein of specific granules of neutrophils, have direct antimicrobial activity and have a synergistic antibacterial effect with defensins. Respiratory tract infection leads to VD activation and an increase in the concentration of cathelicidin mRNA. Such activation of VD may be an important component of the body's defense system, since it has downstream effects, including increased expression of the cathelicidin gene, which is an important component of the innate immunity of the lungs. VD induces a corresponding increase in AMP and antibacterial activity against pathogens, including P. aeruginosa [7,8]. Thus, it is clear that all examined children have vitamin D deficiency, and the disease proceeded with minimal clinical symptoms. Symptoms of intoxication were observed in 62% of children, and in 38% of children, symptoms of intoxication were less pronounced, and febrile temperature was noted at the age of 3 years.

CONCLUSIONS . Conventionally, according to our data, the course of the disease was characterized by mild clinical manifestations of acute community-acquired pneumonia, which should have been expected to influence vitamin D. According to the analysis, it can be argued that changes in serum vitamin D levels have a pronounced modifying effect on the nature of the course of acute community-acquired pneumonia in children. At the same time, the degree and severity of changes should be considered in the context of the etiological nature of the disease. Vitamin D levels in 44.4% of children were insufficient, and vitamin D deficiency was detected in 11.2% of children. It is advisable to determine vitamin D in the blood serum of children suffering from pneumonia, with dynamic dose adjustment until reference values are reached to improve the prognosis of the disease and the quality of life of this category of patients.

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