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CHANGES IN THE STATE OF IMMUNITY AT THE CELLULAR LEVEL IN PATIENTS WITH BRONCHIOLITIS

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Annotation.

Acute bronchiolitis in children is considered one of the serious medical problems, since they occupy one of the leading places among the causes of childhood diseases. Despite numerous studies, the problem of acute bronchiolitis in frequently ill children remains unresolved, which is associated with delayed diagnosis, the peculiarities of the manifestation of clinical symptoms and laboratory data. The aim of the research is to study changes in immunity at the cellular level in patients with bronchiolitis. Materials and methods of research: to establish the relationship with immunity indicators at the cellular level, 62 patients with acute bronchiolitis were examined, divided into 2 groups: Group I - 31 patients with acute bronchiolitis in episodically ill children, group II - 31 patients with acute bronchiolitis in those who are often ill. Our study allows us to better understand the pathogenetic role of the immune status at the cellular level in the development of acute bronchiolitis in episodically ill and frequently ill children, for use in clinical practice and the development of more effective methods for predicting, diagnosing, and treating the disease

Keywords: acute bronchiolitis, cellular immunity, diagnosis, children who are occasionally ill, children who are often ill.

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Diseases of the bronchopulmonary system remain the most common in childhood, and despite the growing number of studies devoted to this problem, it is necessary to continue a detailed approach to the issues of pathogenesis, the state of the immune system in pathology. Despite the systematic studies of BOS in children, the relevance of the disease remains in the attention of both domestic and foreign researchers[1,2]. It has been revealed that some respiratory viruses are able to shift the balance of the human immune system towards a Th2 response, which may become one of the risk factors for the development and/or exacerbation of bronchial asthma. This phenomenon is most often observed in children with frequent respiratory infections (rhinoviruses and respiratory syncytial viruses).

In children with obstructive bronchitis, a decrease in T-cell immunity, phagocytic cell activity, deficiency of the NK cell system, and dysimmunoglobulinemia was revealed[3,4]. At the same time, the decrease in T-cell indices was determined at the level of CD3+ and CD4+ and CD8+ cells, more pronounced with clinical improvement, which was manifested by a lower immunoregulatory index relative to healthy children. Frequent and repeated respiratory infections contribute to sensitization of the body, decrease in immune reactivity, disruption of compensatory and adaptive mechanisms, which contributes to the development of chronic inflammatory processes of the respiratory tract, which ultimately lead to impaired physical and neuropsychological development of children[5,6].

In recent years, the features of the immunological status of frequently ill children have been studied. Frequent and repeated respiratory infections contribute to sensitization of the body, decrease in immune reactivity, disruption of compensatory and adaptive mechanisms, which contributes to the development of chronic inflammatory processes of the respiratory tract, which ultimately lead to impaired physical and neuropsychological development of children[7,8].Violations of the cellular link of immunity determined by the pathology of the phagocytic function of blood cells were revealed in the majority of CBDs. In immunocompromised children, changes in local specific and nonspecific resistance are most often recorded (decreased phagocytosis activity, complement level, lysozyme, secretory IgA2, IgA1, IgM, IgG)

The purpose of the scientific study: To study changes in immunity at the cellular level in patients with bronchiolitis. Research materials and methods. The study was conducted in pediatric departments and the pediatric intensive care unit of the Samarkand branch of the Republican Scientific Center for Emergency Medical Care. To establish the relationship with the indicators of cellular immunity, 62 patients with

acute obstructive bronchitis were examined, divided into 2 groups: group I - 31 patients with acute obstructive bronchitis from the group «episodically ill children», group II - 31 patients with acute obstructive bronchitis from the group «frequently ill children»

The results of the study. To identify possible disorders in the immune system of the observed patients, the indicators of the relative and absolute number of the main populations of lymphocytes were determined: subpopulations of Tlymphocytes: CD3+, CD8+, CD4+ cells, taking into account their role in identifying the relationship of infectious, immune, cytoxic and allergic processes developing in OOB and CBD. With the development of the disease in the EBD group with OOB in relatively healthy children, a significant decrease in CD3+, CD4+, CD8+ indicators characterizing various stages of the formation of the immune response was revealed.

Table-1

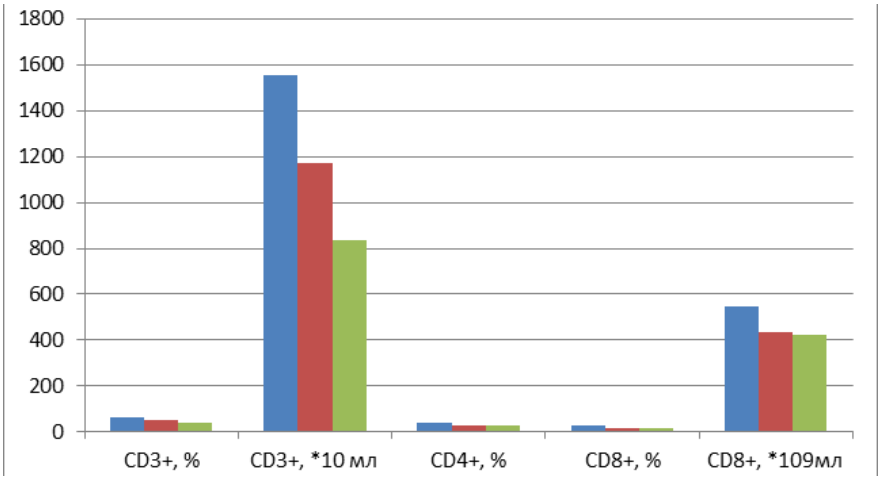
Indicators of cellular immunity in patients with obstructive bronchitis at admission (M ± m).

indicators	norm	I group	II group	P1
CD3+, %	62,4±2,7	50,3±1,3	41,7±1,2	<0,001
CD3+, *109мл	1556,6±77,8	1173,2±28,6	837,7±15,0	<0,001
CD4+, *109мл	966,4±31,7	575,5±14,7	373,3±7,0	<0,001
CD8+, %	27,0±1,6	17,6±0,7	17,3±0,4	<0,001
CD8+, *109мл	546,1±27,4	434,2±10,3	423,3±7,0	<0,001

Note: P1 is the reliability of the differences between the normative values and the OOB.

There was a significant decrease in the level of CD3+ by 1.3 times in percentage, so CD3+ by 1.2 times in absolute comparison, CD4+ by 1.1 and 1.8 times, CD8+ by 1.6 and 1.7 times, respectively, in relation to normative indicators (P<0.001). This suggests that the development of a cellular immune response in children with OOB is associated with a pronounced imbalance of immunoregulatory subpopulations of T cells. The CD3+ level was 50.3±1.3% and 1183.2±29.6*109ml, which is significantly lower than the standard values (P<0.001), indicating a deficiency of the immune system in the regulation of the infectious and inflammatory process, which is the pathogenetic basis of the disease. A decrease in CD4+ both in percentage (30.6±1.3%) and in absolute values (565.5±13.7*109ml), which is produced by various types of cytokines, including IL-4, 6, 10, TNF-α, indicates insufficient activity of the immune response. The significance of reducing cytotoxic CD8+ to 18.7±0.7% and to 432.2±11.3*109ml is to reduce the number of virus-specific cytolytic T lymphocytes and reduce control over infectious and inflammatory processes of the disease. The results of the study confirm the important role of the T-cell link of immunity (CD3+, CD4+, CD8+) in the development and progression of OOB in children. A decrease in the level of markers indicates a violation of immune regulation and the function of the T-cell link of immunity, which can lead to a decrease in the body's defense mechanisms and an increase in the inflammatory process in OOB. In patients with CBD, a more significant decrease in cellular immunity was found compared with the standard values and CBD in EBD.

Picture-1



The data obtained indicate the presence of a secondary immunodeficiency condition in patients, which may be associated with frequent acute respiratory infections. The indicators of CD3+ T cells, in case of OOB in BCD, turned out to be lower both in qualitative terms - CD3 - 41.7±1.1%, and in quantitative terms - 829.7±16.0*109ml, compared with those of healthy children and patients of group I. Considering that CD3+ protects the body from an infectious agent by activating neutrophils and macrophages, there was a significant decrease in immune anti-infective protection in CBD with OOB. In children of group II, there was a more significant decrease in CD4 23.0±0.5% and CD4 381.3±7.0*109ml, both in relation to healthy and in relation to children of group I (P<0.001), indicating defects in antibody production and cell-mediated immunity reactions occurring in the disease. When comparing CD8+ with OOB in BCD, it was found to decrease to 16.3±0.4% and to CD8 423.3±7.0*109ml with respect to control values (P<0.001). At the same time, the number of CD8+ had no significant differences in comparison with group I (P>0.1), indicating a less significant role of the cytoxic immune effect in the development of OOB in CBD. The results of the immunological study indicated violations in the T-cell link of immunity, expressed in a decrease in CD3, CD4, a tendency to decrease CD8, indicate the presence of secondary immunodeficiency in patients, possibly due to frequent respiratory diseases. The most informative indicators of the risk of pathogenetically unfavorable enhancement of the cellular immune response in OOB are a decrease in the CD3+, CD4+, CD8+ subpopulation.

Conclusions. This study makes it possible to better understand the pathogenetic role of the immune status at the cellular level in the development of acute bronchiolitis in episodically ill and frequently ill children, for use in clinical practice and the development of more effective methods for predicting, diagnosing, and treating the disease.

LIST OF REFERENCES

[1] Kaitmazova N. K. Dynamics of immunity indicators in children with obstructive bronchitis. Modern issues of biomedicine 2022;6:20-25.

[2] Shamsiev A.M. Yusupov Sh. A., Yuldashev B. A., Mukhamadieva L. A. The state of the immune status in children with chronic bronchitis. Pediatric Bulletin of the Southern Urals 2017:84–9.

[3] Ibragimova M. F. Diagnostic criteria for pneumonia of atypical etiology in children. British Medical Journal 2022;2.

[4] Shavazi N., Ibragimova M. Применение препарата полиоксидоний при лечении обструктивного бронхита у детей. International Journal of Scientific Pediatrics 2023:26–8.

[5] Kasokhov T. B., Alborova A.V., Mazur A. I., Tsareva A. A., Kasokhova V. V. The importance of indicators of local and systemic immunity in the development of obstructive bronchitis in children and treatment methods. Literature review. Polish Journal of Science n.d.:3–8.

[6] Castro-Rodriguez JA, Mallol J, Rodriguez J, Auger F, Andrade R. Risk factors for X-ray pneumonia in the first year of life and its relation to wheezing: a longitudinal study in a socioeconomic disadvantaged population. Allergol Immunopathol (Madr) 2008;36:3–8. https://doi.org/10.1157/13115664.

[7] Sachkova L. A., Balashov A. L., Trukhmanov M. S. Often ill children. University Therapeutic Bulletin 2020;2:75–85.

[8] Lukianenko N, Kens O, Nurgaliyeva Z, Toguzbayeva D, Sakhipov M. Finding a molecular genetic marker for the incidence of recurrent episodes of acute obstructive bronchitis in children. J Med Life 2021;14:695–9. https://doi.org/10.25122/jml-2021-0052.

[9] Fedorovna IM. THE INFLUENCE OF RISK FACTORS ON THE DEVELOPMENT OF ATYPICAL PNEUMONIA IN YOUNG CHILDREN. Asian J Pharm Biol Res 2022;11.