



## FEATURES OF OBSTRUCTIVE BRONCHITIS IN CHILDREN

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<b>Article history:</b>	<b>Abstract:</b>
<b>Received:</b> 20 <sup>th</sup> January 2024 <b>Accepted:</b> March 8 <sup>th</sup> 2024	Today, there is an increase in the number of children with acute respiratory diseases. In 25–31% of children, respiratory infections occur with the clinical picture of obstructive bronchitis, and in 30–50% of cases it takes a protracted, undulating or recurrent course. Obstructive bronchitis in children attracts close attention from pediatricians due to their prevalence, lack of clear diagnostic criteria and difficulty of therapy. This study will determine the clinical and immunological characteristics of young children with obstructive bronchitis.

**Keywords:** obstructive bronchitis, children, immune status, bronchial obstruction syndrome (BOS)

### INTRODUCTION

The search for the causes of recurrent respiratory infection occurring with obstructive bronchitis, the early age of the sick, and similar clinical manifestations of broncho-obstruction significantly complicate the identification of the etiological spectrum. In children, obstructive bronchitis is represented by various clinical variants [2, 4]. Triggers such as allergens, respiratory viruses, and environmental pollutants are based on bronchial hyperreactivity. Also, bronchial hyperreactivity may be secondary (association of BOS with upper respiratory tract pathology; gastroesophageal reflux). They also distinguish BOS, which developed as a result of specific diseases of the respiratory system (cystic fibrosis, pneumonia, foreign bodies, primary ciliary dyskinesia, congenital anomalies) [1]. Obstructive bronchitis develops in children at an early age due to the anatomical and physiological characteristics of the respiratory tract: relative narrowness of the respiratory tract, smaller volume of smooth muscles, pliability of cartilage and rigidity of the chest, hyperplasia of glandular tissue, secretion of predominantly viscous sputum, less elasticity of lung tissue, its abundant vascularization, low collateral ventilation, insufficiency of local immunity [2, 3].

### MATERIALS AND METHODS

The above anatomical and physiological features determine the clinical picture of obstructive bronchitis. Poor smooth muscle development in children under two years of age rarely contributes to the development of bronchospasm, as the main cause of obstruction at this age [5]. Bronchial obstruction syndrome develops more often with aggravated allergic background (atopic dermatitis, allergic rhinitis, allergic dermatitis) - in every second child, also in children who often suffer from respiratory viral infections [1, 4]. The prevailing diseases in the structure of BOS are acute obstructive bronchitis (AOB), bronchial asthma (BA).

During the period from 2018 to 2019, 80 children aged 1 to 4 years who received inpatient treatment in the departments of allergology and pulmonology were examined. The mothers' medical history was carefully collected, and background pathologies were identified. Episodes of bronchitis recurred 2–3 times a year for 2–3 years. All patients were registered at the dispensary in the CBD group. There were 52 (65%) boys and 28 (5%) girls. The T- and B-cell immunity was assessed by determining in venous blood cells with markers CD3, CD4, CD8, CD56, CD19, CD4/CD8, the number of NK cells, phagocytic index and phagocytic number, and also determined concentration in the blood of total IgA, IgG, IgM, Ig E.

### RESULTS AND DISCUSSION

The occurrence and development of obstructive bronchitis in young children is influenced by various factors. So, viral infection is of great importance. The viruses that most often cause obstructive syndrome include respiratory syncytial virus (RSV), then parainfluenza virus, mycoplasma pneumoniae, chlamydia, and less commonly, influenza viruses and adenovirus. In children in the first year of life, mixed infection (a combination of RSV and adenovirus) comes to the fore in the development of bronchitis; in children older than one year - RSV, adenoviruses, less often a combination of RSV and adenovirus infections is recorded. Regardless of age, influenza virus occurs with equally low frequency in the etiology of AOB [5]. Among infectious causes, it is worth noting the increased role of atypical pathogens. Infections caused by C.pneumoniae and M.pneumoniae in school-age children firmly occupy second place in the spectrum of pathogens of pneumonia (after Streptococcus pneumoniae).

Analysis of the data showed that children with obstructive bronchitis have pronounced clinical



manifestations and significant decreases in the immune system.

In children with a burdened allergic history during the period of exacerbation, low-grade fever was reliably recorded in 32% (40) of children, cough in 64% (80) of children, weakness and loss of appetite in 42.4%

(53) children, enlargement and pain of peripheral lymph nodes by 40% (50) children, skin manifestations by 56% (70) children, nasal congestion by 40.8% (51) children, grade 2 adenoids by 46.4% (58) children. A decrease in the level of CD4 lymphocytes by 13.6% (17) of children, a decrease in the CD4/CD8 ratio by 24% (30) of children, the immunoregulatory index was reduced by 24% (30) of children. Reduction in phagocytic number by 40% (50) of children, phagocytic index by 32% (40) of children, CD19 markers by 50.4% (63) of children, number of CD56 NK cells by 48.8% (61) of children. The value of the phagocytic index and phagocytic number (PF) correlates with the severity of bronchial asthma. In the blood serum of patients, the content of IgA was reduced by 40% (50) of children, IgM by 24% (30) of children, IgG by 36% (45) of children and an increase in IgE by 62.4% (78) of children.

The pronounced clinical picture in patients of the main group was reflected in the length of hospitalization - an increase in stay by 70%, which increased the economic costs of examination and treatment of one patient. Indicators of the immune status of children are characterized by a deficiency of suppressor T-lymphocytes against the background of a genetically determined increase in the activity of the Th2-type fraction and inhibition of the Th1-type fraction. Analysis of the results of a laboratory immunological study of a general group of children made it possible to detect in the vast majority of them (84%) deviations in various parts of the immune response: a decrease in the concentration of serum immunoglobulins A, M, G and indicators of phagocytic activity, an increase in the content of total IgE, as well as a violation of the ratio CD4+/CD8+ lymphocytes (decrease in immunoregulatory index). Thus, in addition to a significantly higher value of total IgE ( $149.3 \pm 33.1$  compared to  $47.5 \pm 9.0$  IU/ml), atopics had higher average IgA levels comparable to normal ( $1.03 \pm 0.05$  compared to  $0.77 \pm 0.03$  g/l) and phagocytosis ( $58.9 \pm 2.2$  compared to  $50.6 \pm 2.1\%$ ), which may indicate the development of recurrent obstructive syndrome of non-immune mechanisms in children with manifestations of allergic diseases. Perhaps they are more sensitive to viral infections due to a violation of the mechanisms of local protection of the mucous membranes of the respiratory tract against the

background of persistent allergic inflammation developing in them. In our opinion, this also explains the more frequent development in the group of atopic children of such complications of acute respiratory infection as rhinosinusitis and obstructive bronchitis

### CONCLUSION

Our studies showed that children with obstructive bronchitis had a decrease in T- and B-cell immunity and the number of NK cells, which indicates the presence of a secondary immunodeficiency state. Such changes in the indicators of cellular, humoral and phagocytic immunity indicate the influence of obstructive bronchitis on the immune status of the child. And the need for targeted immunocorrection, which will optimize some indicators of immune status.

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