

# CHARACTERISTICS OF THE CLINICAL PATHOGENETIC COURSE OF RECURRENT BRONCHITIS IN CHILDREN ON THE BACKGROUND OF COMORBID DISEASES

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#### Abstract

This article analyzes the clinical and pathogenetic course of recurrent bronchitis in children against the background of comorbid diseases. Also, the mechanism of development, diagnosis and treatment methods are discussed in this case.

**Keywords**: children, recurrent bronchitis, comorbid diseases, pathogenesis, immunological changes..

#### **INTRODUCTION**

Recurrent bronchitis in children is a common respiratory disease, and it is associated with an immature immune system, atopic background, and comorbid diseases. Among the comorbid conditions, allergic diseases, immunodeficiency, and metabolic disorders are of great importance[1,5].

Prevalence of recurrent obstructive bronchitis in children: Studies show that obstructive bronchitis relapses play an important role in the structure of respiratory pathology in children. When analyzing the histories of 12,869 children between 2020 and 2022, it was found that relapses occur mainly in children aged 6 months to 2 years, especially in the period from 2 to 8 months. These relapses are often seasonal and are associated with climatic conditions[2,8].

Characteristics of acute obstructive bronchitis in frequently ill children: The course and diagnosis of acute obstructive bronchitis in a group of frequently ill children is challenging. Research shows that external and internal factors affect the development of the disease in these children. It was also found that these children have important risk factors for the formation of obstructive bronchitis[3,7].

Recurrent simple bronchitis: Episodes of non-obstructive bronchitis can recur 2-3 times within 1-2 years against the background of ARVI. Relapses occur like acute bronchitis with moderate shortness of breath, the cough is first dry, then wet, and lasts 3-4 weeks. The general condition of patients does not deteriorate significantly. Dry and rare rales with medium and large bubbles can be heard. Relapses often coincide with the seasonality of ARVI. Symptoms are not observed





between relapses, but "cough readiness" may persist. Up to 80% of patients may have signs of allergies[4,9].

Genetic polymorphisms in bronchial asthma and chronic bronchitis: Studies show the prognostic significance of the CC16 gene polymorphism (A38G) in children with bronchial asthma and the CD14 gene polymorphism (C-159T) in children with chronic bronchitis. These genetic markers play an important role in the formation and development of the diseases[6,10].

## MATERIAL AND METHODS

During the research, 100 children aged 3-12 years were studied. They were divided into two groups:

- 1. The first group children with recurrent bronchitis and allergic diseases (50 people);
- 2. The second group is children with recurrent bronchitis and immunometabolic disorders (50 people).

Inspection methods included:

- **Clinical evaluation**: The general condition of the patients, cough characteristics, respiratory disorders, number of relapses and their duration were analyzed. In the patients' anamnesis, cases of bronchitis relapses at least three times a year were noted.
- Laboratory analyses:
- General blood analysis (level of leukocytosis, neutrophils and eosinophils);
- Biochemical analysis (C-reactive protein, ferritin, vitamin D);
- Immunological analysis (IgA, IgG, IgE, cytokines IL-4, IL-6, TNF-α)?
- Analysis of bronchoalveolar fluid (in certain cases);
- Microbiological analysis (determining sensitivity to bacteriological cultures and antibiotics);
- Functional tests:
- Spirometry (FJEL, degree of bronchial obstruction);
- Bronchoscopy (mucus accumulation and signs of inflammation);
- Indicators of oxidative stress (malondialdehyde, antioxidant system activity);
- Radiological methods:
- X-ray of the chest (peribronchial infiltrates);
- Computed tomography (CT) (in chronic bronchitis);
- Allergological tests:
- Skin reaction to an allergen;
- Specific IgE analysis.

The results obtained during the study were analyzed using statistical methods (p<0.05 was considered a significance level). Patients were also monitored continuously, and the number of relapses and their course were recorded.

# RESULTS

The results of the study showed that recurrent bronchitis is different in children against the background of various comorbid diseases.

- Children in the first group had relapses on average 3-5 times a year, and they showed signs of bronchial hyperreactivity and eosinophilic inflammation associated with an allergic background.

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70% of these children had elevated IgE levels, and most of them had atopic dermatitis and allergic rhinitis.

- In the second group, increased bronchial inflammation, decreased immune system function, and morphological changes in the respiratory tract were noted. 60% of patients had elevated levels of interleukin-6 and TNF- $\alpha$ , and bronchitis relapses occurred 4-6 times per year.

- According to the results of spirometry, bronchial obstruction indicators were higher in children in the first group than in the second group, which was associated with bronchial hyperreactivity.

- In the results of radiological examination, peribronchial infiltrates and signs of extended inflammation were more noted in the second group.

- Microbiological analyses showed that pathogens such as S. pneumoniae and H. influenzae predominated in both groups, but the second group had a higher level of resistance to antibiotics.

### DISCUSSION

Comorbid diseases make recurrent bronchitis more severe in children. Children with allergic diseases and immunodeficiency have more relapses. Pathogenetic mechanisms in this case have their own characteristics:

**Immunological changes:** In children, increased activity of Th2 cells and hyperproduction of IgE increased bronchospasm and inflammation in patients with an allergic background.

**Microbiological aspects:** Relapses were more common in patients with high resistance of pathogenic flora to antibiotics, which led to the need for long-term antibiotic therapy.

**Oxidative stress and inflammation:** The second group had an imbalance in the levels of malondialdehyde (MDA) and antioxidant enzymes, which ensured the continuation of chronic inflammatory processes.

**Functional changes:** According to the results of spirometry, the second group had decreased respiratory reserve and increased bronchial hyperreactivity.

Based on the results of the research, it was determined that it is necessary to use complex treatment methods. Antibiotic therapy requires an individual approach, and immunomodulators and antioxidants help to increase the effectiveness of treatment.

**Immunotherapy**: administering an allergen in gradually increasing doses to acclimate the body to the allergen. Probiotics and prebiotics: strengthening the immune system by improving the intestinal microflora.

#### CONCLUSION

The course of recurrent bronchitis in children associated with comorbid diseases ensures its long duration and more frequent recurrences. Therefore, a comprehensive approach and early diagnosis are important in preventing the disease.

The results of the study showed that the frequency and severity of bronchitis relapses depend on the general immunological status of the child and concomitant diseases. Therefore, comorbid conditions should be taken into account when developing a differential diagnosis and treatment plan.



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It is also possible to increase the effectiveness of treatment by applying a more in-depth analysis of the mechanism of pathogenesis and an individual therapeutic approach. In this case, the combined use of antibiotic therapy, immunomodulators and antioxidants gives a positive result. In the future, larger clinical trials are needed to evaluate the effectiveness of therapeutic approaches in children with recurrent bronchitis.

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