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OPTIMIZATION OF THE PERSONALIZED TREATMENT OF CHILDREN'S RECURRENT BRONCHITIS ON THE BACKGROUND OF COMORBID DISEASES

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Abstract:
This article analyzes the course of recurrent bronchitis in children against the background of comorbid diseases and its personalized (personalized) treatment methods. Based on the results of scientific research, optimal therapeutic approaches are discussed.

Keywords: Children, recurrent bronchitis, comorbid diseases, personalized therapy, pathogenesis, immunomodulators.

Introduction

Recurrent bronchitis in children is a chronic respiratory disease that is often associated with allergic, immunological, and metabolic disorders. Personalized treatment strategies for this disease should be based on specific pathogenetic mechanisms [2].

According to studies by foreign scientists, the pathogenesis of recurrent bronchitis is associated with the activation of the immune system by Th2 cells, which increases inflammation (Smith et al., 2020). Also, the French researcher Dupont (2019) showed that bronchial hyperreactivity and microbiome imbalance play a key role in children with recurrent bronchitis. Studies conducted in Germany (Müller et al., 2021) revealed a positive effect of immunomodulatory therapy and antioxidants on the course of the disease. In this regard, it is important to increase the effectiveness of an individual approach in the treatment of recurrent bronchitis[1,3].

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Recurrent bronchitis is an inflammatory disease of the bronchial system, in which symptoms are observed in a recurring manner. The high incidence of bronchitis in children is associated with a weakened immune system and a significant risk of upper respiratory tract infections. Recurrent bronchitis can also develop frequently or chronically in children [4,7].

Comorbid diseases are the presence of several diseases at the same time. Comorbid diseases can also occur in children with recurrent bronchitis. For example, asthma, allergic rhinitis, infections, diseases of the chest or nervous system, cardiovascular or endocrine diseases can affect the course of bronchitis in children[5,8].

Material and Methods

120 children aged 3-12 were involved in the study. They were divided into three groups:

1. The first group - children with recurrent bronchitis and allergic diseases (40 people);
2. The second group - recurrent bronchitis and immunometabolic disorders (40 people);
3. The third group - children who received standard therapy (40 children, control group).

Inspection methods:

Clinical and laboratory analyses – complete blood count, immunoglobulin levels (IgE, IgG, IgA), inflammatory markers (CRP, IL-6);

Spirometry and radiological studies - assessment of respiratory function and X-ray diagnostics;

Immunological and allergological tests - thermal and serological allergy tests, bronchial provocation tests;

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)?

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— 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);

Evaluation of the results of personalized therapy– clinical dynamics after treatment, the number of relapses and the effect on the general condition of patients. Additionally, the study evaluated personalized therapy methods used in foreign studies. In particular, immunomodulators recommended by the American Pulmonary Society (ATS) and antioxidant strategies proposed by German scientists (Müller et al., 2021) were used.

Results

The results of the study showed that the recurrence of the disease was significantly reduced in children who used personalized treatment strategies (a combination of antibiotic therapy, immunomodulators, antioxidants and bronchodilators). In the first and second groups, bronchitis relapses decreased to 2-3 times a year, and in the control group, this indicator was 4-6 times[6,9].

Also, the level of inflammatory markers (CRP, IL-6) decreased by 40-50% after treatment in the first and second groups, while in the control group this change was 20-25%. According to the results of spirometry, FEV1 increased by 15-20% in children who received individual therapy[10].

The study showed that immunomodulatory and antioxidant therapy is important in reducing airway inflammation and bronchial hyperreactivity. The general condition of the patients improved and the period of remission was extended.

Personalized treatment is a therapeutic approach based on a child's unique characteristics, including genetic, immunological, and biomarkers. A personalized approach to optimizing treatment against the background of recurrent bronchitis and comorbid diseases requires complex diagnostics and individual treatment. For example:

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- Genetic tests: Identifying genetic predispositions for bronchitis and comorbid diseases can help predict a child's future reactions to the disease.
- Immunological tests: To determine the state of the immune system and take into account the individual characteristics of reactions to infection.

Individualize treatment: Choose an appropriate therapy strategy to minimize the recurrence of bronchitis, taking into account comorbid conditions. For example, antihistamines and bronchodilators may be used in children with allergic bronchitis, and steroids in children with asthma.

Discussion

Comorbid diseases aggravate the course of recurrent bronchitis in children. Based on this research, a personalized treatment approach should include the following key areas:

- **Immunomodulatory therapy** - normalization of immune response;
- **Targeted selection of antibiotics** - increase the effectiveness of antibiotic therapy;
- **Reducing oxidative stress** – treatment with antioxidants;
- **Control of allergic reactions** - antihistamines and inhaled corticosteroids.
- **Restoring the microbiome** - use of probiotics and prebiotics;
- **Development of personalized treatment plans based on genetic analysis**.

At the same time, restoring the balance of the microbiome is also important. Current studies show that probiotic and prebiotic therapy can help reduce inflammatory processes in the respiratory tract. Also, the development of personalized treatment plans based on genetic analysis may play an important role in reducing disease relapses.

Optimization methods:

- Prevention: To prevent recurrent bronchitis, it is first necessary to take preventive measures against the risk factors that the child is exposed to (for example, preventing infectious diseases).
- Treatment of comorbid diseases: against the background of comorbid diseases, creating an individual therapy suitable for each condition of the child for the relief of bronchitis.

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- Psychological and socio-legal support: Children's psychological health and family environment also play an important role in the course of bronchitis.

Scientific research and new trends:

- The use of new biomarkers and genetic studies will help develop effective methods for treating recurrent bronchitis in children, as well as problems associated with comorbid diseases.
- Targeted therapy, that is, the use of new methods of pharmacology, such as immunomodulators and biological drugs, provides new efficacy.

Conclusion

The results of the study showed that personalized therapeutic approaches increase the effectiveness of treating recurrent bronchitis. In this case, it is important to take into account individual pathogenetic mechanisms. Targeted selection of immunomodulators, antioxidants and antibiotics can reduce disease recurrence. Also, individualization of treatment regimens based on microbiome restoration and genetic analysis should be one of the main directions of future research.

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