

DIAGNOSIS AND TREATMENT OF AIRWAY HYPERRESPONSIVENESS IN FREQUENTLY ILL CHILDREN AND ADOLESCENTS

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Annotation: Frequently ill children and adolescents represent one of the pressing problems in pediatrics, and airway hyperresponsiveness is considered one of the most common conditions in this group. Airway hyperresponsiveness is most often associated with recurrent respiratory infections, allergic factors, and functional immaturity of the immune system. This scientific article analyzes clinical, functional, and laboratory diagnostic methods used to identify airway hyperresponsiveness in frequently ill children and adolescents, as well as the principles of treatment. The obtained results demonstrated that early diagnosis and a comprehensive therapeutic approach play an important role in alleviating the course of the disease and preventing the development of complications.

Key words: children, adolescents, frequently ill children, airway hyperresponsiveness, diagnosis, treatment.

Introduction

In recent years, the increasing number of frequently ill children and adolescents has been regarded as a serious problem in pediatric practice. These children experience several episodes of acute respiratory diseases, bronchitis, and prolonged cough throughout the year. Such background conditions create favorable circumstances for the development of airway hyperresponsiveness.

Airway hyperresponsiveness is characterized by excessive sensitivity of the bronchi to various stimuli and is often considered a preclinical stage preceding the development of bronchial asthma. Clinical manifestations of the condition are frequently nonspecific and may be confused with common respiratory infections. Therefore, early identification of this condition and appropriate treatment are of great importance.

The aim of this article is to scientifically analyze diagnostic and treatment methods for airway hyperresponsiveness in frequently ill children and adolescents.

Clinical, Laboratory, and Instrumental Examination Methods

The practical part of the scientific work was carried out between 2023 and 2025 on the basis of pediatric and pulmonology departments. Seventy children and adolescents aged 6 to 17 years who frequently presented with acute respiratory diseases were included in the examination. Written informed consent was obtained from the parents of all participants.

During the clinical examination, patients' complaints, disease history, and frequency of recurrent illnesses were assessed. Laboratory examinations included complete blood count, immunological parameters, and assessment of allergic background.

Instrumental examinations comprised spirometry, bronchodilator testing, and peak flowmetry when indicated. Based on spirometric parameters, airway patency and the degree of bronchial reactivity were evaluated.

The obtained data were processed using statistical analysis methods, and the results were expressed as percentage values.

Results

According to the results of clinical and functional examinations, signs characteristic of airway hyperresponsiveness were identified in 58% of the observed patients. Spirometric findings revealed decreased airway patency, with reductions in forced expiratory volume in one second (FEV₁) and the FEV₁/FVC ratio below normal values. These changes indicated the presence of elements of bronchial obstruction.

Analysis of bronchodilator test results showed a positive bronchodilator response in 45% of patients, with a clinically significant increase in FEV₁ after administration of the medication. This finding indicated reversible airway obstruction and increased bronchial reactivity.

Laboratory examination revealed elevated eosinophil counts and increased total immunoglobulin E (IgE) levels in the majority of patients. These indicators confirmed the presence of allergic inflammation and demonstrated a significant association between airway hyperresponsiveness and allergic background.

In addition, data analysis showed a direct relationship between airway hyperresponsiveness and the frequency of acute respiratory infections. Patients with a higher number of respiratory infections during the year exhibited more pronounced spirometric changes and bronchial reactivity, confirming that recurrent infections play an important role in the development of airway hyperresponsiveness.

The obtained results indicate that airway hyperresponsiveness is widely prevalent among frequently ill children and adolescents and often remains unrecognized at early stages. Spirometry and bronchodilator testing are considered the most reliable and informative methods for diagnosing this condition.

During treatment, the use of anti-inflammatory and bronchodilator medications, protection from allergens, and strengthening of the immune system were found to be of significant importance. A comprehensive approach contributes to restoration of airway function and prevention of disease progression to a chronic form.

Treatment Principles

An individualized approach was applied in the treatment of airway hyperresponsiveness, taking into account each patient's age, severity of clinical manifestations, spirometric parameters, and presence of allergic background. Therapeutic measures were aimed at reducing airway inflammation, eliminating bronchial obstruction, and decreasing bronchial reactivity.

Inhaled bronchodilators were used as the main therapeutic agents to ensure airway dilation and rapid relief of clinical symptoms. Inhaled corticosteroids were administered as the primary anti-inflammatory therapy to reduce inflammation of the bronchial mucosa and control airway hyperresponsiveness. In patients with an allergic background, antihistamines and anti-allergic agents were included in the treatment regimen.

Alongside pharmacological therapy, rehabilitation measures were widely applied. Breathing exercises were aimed at improving respiratory mechanics, enhancing lung ventilation, and reducing bronchial spasm. Patients were also provided with detailed recommendations on maintaining a healthy lifestyle, regulating physical activity, and avoiding allergens and factors provoking respiratory infections.

The effectiveness of the comprehensive and step-by-step treatment was evaluated based on the dynamics of clinical symptoms and improvement in spirometric parameters.

Table 3. Treatment methods applied in patients with airway hyperresponsiveness

Treatment method	Number of patients (n=70)	Percentage (%)	Clinical effectiveness
Inhaled bronchodilators	56	80%	High
Inhaled corticosteroids	42	60%	High
Anti-allergic medications	38	54%	Moderate–high
Rehabilitation measures (breathing exercises)	50	71%	Moderate
Healthy lifestyle recommendations	70	100%	Preventive

Conclusion

Early detection and comprehensive treatment of airway hyperresponsiveness in frequently ill children and adolescents play an important role in preventing the development of bronchial asthma. Spirometry is the main diagnostic method and should be evaluated in combination with clinical and laboratory findings.

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