



IMPORTANCE OF THERAPY FOR BRONCHIAL ASTHMA IN CHILDHOOD

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Abstract

The problems of increasing the number of atopics around the world are of increasing concern to the medical community. Today, every fifth person on the planet suffers from some form of allergy. According to the World Health Organization (WHO), there are about 300 million patients with bronchial asthma (BA) and 400 million patients with allergic rhinitis in the world, and the prevalence of these nosologies is growing every year.

Keywords: ISAAC allergy, children, bronchial asthma, virus-induced asthma, leukotriene receptor antagonists.

INTRODUCTION

The rapid increase in the prevalence of allergic diseases served as the basis for a unique epidemiological study conducted in different countries of the world (International Study of Asthma and Allergies in Childhood (ISAAC)). This study is included in the Guinness Book of Records as the largest epidemiological study in children. It involved 1,018,846 children from 105 countries, and 306 research centers were involved. The ISAAC program has identified variability in symptoms across regions and even within countries. Detection of difficulty, wheezing requires an in-depth examination and an individual program for eliminating risk factors to prevent the progression of allergic diseases [2].

MATERIALS AND METHODS

Unfortunately, for various reasons, we are still far from fully introducing personalized medicine into real clinical practice, but given the heterogeneity of bronchial asthma, more and more attention is being paid to a differentiated approach to the selection of basic therapy. This concept is especially relevant in pediatric practice.

The management program for children with bronchial asthma includes:

- elimination measures (elimination of the impact of causative factors);





- pharmacotherapy (development of an individual plan for basic anti-inflammatory therapy, taking into account the asthma phenotype, an individual plan for relieving exacerbations);
- development of a rehabilitation and clinical observation plan;
- non-drug treatment methods;
- educational programs for children and family members;
- immunoprophylaxis of respiratory infections (vaccination, use of bacterial lysates) [2].

RESULTS AND DISCUSSION

The main goal of asthma therapy is to achieve and maintain complete control of the disease. To solve the problem, adequate basic (anti-inflammatory) therapy is selected. It is prescribed individually, taking into account the severity of the disease at the time of examination of the patient and is adjusted depending on the achieved effect. In clinical practice, the most significant effect of treatment is a reduction in the frequency of exacerbations and the frequency of hospitalizations; in children over six years of age, the criterion for effectiveness is indicators of external respiratory function [3]. Basic therapy drugs include inhaled glucocorticosteroids (ICS), leukotriene receptor antagonists (ALTR), long-acting β_2 -agonists in combination with inhaled glucocorticosteroids, cromones, theophyllines, monoclonal antibodies to IgE, systemic glucocorticosteroids.

Inhaled glucocorticosteroids are effective in children of all age groups [3]. However, in cases of virus-induced asthma, the significance of using ICS monotherapy is limited [4]. Most likely, this is due to their immunosuppressive effect. A number of studies have shown that the constant use of ICS in children with intermittent virus-induced asthma reduces the number of hospitalizations, but does not reduce the number of exacerbations [3]. Currently, for bronchial obstruction provoked by a viral infection, it is recommended to add type 1 cysteinyl leukotriene (LT) receptor antagonists (montelukast, pranlukast and zafirlukast) to therapy.

This is due to the fact that cysteinyl LTs have a significant role in the development of the inflammatory process in bronchial asthma. They are involved in the development of bronchial obstruction, bronchial hyperreactivity and inflammation of the mucous membrane of the respiratory tract. There are two groups of receptors for cysteinyl leukotrienes:

- CysLT₁ (located in the bronchi and trachea), upon stimulation of which bronchospasm occurs, plasma exudation occurs, vascular tone changes, mucus secretion increases, and eosinophil chemotaxis;





■ CysLT₂ (located in the human pulmonary veins), when stimulated, vascular changes can occur [5].

Leukotrienes increase the influx of eosinophils, increase the permeability of blood vessels, lead to contraction of bronchial smooth muscle, and promote the migration of cells that participate in the development of the inflammatory process (activated T cells, mast cells, eosinophils) [3]. Sulfide peptide cysteinyl leukotrienes L_{TS4} and L_{TD4} have a powerful bronchoconstrictor effect. Bronchospasm caused by RT develops more slowly, but is longer lasting (unlike histamine). It has been established that leukotrienes B₄, C₄, D₄, E₄ cause changes characteristic of bronchial asthma [4]. The study of the pathogenesis of the development of allergic inflammation made it possible to develop the concept of creating drugs that are antagonists of leukotriene receptors. Indications for the use of this group of drugs are:

- prevention and long-term treatment of bronchial asthma, including prevention of daytime and nighttime symptoms of the disease in adults and children from 2 years of age;
- treatment of aspirin-sensitive patients with bronchial asthma;
- prevention of bronchospasm caused by physical activity;
- the possibility of using drugs from the group of leukotriene receptor inhibitors in combination with any basic drug, as well as the possibility of using them as monotherapy for mild persistent forms of bronchial asthma in children;
- relief of daytime and nighttime symptoms of seasonal allergic rhinitis (in adults and children from 2 years of age) and persistent allergic rhinitis (in adults and children from 2 years of age).

Almost all currently known leukotriene receptor antagonists act on CysLT₁.

According to international consensus documents, leukotriene receptor antagonists are used starting from the 1st step of therapy as monotherapy or from the 2nd step of therapy in combination with ICS [2].

One of the widely used and best-studied antileukotriene drugs is montelukast (Singulair, MSD), the effectiveness of which has been proven in numerous studies. Singulair is a potent selective leukotriene receptor antagonist that targets CysLT₁ in the respiratory tract. In addition, montelukast causes bronchodilation within 2 hours after oral administration and may prolong bronchodilation caused by β ₂-agonists. The duration of blockade of LTD₄-specific receptors lasts 24 hours, which allows the drug to be taken once a day. In addition, montelukast indirectly affects the expression of interleukin-5 [3].

The PREVIA (PREvention of Virally Induced Asthma) study examined the value of montelukast in the prevention of exacerbations of mild virus-induced asthma in





children aged 2 to 5 years. This was a double-blind, parallel-group study (n = 248 and n = 271) where patients received montelukast (4 mg/day) or placebo for 12 months. Inclusion criteria were age from 2 to 5 years, a history of at least three obstructions (in the last 12 months) due to ARI, requiring the use of a b2-agonist for more than 3 days. A study of viruses in nasal secretions was carried out, and rhinoviruses (27.6%), coronaviruses (OC43, 229E) (9.0%), respiratory syncytial virus (RSV) (8.3%), influenza viruses (AH1) were identified, AH3, B), parainfluenza (types 1, 2 and 3), enteroviruses, adenoviruses, pneumoviruses, *Mycoplasma pneumoniae* and *Chlamydia pneumoniae*.

CONCLUSION

Considering that acute respiratory viral infection plays a significant role in the pathogenesis of the inflammatory process in bronchial asthma in children, in the formation and aggravation of bronchial hyperreactivity, leukotriene antagonists seem to be effective anti-inflammatory drugs for the prevention of exacerbations of virus-induced bronchial asthma at the present stage - new receptors.

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