Investigation of the Comorbidity of Bronchial Asthma and Allergic Rhinitis in Children

Mirzakhanov Said Madridovich[1], Abdulkhalikov Magomedsaid Magomedovich[2], Nazila Abdurakhmanova Raidinovna[3], Amangulova Diana Abdullatipovna[4], Zalova Bella Shakhmuradovna[5], Salmakhanova Khadidja Abubakarovna[6], Aliev Magomedrasul Aligadzhievich[7], Salmakhanov Abusufyan Abubakarovich[8]

[1,2,3,4,5,6,7,8]*Dagestan State Medical University, Makhachkala, Russian Federation.* E-mail: mirzahanovsaid@mail.ru

Abstracts: Today there is an increasing tendency for all allergic diseases, including a high prevalence of bronchial asthma (BA), as well as an increasing number of patients with co-morbidities. Allergic rhinitis leads in frequency of occurrence with bronchial asthma. In the last decade, the term comorbidity has often been used to define the interrelation as well as the mutual influence of 2 or more syndromes, diseases in one patient. The aim of the research was to study the comorbidity of bronchial asthma and allergic rhinitis in children in the Department of Pulmonology. The retrospective study included an analysis of 51 case histories of children diagnosed with atopic bronchial asthma. Of the 51 patients, 28 children (54.9±7%) were diagnosed with allergic rhinitis after examination by an ENT specialist.

Keywords: Bronchial Asthma, Allergic Rhinitis, Comorbidity, Allergy, Patient

1. INTRODUCTION

Bronchial asthma is a chronic inflammatory disease of the respiratory tract, which is characterized by frequent concomitant allergic diseases and comorbid conditions. According to the conducted studies, the severity and control of bronchial asthma is affected by the presence of many concomitant diseases. Allergic rhinitis is the leader in the frequency of occurrence with bronchial asthma. The association of allergic rhinitis with bronchial asthma is a factor aggravating its clinical course. Allergic rhinitis is an inflammatory disease of the nasal mucosa that develops due to the contact of allergic agents with the nasal mucosa [1], [2].

Nowadays, there is a tendency to increase the number of all allergic diseases, including the high prevalence and incidence of bronchial asthma, as well as an increase in the number of patients with combined pathology. This relationship is especially often observed among patients with bronchial asthma. According to WHO statistics, up to a quarter of the urban population with highly developed industry in their region suffers from allergic pathologies [3].

In the last decade, the term comorbidity has often been used as a definition of the relationship, as well as the interaction of 2 or more syndromes, diseases in one patient. Comorbidity is based on signs of anatomical and structural similarity of the organs involved in the pathological process, common etiology, pathogenetic mechanisms, a direct relationship between the clinical manifestations of diseases. The most studied to date is the comorbidity of allergic rhinitis and bronchial asthma [4], [5].

In 2017, the United States published the results of a study according to which more than 25 million patients suffer from bronchial asthma in the country, which is about 8% of the country's population. According to modern research, the prevalence of bronchial asthma is 5-10% in the general population of allergic rhinitis – from 12.7 to 24%. Almost more than 80% of patients with atopic bronchial asthma have symptoms or a diagnosis of allergic rhinitis during exacerbation or during disease control. 20-50% of patients have an allergic rhinitis is combined with bronchial asthma. There is also a fairly frequent detection of sensitization to household (72%), pollen (55%) and epidermal (40%) allergens with a combination of bronchial asthma and allergic rhinitis. Patients with allergic rhinitis are 3 times more likely to be diagnosed with bronchial asthma compared to patients without allergic rhinitis, which may indicate that allergic rhinitis is a high risk factor for developing bronchial asthma. Over 70% of patients have

clinical manifestations allergic rhinitis precedes the manifestation of bronchial asthma. In children under 7 years of age, allergic rhinitis is often diagnosed after the diagnosis of bronchial asthma, which probably indicates a late diagnosis of allergic rhinitis or a late manifestation [6], [7].

AD can be associated with allergic as well as non-allergic rhinitis, this dependence is due in most cases to allergic inflammation. In 2011, COPSAC presented the following results of its study: patients with allergic rhinitis have bronchial hyperreactivity and elevated levels of nitric oxide in inhaled air. This indicates the involvement of both the upper and probably the lower parts of the respiratory tract in the allergic process. This made it possible to identify different types of bronchial asthma in children with allergic and non-allergic rhinitis. In the process of individual development, allergic diseases can systematically alternate with each other [8].

The risk of developing bronchial asthma in children is higher in the presence of atopic diseases in the family (allergic rhinitis, dermatitis, allergic conjunctivitis, urticaria, Quincke's edema and others). In the presence of a disease in one of the parents, the probability of atopic disease is about 21-40% if both parents have — 41-80%, if allergic diseases are noted in brothers or sisters, then 21-35%. There is also the fact that it is possible to transmit a predisposition by inheritance to hyperproduction of total IgE, synthesized in response to the action of exogenous allergens [9].

The results of provocative tests using specific allergens in contact with the bronchial mucosa lead a patient with allergic rhinitis to respond to the mucous membrane of the nasal cavity. A test from the nasal mucosa can lead to the development of inflammation in the bronchi. These results prove the close relationship between bronchial asthma and allergic rhinitis. They also show that the inflammatory response in these pathologies can be maintained and enhanced by interrelated mechanisms. It follows that patients with allergic rhinitis should be examined for the presence of asthma and, conversely, in patients with bronchial asthma, it is necessary to search for allergic rhinitis [10].

2. MATERIEL AND METHODS

Purpose: to investigate the comorbidity of bronchial asthma and allergic rhinitis in children in the Department of pulmonology.

The retrospective study included the analysis of 51 case histories of children diagnosed with bronchial asthma atopic form admitted to the Department of Pulmonology. 51 patients aged 6 to 18 years were selected as the study group, the average age was 11.2±3.1 years. Among those analyzed, the female subjects were 26 people, and the male ones were 25 children. The patients were diagnosed with bronchial asthma, mild atopic form, controlled course (36 children) and moderate severity of the controlled course (15 children). The duration of the disease was more than 1 year, and included more than 3 periods of exacerbation. All patients used inhaled glucocorticosteroids in small and medium doses for at least a year as basic therapy for bronchial asthma. As part of the study, the children were divided into age groups: the first group — children aged 6-10 years (17 people), the second group – children aged 10-14 years (20 people), the third group – children aged 15-18 years (14 people).

3. RESULTS AND DISCUSSIONS

Of the 51 patients, 28 children were diagnosed with allergic rhinitis after examination by an ENT doctor. After consulting an ENT doctor, 8 subjects were diagnosed with allergic rhinitis in the first study group, 11 children in the second age group were diagnosed with allergic rhinitis, and 9 children in the third study group had allergic rhinitis (Table 1).

Table 1 - Frequency of allergic rhinitis in different age groups

	Allergic rhinitis	ENT pathologies were not detected
General data (51 subjects)	28 children 54,9±7%	23 patients 45.1±7%
1 age group (17 subjects studied)	8 children 47,1±12,5%	9 patients 52,9±12,5%
2 age group (20 subjects studied)	11 children 55±11,4%	9 patients 45±11,4%
3 age group (14 subjects studied)	9 children 64.3±13.3%	5 children 35.7±13.3%

CONCLUSIONS

1. The results of our study showed that patients with atopic bronchial asthma during exacerbation or during disease control have symptoms or a diagnosis of allergic rhinitis in 54.9±7% of cases

2. Age differences in the comorbidity of bronchial asthma and allergic rhinitis between the first group (children aged 6-10 years) and the second group (children aged 10-14 years) are insignificant – p=0.08808.

3. Age differences in the comorbidity of bronchial asthma and allergic rhinitis between the first group (children at the age of 6-10 years) and the third group (children 15-18 years old) it can be considered probable – p=0.044816.

4. Age differences in comorbidity of bronchial asthma and allergic rhinitis between the second group (children 10-14 years old) and the third group (children 15-18 years old) were insignificant – p=0.164938.

5. These results prove a close relationship between bronchial asthma and allergic rhinitis.

6. Based on the data, it is recommended to refer patients with bronchial asthma to an ENT doctor for the presence of allergic rhinitis, on the contrary, in patients with allergic rhinitis it is necessary to carry out diagnosis of the presence of asthma.

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