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MODERN METHODS OF COMPREHENSIVE ASSESSMENT OF THE FACTORS FOR THE FORMATION OF ALLERGIC RHINITIS IN CHILDREN WITH BRONCHIAL ASTHMA

Zokirov Botirjon Qobiljon o`g`li
Candidate of Medical Sciences
Yakubov Nodirbek Ilhomjon o'g'li
Candidate of Medical Sciences
Andijan State Medical Institute
Andijan, Uzbekistan

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Abstract:

Nowadays, there is a tendency to increase the number of all allergic diseases, including the high prevalence of bronchial asthma (BA), as well as an increase in the number of patients with combined pathology. Allergic rhinitis is the leader in the frequency of occurrence with bronchial asthma. 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.

Keywords: bronchial asthma, allergic rhinitis, comorbidity, allergy, patient.

INTRODUCTION. Bronchial asthma (BA) occupies a leading place in the structure of respiratory diseases and is the most important problem of clinical medicine and pulmonology. Asthma is one of the most common chronic diseases of modern society: There are about 300 million asthma patients in the world [1]. A feature of the coming century is the increase in the number of patients with combined pathology. This primarily concerns asthma and allergic rhinitis (AR) [2; 3]. According to epidemiological studies conducted in various countries of the world, the prevalence of AD ranges from 1 to 18%, and the prevalence of AR ranges from 10 to 25% [4].

In our country, the problem of underdiagnosis of asthma remains extremely urgent: its prevalence, according to official statistics, is several times less than the real one. One of the problems is that many patients suffer from incoming respiratory symptoms until they get to a doctor's appointment later. Another important factor leading to an insufficient diagnosis of asthma is the nonspecific nature of the symptoms, which can lead to an alternative diagnosis [5]. All this leads to the progression of the disease, a decrease in the ability to work of patients, late diagnosis, perversion of statistics and increased costs within the framework of public health [6].

The costs associated with AD depend on the level of disease control in a particular patient and the effectiveness of preventing exacerbations. As recent studies have shown [7], the economic burden of uncontrolled asthma is high. Despite the existence of international guidelines and modern effective medicines, the level of BA control remains insufficient in the vast majority of patients with any severity of the disease [8]. To date, the factors influencing the level of disease control remain poorly understood, and there is insufficient information on quality of life (QOL) indicators in patients with BA in combination with AR. For timely diagnosis and prognosis of respiratory diseases in adults, it is of great importance to analyze the relationship between the level of BA control, functional parameters and the degree of inflammation.

THE PURPOSE OF THE WORK. Investigation of the clinical and immunological features of allergic rhinitis in combination with atopic bronchial asthma in children.

MATERIALS AND METHODS. 64 children with a combination of allergic rhinitis and atopic bronchial asthma aged from 4 to 15 years were examined. Of these, 27 are girls and 37 are boys. 60.9% of children had year-round allergic rhinitis (CAR) and 39.1% of patients had seasonal allergic rhinitis (SAR). The comparison group consisted of 30 practically healthy children, representative by gender and age. The diagnosis of allergic rhinitis was carried out in accordance with the recommendations of the European Academy of Allergy and Clinical Immunology (2000) and WHO (ARIA, 2001). All patients underwent mandatory examinations: laboratory (general blood test, cytological examination of nasal smears); X-ray (radiograph of the paranasal sinuses); allergological (collection of allergological, nutritional, pharmacological anamnesis; skin tests with atopic allergens); consultations of specialists: allergologist, otorhinolaryngologist, pulmonologist. The main classes of lymphocytes and their subpopulations (CD3, CD4, CD8,) were counted by the reaction of spontaneous

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rosette formation and indirect membrane immunofluorescence modified on poly-D-lysine using monoclonal anti-lymphocytic antibodies. The functional activity of leukocytes was determined using the phagocytic reaction of polymorphonuclear leukocytes; the reaction of blast transformation of lymphocytes (RBTL); cytopathogenic action (CPD) of lymphocytes by the destruction test of a monolayer of allogeneic fibroblasts (Fedoseeva V.N. et al., 1993); affinity of T lymphocytes (Ea-ROCK) was evaluated by spontaneous rosette formation with sheep erythrocytes according to R. Kerman (1976). The functional activity of B lymphocytes was determined by the concentration of circulating immune complexes according to E. I. Sokolova (1998); the level of serum immunoglobulins (A, M, G) according to G. Mancini et al. (1999); immunoglobulin E by ELISA.

THE RESULTS OF THE STUDY. The majority (66.7%) of the examined patients had a complicated heredity for allergic diseases. The frequency of AR in relatives of patients with BA in combination with AR significantly ($p<0.05$) exceeded the same indicator in isolated asthma (38.1% and 15.2%, respectively). Allergic diseases such as allergic conjunctivitis (68.6% and 6.1%, respectively) and atopic dermatitis (30.5% and 6.1%, respectively) were significantly more common in patients with combined pathology than in isolated BA ($p<0.01$).

Statistically significant ($p<0.05$) in these groups were differences in the frequency of occurrence of drug (34.3% and 12.1%, respectively) and food (34.3% and 15.2%, respectively) allergies in patients. Skin scarification tests revealed that in the group of patients with BA in combination with AR, pollen allergens were the most significant (the incidence of pollen sensitization was 77.1%, in patients with isolated BA – 45.5%). Sensitization to household and epidermal allergens prevailed in the group of patients with isolated BA (90.9% and 60.6%, respectively), which statistically significantly ($p<0.01$) exceeded similar indicators with a combination of BA and AR (74.3% and 34.3%, respectively). The predominance of pollen sensitization in patients with BA in combination with AR can probably be explained by the fact that pollen particles, being high-molecular allergens, settle on the mucous membrane of the upper respiratory tract, especially when their patency is impaired [9].

The incidence of upper respiratory tract pathology in the form of adenoids, curvature of the nasal septum, polyps in patients with BA in combination with AR was 21.9%, which significantly ($p<0.01$) exceeded the same indicator in patients with isolated asthma (3.0%). It was found that in the group of patients with BA and AR, in 42.9% of cases, rhinitis symptoms preceded the appearance of asthma symptoms. However, only 18.1% of patients were diagnosed with AR in a timely manner, in 53.3% of cases it was diagnosed simultaneously with AD, in 28.6% of cases – later. We assessed the level of control over the symptoms of AD using the AST questionnaire. The majority (65.7%) of patients had uncontrolled BA, 28.6% had good control, and only 5.7% of patients had their symptoms completely controlled, which corresponds to literature data [3, 10], according to which complete control over BA was achieved in 5.0% and 3.0% of patients, respectively.

Despite the large number of complaints, the vast majority (81.0%) of the surveyed patients believed that their asthma was under control. The high frequency of cases of patients underestimating their condition can be explained by the fact that patients and doctors have different requirements for the concept of "control over AD". To study the factors determining the level of control over AD when combined with AR, all patients were divided into 2 groups. The first group consisted of 69 patients with uncontrolled asthma (the result of the AST test was <20 points), the 2nd group consisted of 36 patients with controlled asthma (the result of the AST test was from 20 to 25 points).

The average age of patients with uncontrolled BA significantly ($p<0.001$) exceeded the average age in the group of patients with controlled BA (33.4 and 25.4 years, respectively); patients aged > 40 years were 36.2% and 5.6%, respectively. All patients in group 2 were employed, in group 1, 92.8% were employed, and their level of education was significantly lower ($p<0.001$). Among the patients of the 1st group of patients with higher education there were 75.4%, in the 2nd group - 97.2%. In the uncontrolled course of the disease, patients were significantly more likely ($p < 0.001$) to have severe or moderate asthma (89.9%; in group 2 - 44.4%), it was combined with moderate AR (59.4% and 25.0%, respectively), in 33.3% of cases there was concomitant pathology (in group 2 – in 13.9% of cases). No cases of a controlled course of the disease were detected in patients with severe asthma. In the 1st group of patients, indicators of external respiration function (FVD): forced expiratory volume in 1 second (OFV1), forced vital capacity of the lungs (FVC), maximum volume expiratory velocity at 75% FVC (MOS75) were within the normal range in 12 patients (17.4%), moderately They were reduced in 34 (49.3%), significantly reduced in 23 patients (33.3%).

In the group of patients with controlled asthma, these parameters of FVD were significantly more often ($p<0.001$) within the normal range (77.8%)

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and only in 8 patients (22.2%) they were moderately reduced. The anamnesis revealed significant differences in the timing of the diagnosis of asthma. In group 1, this period was 4.5 ± 0.71 years, in group 2 - 2.3 ± 0.71 years, the differences were significant ($p<0.01$). In the group with uncontrolled asthma, 31.9% of patients did not consult a doctor after the first symptoms of the disease appeared, and were treated independently for a long time. Among patients with controlled asthma, long-term self-treatment was noted in 13.9% of cases, the differences were significant ($p<0.05$). At the time of follow-up in group 1, 56.5% of patients did not receive regular basic anti-inflammatory therapy. We assessed the quality of life of patients using a questionnaire from St. George's Hospital. It was revealed that in the observed patients, the QOL values statistically significantly ($p<0.001$) exceed the average values of the scales for healthy people.

In men and women, with almost identical (52.2 and 56.4 points) indicators on the "Symptoms" scale, a statistically significant ($p<0.05$) excess of all unfavorable indicators on the remaining scales in women was revealed. A comparison of QOL indicators in 2 age groups (1st - <40 years; 2nd –> 40 years) showed a significant decrease in QOL with age on all scales ($p<0.001$). Various risk factors play a role in the development and provocation of exacerbations of asthma. The statistically significant ($p < 0.05$) differences in indicators on the "Symptoms" scale in the groups of smokers and non-smokers (65.0 and 54.5 points, respectively) that we have identified prove that smoking is one of such significant factors. There was also a statistically significant ($p < 0.001$) excess of all unfavorable indicators of QOL in patients with secondary education compared with patients with higher education and a significantly higher level of QOL on all scales in working patients compared with non-working ($p < 0.01$). With an increase in the severity of AD, the QOL parameters significantly ($p< 0.001$) worsened on all scales, which is consistent with the literature data [11], where it was noted that the QOL of patients with AD progressively worsens as the severity of the disease worsens.

There was a significant ($p<0.01$) excess of QOL parameters on all scales in patients with BA in combination with moderate AR compared with patients with BA in combination with mild AR. Based on the conducted correlation analysis, a noticeable inverse relationship of QOL indicators with the result of the AST test was revealed. The study of the cytokine profile of patients with AD in combination with AR revealed that in the group of examined patients, serum levels of IL 1-β and IL-8 were 5 times higher, and IFN-γ 2 times higher than the corresponding indicators of the control group. Our comparative analysis of the cytokine profile of blood serum in patients with different levels of AD control revealed a significant ($p<0.05$) increase in IFN-γ and a decrease in IL-8 in patients with uncontrolled asthma. It is known that Th2 lymphocytes and cytokines produced by them play a crucial role in the immunopathogenesis of allergic diseases. The increased content of IFN-γ, which is a cytokine of Th1 lymphocytes, can be explained by the fact that it participates in the maintenance and intensification of already developed allergic inflammation together with cytokines of Th2 lymphocytes. According to the results of the correlation analysis, a direct relationship was found between the level of IFN-γ and the indicator of QOL on the "Symptoms" scale ($r = 0.33$), as well as an inverse relationship between the level of IL-8 and the indicators of the other scales. That is, the higher the score on the "Symptoms" scale, which corresponds to a lower quality of life of patients, the higher the level of IFN-γ and the lower the level of IL-8 in the blood serum.

CONCLUSIONS. Based on the results of the conducted research and comprehensive statistical analysis The following conclusions were drawn:

Drug and food allergies were significantly more common in patients with BA in combination with AR than in patients with isolated asthma (34.3 %), pollen sensitization (77.1 %), concomitant pathology of the upper respiratory tract tay (21.9%), as well as aggravated hereditary AR (38.1%).

The majority of the observed patients (65.7%) had an uncontrolled course of asthma. According to the negative effect of BA in combination with AR on the quality of life of patients.

It was found that when allergic rhinitis was combined with atopic bronchial asthma, morphological and functional disorders of cellular and humoral immunity were noted, more pronounced in the year-round form of allergic rhinitis.

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