CLINICAL AND IMMUNOLOGICAL ASPECTS OF THE CORRELATION BETWEEN ATOPIC DERMATITIS AND BRONCHIAL ASTHMA IN CHILDREN

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ABSTRACT

Clinical features of atopic dermatitis in children with bronchial asthma include: atopic dermatitis with bronchial asthma occurs mainly in boys up to 5 years of age. 60.9% of young children had severe atopic dermatitis with bronchial asthma. In the comorbidity of atopic dermatitis with bronchial asthma, a high diagnostic concentration of specific IgE to food allergens was detected in 72.5% of children.

Keywords: dermatitis, asthma, children, special IgE, clinical aspects.

I. INTRODUCTION

Allergic diseases are among the most common chronic diseases [1,3,9,12,14]. There are about 300 million patients with allergic diseases in the world, of which about 30% are allergic rhinitis, 20% - bronchial asthma and 5-15% - atopic dermatitis. Severe, life-threatening manifestations of the disease are observed in 20% of these patients [2,4,5,7,10]. Atopic dermatitis is a topical problem not only in dermatology and allergology but also in pediatrics due to its high prevalence and frequent recurrence. It is known that atopic dermatitis is associated with bronchial asthma in 10-28% of young children worldwide. In the last 10 years, the comorbidity of the disease in developed countries has increased by 25-60% [1,4,6,8,11,13]. The prognosis usually depends on the severity of the disease and the time of its manifestation.

The purpose of research is to analyze clinical and immunological examinations of 50 children with atopic dermatitis (AD) and BA observed in 2017-2019.

II. MATERIALS AND METHODS

The results of anamnestic, clinical-allergological and immunological studies are presented in the scientific work. Determination of total IgE (HB / ml) in the blood by immuno-chemiluminescent method (COBAS E 411, Russia), serum-specific IgE (HB / ml) by solid-phase IFA method (C.A.R. L.A., System, Russia) was performed in TMA scientific laboratory. We used the SCORAD (Severity Scoring of Atopic Dermatitis) index to measure AD severity in children. This index is calculated using the following formula:

\[ \text{SCORAD} = \frac{A}{5} + 7\times \frac{B}{2} + C \]

where:

A - area of skin injury (%); B – the sum of the objective signs in points (erythema, edema, eczema, excoriation, lichenification, dry skin); C – the sum of the subjective signs in points (itching, sleep disorders); Mild degree of AD - up to 20 points (1-2 times a year, prolonged remission, good response to therapy). AD moderate - 20-40 points (recurrence 3-4 times a year, remission no more than 4 months, no clear response to therapy); Severe AD - more than 40 points (prolonged duration of symptoms, remission not exceeding 2 months, therapy is ineffective). Each subjective mark is rated on a scale of 0 to 10 points; then the points are collected. The total score for subjective characters can range from 0 to 20.
Our study of data from children suspected of having AD with BA showed that 53.5% of those surveyed people complained of an itchy rash in the last 12 months, a more common figure in children of 2-5 years of age. Comorbid occurrence of atopic dermatitis with BA was detected 2.3 times more often in children under 5 years of age than in 5-12 years. The usual location of rashes, on the skin of the elbows, ankles, around the neck area, eyes, and ears, was more common at 5 years of age. When atopic dermatitis was comorbid, 9.2% of children went through a period of complete clinical remission. The rash disappeared completely, and nocturnal awakenings were not observed due to itching and shortness of breath, which was higher in children aged 5–12 years (43.5%). Nighttime sleep disturbances due to itching and shortness of breath were observed in less than one day per week in 35.7% of children and more than once a week in 49.2% of children. This information was higher in children under 5 years of age.

The data show that the prevalence of AD with bronchial asthma was 60.9% in boys under 5 years of age and when distributed by sex (p<0.001). Sensitivity to atopic dermatitis in the first 2 years of age is sensitivity to food proteins [5], and in our study, the symptoms of atopic dermatitis in children under 5 years of age were observed mainly due to food proteins. A study of data from children suspected of having atopic dermatitis with BA showed this in our study. 49.4% of mothers answered positively to the question, “Has it been observed that when your child eats red foods or a lot of sweets, skin rashes are accompanied by shortness of breath?” In our study, etiologically significant allergens in the course of atopic dermatitis in children under 5 years of age with BA: cow’s milk - 67.2%, eggs - 31.9%, cereals - 30.5%, soy - 15.4%, fish - 29.4%, vegetables and fruits - 41.3%.

A study of the anamnesis showed that 89.5% of children had allergic diseases inherited, which was generally consistent with the results of research by many authors [2]. Thus, in one of the parents of the patients we observed, 39.6% of cases had bronchial asthma, 29.5% - allergic rhinitis, 18.3% - pollinosis, 19.5% - food allergy, 18.3% - atopic dermatitis and 12.2% - drug allergies were detected. Mothers aged 20 to 30 years (70.3%) predominated in all groups. Most children were born from second pregnancies (51.8%). A study of gestational age showed that mothers were more likely to be bothered by gestosis (49.5%), anemia (63.5%), and allergies (69.8%) in the second half of pregnancy. It has been noted that the presence of allergic and somatic diseases in most mothers during pregnancy has led to co-occurrence of AD with BA in their children.

Psychoemotional disturbances, especially in children before going to kindergarten and school, during school exams, were expressed in the form of sleep disturbances, anxiety, and emotional lability.

In 42% of young children, erythematos skin rash, shortness of breath, recurrence of cough were observed as a result of hypoallergenic diet disorders or the use of antibacterial drugs in the treatment of observed acute respiratory disease. In the follow-up period, 19.8% of children had recurrences of skin rashes and shortness of breath as a result of hypoallergenic diet disorders.
In our study, AD severity according to the SCORAD index was: mild - 25, moderate - 15, severe - 10 children, and 65% of severe patients were mostly under 5 years of age.

A study of the indications of peripheral blood in sick children in our follow-up showed the following changes. The data suggest that no significant changes in peripheral blood were detected during the disease progression, except for the number of eosinophils in all examined children. The number of eosinophils was 7.2 ± 0.31 higher in the BA with atopic dermatitis (p <0.001) compared to 1.31 ± 0.12 in healthy children.

According to the literature, the range of eosinophils in peripheral blood in healthy children is 1-5%. The comorbidity of atopic dermatitis with BA ranged from 2 to 15%. One of the traditional markers used to diagnose genetically. Diagnostically significant concentrations of IgE specific for allergens in the blood serum of children under examination revealed their sensitivity to household, epidermal, dust and food allergens. Diagnostically significant concentrations of allergen-specific IgE antibodies in the serum of children under examination revealed their sensitivity to household, epidermal, dust and food allergens. Diagnostically significant concentrations of allergen-specific IgE in serum were detected in 92.5% of children. Diagnostically significant concentrations of IgE specific for allergens in the blood serum for food allergens were detected in 72.5% of children. Diagnostically significant concentrations of allergen-specific IgE in blood serum for household allergens were detected in 14.8% of children. Diagnostically significant concentrations of specific IgE in blood serum for food allergens were detected in 19.7%. Diagnostically significant IgE concentrations specific to dust allergens were found in the serum of 15.9% of children.

One of the important factors contributing to the comorbid course of atopic dermatitis with BA are genetically proven allergens that are observed through an allergic reaction. It develops as a result of the body’s sensitivity to allergens. The result is an allergen-specific inflammatory reaction, tissue damage and the appearance of clinical signs of allergic diseases. [5,9]. Special allergological examinations were performed in 50 children confirmed to have a comorbid course of atopic dermatitis with BA. Collection of allergological anamnesis and detection of allergen-specific IgE antibodies in the serum of children under examination revealed their sensitivity to household, epidermal, dust and food allergens. Diagnostically significant concentrations of allergen-specific IgE in serum were detected in 92.5% of children. Diagnostically significant concentrations of IgE specific for allergens in the blood serum for food allergens were detected in 72.5% of children. Diagnostically significant concentrations of allergen-specific IgE in blood serum for household allergens were detected in 14.8% of children. Diagnostically significant concentrations of specific IgE in blood serum for epidermal allergens were detected in 19.7%. Diagnostically significant IgE concentrations specific to dust allergens were found in the serum of 15.9% of children.

IV. CONCLUSION

The clinical features of the comorbidity of atopic dermatitis with BA in children under 5 years of age are as follows: severe course of AD according to the SCORAD index was observed in 65% of children; In 72.5% of children, high diagnostic concentrations of food-specific IgE were detected at the onset of the disease.

Conflict of interests and contribution of authors
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