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COMPLEX ASSESSMENT OF FACTORS FOR THE FORMATION OF ALLERGIC RHINITIS IN CHILDREN WITH BRONCHIAL ASTHMA

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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. In recent decades, there has been an increase in the frequency and prevalence of allergic respiratory diseases worldwide, especially allergic rhinitis (AR) and bronchial asthma (BA) [2,7]. The most alarming data are on the increase in allergic diseases of the respiratory tract in children [6]. It has been established that in large industrial cities of Russia, the incidence of allergies among children ranges from 10 to 40% [3,5]. In a large percentage of cases, children have combined manifestations of allergic respiratory diseases [4]. In recent years, the close relationship between allergic rhinitis and bronchial asthma has been convincingly proven. A number of authors consider allergic rhinitis as the initial stage of development of atopic bronchial asthma [8,1]. AR is a risk factor for the formation of bronchial asthma and precedes its development in 32-64% of cases and is present in 80-90% of patients with asthma. When examining children aged 13 to 17 years with AR and BA, it was shown that 59% of AR phenomena were diagnosed before the onset of atopic bronchial asthma, and 21% of upper and lower respiratory tract diseases appeared simultaneously. Studies conducted in various medical centers indicate that upper respiratory tract dysfunction is an important factor in the development of subsequent lower respiratory tract diseases. The WHO document "Allergic rhinitis and it's impact on asthma" (ARIA), based on the principles of evidence-based medicine, is devoted to this urgent problem [9]. However, if the clinical and immunological features of such a nosological form as bronchial asthma are well studied, then similar information regarding allergic rhinitis, as well as their associations with other atopic diseases in children, are sketchy and often contradictory.

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 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

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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. A comprehensive study of children with a combination of allergic rhinitis and atopic bronchial asthma revealed a positive allergic history in 63.5% of children with seasonal allergic rhinitis and 55.6% of children with CAR. Familial burden in SAR on the mother's side was noted in 37.5% of patients, the father in 35%, and the closest relatives in 27.5%. In case of year-round allergic rhinitis, family burden was detected significantly more often on the mother's side - 55% than on the father's side or next of kin (26% and 20%, respectively).

The analysis of the structure of allergic rhinitis by severity showed the predominance of moderate and severe degrees of the process (65.6% and 18.8%, respectively). The main symptoms of allergic rhinitis were sneezing, rhinorrhea, itching and nasal congestion. In children with a combination of rhinitis and asthma, a complete symptom complex of the disease was detected in 80% of cases. When studying diseases associated with allergic rhinitis, it was found that lesions of the ENT organs, such as pharyngitis, otitis media, impaired patency of the auditory tubes, rhinosinusitis, adenoid vegetations of II-III degrees were present in 98.4% of children.

In addition, allergic eye lesions were observed in the form of allergic conjunctivitis (26.6%), often concomitant with seasonal allergic rhinitis, skin lesions in the form of atopic dermatitis (20.3%) and tracheobronchial tree in the form of tracheobronchitis (34.4%). The analysis of the course of atopic bronchial asthma revealed a mild form in only 10 children. The majority of patients with allergic rhinitis (65.6%) had a moderate form of atopic bronchial asthma, severe course was diagnosed in 12 patients. In 25% of cases, symptoms of allergic rhinitis appeared together with exacerbation of bronchial asthma, most often such a combination was detected with seasonal allergic rhinitis - 62.5% (10 people). In order to study the immune status, all patients were divided into 2 groups.

Group 1 included children suffering from SAR in combination with atopic bronchial asthma - 25 people, group 2 - children with CAR in combination with atopic asthma - 39 people (30.9%). In order to study the functional characteristics of CD3 lymphocytes, the phenomenon of blast transformation under the influence of nonspecific stimulation of the Con-A mitogen was used. In the 1st group of patients, the RBTL level decreased to 36.9±0.36% ($p<0.05$). This decrease progressed with the combination of year-round allergic rhinitis with atopic bronchial asthma to 29.6±0.76% ($p<0.05$). Consequently, all patients showed a statistically significant decrease in the functional ability of peripheral blood lymphocytes to transform into blasts. Lymphocytes, which have a damaging effect in tissue culture, occupy a special place in the general characteristic of effector reactions of cellular immunity. It was found that the cytotoxic effect was manifested in all patients.

Thus, in the 1st and 2nd groups of patients, the cytotoxic index of lymphocytes decreased to 0.358±0.036 and 0.252±0.040, respectively (in the control, 0.912±0.041; $p<0.05$). The study of the affinity of E-receptors of T-lymphocytes showed a uniform decrease in all fractions of Ea-ROCK (Table.2), however, it was statistically significant only in medium- and high-affinity Ea rocks ($p<0.05$). In order to identify the functional state of the B-system, the levels of serum Ig A, Ig M, Ig G, Ig E were determined.

Studies have shown that fluctuations in the parameters of these immunoglobulins were insignificant, only the content of Ig E in patients of all groups was significantly increased and reached a maximum in children with ATS in combination with bronchial asthma. Further studies revealed increased formation of circulating immune complexes in patients with AR. In group 1, the concentration of CEC was 187.6±2.3 units. (in the control - 116.0 ± 2.2 $p<0.05$), in group 2 - 215.2±6.7 units ($p<0.05$). The phagocytic activity of neutrophils was studied in children. Phagocyte activity was expressed in terms of phagocytic index. The phagocytic index in the 1st group of patients (SAR + BA) was 43.6 ± 0.6%, in the second group (CAR + BA) - 38.2± 1.3%. In the control group, this indicator was 55.8 ±2.2% ($p<0.05$). One of the important indicators characterizing the protective role of the phagocytosis system is the phagocytic number, reflecting the ability of cells to capture pathogens.

The phagocytic number in patients in the first group (CAP+ BA) was 4.92±0.97 cu; in the second group (CAR+ BA) - 3.90±0.54 (in the control - 5.31±0.15 CU; $p>0.05$). Consequently, despite some fluctuations in the phagocytic number, the differences between the groups were not statistically significant. On the contrary, the determination of phagocytosis completion indicators (PPF) revealed a significant decrease in the digesting function of phagocytes. Thus, in patients of the first group, the PF was 28.19 ± 0.72% (in the control group - 39.24± 1.23%; $p>0.05$), and in children of the second

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group, the decrease in this indicator progressed to 19.76±0.36%.

Thus, the study of the phagocytic reaction of peripheral blood neutrophils in children with allergic rhinitis in combination with atopic bronchial asthma revealed a significant decrease in the values of the phagocytic index in all the studied groups, which indicates a decrease in the number of neutrophils with phagocyte functions. At the same time, the average number of microbes absorbed by one active neutrophil changed slightly. However, the killing function suffered significantly, and the phagocytosis completion rate was significantly reduced in all patients.

CONCLUSIONS. Thus, the conducted studies have shown that the clinical features of allergic rhinitis in combination with atopic bronchial asthma were a more severe course of both diseases, a large number of concomitant complications.

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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