

FEATURES OF THE RISK OF BRONCHIAL ASTHMA IN CHILDREN WITH OBSTRUCTIVE BRONCHITIS

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Summary. The development of prognostic markers for the risk of developing bronchial asthma in children with obstructive bronchitis will improve the quality of diagnosis of this disease and promptly begin a set of treatment and preventive measures, which will prevent disability in this group of patients.

Key words: bronchial asthma, obstructive bronchitis, immunology, children.

ОСОБЕННОСТИ РИСКА РАЗВИТИЯ БРОНХИАЛЬНОЙ АСТМЫ У ДЕТЕЙ С ОБСТРУКТИВНЫМ БРОНХИТОМ

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Резюме. Разработка прогностических маркеров риска развития бронхиальной астмы у детей с обструктивным бронхитом позволит повысить качество диагностики данного заболевания, своевременно начать комплекс лечебно-профилактических мероприятий, что позволит предотвратить инвалидизацию данного контингента больных.

Ключевые слова: бронхиальная астма, обструктив бронхит, иммунология, дети.

ОБСТРУКТИВ БРОНХИТЛИ БОЛАЛАРДА БРОНХИАЛ АСТМА ХАВФИ ХУСУСИЯТЛАРИ

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Хулоса. Обструктив бронхит билан оғриган болаларда бронхиал астманинг ривожланиш прогностик маркерларини ишлаб чиқиш, ушбу касалликни ташхислашни сифатини оширади, даво профилактик тадбирларини комплекс равишда ўз вақтида бошлашга олиб келади, бу эса ўз навбатида беморларнинг инвалидизациясни олдини олади.

Калит сўзлар: бронхиал астма, обструктив бронхит, иммунология, болалар.

Relevance . Allergic pathology is one of the pressing problems of modern medicine. According to epidemiological studies, allergic diseases affect from 15 to 25% of the child population. The development of allergic diseases is closely related to the influence of genetic and environmental (ecological) factors. Knowledge of various risk factors for allergic diseases can contribute to its prevention [1, 2, 3, 6]. The modern concept of the pathogenesis of allergic diseases represents immune disorders as key in the initiation of the disease and clinical manifestations of the pathology [4, 5]. Therefore, we studied risk factors for allergic diseases, some aspects of immunopathogenesis using studies of immune defense indicators, their diagnostic and prognostic value.

Purpose of the study : to establish the prognostic significance of risk factors for the development of bronchial asthma in children with obstructive bronchitis.

Materials and methods of research : a total of 96 children aged 1 to 14 years were examined: 62 (64.6%) of them were patients diagnosed with obstructive bronchitis (OB) and 34 (35.4%) with bronchial asthma (BA) .

The group of children with asthma consisted of 34 patients, of which 2 (5.9%) patients were diagnosed with a mild intermittent form of the disease, 6 (17.6%) with a mild persistent form, 18 (52.9%) with a moderate form and 8 (23.5%) severe asthma.

In 58.8% of cases, a controlled course was observed, and in 41.2%, an uncontrolled course of the disease was observed.

The control group consisted of 40 practically healthy children.

The study used the study of life history and illness, genealogical analysis of the pedigree, assessment of the current somatic status, immunological - Ig E , M , G , general clinical tests: complete blood count, instrumental: spirometry (for patients over 5 years old), peak flowmetry, sequential Wald analysis.

Study results : The average age of patients with OB was 4.5 ± 0.5 years, and with BA – 8.1 ± 0.9 . As can be seen from the data obtained, the manifestation of the disease in children was observed much earlier compared to children with asthma. As can be seen from the presented data, boys predominated in both groups , their ratio was 1:2.4.

To solve the set tasks, a comprehensive examination was carried out in the work, including copying information from medical records, questioning parents, analyzing risk factors of genealogical, social and biological history, assessing allergy history, clinical examination with assessment of health status, and studying laboratory and functional parameters .

Most children had concomitant diseases. Children of early and preschool age were characterized by such concomitant diseases as anemia, constitutional anomalies, and chronic nutritional disorders. Recurrent respiratory infections were equally common in infants and preschool children. The cause of exacerbation of the underlying disease in 22.9% was recurrent respiratory infections. It is known that one of the main

risk factors for recurrence of the disease is the presence of foci of chronic infection in the child. A third of the examined patients had chronic ENT pathology. Digestive diseases were observed in 16.7% of the examined children. The state of the child's nervous system plays an important role during the course of the disease. Dysfunction of the autonomic nervous system was detected in 25.0% of patients, which undoubtedly complicates the course of the underlying disease.

A comparative analysis of a generalized family portrait of children with allergic diseases and a generalized family portrait of a population of practically healthy children revealed that children from families with allergies are more frequently affected by allergic diseases than children from families where parents do not have allergic diseases. It turned out that first-degree relatives more often suffered from allergic diseases, which in relation to the total number of patients in this concentration is 38.9%. Hereditary complications were observed more often on the maternal side. The familial nature of the disease occurred equally often in both boys and girls. A comparative analysis of anamnestic information showed that patients with a verified diagnosis of BA were significantly more likely to have a hereditary burden of atopic diseases: in 43.4% of cases versus 21.5% in the group with OB ($p < 0.05$). A positive atopic history on the maternal side was observed almost 2.6 times more often than on the paternal side ($p < 0.01$).

In the group of children with OB, the genealogical history was dominated by factors indicating a hereditary impairment of anti-infective defense ($p < 0.05$): the presence of recurrent and chronic inflammatory diseases of the upper and lower respiratory tract in parents and close relatives.

Analysis of the pathology of pregnancy shows the presence of a more pronounced burden of biological history during all periods of ontogenesis in the group of children with asthma. The reason for the risk of developing allergies in a child is foci of chronic infection in the mother, a high proportion of diseases such as acute respiratory viral infections, gestosis in the second half of pregnancy, allergic manifestations during pregnancy in the mother, antigenic and drug load in the second half of pregnancy, which indicates the possibility of intrauterine sensitization fetus

A study of allergenic factors in the living environment revealed a statistically significant difference: in families of children with early manifestations of allergies and family history, the frequency of allergenic factors in the home is lower compared to families without atopy (51.6% and 73.3%, respectively). This result apparently indicates that parents whose children suffer from allergic diseases are better informed about the need to maintain a hypoallergenic home environment.

An analysis of diet violations by pregnant and lactating mothers found that 61.6% of mothers violated their diet during pregnancy. The results of our research convincingly indicate that the presence of unfavorable environmental factors in which

pregnant women live, their diet, bad habits, and drug therapy contribute to the formation of atopic status in their children.

Clinical manifestations of allergic diseases in children with allergic diseases were quite varied and depended not only on the age and duration of the disease, but also on the etiological factors of the disease. The manifestation of allergic diseases in the children we examined began with symptoms of food allergy, often manifested by atopic dermatitis. It debuted mainly in the first year of life and was the first sign of atopic disease. In children with food allergies and atopic dermatitis, functional gastrointestinal disorders were noted in 60% of cases and respiratory pathology in 30% of cases.

Calculation of indicators of the information content of the allergy history (AA) method allowed us to determine the value of the coefficient equal to 68.7%, with a higher specificity - 84.2%. False-positive data were observed in 15%, and false-negative data in 30% of patients. It was revealed that the diagnostic significance of the positive results of the AA method reached the level of 83.8 %, with the prognostic significance of negative results being 69.4%. When studying the acceptability of the AA method for identifying causally significant food allergens , it was found that it has the greatest information content for identifying sensitization to the majority of obligate allergens: fish, honey, egg whites, citrus fruits and the least to everyday food products: wheat flour, beef, milk .

Skin tests revealed sensitization to egg white (32%), fish (30%), chicken (28%), lemon (25%), oranges (23%), tomatoes (23%), milk (22%) , grapes (21%).

An analysis of the immune status of children with allergic diseases revealed the presence of inhibition of nonspecific defense and specific immunity, inflammatory dissonance, which is an unfavorable prognostic sign characterizing the worsening of the pathological process.

The study of the humoral component of immunity revealed the presence of a significant difference between the groups of children with OB and BA with the values of the control group in the content of Ig E and Ig G in the peripheral blood serum (Table 1). It is known that IgG is a numerous and main class of immunoglobulins, very important in the fight against infectious agents. The study of IgG concentration showed a significant difference in patients with OB (1.3 ± 0.05 versus 0.8 ± 0.07 , $P < 0.05$). Children with asthma also showed a significant increase in IgG (1.01 ± 0.05 versus 0.8 ± 0.07 , $P < 0.05$).

The concentration of IgE in the blood serum in children with OB was 148.2 ± 22.4 IU/ml, while in children of the control group it was 12.8 ± 1.0 IU/ml ($p < 0.001$), in the group of children with BA – 244.8 ± 30.2 ($P < 0.001$). As can be seen, in children with OB, IgE was increased on average by 11.6 times compared to the control group, and in BA by 19.1 times.

Table 1

Indicators of humoral immunity in children with OB and BA, M±m

Immunity indicators	Control group, (n=20)	with OB (n=31)	With asthma (n=13)
IgG	0.8±0.07	1.3±0.04*	1.01±0.05*
IgE, pg/ml	12.8±1.0	148.2±22.4***	244.8±30.2

Note: * - significance of differences with the norm ($p < 0.05$), ***- $P < 0.001$

The immune response develops according to the Th1 type, which suggests that the formation of a focus of infectious inflammation in the bronchial wall plays a leading role in the occurrence of OB symptoms in these patients. A distinctive feature of the immune response in asthma is its Th2-direction, which leads to hyperproduction of IgE.

An increase in IgE and IgG levels in the humoral immune system indicates that children with OB have a tendency to develop AD. Overproduction of IgE predicts the development of repeated episodes of OB in the examined children, which can subsequently lead to the transition of the disease to bronchial asthma.

Thus, the significant increase in IgE content in the peripheral blood serum that we identified in children with obstructive bronchitis is an unfavorable prognostic sign indicating the progression of the disease, which requires monitoring these patients with regard to the prognosis of BA development. The development of clinical and immunological foundations for the prognosis of the development, course and outcome of bronchial asthma in children will make it possible to timely plan and carry out treatment and preventive measures to prevent an unfavorable outcome of the disease.

Using sequential Wald analysis, prognostic coefficients were calculated to determine the likelihood of allergy development, its course and outcome.

We conducted a retrospective assessment of data on the premorbid background of the examined children to search for criteria that, even at the first symptoms of bronchial obstruction at an early age, would allow us to differentiate bronchial asthma. At the same time, clinical and anamnestic data were compared in the groups of patients with BA and OB. The comparison was made using 65 different indicators, some of them are shown in Table 2. Hereditary burden of allergic diseases and atopic manifestations predominated in the group of patients with asthma, while passive smoking, nonspecific lung diseases in relatives, and infectious diseases in the first month of life were more often noted in a group of children with OB.

Analyzing the features of the course of the disease at an early age, we can identify the following symptoms, which are characteristic mainly of children with asthma: an increase in the severity of obstruction over time; cough, shortness of breath during physical and emotional stress, inhalation of cold air. In the majority of children

with OB, the syndrome developed against the background of ARVI, only subsequently began to experience attacks of difficulty breathing under the influence of non-infectious factors.

Forecasting is based on knowledge of the laws of development of nature, society, thinking and the ability of the human brain to anticipate, anticipate, and proactively reflect reality - anticipation. The main goal of medical forecasting is to reduce the uncertainty of the future. It is clear that the forecast is justified only if the determining factors underlying it remain unchanged. Using the terminology of sociologists, a probabilistic forecast answers the question of what is most likely to happen if existing trends continue. Hence the multivariate nature of the medical prognosis and the mandatory provision for the possibility of adjustments. When forecasting, we study not only established and established patterns in children's health, but also what will arise and undergo changes. This feature of medical prognosis is associated with modern theoretical concepts of the general system theory, according to which the human body belongs to a complex system, probabilistic in nature, and physiological and pathological conditions are not strictly determined and are described by probability. The probabilistic approach takes into account that phenomena, when they are repeatedly reproduced, proceed somewhat differently each time.

Another, no less important feature of medical prognosis, arising from the probabilistic approach, is its active nature, which means the possibility of indirect or direct influence on the object of the forecast: for example, the early introduction of general or specific preventive and therapeutic interventions, additional research, more regular monitoring.

The purpose of medical forecasting is to reduce uncertainty about the future. One of the most important consequences arising from it is the possibility of targeted early active influence on the object of forecasting. In this case, apparently, it is necessary to take into account the existing opinion that the accuracy of forecasts decreases in proportion to the square of time. Accordingly, the nature, type, level of specificity of the decisions made cannot but be associated with the degree of remoteness of the forecast object from possible influences, and all states between health and disease are considered as qualitative micro-leaps preceding the macro-leap - the actual developed disease.

The development of prognostic criteria for the development of allergies in children can contribute to the early diagnosis of the disease and, accordingly, the timely prescription of adequate therapy. By helping to identify very early signs of the disease, prognosis allows us to approach the earliest stages of the pathological process, highlighting the periods in which the process of sanogenesis is most likely, helps to better understand the pathogenesis of the disease. Using sequential Wald analysis,

prognostic coefficients were calculated to determine the likelihood of allergy development, its course and outcome.

As can be seen from the table, unfavorable prognostic information is carried by signs indicating a woman's age under 18 years and over 35 years, the presence in the family of at least two patients with allergies, with chronic infectious and allergic diseases 2 or more, pathology of pregnancy, artificial feeding from the first days of life, the presence of RRI in the child, **frequent episodes of wheezing, and** constitutional abnormalities in the child, an increase in IgE concentration by 2 or more times.

With a sum of PC points (± 10.0) (90% probability level or 8 chances out of 10), we can talk about a very high probability of the predicted event occurring; with a sum of PC points (± 6.0), we can talk about a 4-fold increase in risk; with the sum of PC points ($\pm 3.0-5.5$), we can talk about the possible fulfillment of the predicted event.

Thus, the analysis of the immune status in children with allergic diseases revealed the presence of inhibition of nonspecific defense and specific immunity, inflammatory dissonance, which is an unfavorable prognostic sign characterizing the worsening of the pathological process. The development of clinical and immunological foundations for the prognosis of the development, course and outcome of bronchial asthma in children with obstructive bronchitis will make it possible to timely plan and carry out treatment and preventive measures to prevent an unfavorable outcome of the disease. Modern, safe, and at the same time effective drugs are offered as preventive measures, leading to accelerated relief of inflammatory manifestations in the bronchi and improved immunity.

Thus, the development of clinical and immunological foundations for the prognosis of the development, course and outcome of bronchial asthma in children with obstructive bronchitis will make it possible to timely plan and carry out treatment and preventive measures to prevent an unfavorable outcome of the disease. Modern, safe, and at the same time effective drugs are offered as preventive measures, leading to accelerated relief of inflammatory manifestations in the bronchi and improved immunity.

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