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CLINICAL AND IMMUNOLOGICAL FEATURES OF BRONCHOOSTRUCTIVE SYNDROME IN CHILDREN OF EARLY AND PRESCHOOL AGE

Allanazarov Alisher Baymuradovich
Assistant of the Department of Pediatrics № 1
Samarkand State Medical Institute

ANNOTATION

At present, all over the world, the study of the phenotypes of bronchial obstruction in children of early and preschool age remains a subject of great scientific interest. The identification of phenotypes is necessary for a better understanding of the etiopathophysiological, including epigenetic, mechanisms of the disease, the determination of predictors and the prediction of the risk of BA. In this regard, the aim of the study was to study the clinical and immunological features of broncho-obstructive syndrome in children of early and preschool age. On the basis of the SF of RSCEMA, 111 patients aged from 1 to 6 years were examined. The results of the study showed that under conditions of prolonged antigenic load, humoral immunity is activated; children with RSMS have hyperimmunoglobulinemia G and M, which is the cause of incomplete immunity.

Key words: *Bronchial obstructive syndrome, bronchial asthma, immunoglobulin, interleukin.*

ЭРТА ВА МАКТАБГАЧА ЁШДАГИ БОЛАЛАРДА БРОНХООБСТРУКТИВ СИНДРОМНИНГ КЛИНИК ВА ИММУНОЛОГИК ХУСУСИЯТЛАРИ

Allanazarov Alisher Baymurodovich
1-son pediatriya kafedrasi assistenti
Samarqand davlat tibbiyot instituti

ANNOTATSIYA

Ҳозирги кунда бутун дунёда эрта ва мактабгача ёшдаги болаларда бронхиал обструктсиянинг фенотипларини ўрганиш катта илмий қизиқиш

мавзуси бўлиб қолмоқда. Фенотипларни аниқлаш этиопатофизиологик, шу жумладан касалликнинг эпигенетик механизмларини, предикторларни аниқлаш ва БА хавфини башорат қилишни яхшироқ тушуниш учун керак. Шу муносабат билан, тадқиқотнинг мақсади эрта ва мактабгача ёшдаги болаларда бронхо-обструктив синдромнинг клиник ва иммунологик хусусиятларини ўрганиш бо'лди. РШТЁИМ СФ асосида 1 ёшдан 6 ёшгача бўлган 111 бемор болалар текширилди. Тадқиқот натижалари шуни кўрсатдики, болаларда узоқ давом этадиган антижен та'сири шароитида гуморал иммунитет фаоллашади; РСли болаларда Г ва М гипериммуноглобулинемия кузатилади, бу эса тўлиқ бўлмаган иммунитетнинг шаклланишига сабаб бо'лади.

Калит сўзлар: *Бронхиал обструктив синдром, бронхиал астма, иммуноглобулин, интерлейкин.*

КЛИНИКО-ИММУНОЛОГИЧЕСКИЕ ОСОБЕННОСТИ БРОНХООБСТРУКТИВНОГО СИНДРОМА У ДЕТЕЙ РАННЕГО И ДОШКОЛЬНОГО ВОЗРАСТА

Алланазаров Алишер Баймурадович
Ассистент кафедры Педиатрии №1
Самаркандский государственный медицинский институт

АННОТАЦИЯ

В настоящее время во всем мире изучение фенотипов бронхиальной обструкции у детей раннего и дошкольного возраста остается предметом большого научного интереса. Идентификация фенотипов необходима для лучшего понимания этиопатофизиологических, в том числе эпигенетических, механизмов заболевания, определения предикторов и прогнозирования риска развития БА. В связи с этим целью исследования явилось изучить клинико-иммунологическую особенность бронхообструктивного синдрома у детей раннего и дошкольного возраста. На базе СФ РНЦЭМП обследовано 111 пациентов в возрасте от 1 года до 6 лет. Результаты исследования показали, что в условиях длительной антигенной нагрузки активируется гуморальный иммунитет, у детей с РСРС отмечается гипериммуноглобулинемия G и M, являющаяся причиной неполного иммунитета. Инициирование активности через IL-6 макрофагального звена иммунной системы как неспецифического защитного фактора приводит к увеличению кислородзависимых механизмов.

Ключевые слова: *Бронхиальный обструктивный синдром, бронхиальная астма, иммуноглобулин, интерлейкин.*

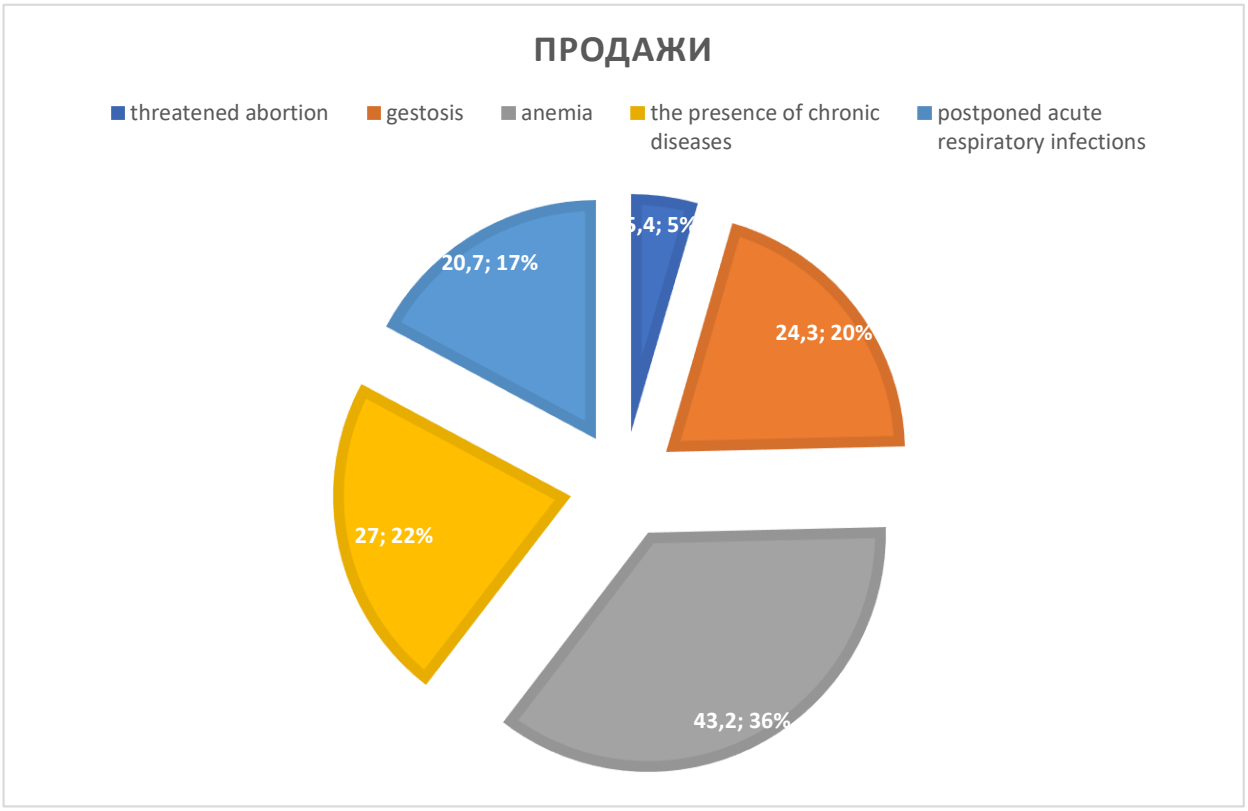
RELEVANCE

One of the leading places in the structure of chronic childhood diseases is bronchial asthma (BA). Over the past three decades, there has been an increase in the incidence of this disease, which, according to the World Health Organization (WHO), affects at least 235 million people in all countries of the world, regardless of their level of development, regardless of age, race, national re- strictions [14 ,16]. Despite the progress achieved in the diagnosis and treatment of this nosology, which has led to a decrease in the number of hospitalizations and related deaths, BA remains an urgent medical, social and economic problem in pediatrics. Globally, about 50% of all young children have at least one episode of bronchial obstruction syndrome (BO) [1], and more than half of them (57.5%) have episodes of recurrent obstruction, despite this, only 30-40% of they will develop bronchial asthma (BA) at an older age [6,8]. The remaining episodes of bronchial obstruction after 6 years of age will not recur [11]. The issues of phenotyping of broncho-obstructive syn-drome in young and preschool children are outlined in the Global Strategy for the Treatment and Prevention of AD (GINA), revised in 2019 and in subsequent years [3,7]. At present, all over the world, the study of the phenotypes of bronchial obstruction in children of early and preschool age remains a subject of great scientific interest. The identification of phenotypes is necessary for a better understanding of the etiopathophysiological, including epigenetic, mechanisms of the disease, the determination of predictors and the prediction of the risk of AD development.

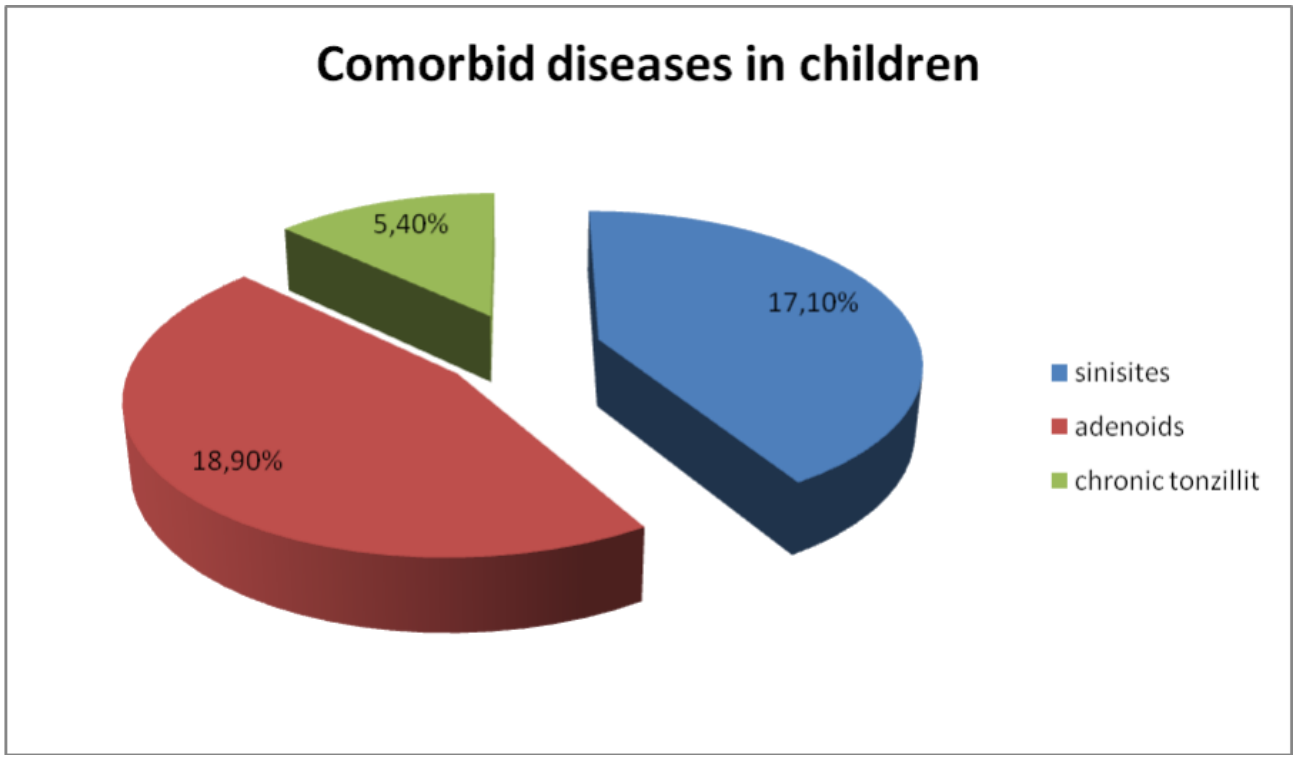
PURPOSE OF THE STUDY: to study the clinical and immunological features of broncho-obstructive syndrome in children of early and preschool age.

MATERIALS AND METHODS OF RESEARCH: The research was carried out on the basis of our own obser-vations and data from medical records. Informed consent was obtained from all patients to participate in the study. At the first stage, BO was identified. To solve the tasks at admission, a survey of parents was carried out, followed by the study of anthropometric data, the characteristics of the course of the neonatal period. Allergic and hereditary history, medical history: frequency of

bronchial obstruction syndrome, relationship of BOS with respiratory diseases and other triggers, clinical response to ongoing therapy and reversibility of symptoms after drug withdrawal were evaluated. Asthma susceptibility index analyzed (API - Asthma Predictive Index, modified in 2008 [2,9]). All observed children were examined by convention-al clinical, laboratory and instrumental methods. blood test, CRP, streptolysin O, thymol test), chest xray, electrocardiography, bacteriological examination of the throat and nasal swabs, pulse oximetry, bronchophonography. Immunological examination included: determination of the level of absolute and relative amount of T- and B-lymphocytes of peripheral blood; study of the phagocytic link of immunity with the calculation of the percentage and index of phagocytosis, the level of IgA, IgM, IgG, total IgE, detection of circulating immune complexes. Levels of cytokines (IL-1β, IL-4, IL-6, IL-8) in the first tenth day of inpatient treatment.



Picture 1. Adverse risk factors for mothers during pregnancy



Picture 2. Comorbid diseases in children with BOS.

RESEARCH RESULTS: On base of SB of RSCEMA 111 patients were examined at the age from 1 to 6 years. The following unfavorable pregnancy factors were revealed in mothers of children with recurrent BOS: the threat of termination of pregnancy 27 (24.3%), gestosis 48 (43.2%), anemia during pregnancy 30 (27%), the presence of chronic diseases in the mother 23 (20 , 7%) who had acute respiratory infections during pregnancy 6 (5.4%).

Recently, there are more and more scientific works reflecting the relationship between recurrence of BOS and low birth weight, for the first time this risk factor was described in the Global Initiative on Asthma (GINA) 2002 [5,15,16]. Noteworthy is the high incidence of allergic reactions in children with RBOS 40 (36.1%), such as: a history of food allergy, the frequency of occurrence was 17 (15.3%); drug allergy, frequency of occurrence - 19 (17.1%); sensitization to household allergens was detected in 4 (3.6%). All of the above factors were classified as minor criteria, and in

the absence of their combinations, the asthma susceptibility index - API in the analyzed children was assessed as negative.

Analysis of hereditary predisposition to allergic reactions showed that food allergy and allergic rhinitis are found in 9 (8.1%) mothers of children with PCP; manifestations of allergic diseases in the father were noted in 7 (6.3%) of the study group; in the anamnesis of some children there were indications of the presence of allergic diseases in secondline relatives. Sex and age characteristics were also assessed. Despite the fact that boys predominated in the analyzed group, no statistical significance was found. On the part of the child, the presence of comorbid diseases was assessed: 19 (17.1%) children were diagnosed with sinusitis, 21 (18.9%) - adenoiditis, 6 (5.4%) - chronic tonsillitis (pic. 2).

Analysis of hemograms, immunological status, cytokine levels did not reveal significant differences between the comparison groups, with the exception of the IgE value; therefore, the IgE level in the RB children group (n = 111) was 38.4.

M ± 2.5 IU / ml, in the control group (n = 30) -28.2 ± 2.3 IU / ml, p = 0.001. Comparative analysis of the level of cytokines IL-1β, IL-4, IL-6, IL-8 did not reveal significant differences in the analyzed groups. Studying the cytokine profile, we identified the most significant risk factor for RBOS, which is characterized by different from the reference values in the direction of increasing IL-6, with a value of $\chi 2 = 7.657$, p = 0.005. The scientific literature contains data on the possible participation of IL-6 in the pathogenesis of RBOS [10, 13]. In his work, D. Hirani showed that in response to damage (barotrauma, oxygen poisoning, infection, hypoxia), inflammation is formed in the airways due to the activation of macrophages and the synthesis of IL-6 [12]. Thus, such significant risk factors as hyperimmunoglobulinemia G and M, increased levels of IL-6 characterize the im- mune system of children with RSRS and an initially low asthma susceptibility index - API, a feature of which is the intensity of the immune response, contributing to the persistence and recurrence of bacterial infection [11.14].

CONCLUSIONS: Thus, it is possible that under conditions of prolonged antigenic load, humoral immunity is activated; children with RSMS have

hyperimmunoglobulinemia G and M, which is the cause of incomplete immunity. The initiation of activity through IL-6 of the macrophage link of the immune system as a nonspecific protective factor leads to an increase in oxygen-dependent killing mechanisms and reserve capacities of phagocytes in the early stages of the disease, followed by a decrease in the reserve capacities of phagocytes as a result of im-paired adaptive capabilities.

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