JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205

Volume 14 Issue 08, August 2024

Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

DEPENDENCE OF THE DEVELOPMENT OF BRONCHIAL ASTHMA IN CHILDREN FROM FUNCTIONAL IMMATURITY OF THE IMMUNE SYSTEM

MM. Madumarova
Senior Lecturer Andijan State Medical Institute
N.I. Alimov
5th year student Andijan State Medical Institute

Annotation. Allergic pathology in childhood has been studied in detail, the development of which may be facilitated by the functional immaturity of the innate immune system. Studies have confirmed the predominance of atopic bronchial asthma in children of the first years of life. IgE plays a leading role in the mechanism of their development.

Keywords: allergic diseases, IgE, bronchial asthma, atopy, hereditary predisposition, interleukins, MAST method.

RELEVANCE OF THE TOPIC

Allergic diseases are the most common pathology in childhood. Bronchial asthma is a common disease among adults and children. There has been a twofold increase in the prevalence of bronchial asthma over the past two decades, while the frequency of its detection in children, according to epidemiological studies, is 5–10%. In 67% of children with bronchial asthma, the onset of the disease occurs before the age of 5 years. The formation of allergies in children in most cases occurs in the first years of life, which is associated with the significant influence of atopy on the development of these diseases, which is characterized by a hereditary predisposition to allergic diseases and increased production of IgE to exogenous allergens. At the same time, atopic diseases such as bronchial asthma, atopic dermatitis, allergic rhinitis, hay fever are most often detected in families; Some families show a predisposition to food and drug allergies. The more pronounced the burden of heredity with allergic reactions and diseases, the higher the risk of their occurrence in born children and the earlier manifestation of allergy manifestations.

PURPOSE OF THE STUDY

To study the factors influencing the development of bronchial asthma and its course in children.

MATERIALS AND METHODS OF RESEARCH

The study was carried out in the Andijan Regional Children's Clinical Hospital in the pulmonology department. 100 children with bronchial asthma, aged from 1 to 5 years, were examined, of which 42 (42%) children were aged from 1 to 2 years, 58 (58%) children were from 3 to 5 years. Among the observed children, there were 16 (16%) with a mild intermittent course of bronchial asthma, 42 (25%) with a mild persistent course, 25 (25%) with a moderate course and 17 (17%) children with a severe course of bronchial asthma.

RESULTS OBTAINED

The presence of anatomical and physiological characteristics of the bronchopulmonary apparatus in children of the first years of life affects the clinical manifestations of bronchial

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 14 Issue 08, August 2024
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

asthma. The anatomical and physiological features of the bronchopulmonary apparatus in children of the first years of life include: the presence of a narrow lumen of the bronchi, hyperplasia of the mucous glands, reduced elasticity and contractility of the lungs, insufficient development of the muscular system, the presence of an abundant network of lymphatic and blood vessels, limitation of respiratory movements due to the horizontal position of the diaphragm. These factors contribute to a generally more pronounced impairment of bronchial obstruction during exacerbation of bronchial asthma in this age group of children. The main risk factors for bronchial asthma in children include the presence of bronchial asthma in parents, atopic dermatitis, food allergies and sensitization to inhaled allergens in children; Minor risk factors for the occurrence of bronchial asthma include allergic rhinitis, bronchial obstruction syndrome against the background of an acute respiratory viral infection. Smoking of parents, and especially mothers, is considered an additional risk factor for the development of bronchial asthma. 90% of children who experienced repeated bronchial obstruction up to 3 years after bronchiolitis caused by respiratory syncytial virus infection develop bronchial asthma by 6 years of age. When analyzing anamnestic data, hereditary burden with allergic reactions and diseases was identified in 103 (86%) children with bronchial asthma, while it occurred on the mother's side in 50 (49%) children, on the father's side in 36 (35%) children, and in both lines – in 17 (16.2%) children, which indicates a significant influence of genetic factors on the development of this disease. In 72 (60%) of the observed children, the onset of bronchial asthma was preceded by atopic dermatitis, in 6 children there was a simultaneous development of bronchial asthma and atopic dermatitis. In 38 (32%) children, the onset of bronchial asthma was preceded by food allergies caused by sensitization to cow's milk proteins, eggs, fish, cereals, some vegetables and fruits; At the same time, sensitization to food products was causally significant in the development of atopic dermatitis and gastrointestinal allergies. In 7 (5.8%) children, the onset of bronchial asthma was preceded by year-round and in 6 (5%) by seasonal allergic rhinitis. In the first year of life, 82 children (68.3%) suffered an acute respiratory infection, of which 50 (41.6%) more than 3 times a year. Pneumonia prior to bronchial asthma occurred in 19 (15.8%) patients. 2 (1.6%) children were observed for bronchopulmonary dysplasia before developing bronchial asthma. These low birth weight infants were mechanically ventilated due to developing respiratory failure. Manifestation of bronchial asthma in the first year of life was observed in 10 (8.3%) children, in the second year - in 27 (22.5%) children, in the 3rd year - in 45 (37.5%) children, at the 4th year – in 28 (23.3%) children and at the 5th year – in 10 (8.3%) children. In a number of patients, the development of bronchial asthma was facilitated by exposure to unfavorable environmental factors: the presence of high humidity was found in living quarters in 56 (46.9%) patients, and passive smoking was noted in 38 (32%) patients. The first attack of bronchial asthma in 80 (67%) children was caused by an acute respiratory infection. The occurrence of subsequent attacks was caused by acute respiratory infection (65%), physical activity (30%), contact with household allergens (27%), psycho-emotional stress (25%), contact with pollen (10%), pets (10%), changes in the weather situation (8%), introduction of vaccines (DPT, BCG) - 6%. When examining children in the first years of life, other allergic diseases and reactions were identified: food allergy (39%), atopic dermatitis (30.8%), persistent allergic rhinitis (14%), intermittent allergic rhinitis (14%), hay fever (6 %). When conducting an allergological examination using scratch skin tests in 77 patients, sensitization to house dust allergens was revealed - in 24 (30.6%) children, Dermatophagoides pteronyssinus - in 21

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 14 Issue 08, August 2024
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

(27.3%), Dermatophagoides farinae - in 17 (22.1 %), food allergens – in 15 (19.5%) and epidermal allergens – in 14 (18.2%) children. Positive skin tests for two or more groups of allergens were detected in 69 (90%) children with bronchial asthma, which indicates the predominance of polyvalent sensitization in children of the first years of life suffering from bronchial asthma. When examining 50 children with bronchial asthma in the first years of life using the MAST method, sensitization to house dust allergens was detected in 6 (12%) children, Dermatophagoides pteronyssinus - in 7 (15%), Dermatophagoides farinae - in 7 (15%), to mold allergens mushrooms – in 2 (4%), pets – in 5 (11%), pollen allergens – in 5 (11%), food allergens – in 7 (14%) children. During an allergological examination, an increase in the level of total IgE in the blood serum was found in 108 (90%) children of the first years of life suffering from bronchial asthma, while an increase in the level of total IgE in the blood serum from 61 to 150 IU/ml was detected in 51%, from 150 to 400 IU/ml – in 21%, from 400 to 800 IU/ml – in 12%, above 800 IU/ml in 6% of the examined patients. The highest levels of total IgE in the blood serum were detected in children with diseases concomitant with bronchial asthma, such as atopic dermatitis, hay fever, food allergy, and in children with polyvalent sensitization. In 10% of children with normal levels of total IgE, the participation of other types of immunopathological reactions (immune complex and cell-mediated) in the pathogenesis of bronchial asthma was noted. The results of our studies confirm the predominance of atopic bronchial asthma in children of the first years of life and the leading role of the IgE-mediated mechanism in its development.

Receptors of cells of the innate immune system recognize various structures of microorganisms - lipopolysaccharides, peptidoglycans, DNA, double-stranded RNA viruses, etc. These structures of microorganisms are designated as pathogen-associated molecular patterns, and the cell receptors that recognize them are designated as pattern recognition receptors. Pattern recognition receptors are found on almost all cells of the body. TLRs (Toll-like receptors) have been detected on leukocytes, endothelial cells, fibroblasts, epithelial, muscle, and nerve cells; their low concentration was noted on T-lymphocytes. All of these cells can recognize foreign ligands and respond to them. In this regard, various cells of the body can participate in the reactions of the innate immune system. Gene changes in Toll receptors (TLR2/TLR1 and TLR2/TLR6) determine the risk of developing bronchial asthma. Pathogen ligands, by binding to pattern recognition receptors and stimulating the release of proinflammatory cytokines, can induce the development of allergic reactions. The onset of allergic diseases in children (50% of cases) occurs in early and preschool age, while the highest prevalence of allergic diseases in this age group is observed in environmentally disadvantaged areas. Atopic diseases prevail in the structure of allergic morbidity in children of the first years of life. The pathogenetic basis of atopic diseases in children of early and preschool age is IgE-mediated allergic reactions, which is confirmed by the increased levels of total and specific IgE in the blood serum found in them.

CONCLUSION

The occurrence of allergic reactions and diseases in children with a hereditary predisposition to allergies is facilitated by the imbalance of Th2/Th1 lymphocytes that persists after birth in the child due to the predominance of the Th2 immune response with an increase in the production of IL-4, IL-13, which induce increased synthesis of IgE, and proinflammatory cytokines (IL-5, IL-8, TNF", IL-17), which contribute to the development of allergic

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 14 Issue 08, August 2024
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

inflammation. High risk factors for allergic reactions and diseases in children include intrauterine viral infection, complicated pregnancy and childbirth in the mother, cesarean section, artificial feeding child, polypharmacy with frequent use of antibiotics. The development of allergic diseases in children of the first years of life can be facilitated by the functional immaturity of the innate immune system. This is confirmed by the reduced activity of leukocytes detected in them during the NBT test and the detection of reduced levels of interferon gamma excretion by blood leukocytes.

REFERENCES

1. Balabolkin I.I. Bronchial asthma in children. – M.: Medicine, 2003. – 320 p.
2. Korrmann SD, Depner M, Hart D et al. Toll-like receptor heterodimer variants protect from childhood asthma // J. Allergy Clin. Immunol. – 2008. – No. 1. – P. 86–92.
3. Titova N.D. Pattern recognition receptors and allergies // Ros. allergol. magazine. – 2011. – No. 1. – P. 32–39.
4. Kaisho T., Akira S. Toll-like receptors function and signaling // J. Allergy. Clin. Immunol. – 2006. – Vol. 117. – P. 979–987.
5. Korppi M. Asthma predictive factors in infants with bronchiolitis: asthma risk at 13-20 years of age // Eur. Resp. J. 2010; 36(1):221–222.
6. Jackson DJ, Gangnon RE, Evans MD et.al. Wheezing rhinovirus illnesses in early life predict asthma development in high-risk children // Am. J. Respira. Care Med. 2008, 178(7):667–672.
7. Syurakshina M.V. Functional characteristics of the course of bronchial asthma in children of the first years of life: abstract. dis. Ph.D. honey. Sci. – M., 2008. – 25 p.
8. Ryleeva I.V. Pathogenetic basis of the effectiveness of allergen-specific immunotherapy and immunopharmacotherapy of atopic bronchial asthma in children: abstract. dis. Dr. med. Sci. – M., 2004. – 46 p.
9. Calassi C., De Sario M., Biggeri A. et al. Changes in prevalence of asthma and allergies among children and adolescents in Italy: 1994–2002//Pediatrics. – 2006. – Vol. 117. – P. 34–42.