

RISK FACTORS FOR THE DEVELOPMENT OF BRONCHIAL ASTHMA IN CHILDREN WITH ALLERGIC RHINITIS

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ABSTRACT

The aim of the study was to identify risk factors for the development of bronchial asthma in children with allergic rhinitis. We have studied the clinical course of bronchial asthma occurring in patients with allergic rhinitis. Based on the study, a high frequency of burdened obstetric anamnesis was noted in mothers of children from the compared groups, namely in children in the BA group with AR, in children with bronchial asthma. Studies have shown that in bronchial asthma in children with AR, a decrease in MOS 25 is clearly observed, more than MOS 75, which corresponds to the proximal type of obstruction, while in children with BA without AR there is a uniform decrease in all indicators of MOS, which corresponds to the total type of obstruction. A statistically significant difference between the groups according to these indicators was established, which indicates a more pronounced obstruction against the background of the presence of AR, the development or aggravation of the course of the disease.

KEYWORDS: bronchial asthma, allergic rhinitis, children, risk factors.

INTRODUCTION

Bronchial asthma (BA) and allergic rhinitis (AR) are multifactorial diseases. An important role in the development of atopic diseases is given to the influence of numerous risk factors (biological, environmental, social), which are etiologically significant. Recommendations for further research are questions about the influence of a number of perinatal factors (gestational age, anthropometric indicators at birth, parental age, family composition, feeding patterns), as well as respiratory infections on the development of asthma and rhinitis [3,5,6]. This puts the problem of forecasting, timely prevention, and improvement of methods for the treatment of allergic diseases among the most important tasks of modern medicine.

The simultaneous development of asthma and rhinitis in the vast majority of patients significantly affects the quality of life of the child, limits his physical, mental and social capabilities. An international group of asthma experts developed a World Health Organization (WHO)/US National Institutes of Health advisory document, The Global Strategy for the Treatment and Prevention of Asthma (Revised 2002).

In Russia, a scientific and practical program has been presented to practical healthcare. "Bronchial" asthma in children: diagnosis, treatment and prevention" (under the guidance of Baranov A.A., 2004) [1,2]. The predominant form of asthma in children is atopic. The combination of atopic BA and AR, due to the high frequency of occurrence, attracts the attention of various specialists*, while a single point of view on

the value of individual diagnostic techniques, determining the severity of the pathological process and treatment features has not yet been formed [7,9].

Observations indicate that the first signs of respiratory disorders are symptoms of difficulty in nasal breathing, then signs of impaired bronchial patency appear quite quickly: and a clinic of attacks of expiratory suffocation. Subsequently, AR and BA become a single pathological process [2,8,10].

The aim of the study was to identify risk factors for the development of bronchial asthma in children with allergic rhinitis.

MATERIALS AND METHODS

We have studied the clinical course of bronchial asthma occurring in patients with allergic rhinitis. The observation was carried out in 130 children aged 7 to 14 years. The main group consisted of 105 people. The comparison group consisted of 70 children with allergic rhinitis with bronchial asthma and 35 children with asthma. First of all, the data of the allergic anamnesis were of interest. A high frequency of burdened obstetric anamnesis was noted in mothers of children from the compared groups, namely in children in the BA group with AR, in children with bronchial asthma. First of all, the data of the allergic anamnesis were of interest.

This study was aimed at: firstly, to test the hypothesis about the influence of perinatal factors, such as the age of parents, the number of previous pregnancies, preterm birth, gestational age, Apgar score, anthropometric indicators of the newborn (weight and length of the body at birth, head circumference, chest) , as well as the composition of the family, the nature of feeding, early cessation of breastfeeding, personal and family allergic history, the development of bronchial asthma, allergic rhinitis.

RESULTS AND DISCUSSION

Among the variety of pathologies during pregnancy, the most frequently recorded threat was the interruption and development of acute respiratory viral infections in mothers of the examined children. Analysis of statistical data showed that anemia in mothers during pregnancy is a predictive adverse factor for the development of further formation of bronchial asthma, in children with BA with AR in 48.2% and 56.5%, respectively (Table 1).

As can be seen from the table, there were no significant differences in the incidence of respiratory viral infections, toxicosis, hypertension and the threat of abortion in the study groups.

We analyzed hereditary family allergic history in the examined children. The data are presented in table 1.

Table 1
Features of the course of pregnancy in mothers of the examined children, %

Adverse factors of the antenatal period	bronchial asthma(n=70)		bronchial asthma with allergic rhinitis (n=60)	
	abs.	%	abs.	%
SARS during pregnancy	32	46,2	26	42,6
Threat of abortion	34	48,2	21	34,5
Anemia	40	56,5	29	48,2
Hypertension	7	10,5	7	11,2
Toxicosis	18	25,4	7	12,3
Absence of pathology during pregnancy	12	17,2	12	19,3

In a comprehensive study of children with allergic rhinitis, it was established (Table 2) that a burdened allergic history was detected in 69.6% of children with seasonal allergic rhinitis and in 46.2% of cases in children with BA.

Table 2

Family allergy history in examined children, %

Family allergy history	bronchial asthma(n=70)		bronchial asthma with allergic rhinitis (n=60)	
	abs.	%	abs.	%
Burdened heredity for bronchial asthma	32	46,2	42	69,6
Burdened heredity for other allergic diseases	24	34,5	43	72,2

The study revealed aggravated heredity for bronchial asthma and other atopic diseases, allergic rhinitis, allergic conjunctivitis, acute and recurrent urticaria, acute allergic reaction, atopic dermatitis were classified as other allergic diseases.

Attention is drawn to the fact that the development of bronchial asthma is significantly associated with allergic rhinitis in children whose mothers have atopic allergic diseases (Table 3).

So, on the mother's side, atopic diseases occurred in 25% of cases, on the father's side - 30%. At the same time, in the main group, bronchial asthma in relatives was recorded 2.5 times more often.

It is noteworthy that mothers of children with isolated allergic rhinitis did not have bronchial asthma, atopic dermatitis and urticaria. In the same group, the predominant disease in relatives (both maternal and paternal) was allergic rhinitis, which was registered in 55.2% of cases.

Table 3
Frequency of atopic diseases in relatives of BA patients with AR and AR patients, %

Disease	BA with AR (n=60)				BA (n=70)			
	maternal		paternal		maternal		paternal	
	π	%	π	%	π	%	π	%
BA	12	20	10	16	4	5	9	12,5
AR (seasonal and year-round)	10	17	5	8	14	20	8	11,6
atopic	10	16	4	7	-	-	4	6,1
dermatitis	4	7	1	2	-	-	-	-

As you know, a necessary condition for the normal development of a child, which ensures health and harmonious development, is nutrition, the nature of feeding children in the first year of life (Table 4).

The data in Table 4 indicate that 31% of BA children with AR during the first 6 months of life received predominantly breast milk, while 44.1% of children were partially breastfed and 20.8% received artificial feeding from the first days.

Nutrition is important, so breastfeeding a child up to 4-6 months of life, which has been proven by a number of authors. In our study, 66% of children with combined forms of bronchial asthma and allergic rhinitis were transferred to artificial feeding up to 6 months of age.

Acute respiratory viral infections can both initiate the development of bronchial asthma (as a risk factor) and cause subsequent exacerbations of the disease. The influence of a respiratory viral infection on the course of bronchial asthma is realized through an inflammatory process induced by viruses, an increase in bronchial reactivity and activation of IgE synthesis.

In the group of patients with bronchial asthma and allergic rhinitis, a significant predominance of frequent ARVI preceding the disease (more than 4-5 times a year) in 79% of children attracts attention.

Table 4
Effect of child feeding on the course of BA with AR in children with BA, %

Types of feeding	abs.	%	The first signs of AR in the first 6 months of life	
Predominantly breastfeeding	19	31,0	8	12,9
Partial breastfeeding	29	48,0	26	44,1
Artificial feeding	13	21,0	12	20,8
Total	61	100	46	77,8

The connection of exacerbations of bronchial asthma with acute viral infections was observed in the future in 70% of children, which were most severe in young children (up to 3 years). 29% of children at an early age (up to 3 years) had pneumonia, in 11% of patients it was quite severe and required inpatient treatment. In the group of patients with allergic rhinitis, significantly less than in the main group, there were previous acute respiratory viral infections (12.5%), and pneumonia was twice as rare (12.5%).

When comparing the age at which allergic rhinitis began, it turned out that in patients with a combination of bronchial asthma and allergic rhinitis, the rhinitis clinic appeared much earlier (up to 6 years), while in patients with allergic rhinitis - older than 6 years.

It is important that the combined forms of the disease in 60% occurred at early and preschool age (up to 6 years). At the same time, in children with isolated allergic rhinitis, signs of the disease appeared in most cases (85%) over the age of 6 years. Atopic dermatitis had 55% of children with a combination of allergic rhinitis and bronchial asthma and 37.5% with isolated rhinitis.

More than 56% of children with bronchial asthma and allergic rhinitis reported worsening from contact with pets. Contact with a cat caused severe rhinorrhea and sneezing in 54% of children, suffocation in 46%. Contact with a dog led to an exacerbation of the disease in 30%, while in 21% of children there was an increase in signs of allergic rhinitis, in 18% - shortness of breath.

When analyzing the clinical picture of children with bronchial asthma and allergic rhinitis, it was found that the disease was characterized by a predominance of nocturnal attacks (97%) and a rather severe course. Allergic rhinitis was year-round in all children, and 37% of children also had seasonality. Shortness of breath in 92% of cases was expiratory in nature. Asphyxiation attacks in 31% of patients were recorded daily, up to 3 times a week - in 40%, occasionally - in 29%.

Manifestations of allergic rhinitis in the main group were more pronounced in the morning hours (62%) and were manifested by nasal congestion, sneezing, itching of the nose and eyes. With isolated rhinitis, worsening of the condition was equally often observed both in the morning and at night (Table 5). Minimal persistent inflammation of the nasal mucosa was observed in most children, even without clinical symptoms of the disease.

Table 5
Clinical manifestations of allergic rhinitis in children with combined pathology and isolated allergic rhinitis, %

Clinical signs	BAwith AR(n=60)		BA (n=70)	
	n	%	n	%
Itchy nose, eyelids, eyes	68	76	16	62
Rhinorrhea	59	66	11	42
sneezing	75	83	21	81
Nasal congestion	88	98	24	92
lacrimation	39	43	6	23

Headache	19	21	5	19
Night symptoms	66	73	12	46
morning symptoms	34	38	15	58

The severity of nasal symptoms exacerbated the severity of clinical manifestations of asthma in 66% of children. The development of attacks of expiratory suffocation and coughing was always preceded by a sharp deterioration in nasal breathing, sneezing, itching in the nose, rhinoscopy - increased edema and pallor of the nasal mucosa with a moderate amount of secretion. Abundant watery discharge from the nasal cavity was more often noted with seasonal manifestations. In asthmatic children with AR, 98% had nasal congestion, headache -21%, nocturnal symptoms in 73%, and morning symptoms in 38%.

Disturbances in the function of external respiration cause the main clinical manifestations of bronchial asthma in children. When assessing the condition of children, determining the effectiveness of ongoing therapeutic interventions, along with the nature of changes in the clinical picture, the dynamics of indicators of the function of external respiration is taken into account.

For all periods of the disease, obstructive disorders of respiratory function are characteristic, which lead to an objective increase in the resistance of the air flow of the entire bronchial tree, mainly at the level of the peripheral respiratory tract. At the same time, the most useful indicators for assessing the degree of obstruction and the severity of the disease are the ratio of FEV1 / FVC, a decrease in MOS50, MOS75, SOS75-85. The initial study of respiratory function showed a significant decrease in all parameters (especially lung capacity (VC)), in patients with BA in combination with AR compared with patients without AR (Table 6).

In patients during the period of exacerbation, moderately pronounced violations of respiratory function of the obstructive type were revealed. In the group with comorbidity, a mixed type of disorder is observed: a moderate decrease in FEV1 and all speed indicators is combined with a fairly pronounced decrease in VC and FVC, while the Tiffno index is normal due to an equal decrease in FEV1 and VC. However, the differences between these parameters of respiratory function in BA patients and BA patients with AR are not significant (P>0.05).

In BA children with AR, there is a clear decrease in MOS 25 more than MOS 75, which corresponds to the proximal type of obstruction, while in children with BA without AR, a uniform decrease in all MOS indicators is observed, which corresponds to the total type of obstruction. A statistically significant difference between the groups according to these indicators was established, which indicates a more pronounced obstruction against the background of the presence of AR.

Table 6
Comparative analysis of the relative values of spirometry in children, (%)

Indicators	BA with AR	BA	Reliability of data between groups (P<)
VC	66,3±3,55	73,5±2,73	0,05
FVC	69,1±2,56	68,6±2,6	-
FEV1	48,4±2,95	51,4±3,03	0,05
FEV1/VC	64,1±2,11	72,1±2,06	0,05
MOS25	44,6±1,97	56,6±1,98	0,05
MOS50	41,8±2,34	52,8±2,25	0,05
MOS75	58,4±2,06	69,3±2,58	0,05

In spirometric studies, there is a decrease in both volumetric (VC, FVC) and speed (FEV1, MOS25%, MOS50%, MOS75%) indicators. Among all sick children with a predominance of restrictive disorders, 3/2 were children with excess body weight and 1/3 with normal body weight. Indicators of forced exhalation and vital capacity in patients with BA with AR children, compared with analogous indicators in children without AR, were statistically significantly low by 2-3 times (Table 7).

Table 7
Functions of external respiration in children with BA and AR, %

Disease	Forced expiratory rates (l/s)	Indicators of vital capacity of the lungs (l)
BA + AR, (n = 60)	1,48±0,46*	1,99±0,35*
BA (n=70)	1,32±0,41*	1,90±0,30*

Note: numerical differences compared to control are significant (*)

According to the results obtained, it can be said that the presence of BA with AR in children causes a change in the mechanical properties of the lungs, limiting the respiratory excursion and, accordingly, reducing the VC index. And the inflammatory process in the airways in BA causes a violation of the airway patency, which is expressed in a decrease in the rate of FEV1. The revealed differences between the groups indicate, in our opinion, a significant role of AR in shaping the nature of the clinical course of BA, BA in combination with AR has a more pronounced negative effect on the parameters of respiratory function than BA alone.

CONCLUSION

According to the results of the anamnesis data, it is possible to identify risk factors that contribute to the development of combined forms of BA and AR: high frequency of allergic diseases in relatives (especially on the mother's side - 64%); early transfer of children to artificial feeding (66%); frequent viral infections preceding the development of an allergic disease (75%). The clinical course of combined forms of BA and AR has a number of features: in the vast majority of patients, the onset of asthma attacks is preceded by symptoms of nasal breathing disorders (from 60 to 90% in different age groups); the disease is formed at early and preschool age (60%); greater frequency of nocturnal symptoms (73%); long attack period (3-4 days); persistent course of allergic rhinitis in all patients. The revealed differences between the groups indicate, in our opinion, a significant role of AR in shaping the nature of the clinical course of BA, BA in combination with AR has a more pronounced negative effect on the parameters of respiratory function than BA alone.

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