Original Article

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Modern Aspects of Risk Factors for the Formation of Bronchial Asthma in Children

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Abstract

The purpose of our study was to study the nature of clinical manifestations and risk factors for the development of bronchial asthma (BA) in children. We examined 120 children aged 5 to 15 years with asthma who were on inpatient treatment in the department of pulmonology and allergology. With moderate and severe asthma, there was a longer manifestation of shortness of breath, oral wheezing, wet cough and wet wheezing in the lungs, emphysematous lung enlargement on both sides with horizontal standing of the ribs. In the presence of severe bronchospasm, the symptoms of intoxication and respiratory failure were more pronounced, which is manifested by long-term clinical signs of the disease. Among the main risk factors for the development of AD, hereditary burden, peculiarities of maternal nutrition during pregnancy and lactation, early transfer of the child to mixed and artificial feeding, unfavorable course of the peri–, intranatal periods and comorbid background can be distinguished.

Keywords: Bronchial Asthma, Risk Factors, Predictors of Development, Children

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Introduction

Bronchial asthma (BA) is one of the most common chronic pathologies of childhood and occupies a prominent place in the structure of allergic diseases, the proportion of which among other allergic diseases is up to 50-70%.[1,2] The prevalence of asthma in the world, according to ISAAC (International Study of Asthma and Allergies in Childhood) (2016) and ECRHS (European Community Respiratory Health Survey), reaches 10-15% of them children – up to 150 million. The prevalence of AD among the child population, according to epidemiological studies, reaches an average of 5-10% (in the USA 6-8%).[3,4,5] In Uzbekistan, BA is recognized as the most common chronic lung pathology in children, it occupies 5%. In 2015, the mortality rate from AD in the world amounted to 0.4 million people, over 25 years, the mortality rate decreased by 26.7%, but the incidence increased. 70% of children with BA have a mild course, about 25% have moderate severity and 5% have severe. Most patients are diagnosed 2-6 years later than the onset of the disease, which worsens its course. The heredity of BA is indisputable, blood relatives of half of BA patients have allergic pathologies and BA. The risk of allergies in a family without allergic heredity is 20%, increases to 50% if there is one allergic parent in the family and up to 75% if both parents are allergic.[6,7,8]

The purpose of the work: To study the nature of clinical manifestations and risk factors for the development of bronchial asthma in children

Subjects and Methods

We examined 120 children aged 5 to 15 years with AD who were on inpatient treatment in the Department of pulmonology of the RSNPMC Pediatrics of the Ministry of Health of the Republic of Uzbekistan and Allergology. Of these, 35.8% (43) of patients were diagnosed with mild persistent BA, 35% (42) of children with moderate persistent BA, 29.6% (35) of children with severe persistent BA. The control group consisted of 20 practically healthy children of the same age.

Results & Discussion

The severity of the course and outcomes of AD are significantly influenced by the timeliness of hospitalization and medical care. It should be noted that patients were admitted for treatment and examination at various times from the onset of the disease. Analyzing these indicators, we found that patients were mostly admitted on the 3-5 day of the disease 62 (51.6%) after unsuccessful treatment at home.

It is known that important factors determining the state of a child's health and its development are the peculiarities of the obstetric history, the condition of the child at birth and its development before the onset of the present disease. Analyzing the complete information on the anamnesis of the examined children, we identified the risk factors that were most common in them (Table 1.). As follows from the table, the majority of patients with AD 59 (49.2%) were born from

the first pregnancy, from II-III pregnancies in 45 (37.5%) cases, from IV and more than 14 (11.6%) children. 104 (86.6%) of the observed mothers of the examined BA patients had various pregnancy complications. 96 (80.0%) mothers reported ARI during pregnancy. During pregnancy, a mild or moderate - severe form of anemia was detected in mothers of patients with BA in 99 (82.5%). Prematurity and birth in asphyxia occurred in 9 (7.2%) and 26 (21.6%), respectively. We have recorded perinatal and intranatal pathological symptoms in children as risk factors affecting the development of AD. As follows from the table, factor analysis showed that the highest risk of AD is possible in the presence of complications of pregnancy (RR=1.05; OR=5.08), diseases during pregnancy (RR=1.6; OR=4.2) and artificial feeding of the child (RR=1.7; OR=2.6).

In the formation of AD, great importance is attached to hereditary predisposition. In this regard, we have studied in detail the anamnesis of 120 families of the groups we observed. The identified forms of allergic diseases are summarized in [Table 2]. The hereditary burden of the allergic background in children with BA was recorded 2 times more often. Allergic diseases were observed in 78.3% (94) of mothers and 38.3% (96) of fathers. In general, the observed children were able to identify hereditary burden of allergic diseases, and more often on the maternal side, which was 45.0% (54) than on the father's side 40.0% (48). Some children had a bilateral hereditary burden of allergic diseases of 31.6% (38). The fact of smoking by parents with a child was also revealed in 63.0% (75).

Table 1: Factor analysis of the risk of the probability of developing AD in the examined children

Risk factors	Practically healthy n=20		BA n=120		P	OR	RR
	абс	%	абс	%			
Born from: I pregnancy	8	40,0	58	49,1	>0,05	0,91	0,95
II -III pregnancies	9	45,0	45	37,5	>0,05	0,55	0,8
IV and more pregnancies.	3	15,0	14	11,6	>0,05	0,7	0,86
Complications of the course of this pregnancy: toxicosis of the I-II half	9	45,0	104	86,6	>0,05	5,08	1,05
Anemia of the III degree	17	85,0	100	83,3	>0,05	0,87	0,98
Diseases of the mother during pregnancy: ORI	8	40,0	96	80,0	>0,05	4,28	1,66
Pathological course of labor	6	30,0	48	40,0	<0,01	1,69	1,41
Born: premature	3	15,0	8	6,6	<0,01	0,34	0,72
in asphyxia	6	30,0	26	21,6	<0,01	0,64	0,72
Meals for up to a year: - natural	13	65,0	56	46,6	<0,01	0,55	0,78
- artificial	2	10,0	28	23,3	>0,05	2,64	1,71
- mixed	5	25,0	42	35,0	>0,05	1,8	1,52

Table 2: The role of hereditary burden of allergic diseases in the examined children

Analyzed indicators	Practically healthy n=20		BA n= 120		P	OR	RR
	абс.	%	абс.	%			
Allergic burden in the mother diseases in the mother	7	35,0	94	78,3	>0,01	2,93	1,63
Allergic burden on the father	3	15,0	46	38,3	>0,01	3,65	2,38
Bilateral burden	2	10,0	38	31,6	>0,01	1,22	2,33
Along the line of matter	5	25,0	54	45,0	>0,01	2,65	1,03
On my father 's side	4	20,0	48	40,0	>0,01	1,78	1,25
Smoking parents	7	35,0	75	62,5	>0,01	2,02	1,47

Table 3: Factor analysis of the background condition and concomitant pathology in the examined children

Background diseases	Практически здоровые n=20		БА n= 120		P	OR	RR
	абс	%	абс	%			
Anemia I-II	8	40,0	87	72,5	>0,01	1,03	0,25
Residual effects of rickets	15	25,0	55	45,8	>0,01	2,57	1,85
Atopic dermatitis	2	10,0	84	70,0	>0,01	8,65	2,04
Overweight	4	20,0	15	12,5	>0,01	1,6	1,42
BENP	3	15,0	18	27,6	>0,01	1,71	1,5
Diseases ENT organs	5	25,0	100	83,3	>0,01	2,9	1,5

Factor analysis of hereditary burden showed that the highest risk of AD occurs in the presence of allergic diseases in parents (RR=2.3; OR= 3.6) and smoking parents (RR=1.4; OR=2.05).

The severity of the examined patients is significantly affected by an unfavorable premorbid background and concomitant pathology. Thus, in children with BA, it was revealed: anemia of I-II degree in 72.5% (87), residual rickets in 45.8% (55) and atopic dermatitis in 70.0% (84). Of the concomitant pathology, ENT organ diseases were found in 83.3% (100) patients with BA. In patients with BA, 54 (83.1%) of the examined patients had diseases of ENT organs, 30.0% (25) had EBD, 12.5% (15) were overweight.

Factor analysis of the background condition and concomitant pathology showed that the highest risk of AD is possible in the presence of residual rickets (RR=1.8; OR=2.6), atopic dermatitis (RR=2.04; OR=8.6), diseases of the ENT organs (RR=1.5; OR=2.9) [Table 3].

The presented data once again confirm that children with varying degrees of severity of background conditions and concomitant pathology are a risk group for the development of AD.

The main complaints of parents of all sick children during hospitalization were cough with mostly mucous sputum, often upon awakening and shortness of breath, decreased appetite in 90.0% (108), lethargy in 93.3% (112), attacks of suffocation in 80.0% (96), oral wheezing in 80.0% (96), sweating in 50.0% (60) and headache in 45.0% (54) of patients.

The leading clinical manifestation of AD in all 120 (100%) patients was expiratory dyspnea with the participation of auxiliary muscles in the act of breathing with a respiratory rate under the age of 8 years above 45 in 1 minute, and over 10 years above 48 in 1 minute. The duration of shortness of breath was 4.2?0.2 days. Signs of hypoxia (cyanosis of the nasolabial triangle) were recorded in 49.1% (59) patients with a duration of 5.5?0.3 days. Oral wheezing was observed in all children with AD (100%), their duration was 5.2-0.2 days. Percussion changes in the lungs were observed in 51 patients and amounted to 43.1%. Auscultation was listened to the hard breathing of 70 patients with BA, which is 58.3%, various wet wheezes were listened to, their duration was 6-7 days. In 50 patients, dry wheezing was heard (41.7%), the duration of which was 6.5?0.3 days. According to X-ray studies of the respiratory organs, in most patients admitted in the first days of the disease, emphysematous expansion of the lungs on both sides with horizontal standing of the ribs was found in 60%, a pronounced vascular pattern of 49.2%, infiltrative enhanced changes in the roots of the lungs with signs of destruction of their X-ray morphological structure were recorded in all patients.

Conclusion

Based on the results obtained, it can be concluded that with moderate and severe asthma, there is a longer manifestation of shortness of breath, oral wheezing, wet cough and wet wheezing in the lungs, emphysematous expansion of the lungs on both sides with horizontal standing of the ribs. In the presence of severe bronchospasm, the symptoms of intoxication and respiratory failure were more pronounced, which is manifested by long-term clinical signs of the disease. Among the main risk factors for the development of AD, hereditary burden, peculiarities of maternal nutrition during pregnancy and lactation, early transfer of the child to mixed and artificial feeding, unfavorable course of the peri, intranatal periods and comorbid background can be distinguished.

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