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Risk Factors for Development of Broncho-Obstructive Syndrome in Children

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ABSTRACT

Introduction: Respiratory diseases today are one of the urgent problems of paediatrics and occupy the first place in the structure of child morbidity and mortality.

Objective: The study aimed to identify the main risk factors for the development of broncho-obstructive syndrome in young children based on the data of the Samarkand Branch of the Republican Scientific Center for Emergency Medical Aid.

Methods: Assessment of risk factors for the development of broncho-obstructive syndrome was carried out using statistical methods in epidemiological analysis. We carried out a retrospective analysis of 912 case histories of children with the broncho-obstructive syndrome at the age of 1 to 3 years. General analysis of blood, urine, faeces, X-ray examinations of the chest organs, pulse oximetry data and expert opinions.

Result: Biofeedback developed against the background of acute obstructive bronchitis was diagnosed in 494 (54.2%) children as compared to 418 (45.8%) patients in other group. Studies have shown that risk factors are cases of exudative forms of atopic dermatitis (39.1%), lymphatic-hypoplastic diathesis (19.5%), prematurity 61 (9.4%), with acute obstructive bronchitis -46, and with acute bronchitis - 15 children. Disharmonious physical development was noted (in 223 children, 36.4%) due to an increase in body weight above the 90th percentile.

Conclusion: Main risk factors for the development of broncho-obstructive syndrome are children over a year old, winter and spring seasons of the year, perinatal encephalopathy, aggravated allergic anamnesis, protein-energy malnutrition, part trophy, food allergy, early transfer of children to artificial feeding, hereditary and congenital pathology of the bronchopulmonary system and others. All this dictates the need for preventive work in families and family clinics for the prevention of bronchial asthma in the future.

Key Words: Broncho-obstructive syndrome, Risk factors, Children, Retrospective analysis, Pneumonia, Acute obstructive bronchitis, Bronchial asthma

INTRODUCTION

Diseases of the respiratory system today are one of the urgent problems of paediatrics and occupy the first place in the structure of childhood morbidity and mortality.^{1,2} In young children, acute pneumonia and bronchitis are widespread, which occur with the broncho-obstructive syndrome and often cause an unfavourable outcome of the underlying disease in a child. Broncho-obstructive syndrome is a symptom complex that is clinically manifested by paroxysmal cough, expiratory dyspnea, asthma attacks and is associated with impaired bronchial patency of functional or organic origin.^{2,3}

By itself, it has a characteristic clinical picture, so there are no difficulties with its diagnosis.

Especially clinically, broncho-obstructive syndrome manifests itself in children in the first years of life, which is due to the anatomical and physiological characteristics of the respiratory system: narrowness of the airways, insufficient elasticity of the lungs, softness of the cartilage of the bronchial tree, insufficient rigidity of the chest, a tendency to develop oedema, hypersecretion of viscous mucus, poor development smooth muscles of the bronchi.^{4,5} Faced with the broncho-obstructive syndrome in infants in practice, the

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doctor, as a rule, makes a diagnosis of obstructive bronchitis or bronchiolitis, occurring with symptoms of respiratory failure, developing more often against the background of Arvi.⁶⁻⁸

The emergence and development of broncho-obstructive syndrome are influenced by various factors and, above all, respiratory infection, obstructing 5% to 40% of cases.^{7,9} Risk factors for the development of bronchial obstruction in children are: toxicosis of pregnancy, complicated childbirth, hypoxia in childbirth, prematurity, aggravated allergic history, rickets, protein-energy malnutrition, perinatal encephalopathy, early artificial feeding, past respiratory diseases at an early age, hereditary and pathology of the bronchopulmonary system and an unfavourable state of the external environment.¹⁰ Predicting asthma at an early age continues to be difficult. In some studies, up to two-thirds of children with bronchial asthma had no symptoms of bronchial obstruction at an early age^{11,12} and, accordingly, these children had a late diagnosis of bronchial asthma.¹³⁻¹⁴

MATERIALS AND METHODS

Assessment of risk factors for the development of broncho-obstructive syndrome was carried out using statistical methods in epidemiological analysis. We carried out a retrospective analysis of 912 cases of case histories of children with broncho-obstructive syndrome aged 1 to 3 years who were hospitalized in the intensive pediatric department of the SFRNCEMP for the period from 2016 to 2019.

To assess the risk factors for the development of the disease, we conducted studies that included a thorough analysis of complaints, anamnestic data of patients, general

examination data, the results of physical research methods, general clinical laboratory, immunological, microbiological and instrumental research methods according to standard methods, taking into account anthropometric data and mass growth indicators. All the data we received from archival materials were entered into specially designed maps.

To diagnose the syndromological features of the disease, data from paraclinical research methods were used: general analysis of blood, urine, faeces, X-ray examinations of the chest organs, pulse oximetry data and expert opinions.

Biofeedback developed against the background of acute obstructive bronchitis was diagnosed in 494 (54.2%) children (group 1). In the comparison group, the diagnosis of acute bronchitis without symptoms of bronchial obstruction was ascertained in 418 (45.8%) patients (group 2) (Table 1).

Table 1: Distribution of examined patients by nosology

No	Nosological forms of diseases	Total	%
Group 1	Acute obstructive bronchitis with the broncho-obstructive syndrome	494	54.2
Group 2	Acute bronchitis without the broncho-obstructive syndrome	418	45.8
Total		912	100

Among them, infants made up 499 (54.7%), children from 1 to 3 years old made up 277 (30.4%) and children from 3 to 5 years old - 136 (14.9%). Among all surveyed boys there were only 540 (59.2%), girls - 372 (40.8%) (Table 2).

Table 2: Distribution of examined patients by age and sex

Gender of children	Groups	Age structure						Total	
		2 month - 1 year		1 - 3 years		3 - 5 years		N	%
		n	%	n	%	n	%		
Boys total 540 (59,2%)	1	165	50.8	103	31.7	57	17.5	325	65.8
	2	124	57.7	59	27.4	32	14.9	215	51.4
Girls total 372 (40,8%)	1	94	55.6	54	31.9	21	12.5	169	34.2
	2	116	57.1	61	30.0	26	12.9	203	48.6
Total		499	54.7	277	30.4	136	14.9	912	100

In the group of children with broncho-obstructive syndrome against the background of acute obstructive bronchitis, the number of boys was 325, where there was a clear predominance of it over girls (65.8% and 34.2%, respectively). In the second group, among children with acute bronchitis, there were 215 boys (51.4%), girls - 203 (48.6%), i.e., there was

no significant difference in the sex of the patients. As shown in Table 2, among all examined patients, children under 1 year of age suffered from broncho-obstructive syndrome and acute bronchitis more often (54.7%) than older children (1-3 years - 30.4%; 3-5 years - 14.9%).

Among all children who were hospitalized in the period from 2012 to 2015, the following seasonality of this disease was noted. So, most often children with acute obstructive bronchitis were admitted in winter (201 patients) and spring (175 patients). In autumn, 102 patients were admitted and in summer only 56 patients. And if in relatively cold and humid periods of the year the increase in the incidence of acute obstructive bronchitis can be compared with the increase in the activity of the corresponding viral infections, then in the summer period the role of pollen and food allergies as a risk factor for the development of broncho-obstructive syndrome is possible.

Studying the seasonality of acute bronchitis, we found the following - in the winter months of the year, 161 patients were admitted, in the spring - 132, in the fall - 86 and in the summer - 39 patients. Similarly, an increase in the incidence of acute bronchitis in winter is also associated with an increase in the viral activity of pathogens.

Repeated cases of acute respiratory infection (6 times or more) during the year were observed in 212 (42.9%) patients with acute obstructive bronchitis. In the majority of children with acute obstructive bronchitis (358 patients - 72.5%) deficiency states and aggravated premorbid background were revealed: 313 (63.4%) children were early transferred to artificial feeding, 278 (56.3%) had a history of revealed a perinatal lesion of the central nervous system, 222 (45%) - rickets and 481 (97.3%) - anaemia.

Most of the babies were born full-term 851 (90.6%) babies and had a bodyweight of more than 2500 grams. There were only 61 premature babies (9.4%), with 46 children with acute obstructive bronchitis, and 15 children with acute bronchitis. In half of the examined children with acute obstructive bronchitis, there was a violation of physical development. At the same time, high and disharmonious physical development was more common (in 223 children, 36.4%). Figure 1 shows the frequency of manifestations of various anamnestic data in sick children with acute obstructive bronchitis.

RESULTS AND DISCUSSION

A retrospective analysis of archival material showed that the development of acute respiratory failure by the type of bronchial obstruction in patients with acute. ^{28,29,30} Obstructive bronchitis depends on a combination of many factors, age differences, the presence of concomitant diseases, their combination, risk factors, etc.

The work carried out has shown that constitutional abnormalities are also a risk factor, in particular cases of exudative forms of atopic dermatitis (39.1%), lymphatic-hypoplastic diathesis (19.5%). Most of the babies were born full-term 851 (90.6%) babies and had a bodyweight of more than 2500

grams. There were only 61 premature babies (9.4%), with 46 children with acute obstructive bronchitis, and 15 children with acute bronchitis.

In half of the examined children with acute obstructive bronchitis, there was a violation of physical development. At the same time, high and disharmonious physical development was more common (in 223 children, 36.4%) due to an increase in body weight above the 90th percentile. Low and disharmonious physical development was recorded in 98 (13.9%) children due to a decrease in body weight below the 10th percentile.

According to our data, physical symptoms of bronchial obstruction in acute obstructive bronchitis were observed in all children. Frequent and productive cough occurred in 1/3 of children (36.4%), and rare, more often in the morning, in the remaining 2/3 (63.5%) of patients, which is associated with insufficient mucociliary clearance in this age period.¹⁵⁻¹⁷

Organ-specific symptoms and data from X-ray research methods turned out to be more informative in the diagnostic and differential-diagnostic terms. So, dry cough at the onset of the disease, with a further transition to a wet cough, was noted in all patients with acute obstructive bronchitis and acute bronchitis. Wet cough with the discharge of viscous, mucopurulent sputum or vomiting was noted in the case histories of 303 (61.3%) patients with acute obstructive bronchitis and 264 (63.2%) patients with acute bronchitis. Noisy wheezing and expiratory dyspnea, as clear signs of bronchial obstruction of the lower airways (respectively, in 460 - 93.1% and 448 - 90.6%) were detected only in patients with acute obstructive bronchitis, in contrast to patients in the control group with acute bronchitis, in which this symptomatology was not recorded in the medical history.^{15,18}

CONCLUSIONS

Thus, the main risk factors for the development of broncho-obstructive syndrome are children over one-year-old, winter and spring seasons of the year, perinatal encephalopathy, aggravated allergic anamnesis, protein-energy malnutrition, part trophy, food allergy, early transfer of children to artificial feeding, hereditary and congenital pathology of the bronchopulmonary system. and others. All this dictates the need for preventive work in families and family clinics for the prevention of bronchial asthma in the future.

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