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THE RELEVANCE OF RESPIRATORY DISEASES IN PEDIATRICS: RISK FACTORS FOR BRONCHO-OBSTRUCTIVE SYNDROME

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Abstract.

Relevance. Respiratory diseases remain one of the most pressing problems in pediatrics, and in the Republic of Uzbekistan they occupy the first place in the structure of morbidity and mortality in children. **Purpose of the study**. Assessment of risk factors contributing to the development of broncho-obstructive syndrome in children. **Methods and materials**. A retrospective analysis of the case histories of 912 children aged 1 to 3 years hospitalized with BOS in the pediatric intensive care unit of the Samarkand branch of the Republican Scientific Center for Emergency Medical Care in the period from 2022 to 2024 was carried out. **Results and discussion**. In the group of children with BOS associated with AOB, boys significantly predominated - 325 cases (65.8%) compared to 169 girls (34.2%). In contrast, in the second group of children with OB, the gender distribution was more balanced - 215 boys (51.4%) and 203 girls (48.6%), indicating no significant difference in gender prevalence. This study presents a retrospective analysis of 912 cases of children aged 1 to 3 years with a history of broncho-obstructive syndrome (BOS) for the period from 2022 to 2024. Of these, 494 children (54.2%) developed BOS against the background of acute obstructive bronchitis (group 1), and 418 children (45.8%) were diagnosed with acute bronchitis without signs of bronchial obstruction. **Conclusions**. Key risk factors for BOS in children included perinatal encephalopathy, early transition to artificial feeding, frequent acute respiratory infections, family history of allergy, protein-energy malnutrition, rickets and anemia..

Key words: risk factors, retrospective analysis, bronchial obstruction, pneumonia, acute obstructive bronchitis.

RELEVANCE. Respiratory diseases remain one of the most urgent challenges in pediatrics, and in the Republic of Uzbekistan, they rank first in the structure of child morbidity and mortality [1,4,8,15].

Among young children, acute pneumonia and bronchitis are particularly prevalent, often manifesting with broncho-obstructive syndrome (BOS), which can lead to adverse outcomes of the primary illness[9, 11,13,14].

The development of BOS is influenced by multiple factors, with respiratory infections being a primary trigger, contributing to airway obstruction in 5% to 40% of cases [2,3,5].

Several key risk factors have been identified, including maternal toxicosis during pregnancy, complicated labor, perinatal hypoxia, prematurity, a family history of allergies, rickets, protein-energy malnutrition, perinatal encephalopathy, early artificial feeding, recurrent respiratory infections in infancy, hereditary and congenital abnormalities of the bronchopulmonary system, and adverse environmental conditions [6,7,10,12].

PURPOSE OF THE STUDY

To evaluate the risk factors contributing to the development of broncho-obstructive syndrome in children.

METHODS AND MATERIALS

The assessment of risk factors contributing to the development of broncho-obstructive syndrome (BOS) was conducted using statistical methods within an epidemiological framework. A

retrospective analysis was performed on the medical histories of 912 children aged 1 to 3 years who were hospitalized with BOS in the pediatric intensive care unit of the Samarkand Branch of the Republican Scientific Center for Emergency Medical Care between 2022 and 2024.

To evaluate risk factors for BOS, we conducted a comprehensive study that included a detailed assessment of patient complaints, anamnesis, general examination findings, and results from physical examinations. Additionally, we utilized general clinical laboratory tests, immunological and microbiological studies, as well as instrumental diagnostic methods based on standard protocols. Anthropometric data, including weight and height indicators, were also taken into account. All collected information was systematically recorded using specially designed case report forms developed at the Department of Pediatrics No.4.

For the syndromic diagnosis of BOS, various paraclinical research methods were employed, including complete blood count, urinalysis, stool analysis, chest X-ray examinations, pulse oximetry, and expert evaluations. Among the studied cases, BOS associated with acute obstructive bronchitis (AOB) was diagnosed in 494 children (54.2%)—Group 1. In the comparison group, 418 children (45.8%) were diagnosed with acute bronchitis (AB) without signs of bronchial obstruction—Group 2 (Table 1).

Table-1

Distribution of examined patients by nosology

№	Nosological forms of diseases	Total	
			%
Group 1	Acute obstructive bronchitis with biofeedback	494	54,2
Group 2	Acute bronchitis without biofeedback	418	45,8
Total		912	100

Among the examined children, 499 (54.7%) were under 1 year old, 277 (30.4%) were between 1 and 3 years old, and 136 (14.9%) were between 3 and 5 years old. In terms of gender distribution, there were 540 boys (59.2%) and 372 girls (40.8%) among all the studied cases (Table 2).

Table-2

Distribution of examined patients by age and gender

Gender	Groups	Age structure						Total	
		2 мес - 1 г		1 - 3 года		3 г - 5 лет			
		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

RESULTS AND DISCUSSION

In the group of children with BOS associated with AOB, boys predominated significantly, with 325 cases (65.8%) compared to 169 girls (34.2%). In contrast, in the second group of children with OB, the gender distribution was more balanced, with 215 boys (51.4%) and 203 girls (48.6%), indicating no significant difference in gender prevalence.

As shown in Table 2, younger children were more frequently affected by AOB and OB. Children under 1 year of age accounted for 54.7% of cases, while those aged 1–3 years made up 30.4%, and children aged 3–5 years comprised only 14.9%.

An analysis of seasonal trends among hospitalized children from 2012 to 2015 revealed a distinct seasonal pattern of disease incidence. The highest number of AOB cases occurred in winter

(201 cases) and spring (175 cases), while fewer admissions were recorded in autumn (102 cases) and summer (56 cases). The increase in AOB incidence during the colder, more humid months is likely linked to heightened viral activity. In contrast, during the summer months, pollen and food allergies may play a role as potential risk factors for AOB development. A similar seasonal trend was observed for OB, with the highest number of cases occurring in winter (161 cases), followed by spring (132 cases), autumn (86 cases), and summer (39 cases). The seasonal surge in OB cases during winter is also likely associated with increased viral pathogen activity. Among children with AOB, frequent episodes of acute respiratory infections (≥6 times per year) were recorded in 212 cases (42.9%). A significant proportion of these children (358 cases, 72.5%) had underlying health conditions or a history of developmental concerns, including:

- Early transition to artificial feeding (313 cases, 63.4%)
- History of perinatal central nervous system damage (278 cases, 56.3%)
- Rickets (222 cases, 45%)
- Anemia (481 cases, 97.3%)

Most of the children in the study were born full-term, with 851 (90.6%) weighing over 2500 g at birth. Preterm infants accounted for 61 cases (9.4%), including 46 children with AOB and 15 children with OB.Half of the children diagnosed with AOB exhibited impaired physical development. Notably, high and disharmonious physical development was more prevalent, observed in 223 cases (36.4%).

A retrospective analysis of archival data revealed that the development of acute respiratory failure with bronchial obstruction in patients with AOB is influenced by a combination of multiple factors, including age-related differences, the presence of comorbid conditions, and various risk factors.

Our study demonstrated that constitutional anomalies also contribute to the risk of BOS development. In particular, exudative forms of atopic dermatitis were observed in 39.1% of cases, while lymphatic-hypoplastic diathesis was present in 19.5% of affected children.

According to our findings, all children with AOB exhibited physical symptoms of bronchial obstruction. A frequent, productive cough was observed in 36.4% of cases, while the remaining 63.5% of patients experienced an infrequent cough, often occurring in the morning. This pattern may be attributed to age-related deficiencies in mucociliary clearance.

Organ-specific symptoms and radiological findings proved to be particularly valuable for diagnostic and differential diagnostic purposes. A dry cough at the onset of the disease, transitioning to a wet cough, was noted in all patients with AOB and OB. Additionally, a wet cough with the production of viscous, mucopurulent sputum or episodes of vomiting was recorded in 303 children (61.3%) with AOB and 264 children (63.2%) with OB.

Clear signs of lower respiratory tract obstruction, including noisy wheezing (93.1%) and expiratory dyspnea (90.6%), were detected exclusively in patients with AOB. In contrast, these symptoms were not documented in the control group, highlighting their diagnostic significance in differentiating BOS from non-obstructive bronchitis.

CONCLUSIONS

Key risk factors identified for the development of broncho-obstructive syndrome in children included perinatal encephalopathy, early transition to artificial feeding, frequent acute respiratory infections, a family history of allergies, protein-energy malnutrition, rickets, and anemia. These findings underscore the critical need for targeted preventive strategies. Given these risk factors, there is an urgent necessity for proactive measures at the family level, as well as within rural medical centers and family clinics, to prevent the progression of BOS and reduce the likelihood of developing bronchial asthma.

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