



CLINICAL AND IMMUNOLOGICAL FEATURES OF BRONCHOPULMONARY PATHOLOGY IN EARLY AGE CHILDREN IN THE ARAL SEA REGION

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Relevance. Respiratory diseases remain a common problem, despite the use of high-tech diagnostic and treatment methods. Bronchopulmonary diseases remain a common pathology in children. The high incidence of pneumonia and bronchitis is largely due to environmental and medical-biological factors, including environmental pollution, air, soil, and water pollution, as well as maternal and child nutrition, past illnesses, and parental bad habits. Climate change in the Aral Sea region, due to the drying up of the Aral Sea, has led to the global loss of fauna and changes in the region's natural resources, affecting the health of adults and children. Equally significant are the impacts of socio-hygienic and economic factors on the health, growth, and development of children in this region. Against the backdrop of deteriorating environmental conditions associated with the drying up of the Aral Sea, drinking water quality has deteriorated, and its shortage has also led to a general deterioration in the region's environment, as well as living conditions and health of the population.

Materials and Methods. We examined 168 early age children with respiratory diseases living in the Khorezm region. We used clinical and anamnestic methods, assessment of minor external developmental anomalies, parental interviews, and analysis of primary medical records.

Immunological studies were conducted on 60 early age children, 40 of whom were children from the Khorezm region, forming the main group, and a control group of 20 children from Tashkent with respiratory pathologies. Immunological studies were conducted at the Institute of Human Immunology and Genomics of the Academy of Sciences of the Republic of Uzbekistan. The content of secretory IgA in saliva and Ig E in blood serum were determined according to Mancini. The concentration of cytokines: interleukin- 4 (IL-4), 8 (IL-8) was determined by enzyme-linked immunosorbent assay using reagent kits manufactured by Cytokine LLC (St. Petersburg Research Institute of Ultra-Pure Biopreparations) in the immunomorphology group of the Institute of Human Immunology and Genomics of the Academy of Sciences of the Republic of Uzbekistan.

The study is based on the results of a survey conducted at the Urgench Regional Multidisciplinary Children's Hospital in children aged 1-3 years. The distribution of bronchopulmonary pathologies revealed that the incidence of recurrent obstructive bronchitis in children aged 1 year was 12.4%, acute obstructive bronchitis 29.5%, and acute pneumonia 64.9%, which is consistent with literature data. Among 2-year-old children, the incidence of acute obstructive bronchitis was 26.9%, recurrent obstructive bronchitis 14.6%, and acute pneumonia 58.5%. Our study revealed that recurrent obstructive bronchitis was more common in children aged 3 years and accounted for 43.6%.

The incidence of concomitant pathology in patients in the first year of life was high, which amounted to 23.9% of the total number of children with CNS, 27.9% of atopic dermatitis, 55.7% of dysmetabolic nephropathy, and 17% of rickets.

Based on the results of clinical examinations, dysmetabolic nephropathy accounted for 39.8% of comorbid pathologies, atopic dermatitis 27.9%, rickets 18.4%, and polyneuritis of the central nervous system (PCNS) 12.5% among children of other age groups. When studying the clinical course of diseases, mothers mainly complained of an increase in body temperature of 38-39 °C (85%) in 1-year-old children, cough (100%), and weakness (35%). Moreover, 45 children aged 2-3 years (34.6%) had a lingering cough lasting 4 weeks or more, with sputum production. In 30% of 1-year-old patients, cyanosis of the nasolabial triangle was observed during physical activity (crying, feeding). Upon examination, 24.6% of patients demonstrated nasal flaring and accessory muscle involvement, while 57.6% of children experienced rapid breathing. Among children of all age groups, the most common form of dyspnea was mixed dyspnea (26.3%), expiratory dyspnea (22.7%), and inspiratory dyspnea (7%).

Our studies of humoral immunity showed that the content of total IgE in the blood serum of the main group of young children was significantly increased and amounted to 70.16 ± 26.21 IU / ml, and in children of the control group this indicator was 61.85 ± 20.36 IU / ml ($p < 0.005$). In the main group, with obstructive bronchitis, high IgE rates were observed in children and amounted to - 81.8%, in 18.2% of children, the IgE level was within the reference values, and in 10.5% of children with pneumonia, the IgE rate was high, these children had a concomitant pathology such as obstructive syndrome in their anamnesis. In 80.0% of children in the control group, the IgE level was elevated, and in 40% of children with pneumonia, this indicator was elevated, and this is due to the fact that these children had a history of allergic pathologies.

According to the literature, the level of s IgA is of great importance in predicting the development of the health status of the population during a large-scale medical examination of the population [Ivanov V.D. et al., 2006]. In turn, local immunity can also be assessed - a decrease in s Ig A indicates a deficiency in the function of local immunity, and a high amount indicates an imbalance in the immune system [Makovetskaya A.K. et al., 2005]. In our study, the results of the level of secretory s IgA in the salivary fluid in children of the main group showed 38.32 ± 4.91 , respectively, in the control group 45.10 ± 4.11 ($p < 0.005$). It follows from the above that secretory immunoglobulin A - s IgA is the main local immunity and provides protection for all parts of the respiratory tract. The secretory immunoglobulin s IgA index in the human body varies depending on age, environmental factors and morbidity, and it should be taken into account that the level of secretory immunoglobulin class A decreases with age. The sIgA level in the study groups of the Khorezm region and Tashkent city average value decreased, in turn, a lower indicator was in the main group (38.32 ± 4.91 , respectively 45.10 ± 4.11). In percentage terms, in our study, in children in the main and control groups by morbidity, with pneumonia in both groups, the sIgA level was 100% in children was reduced, and with obstructive bronchitis in patients it was 81.7%. sIgA was reduced in the main group, and in the remaining children in this group with obstructive bronchitis it was 9.3% of the reference value. In the control group, OOB was reduced in 100% of sIgA . We studied pro-inflammatory (IL-8) and anti-inflammatory (IL-4) interleukins in saliva. Interleukins play an important role in the immune and inflammatory response in various areas of medicine and modern immunology, regulating specific immune reactions and limiting the development of

inflammation. Among pro-inflammatory cytokines, interleukin IL-4 is considered the most important mediator of inflammation development. Cytokine status indicators in children of the main group were within the range of 21.20 ± 6.37 , in the control group, IL-4 indicators were 9.22 ± 1.66 , and in the context of nosological groups, IL-4 levels were elevated above the reference value by 60% in pneumonia and by 90% in obstructive bronchitis. In studies of IL-4 in children of the control group with pneumonia, it was within the reference values. In studies of young children in the main group, the IL-8 level was within the range of 65.83 ± 43.74 (Table No. 1).

In children with pneumonia in the control group, the IL-8 level averaged 79.32 ± 27.69 , exceeding the reference value by 35%; in obstructive bronchitis, it was 9%; in the remaining cases, the value was decreased. In children with obstructive bronchitis in the control group, IL-4 and IL-8 were elevated in 60%, respectively, while in pneumonia, interleukin IL-4 levels were elevated in 100% of the children studied.

Table No. 1.

Some indicators of immune status in young children

				IL-4	IL-8
		IgE	SIgA		
Main group	Obstructive bronchitis	105.95±29.78	53.79±24.32	18.08±7.11*	28.67±29.76
	Pneumonia	35.74±15.11*	39.96±5.39	17.93±7.63	71.63±43.06
Control group	Obstructive bronchitis	68.00±35.96*	45.11±7.43*	10.37±1.64	62.4±7.38*
	Pneumonia	45.11±18.68	31.91±18.50*	4.95±2.61	81.19±55.05

Note: *reliability $p < 0.05$

The identified changes in the immune status of children with bronchopulmonary pathology living in an unfavorable environmental environment with pneumonia and obstructive bronchitis were high levels of immunoglobulin IgE and low levels of SIgA. Interleukin IL-4 in pneumonia is elevated by 60%, and in obstructive bronchitis by 90% above the reference value, indicating changes in both cellular and humoral immune imbalance, which subsequently leads to more severe diseases of the bronchopulmonary system. Our indicators coincide with the levels of interleukin IL-4 and IL-8 according to literary data, which, accordingly, with an increase in one indicator, the other indicator decreases. Analysis of the obtained data on the correlation relationship of secretory immunoglobulin SIgA with interleukin IL-4 ($r=0.31$) and C-reactive protein ($r=0.41$) showed a moderate association, and immunoglobulin IgE was strongly associated with pulse oximetry ($r=0.62$) and an average negative relationship with respiratory rate ($r=-0.33$). Interleukin-IL-4 is strongly associated with pulse oximetry ($r=0.68$) and IL-8 ($r=0.61$). IL-8 average is correlated with pulse oximetry ($r=0.41$) (Figure 1). Conducted immune status studies showed that the proinflammatory cytokine interleukin IL-4 is an important mediator of inflammation. IL-4 levels were elevated in 60% of children with pneumonia and in 90% of children with obstructive bronchitis in the study group. In the control group, interleukin IL-4 levels remained within the normal range for both pneumonia and obstructive bronchitis.

It is important to note that the identified changes in the humoral status in young children with bronchopulmonary pathology living in unfavorable environmental conditions, namely with pneumonia and obstructive bronchitis, were increased levels of immunoglobulin IgE and



low sIgA levels. Based on literature studies, changes and imbalances in certain immunological parameters may contribute to the development of more severe bronchopulmonary diseases.

Conclusions: the incidence of pneumonia in children under one year of age was 64.9%, while in 2-year-olds it was 58.5%. Recurrent obstructive bronchitis was more common in 3-year-olds, reaching 43.6%. When analyzing the incidence of concomitant diseases, dysmetabolic nephropathy was observed in 39.8%, atopic dermatitis in 27.9%, rickets in 18.4%, and PPCNS in 12.5%. Concomitant pathologies contribute to a protracted and recurrent course of the underlying pathology in children in this region. Changes in the immune status of children with bronchopulmonary pathology living in unfavorable environmental conditions: children with pneumonia and obstructive bronchitis had high levels of immunoglobulin IgE and low levels of sIgA. Interleukin IL-4 levels in pneumonia were higher than the reference value of 60%, and in obstructive bronchitis, 90%. This indicates a cellular and humoral immune imbalance, which subsequently leads to more severe bronchopulmonary diseases. In summary, our research substantiates the need to include IgE immunoglobulin levels in the diagnostic protocol for respiratory diseases.

Literature:

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