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MECHANISMS OF CLINICAL-IMMUNOLOGICAL DEVELOPMENT OF DISEASES WITH BRONCHOOBSTRUCTIVE SYNDROME IN CHILDREN

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Abstract: Bronchoobstructive syndrome (BOS) is a common pathological condition in pediatric practice, accompanied by narrowing of the airways, which occurs against the background of diseases of various etiologies. BOS is manifested by difficulty breathing, wheezing, prolonged expiration and is associated with inflammation, edema, increased secretion or muscle spasm, which causes bronchial obstruction. This syndrome is more common in children against the background of bronchiolitis, bronchial asthma, allergic rhinitis, viral respiratory infections, as well as congenital anomalies.

Relevance: Bronchoobstructive syndrome (BOS) is one of the most common respiratory diseases in children. According to the World Health Organization (WHO), BOS is observed in 30–50% of cases among children under 5 years of age every year. Especially in diseases such as bronchial asthma, viral bronchiolitis, allergic rhinitis, the development of CSF has a negative impact on the quality of life, growth and development of children.

In recent years, scientific research on the role of age-specific immunological changes, genetic predisposition, environmental factors and epigenetic mechanisms in diseases associated with this syndrome has been deepening. In particular, it has been found that Th2-type inflammation, increased levels of interleukins (IL-4, IL-5, IL-13), eosinophils and IgE, as well as epithelial barrier dysfunction play a key role in the pathogenesis of CSF.

In modern pediatrics, early identification of factors causing CSF, assessment of the immunological status and the use of individual treatment approaches are of great importance. Especially in preschool children, bronchoobstructive conditions are often the primary sign of asthma, and their timely and correct assessment is crucial in preventing future chronic respiratory diseases.

Also, factors such as antibiotic-resistant infections, improper and self-medication, environmental pollution, and passive smoking are increasing the severity of BOS. Therefore,

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in-depth study of this syndrome through complex immunological, clinical, and epidemiological approaches is relevant not only in clinical practice, but also in health policy.

Keywords: Bronchoobstructive syndrome, Etiology, Immune response, Th2-lymphocytes, Eosinophils, Children, Allergy, Bronchial asthma, Pathogenesis.

Main part: In the development of bronchial obstruction in children, age-related features of the structure of the bronchial tree, which are characteristic of children in the first years of life, play a certain role. Factors such as prolonged sleep, frequent crying, and lying on the back in the first months of life also undoubtedly affect the dysfunction of the respiratory system in a small child. Early childhood is characterized by the imperfection of many immunological mechanisms: the formation of interferon in the upper respiratory tract, the level of immunoglobulin A in the blood serum (by the end of the first year of life it is 28% of the adult level), since secretory immunoglobulin A (maximum values are determined only at 10-11 years of age), the functional activity of the T-system of immunity also decreases. In addition, perinatal pathology, allergic history, bronchial hyperreactivity, rickets, dystrophies, thymus hyperplasia, early artificial feeding, and respiratory diseases observed in children aged 6-12 months also play an important role in the development of bronchoobstruction.

Etiology and pathogenesis

Among the etiological factors of bronchoobstructive syndrome, the following are distinguished:

1. Viral infections: especially respiratory syncytial virus (RSV), parainfluenza, adenoviruses, rhinoviruses.
2. Allergens: dust, animal hair, plant pollen, house dust mite waste.
3. Bacterial infections: Streptococcus pneumoniae, Haemophilus influenzae.
4. Atopic background: the presence of allergic diseases in parents makes the child's immune system hyperreactive to suspected antigens.

Pathogenesis is complex and occurs through immune and neurohumoral mechanisms:

- Immunological stage: In diseases accompanied by CSF, a Th2-type immune response usually prevails. In this case, interleukins such as IL-4, IL-5, IL-13 are activated and attract eosinophils. Proinflammatory mediators (for example, major basic protein) contained in eosinophil granules damage the bronchial epithelium and lead to edema and hypersecretion.
- Bronchial hyperreactivity: Histamine, leukotrienes and prostaglandins released by mast cells cause spasm of bronchial muscles.
- Neuroimmune regulation: Stimulation of sensory nerve fibers increases bronchoconstriction through vagal reflexes.
- Epithelial barrier disruption: Viruses or allergens damage the bronchial epithelium, weakening its protective function and leading the immune system to a hypersensitive state.

Clinical manifestations

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Diseases associated with BOS usually have the following clinical signs:

- ✓ Shortness of breath (dyspnea), especially expiratory;
- ✓ Wheezing during exhalation (sibilant breathing);
- ✓ Failure of the chest to descend (emphysematous condition);
- ✓ Increased body temperature (if there is an infectious process);
- ✓ Cough - dry or with phlegm;
- ✓ Increased heart rate, anxiety.

In young children, these symptoms can quickly become severe due to narrowing of the airways, immature immune response and epithelial weakness.

Immunological indicators

Depending on the clinical condition, immune changes on the background of BOS are as follows:

- ❖ Systolic and absolute eosinophilia (in allergic diseases);
- ❖ Increased IgE levels, especially in atopic bronchial asthma;
- ❖ Disorders of the T lymphocyte subpopulation - Th2 predominance;
- ❖ Interleukin balance – increased IL-4, IL-5, IL-13, decreased IL-10 and IFN-γ;
- ❖ Decreased lysozyme and secretory IgA in saliva.

The above immuno-biochemical markers are important not only for diagnosing the disease, but also for assessing its severity.

Differential diagnosis

Diseases accompanied by BOS should be differentiated from the following conditions:

Status	**Distinguishing marks**
Pneumonia	Moist breathing, focal auscultatory signs
Congenital heart defects	Cyanosis, heart murmurs, ECG changes
Fremand syndrome	Noise during breathing (laryngospasm)
Negative bodies	Detected by X-ray, bronchoscopy

Treatment approach

Treatment is carried out in a comprehensive manner:

1. Etiotropic treatment:

- ✓ Antiviral (interferons, antivirals - ribavirin in RSV),

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- ✓ Antibiotics - if a bacterial infection is detected.

2. Pathogenetic treatment:

- ✓ Broncholytics (salbutamol, fenoterol),
- ✓ GCS (inhaled or systemic: budesonide, prednisolone),
- ✓ Mucolytics - for liquefaction of sputum (ambroxol).

3. Immunotherapy:

- ✓ If there is an allergic background - ASIT (specific immunotherapy),
- ✓ Immunomodulators - licopid, bronchomunal, IRS-19.

4. Supportive measures:

- ✓ Inhalations (naCl, berodual),
- ✓ Hydration, physiotherapy,
- ✓ Maintaining air humidity and cleanliness.

Prevention

Prevention of COPD includes the following measures:

- ✓ Breastfeeding the mother as much as possible;
- ✓ Early detection and treatment of respiratory viral infections;
- ✓ Avoidance of allergens;
- ✓ Vaccination (experimental against influenza, pneumococcal, RSV);
- ✓ Prophylactic surfactant therapy in newborns.

Conclusion: Bronchoobstructive syndrome in children is a complex syndrome characterized by impaired bronchial permeability through immune and inflammatory mechanisms, which is etiologically and pathogenetically associated with various diseases. A comprehensive clinical and immunological approach is necessary to combat it, which will help to target not only symptoms, but also the main pathogenetic chains. In the future, the widespread introduction of immunoprophylactic methods will help to reduce the severity of this syndrome.

References:

1. Ziyatdinova F.G., et al. “Bronxoobstruktiv sindrom patogenezi: zamonaviy qarashlar.” *Tibbiyot jurnali*, 2022.
2. Global Initiative for Asthma (GINA), 2024 update. www.ginasthma.org
3. Бароян А.М., “Аллергия и иммунитет у детей.” М.: ГЭОТАР-Медиа, 2021.
4. Каганов С.Ю. “Педиатрическая аллергология и пульмонология.” СПб., 2020.

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5. Chuchalin A.G. et al. “Pediatric Respiratory Diseases and Bronchial Obstruction Mechanisms.” *Lancet Respiratory Medicine*, 2020.
6. Martinez F.D. “Development of wheezing disorders and asthma in children.” *Pediatrics*, 2019.