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**CHRONIC BRONCHITIS IN CHILDREN: TOPICAL ISSUES OF DIAGNOSIS AND TREATMENT**

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*Abstract. The most complex and urgent problem of pediatric pulmonology are chronic nonspecific lung diseases. Despite significant advances in the diagnosis and treatment of this pathology, many issues remain debatable. This applies, first of all, to infectious and inflammatory diseases, their terminology, age-related evolution, and their connection with chronic, incapacitating, pathology in adults. The article presents the data of a review of the literature on the etiology and pathogenesis, course features, differential diagnosis and conservative therapy of chronic bronchitis in children.*

*Keywords: children, chronic bronchitis, diagnosis, treatment.*

Respiratory diseases consistently occupy the first place in the structure of the general morbidity of children and adolescents [12, 14]. The most complex and urgent problem of pediatric pulmonology are chronic nonspecific lung diseases. Despite significant advances in the diagnosis and treatment of this pathology, many issues remain debatable. This applies, first of all, to infectious and inflammatory diseases, their terminology, age-related evolution, and their connection with chronic invalidizing pathology in adults [14,15].

The problem of chronic bronchitis in children is currently of the greatest interest. Despite the recognition of chronic bronchitis in children as an independent nosological form, until recently, many leading experts consider it as an obligate sign of other bronchopulmonary diseases [1,6,7,12].

Chronic bronchitis (CB) is understood as a diffuse progressive disease of the bronchial tree, which is characterized by the development of an inflammatory process in the mucous membrane, accompanied by hypersecretion of sputum, a violation of the cleansing and protective function of the bronchi. Chronic bronchitis is characterized by the presence in a sick child of a prolonged cough and various wet and dry rales in the lungs for at least 3 months a year for the last 2 years [12].

Chronical bronchitis - the diagnosis of exclusion and can be made to the child collectively by a medical commission in the absence of any diseases accompanied by a prolonged productive cough or other respiratory symptoms, physical signs indicating bronchial damage, namely, with the exclusion of: bronchial asthma, cystic fibrosis, primary ciliary dyskinesia, malformations bronchopulmonary system, anomalies of large vessels with compression of the esophagus and respiratory tract, immunodeficiency states, aspiration syndrome, tuberculosis and pulmonary aspergillosis. The diagnosis of chronic bronchitis can be revised in the process of monitoring the patient in favor of another nosology [12,14].

Modern achievements have changed the idea of the causes of the formation of a chronic process in the lungs in the direction of recognizing the leading role of malformations [1,12,14]. Of the exogenous risk factors, the importance of foreign bodies of the bronchi and the adverse effects of the environment, primarily the microenvironment and smoking, is still being discussed. The prognosis of chronic bronchitis is always serious, since the inflammation is bilateral diffuse, progresses over time and leads to irreversible changes in the lungs and the development of respiratory failure [7,12,13,14].

Early diagnosis of malformations of the lungs, prevention of the formation of chronic inflammation in the bronchi, improvement of therapy and prevention of secondary chronic bronchitis open the way to reduce its prevalence and improve the prognosis of the disease, to improve the quality of life of sick children.

All of the above suggests that clarifying the main causes of chronic bronchitis in childhood, identifying its clinical and functional features and improving the prevention and treatment of the disease are relevant and timely.

Etiology and pathogenesis of the disease. The cause of chronic bronchitis (CB) in children in 90% of cases are respiratory viruses, primarily parainfluenza, influenza viruses, respiratory syncytial (RS) virus, rhinovirus, adenovirus, metapneumovirus [1]. Up to 10% of CB cases in childhood, especially in schoolchildren and adolescents, are caused by bacterial pathogens such as *Mycoplasma pneumoniae*, *Chlamydia pneumoniae* and *Bordetella pertussis* [1,2,3].

Other bacterial pathogens such as *Streptococcus pneumoniae*, *Moraxella catarrhalis*, non-typeable strains of *Haemophilus influenzae* are extremely rare causes of chronic bronchitis or complicate chronic bronchitis in children without underlying pathology. These pathogens in rare cases can be the cause of prolonged bacterial bronchitis (the term "chronic wet cough" is also used) associated with the formation of microbial biofilms on the damaged mucous membrane of the respiratory tract [2,8]. Protracted bacterial bronchitis occurs more often in children with malacia of the trachea and large bronchi and, if left untreated, can lead to the development of bronchiectasis.

The bacterial nature of bronchitis is more typical for children with cystic fibrosis (cystic fibrosis), malformations of the bronchopulmonary system, immunodeficiency states, smokers or exposed to passive smoking [1,12]. A special group consists of aspiration bronchitis associated with chronic aspiration of food in infants and young children. The etiopathogenesis of such bronchitis is due to the aggressive physicochemical action of aspirate, as well as gram-positive oropharyngeal flora and gram-negative intestinal flora [2].

Epidemiology of the disease. The incidence of CB in Central Asia averages 75-250 per 1000 children per year. *M. pneumoniae* bronchitis occurs more frequently in children > 5 years of age, including adolescents, *C. pneumoniae* it is also more often observed in adolescents, but in general, this pathogen is relatively rare and poorly understood [1,6].

Bronchitis against the background of acute respiratory infection (ARI), incl. repeated (recurrent), are observed especially often in children under six years old in areas of industrial and domestic (passive smoking, stoves, stoves) air pollution, which may be due to the development of bronchial hyperreactivity (BHR) [3,6].

The prevalence of chronic bronchitis in children is difficult to study, since primary chronic bronchitis is extremely rare, and other diseases, one of the clinical signs of which may be chronic bronchitis, are taken into account in accordance with specific nosologies [6]. Data on the prevalence of bronchitis in children are limited. No major epidemiological studies have been conducted to date. According to a study conducted in Italy in 2015, among 563 children with chronic wet cough, prolonged bacterial bronchitis was detected in 11.9% of cases [10]. In Australia, in a study of 191 indigenous children

with chronic wet cough, lingering bacterial bronchitis was diagnosed in 10% [ 8]. According to other data, the prevalence of protracted bacterial bronchitis in children with chronic wet cough can reach 40-44% [12,13,14].

Chronic bronchitis can occur in any age group, including adolescents and adults, but is most often observed in children under 6 years of age [12,15], according to separate publications, boys are slightly more often affected [12] .

Clinical picture of the disease. Chronical bronchitis characterized by a productive cough, different-sized moist rales in the lungs in the presence of at least 2-3 exacerbations of the disease per year for 2 or more years in a row. This definition of chronic bronchitis by the World Health Organization has epidemiological significance and can only be applied to adults. In turn, productive cough and different-sized moist rales in the lungs are not specific and can be observed in children with various chronic bronchopulmonary and other diseases.

In the case of bronchitis caused by *M. pneumoniae* , persistent fever up to 38-39°C for 5-7 days, headache, conjunctival hyperemia, pharyngitis are possible (schoolchildren usually get sick). Signs of intoxication, as a rule, are not observed. Cough appears from the first days of the disease, pronounced, unproductive, sometimes it can be accompanied by parasternal pain as a result of strong cough shocks. Bronchial obstruction syndrome may be observed . Dry and wet rales, often asymmetric, are auscultated in the lungs. Untreated cough may persist for several weeks [2,9,7,11]. Appropriate epidemiological data are possible (cases of obstructive bronchitis, pneumonia in the children's team, family cases).

Bronchitis caused by *C. pneumoniae* , usually found in adolescents, may be accompanied by pharyngitis, sinusitis, and broncho-obstructive syndrome . Fever is not typical [1,3,12,14].

Diagnosis of the disease. The criteria for diagnosis according to the consensus of the European Respiratory Society are:

- Chronic wet cough (?3 weeks).
- No evidence of other possible causes of a wet cough and no evidence of a likely etiology for the cough.
- Resolution of cough after a maximum of 14 days of oral antibiotic therapy directed at *H. influenzae*.

A child with clinical manifestations of bronchitis should take an anamnesis and complaints [2,4]. The following complaints and anamnestic data require the exclusion of alternative diagnoses: a history of foreign body aspiration, hemoptysis, dysphagia, choking while eating or drinking, recurrent inflammatory processes in the paranasal sinuses and lungs, repeated episodes of bronchitis, signs of immunodeficiency, contact with tuberculosis patients infection, severe respiratory pathology in the early neonatal period.

During the physical examination, it is recommended to conduct a standard general examination of the child in order to establish a diagnosis and assess the severity of the condition, while it is necessary:

- assess the presence of signs of intoxication (lethargy, refusal to eat and, especially, drink);
- assess the nature of the cough;
- conduct a visual examination of the upper respiratory tract;
- evaluate signs of respiratory failure (participation of auxiliary muscles in the act of breathing, retraction of compliant places of the chest during breathing) ;
- measure the respiratory rate (RR), heart rate (HR);
- perform a percussion examination of the lungs
- auscultate the lungs, paying attention to the symmetry of auscultatory changes [2,

3, 7,10].

In children of the first months of life with signs of viral bronchitis (and bronchiolitis ), a fever of more than 38.5°C (especially its appearance after 2-3 days of illness), a “toxic” appearance, refusal to eat and especially drink, which may indicate secondary bacterial infection. The appearance of retractions of compliant places of the chest, cyanosis, "groaning" breathing indicate an increase in respiratory failure.

Mycoplasma etiology of bronchitis should be suspected in children over 5 years of age with clinical signs of bronchitis and an asymmetric auscultatory pattern in the lungs.

In case of high fever, lethargy, decreased appetite, decreased saturation, auscultatory weakening of breathing on the one hand, bronchial breathing, focal fine bubbling rales and (or) crepitus, pneumonia must be excluded/confirmed.

The following examination data require excluding alternative diagnoses: signs of chronic hypoxia (deformation of the terminal phalanges of the fingers like "drum fingers" and nail plates like "watch glasses"), deformity of the chest, lag in physical development.

**Conservative treatment of chronic bronchitis in children.** It is recommended that children with chronic bronchitis be treated in accordance with the nosological form that is the cause of chronic bronchitis [11]. It is advisable to consider chronic bronchitis, first of all, not as an independent disease, but as a syndrome in bronchopulmonary pathology. The duration of ABT is usually 7-14 days, with the exception of azithromycin (short courses of 3-5 days have been proven to be effective) [62, 63]. It is possible to use other macrolides that have lower respiratory tract infections (acute bronchitis) in indications for prescribing, in appropriate age dosages. The effect of therapy in the form of a decrease in fever, a decrease in cough and wheezing in the lungs occurs within 48, maximum 72, hours. The specified duration of antibiotic therapy (7-14 days) is defined for community-acquired pneumonia caused by *M. pneumoniae* ; separate studies in obstructive bronchitis caused by mycoplasmas have not been conducted.

It is not recommended to routinely prescribe the group of antitussive drugs (excluding combination with expectorants) (antitussives) in patients with chronic bronchitis. It is necessary to consider the appointment of these drugs only in the presence of a dry, painful cough, with the exclusion of bronchial obstruction and other conditions requiring appropriate therapy [3, 9, 10].



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