



DOI: **10.5958/2249-7137.2021.00580.2**

## BRONCHOO STRUCTIVE SYNDROME IN CHILDREN: PREVALENCE AND DIFFICULTIES OF DIFFERENTIAL DIAGNOSTICS

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### ABSTRACT

*Broncho-obstructive syndrome in children is clinically manifested by paroxysmal cough, expiratory dyspnea, asthma attacks and is associated with impaired bronchial patency, develops acutely, but can be persistent. The first symptoms: shortness of breath and wheezing syndrome often appear in children at an early age. Differential diagnosis of biofeedback in young children is difficult due to the impossibility of using methods for assessing the function of external respiration, difficulties in obtaining sputum for cytological and bacteriological studies in order to verify the diagnosis. Early diagnosis, which determines the tactics of treatment, largely determines the prognosis of the disease and the choice of preventive measures.*

**KEYWORDS:** *Broncho-obstructive syndrome, children, cough, shortness of breath, diagnosis, differential diagnosis, treatment, prognosis.*

### INTRODUCTION

Diseases of the respiratory system are leading in the structure of morbidity in childhood [1, 3, 4, and 10]. It is important to note the high annual rate of increase in the prevalence of bronchial asthma (BA) in children, which reaches 20%. At the same time, in recent years, BA has been increasingly recorded in children in the first years of life [2, 7]. In young children, 5-50% of cases of acute respiratory infections are often complicated by broncho-obstructive syndrome, the main cause of which is acute obstructive bronchitis (AOB) [3, 5, 6, and 17].

Broncho-obstructive syndrome (BOS) 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 [9,10,11]. By itself, Broncho-obstructive syndrome has a characteristic clinical picture, so there are no difficulties with its diagnosis and especially

clinically evident in children of the first years of life, which is due to the anatomical and physiological characteristics of the respiratory system: the narrowness of the airways, insufficient elasticity of the lungs, the softness of the cartilage of the bronchial tree, insufficient rigidity of the chest, a tendency to develop edema, hypersecretion of viscous mucus, poor development of smooth muscles of the bronchi [12].

When faced with broncho-obstructive syndrome in infants in practice, the 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 acute respiratory infection (ARI) [19,21]. With broncho-obstructive syndrome, many diseases of the bronchopulmonary system occur: acute obstructive bronchitis (AOB), BA, bronchopulmonary dysplasia (BPD), congenital malformations (CM) of the bronchopulmonary system (tracheobronchomalacia, tracheobronchomegaly, pulmonary malformations), as foreign body, etc. [5, 6, 8]. The uniformity of the clinical symptoms of bronchial obstruction in these diseases complicates early diagnosis and treatment tactics, which can lead to a protracted and recurrent course of some of them.

Broncho-obstructive syndrome can also be a consequence of allergic inflammation of the tracheobronchial tree, obstructive obstruction or hemodynamic disorders, congenital malformations of the upper respiratory tract. The widespread prevalence of biofeedback in children, as well as the heterogeneity of its course, development and outcome, has been an urgent object of study for many years for scientists and medical practitioners, since difficulties arise in the differential diagnosis of this condition [21].

Acute respiratory infections occupy a leading place in the structure of human infectious pathology. The airborne route of transmission of the pathogen, the high susceptibility of the population to almost all viruses, pathogens determine their main epidemiological feature - the speed and breadth of their spread. They are practically unlimited and significantly increase during periods of seasonal immunodeficiency that occurs in the winter and winter-spring periods.

Clinical manifestations of broncho-obstructive syndrome consist of the elongation of exhalation, the appearance of expiratory noise (wheezing, noisy breathing), asthma attacks, and the participation of auxiliary muscles in the act of breathing; an unproductive cough often develops. This clinical symptom complex is called "wheezing" - "wheezing syndrome", since whistling sounds (distant or heard during auscultation) are the main clinical manifestation of biofeedback [17, 21]. The genesis of wheezing is associated with both turbulent air movement against an obstacle in the airways (trachea, bronchi) and with rapid oscillations of the lumen of the lobar and segmental bronchi. In this case, there is an increase in intrathoracic pressure, fluctuations in the air flow rate during expiration, compression of the bronchi and their vibration, and the end result is the appearance of wheezing rales [22].

Bronchial obstruction against the background of respiratory diseases in children, as a rule, occurs more often in the form of acute obstructive bronchitis. Biofeedback mainly develops acutely, but it can be persistent. Differential diagnosis of BOS in young children is difficult due to the impossibility of using methods for assessing the function of external respiration, difficulties in obtaining sputum for cytological and bacteriological studies in order to verify the diagnosis [18, 22]. The persistent recurrent course of biofeedback, resistant to traditional conservative therapy, may require an endoscopic examination of the bronchial tree, which makes it possible to

visualize changes in the bronchi, as well as laboratory study of biological fluids and tissues obtained during bronchoscopy [12, 19, and 20].

The first symptoms: shortness of breath and wheezing syndrome often appear in children at an early age [13, 15, 23]. Previous bronchial obstruction also increases the risk of viral lower respiratory tract infection [17, 19]. A study conducted in 2008 by L. B. Bacharier et al. Showed that 60% of infants hospitalized with bronchiolitis had more frequent respiratory infections and episodes of bronchopulmonary obstruction within 2 years of follow-up compared with controls [18,24]. Biofeedback of both infectious and allergic inflammatory origin is always more severe in children with bronchial hyperreactivity and manifestations of atopy [22]. It is also known that AD develops in 30–50% of children who had recurrent biofeedback of viral origin in infancy [21]. The viral infection acts synergistically with allergic sensitization and decreased lung function during infancy, leading to the development of AD later. Atopy is a risk factor for the development of AD after virus-induced biofeedback.

Children who underwent BOS in the early years of life and have such signs of atopy as allergic sensitization, atopic dermatitis, allergen-specific immunoglobulin E, have the highest risk of developing AD [20]. In a study by R.F. Lemanske et al. Found that children of the group with a high genetic risk of developing allergic respiratory diseases at the age of 3 years more often develop biofeedback in the presence of the following risk factors in infancy: passive smoking, allergic sensitization to food at the age of 1 year, any respiratory disease without biofeedback moderate and severe, at least one episode of BFB associated with infection with respiratory syncytial (RS) virus, rhinovirus or other pathogens in infancy [23]. In children who often suffer from respiratory infections, biofeedback is recorded more often [7, 20]; according to some data, bronchial obstruction in infants with ARI reaches 50% or more [18].

The frequency of BOS, which developed against the background of infectious diseases of the lower respiratory tract, ranges from 5 to 40% [18]. Soroka Yu.A. et al. argue that in every second child ARI is accompanied by bronchial obstruction of varying severity [12, 23], and recurrent episodes of respiratory infection occur with recurrent BFB [11, 22], which often progress to severe exacerbations requiring hospitalization of children. Timely and correct identification of infants at increased risk for persistent asthma can help predict long-term outcomes and improve prevention and treatment [15, 21,27]. Over the past two decades, many scientific advances have improved the understanding of AD and the physician's ability to effectively control it [2, 7, and 22].

Early diagnosis, which determines the timely start and tactics of treatment, and also largely determines the prognosis of the disease and the choice of preventive measures [1, 6] The basis for determining the prognosis of biofeedback, as well as early diagnosis of AD, was the study of biofeedback phenotypes depending on age, genesis and characteristics of the course of the disease [12, 23]. The non-atopic phenotype of biofeedback is the most difficult to diagnose and understand. It is known that severe adenovirus infection can lead to prolonged bronchial obstruction in a previously healthy child. Respiratory viruses, including rhinovirus, RSV, metapneumovirus, influenza, affect the respiratory epithelium of the lower respiratory tract and provoke a local immunological response, as well as a protective antiviral response with the production of interferons, chemotaxis and activation of NK cells. Respiratory viruses damage the ciliated epithelium of the mucous membrane of the respiratory tract; increase its permeability to

allergens, toxic substances and the sensitivity of the receptors of the submucous layer of the bronchi, which causes an increase in bronchial hyperreactivity and the occurrence of BOS in children [14, 26].

Thus, the differential diagnosis of clinically heterogeneous phenotypes of children with symptoms of bronchial obstruction, concealing many diseases and conditions that are of the same type in their clinical manifestation, will help in determining the prognosis of biofeedback in young children, in choosing treatment tactics and preventive measures [25,28].

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