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CLINICAL AND MORPHOLOGICAL ASPECTS OF BRONCHIECTATIC DISEASE (LITERATURE REVIEW)

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Abstract:

The article presents the analysis of the literature data on investigation of clinical and functional consequences of bronchopulmonary dysplasia in children. Long-term disorders of respiratory function including impairment of bronchial patency, decrease of pulmonary diffusing capacity and bronchial hyperresponsiveness in such patients have been established. The need to investigate the clinical and morphological aspects has been noted.

Keywords: Bronchiectasis, children, clinical and morphological characteristics.

INTRODUCTION. In recent years, it has been accepted that bronchiectatic disease is a multiethiological pathology whose pathogenesis involves a complex interaction between the body, respiratory pathogens and environmental factors. This interaction leads to a vicious cycle of recurrent infections, airway inflammation and tissue remodelling, contributes to poor clearance, destruction of the structural elements of the bronchial wall, and forms dilatation and obstruction of the small bronchi. The incidence among children aged 0-14 years living in developed countries is considered low, ranging for example from 0.5 per 100 000 children in Finland to 3.7 per 100 000 children in New Zealand. However, among Aboriginal children from Central Australia, incidence rates are as high as 200 per 100 000 children [15]. In India, bronchiectasis is diagnosed in 212 to 2,646 cases per 1 million children per year after pneumonia, due to poor medical care in children under 4 years of age [16]. No studies on the prevalence of bronchiectasis in children have been conducted in the Russian Federation. There are statistics on the prevalence of nosological forms corresponding to ICD-10 codes J44 (other chronic obstructive pulmonary disease) and J47 (bronchiectatic disease) in children from 0 to 14 years: 98.3 per 100,000 in 2010 and 89.3 per 100,000 in 2011. [6]. Bronchiectatic disease thus remains an important problem affecting socially disadvantaged populations, particularly children living in developing countries where there is overcrowding, poor hygiene and limited access to health care [18].

Among children, bronchiectatic disease occupies an important place in the structure of bronchopulmonary pathology. As a result, there is a growing interest in the study of various aspects of the disease, including its etiopathogenesis. Recent genetic, structural, and functional studies have revealed that the mucosal epithelium of the respiratory tract and lungs is a key organizer of the immune response. In addition, there is now strong evidence that epithelial dysfunction is involved in the development of inflammatory lung diseases (17). Congenital and hereditary diseases may underlie the formation of bronchiectasis. Congenital abnormalities of the bronchopulmonary system are found in 8-10% of patients with chronic inflammatory lung disease [7,9]. Only 18.0% of patients were found to have congenital bronchiectasis. However, 38.5% of children were found to have an inherited predisposition to respiratory disease [8,11]. There was evidence that chronic pulmonary suppurations that required surgical treatment in 66% of children were due to congenital lung abnormalities [3]. However, according to some researchers, even with careful differential diagnosis, in 26-53% of cases the cause of bronchiectasis formation cannot be identified [12,19].

Bronchiectasis is divided into cylindrical, saccate and mixed. In addition, spindle-shaped, cystic and variceal bronchiectasis have been described. Since different bronchiectasis variants can occur in one patient, the localization and prevalence of changes within specific bronchopulmonary segments are of greatest importance.

Cylindrical bronchiectasis usually occurs with sclerosis of the bronchial walls. In this case the lumen of the bronchus is uniformly dilated over a fairly large extent. It often occurs against a background of other lung diseases - secondary bronchiectasis. Cylindrical bronchiectasis does not cause a large amount of pus, so the general condition of the patient is usually not too severe, and sometimes these bronchiectasis can regress when the cause that caused them (infection,

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atelectasis, aspiration by a foreign body) is removed [6].

Baggy bronchiectasis is a single spherical or oval enlargement on one side of the bronchus. Quite often this form of bronchiectasis is found in congenital defects of bronchopulmonary tissue development. The sacs are blind protrusions of the wall, which can reach a large size. The accumulation of large volumes of sputum and pus is characteristic. The course of the disease is usually severe [13,14,20,22].Some authors suggest lung MRI as a possible alternative to CT scanning in patients with primary immunodeficiency and hypersensitivity (23).

The components of the APUD system are termed neuroendocrine, as they express genes for both neuronal and endocrine cellular phenotypes, including the synthesis and release of amines (serotonin, 5-HT) and various neuropeptides (including bombsin). Hyperplasia of apudocytes and NETs has been established in chronic diseases in children, as well as in experimental pneumonia. In recent years, there have been intensive studies of neuroendocrine cells of APUD lung system in many physiological and pathological conditions of the organ [4,9]. However, the peculiarities of lung endocrine cell structure in children with bronchiectatic disease have not been studied so far. In this connection it is not possible to assess fully the morphofunctional state of lung endocrine apparatus in inflammatory pathological processes including bronchiectatic disease.

The role of APUD cells in lung development and postnatal circulatory rearrangement in fetuses and newborns is well known. Under experimental conditions, apudocytes release secretory granules under the influence of acute or chronic hypoxia, hypercapnia, irritation by nitric oxide and various drugs and medicines (nicotine, reserpine, calcium ionophoresis). Apudocytes are also involved in the pathogenesis of disease. Their hyperplasia is noted in patients with acute pneumonitis, chronic obstructive pulmonary disease, in persistent smokers, in patients with non-immune bronchial asthma, in children with bronchodysplasia [2]. When the structure of the epithelium is disturbed and it lacks endocrine cells, immunogenesis processes take place under the epithelium. The appearance of numerous plasma cells indicates an intense efferent phase of immune development [21].

Congenital structures should also include the continuous detection of APUD cells - apudocytes, both single and small groups of 2-5 cells [10]. Patients with a history of lung abnormalities are considered to be at risk of early-onset chronic obstructive pulmonary disease (1). Chronic bronchitis and bronchiectasis can also develop on this basis [5].

CONCLUSION. The study of the literature data on investigation of clinical and functional consequences of bronchopulmonary dysplasia in children, adolescents and young adults has shown long-term preservation of respiratory dysfunction, including bronchial permeability failure, decreased diffusion ability of the lungs and bronchial hyperresponsiveness in such patients. This fact suggests the necessity for research in this direction.

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