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POST-INFECTIOUS OBLITERATIVE BRONCHIOLITIS

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Abstract
This article provides information about post-infectious obliterative bronchiolitis, including its etiology, pathogenesis, clinical features, diagnostics, treatment, and preventive methods. Post-infectious obliterative bronchiolitis is a rare condition that develops following an infectious process in the respiratory tract and is characterized by inflammation and obliteration of the terminal bronchioles, clinically manifesting as progressive respiratory failure. It is demonstrated that early diagnosis and comprehensive treatment of the disease can improve the patient's quality of life.

Keywords: Bronchiolitis, obliteration, infection, lungs, bronchioles, viruses, inflammation, fibrosis, obstruction, spirometry, corticosteroids, immunosuppression, transplantation, mucoregulators, bronchodilators.

Introduction

In modern medicine, post-infectious obliterative bronchiolitis is considered highly significant. This pathology is a serious issue, especially in children, as it can lead to severe complications. Post-infectious obliterative bronchiolitis develops as a result of inflammation of the walls of the small bronchi and bronchioles of the respiratory system and subsequent formation of fibrous tissue. This process leads to obliteration (blockage) of the bronchioles and causes obstructive changes in the bronchi. The relevance of the disease lies in the fact that it often results in irreversible changes and seriously affects the patient's quality of life. The main objective of this article is to study the etiology, pathogenesis, clinical presentation, diagnosis, and modern treatment methods of post-infectious obliterative bronchiolitis. The study aims to provide data for early detection, accurate assessment, and development of effective treatment strategies for the disease.

Main Part

The etiology of post-infectious obliterative bronchiolitis is multifactorial, but it is most commonly caused by viral infections. The most frequent pathogens include adenoviruses, respiratory syncytial virus, parainfluenza viruses, influenza viruses, measles virus, and Mycoplasma infections. Adenovirus infection, particularly serotypes 3, 7, and 21, is considered the most dangerous and may lead to severe complications. Studies show that approximately 30-40% of children infected with adenovirus may develop obliterative bronchiolitis. The condition can also develop after severe bronchiolitis or pneumonia. In some countries, such as those in South

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America, obliterative bronchiolitis is endemic and is recorded as a common complication of respiratory diseases in childhood.

The pathogenesis of post-infectious obliterative bronchiolitis is complex and multi-stage. Initially, the virus penetrates the epithelial cells of the bronchioles, causing damage. This induces a strong inflammatory response. During the inflammatory process, neutrophils, eosinophils, and lymphocytes migrate to the damaged tissues. Inflammatory mediators (cytokines, chemokines, proteases) are released, exacerbating tissue damage. In the subsequent stage, fibroblasts become activated and begin producing collagen, resulting in the formation of fibrous tissue in the walls of the bronchioles. Consequently, the lumen of the bronchioles narrows or becomes completely occluded (obliteration), leading to airflow obstruction and impaired lung function. The severity of the pathological process depends on the type of infection, its duration, and the individual characteristics of the patient's body.

Clinically, post-infectious obliterative bronchiolitis may present in various forms. Early symptoms usually resemble those of upper respiratory tract infections, such as cough, rhinitis, and shortness of breath. However, unlike typical viral infections, these symptoms do not resolve and instead intensify. Patients often complain of a dry, irritating cough, shortness of breath, wheezing, and exertional dyspnea, which may progress to resting dyspnea in severe cases. Physical examination may reveal high-pitched wheezes and sometimes moist rales in the lungs. Percussion may show unchanged or hyperresonant lung sounds in certain areas. In severe cases, signs of lung hyperinflation appear: barrel-shaped chest and minimal movement of the upper chest during breathing.

Diagnosis of post-infectious obliterative bronchiolitis requires a comprehensive approach. Initial diagnosis is often based on medical history and clinical presentation. Persistent respiratory symptoms following viral infection are of diagnostic importance. Spirometry typically shows obstructive ventilatory impairment, with little or no response to bronchodilators - a key diagnostic feature. Chest X-ray may reveal lung hyperinflation, thickened bronchial walls, and sometimes a mosaic attenuation pattern. Computed tomography provides more detailed information, including bronchopleural damage, mosaic perfusion, and detection of bronchiectasis or bronchiolectasis. For a definitive diagnosis, bronchoscopy and biopsy may be recommended, although these methods are not always used. Differential diagnosis should include asthma, cystic fibrosis, primary ciliary dyskinesia, and immunodeficiency disorders.

Treatment of post-infectious obliterative bronchiolitis is primarily symptomatic and supportive, as the condition often involves irreversible changes. The treatment regimen includes bronchodilators such as β2-agonists and anticholinergic agents, anti-inflammatory drugs such as inhaled and systemic corticosteroids, mucolytics, and anti-infective agents. Systemic corticosteroids may be used in the early stages to reduce inflammation, although their effectiveness remains uncertain. Macrolides, including azithromycin and clarithromycin, which possess anti-inflammatory properties, may be used in long-term treatment. Physiotherapy - including chest percussion, postural drainage, and breathing exercises - helps to clear bronchial secretions. In severe cases, oxygen therapy is indicated. In patients with significant lung function impairment, lung transplantation may be necessary. In recent years, biological therapies, such as TNF-α and IL-6 antagonists, have been investigated, though conclusive data on their efficacy are still lacking.

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Prevention of post-infectious obliterative bronchiolitis primarily involves controlling viral infections. Key measures include hand hygiene, seasonal vaccination against influenza and other viral infections, and limiting contact with infected individuals. Timely and proper treatment of viral infections is essential to reduce the risk of developing obliterative bronchiolitis. Early diagnosis and initiation of treatment are also considered part of preventive strategies.

The prognosis of post-infectious obliterative bronchiolitis varies. In some patients, symptoms may decrease over time and lung function may partially recover, but in most cases, the disease progresses with irreversible obstructive changes. In severe forms, significant impairment of lung function is observed, which seriously affects the quality of life and limits physical activity.

In conclusion, post-infectious obliterative bronchiolitis is a dangerous respiratory complication in both children and adults, leading to serious and often irreversible impairment of lung function. The main cause of the disease is viral infections, particularly adenovirus. The pathogenesis involves inflammation of bronchiolar walls and the subsequent formation of fibrous tissue leading to bronchiolar lumen obliteration. Diagnosis is based on medical history, clinical features, spirometry, and computed tomography findings. Currently, no curative treatment exists; management is symptomatic and supportive. Prevention focuses on avoiding viral infections and timely treatment. Future developments in new therapeutic approaches, including biological and other innovative treatments, may help improve the quality of life in patients with post-infectious obliterative bronchiolitis.

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