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# BRONCHO-OBSTRUCTIVE SYNDROME IN YOUNG CHILDREN: ETIOPATHOGENESIS, CLINICAL FEATURES AND MODERN TREATMENT APPROACHES

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## Abstract

Broncho-obstructive syndrome (BOS) is one of the most common clinical conditions in early childhood, characterized by impaired bronchial patency due to inflammation, edema, bronchospasm, and mucus hypersecretion. The condition is most frequently associated with viral respiratory infections, allergic diseases, and early manifestations of bronchial asthma. This article provides an evidence-based overview of the etiology, detailed pathogenesis, morphological changes, clinical presentation, diagnostic strategies, and modern treatment approaches for broncho-obstructive syndrome in young children.

## Keywords

broncho-obstructive syndrome, children, airway inflammation, bronchospasm, asthma, bronchiolitis, treatment

## Introduction

Broncho-obstructive syndrome represents a complex of clinical symptoms caused by narrowing of the lower airways. In young children, anatomical and physiological characteristics—such as narrow bronchial lumen, increased mucosal vascularization, and immature immune responses—predispose to airway obstruction.

## Etiology

The most common etiological factors include viral infections (especially respiratory syncytial virus), parainfluenza virus, adenovirus, rhinovirus, allergic inflammation, environmental pollutants, passive smoking, and genetic predisposition to atopy.

## Pathogenesis

The pathogenesis of broncho-obstructive syndrome in young children involves a multifactorial interaction between infectious triggers, immune responses, and structural airway characteristics. Viral invasion of bronchial epithelial cells leads to epithelial damage, activation of innate immunity, and release of pro-inflammatory cytokines such as IL-1, IL-6, IL-8, and TNF-α. These mediators increase vascular permeability, resulting in mucosal edema.

Goblet cell hyperplasia and submucosal gland activation cause excessive mucus production. Impaired mucociliary clearance further promotes mucus accumulation and airway plugging. Smooth muscle contraction mediated by vagal reflexes and inflammatory mediators contributes to bronchospasm.

In atopic children, Th2-mediated immune responses dominate, with increased production of IL-4, IL-5, and IL-13, leading to eosinophilic inflammation and IgE synthesis. Chronic or recurrent obstruction may result in airway remodeling, including basement membrane thickening and smooth muscle hypertrophy.

**Clinical Features**

Clinically, broncho-obstructive syndrome presents with expiratory dyspnea, wheezing, prolonged expiration, use of accessory respiratory muscles, tachypnea, and sometimes cyanosis. In severe cases, hypoxemia may develop.

**Diagnosis**

Diagnosis is primarily clinical. Pulse oximetry is used to assess oxygen saturation. In selected cases, chest radiography, complete blood count, C-reactive protein, and viral testing may be indicated. Recurrent cases require evaluation for asthma.

**Treatment**

Management depends on severity. Short-acting β2-agonists (such as salbutamol) are first-line therapy. In moderate to severe cases, inhaled corticosteroids or systemic corticosteroids may be required. Oxygen therapy is indicated in hypoxemic patients. Adequate hydration and airway clearance techniques support mucus removal.

**Prevention**

Preventive strategies include reducing exposure to tobacco smoke, timely vaccination, breastfeeding promotion, and early management of allergic conditions.

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