



BRONCHO-OBSTRUCTIVE SYNDROME IN CHILDREN: CLINICAL FEATURES, CAUSES, AND MANAGEMENT

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ABSTRACT

Broncho-obstructive syndrome (BOS) is one of the most common respiratory conditions in pediatric practice, characterized by limited airflow due to obstruction in the bronchi. The condition is especially prevalent in early childhood because of narrow airways and immature immune responses. This article examines the causes, clinical manifestations, diagnostic approaches, and treatment strategies for BOS in children, emphasizing early recognition and comprehensive management to prevent long-term respiratory complications.

Introduction. Broncho-obstructive syndrome in children represents a complex of clinical symptoms resulting from partial or complete obstruction of the bronchial lumen. The condition significantly affects oxygen exchange and respiratory efficiency, often leading to acute episodes of dyspnea, wheezing, and persistent coughing. Early childhood is considered the most vulnerable period due to anatomical and physiological characteristics such as small airway diameter and increased reactivity of the bronchi. Understanding the mechanisms, risk factors, and treatment approaches for BOS is essential for pediatricians and healthcare providers to ensure timely and effective interventions.

Etiology and Pathogenesis. The development of broncho-obstructive syndrome is multifactorial. The main mechanisms of airway obstruction include:

1.Bronchospasm – narrowing of the bronchial muscles due to increased airway reactivity.

2.Mucosal edema – swelling of the bronchial walls caused by inflammation.

3.Hypersecretion of mucus – excessive mucus production that blocks the airway lumen.

The most frequent etiological factors include:

- **Viral infections**, particularly respiratory syncytial virus (RSV), rhinovirus, adenovirus, and parainfluenza.

- **Bacterial infections**, such as *Mycoplasma pneumoniae*.

- **Allergic diseases**, including atopic dermatitis and allergic rhinitis, which increase airway sensitivity.

- **Environmental factors**, such as passive smoking, indoor pollutants, and cold climate conditions.

Children under five years old are especially susceptible due to narrower bronchi and insufficiently developed mucociliary clearance.

Clinical Manifestations. Broncho-obstructive syndrome presents with a characteristic set of symptoms:

- **Wheezing** — a high-pitched sound during exhalation.
- **Shortness of breath** and rapid breathing.
- **Prolonged expiration**, indicating difficulty in releasing air from the lungs.
- **Chest retractions**, especially in the intercostal and suprasternal regions.
- **Persistent cough**, often worsening at night or during physical activity.
- **Cyanosis** may appear in severe cases due to oxygen deficiency.

The severity of symptoms varies depending on the degree of airway obstruction and the child's general health condition.

Diagnosis. Diagnosis of BOS relies on a combination of clinical evaluation and instrumental methods:

- **Auscultation** to detect wheezing and decreased breath sounds.
- **Pulse oximetry** to assess oxygen saturation.
- **Chest X-ray** in complicated or recurrent cases.
- **Spirometry**, particularly in children older than five years, to evaluate airflow limitation.

• **Bronchodilator response testing** helps differentiate BOS from other respiratory disorders, such as asthma.

A detailed medical history, including previous respiratory infections and allergic conditions, is essential for accurate diagnosis.

Treatment and Management. Treatment of broncho-obstructive syndrome aims to relieve airway obstruction, reduce inflammation, and restore normal breathing. The main therapeutic approaches include:

1. Bronchodilators. Short-acting β_2 -agonists (e.g., salbutamol) are the primary medications used to relieve bronchospasm.

2. Corticosteroids. Inhaled or systemic corticosteroids are administered to reduce airway inflammation in moderate to severe cases.

3. Mucolytic agents. These help liquefy thick mucus and improve airway clearance.

4. Oxygen therapy. Administered when oxygen saturation drops below normal levels.

5. Nebulized therapy. Provides effective delivery of medications to the lower respiratory tract.

6. Treatment of underlying causes. Managing viral infections, reducing exposure to allergens, and treating chronic respiratory diseases.

Parental education is an important aspect of management, as caregivers must recognize early signs of bronchial obstruction and seek timely medical support.

Prevention. Preventive measures play a crucial role in reducing the incidence and severity of BOS:

- Avoiding exposure to tobacco smoke and polluted air.
- Strengthening the immune system through balanced nutrition and physical activity.
- Regular vaccination against influenza and other respiratory infections.
- Preventing contact with sick individuals during peak viral seasons.

Early and comprehensive prevention strategies significantly reduce the likelihood of recurrent episodes.

Conclusion. Broncho-obstructive syndrome is a common and potentially serious respiratory condition in children. Timely diagnosis and effective treatment are essential to prevent complications such as chronic obstructive symptoms or the development of asthma. A combination of medical therapy, preventive measures, and caregiver awareness forms the foundation of successful management. Early intervention improves respiratory function, reduces hospitalizations, and enhances the overall quality of life for affected children.

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