RECURRENT OBSTRUCTIVE BRONCHITIS IN EARLY CHILDHOOD: RISK FACTORS AND PROGNOSIS

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Over the last ten years, the incidence of the pathology of the bronchus-pulmonary system in children has increased 3.6 times, mainly due to acute and recurrent inflammatory diseases of the upper and lower respiratory tract. Thus, the problem of identifying children with recurrent episodes of acute obstructive bronchitis and an increased risk of developing asthma is relevant and promising. Defined as three or more episodes of bronchial obstruction within a twelve-month period, ROB occupies a central position in the spectrum of lower respiratory tract disorders in early childhood and serves as a recognised precursor to bronchial asthma in a substantial proportion of affected individuals. The global burden of this condition is considerable: epidemiological data indicate that obstructive bronchitis accounts for up to 30-40% of all acute respiratory illnesses requiring hospitalisation in children below five years of age, with prevalence figures varying markedly across geographic regions and socioeconomic settings. The increasing recognition of ROB as a distinct clinical entity, rather than merely a symptomatic manifestation of viral respiratory infection, has prompted intensified investigation into its pathophysiological underpinnings, modifiable risk determinants, and long-term respiratory outcomes.

Keywords*: recurrent obstructive bronchitis, bronchial asthma, respiratory syncytial virus, bronchial hyperreactivity*

Respiratory diseases remain one of the leading causes of pediatric consultations, accounting for approximately 25% of all visits among children aged 0-14 years [1]. During the past decade, the incidence of bronchopulmonary disorders in the pediatric population has increased by 3.6-fold, primarily due to a growing number of acute and recurrent inflammatory conditions affecting both the upper and lower respiratory tract [2,3]. In addition to the high prevalence of acute respiratory infections, acute obstructive bronchitis has become a significant clinical concern, occurring in 10–30% of children according to various studies and considerably complicating outpatient management. A substantial proportion of these patients require hospitalization,

resulting in increased healthcare expenditures and causing considerable psychological stress for both children and their families. Recurrent episodes of acute obstructive bronchitis accompanied by persistent bronchial inflammation may progressively impair lung function and contribute to structural changes in the airways and alveolar tissue. Such remodeling processes can increase the risk of developing chronic respiratory conditions, including chronic obstructive pulmonary disease and bronchial asthma later in life.

Recurrent obstructive bronchitis (ROB) is a multifactorial condition that develops as a result of complex interactions between genetic predisposition, immune characteristics, infectious agents, and environmental influences. One of the strongest predictors of recurrent bronchial obstruction is a personal or family history of atopic disorders, including atopic dermatitis, allergic rhinitis, and bronchial asthma. Children with such backgrounds demonstrate a significantly greater risk of recurrent wheezing episodes and subsequent asthma development.

Respiratory viral infections play a pivotal role in the pathogenesis of ROB. Among the most important pathogens are respiratory syncytial virus (RSV) and rhinovirus, both of which are capable of precipitating acute episodes of airway obstruction and inducing long-term changes in bronchial responsiveness. Severe

RSV infection during infancy has been associated with a markedly increased likelihood of recurrent wheezing later in childhood. This relationship is believed to result from virus-induced damage to the airway epithelium, promotion of type 2 immune responses, and alterations in innate immune regulation.

Environmental factors also contribute substantially to disease development. Exposure to tobacco smoke, both before and after birth, remains one of the most significant modifiable risk factors. Maternal smoking during pregnancy has been linked to impaired lung development, reduced airway diameter, and increased bronchial hyperresponsiveness in offspring, thereby predisposing children to recurrent obstructive episodes. Additional environmental determinants include sensitization to indoor allergens such as house dust mites, molds, and cockroach allergens, as well as exposure to air pollution, damp housing conditions, and household overcrowding.

The pathophysiology of ROB reflects the combined effects of anatomical vulnerability and immune dysregulation. In early childhood, the relatively narrow caliber of the peripheral airways makes even minor inflammatory changes clinically significant. Mucosal edema and accumulation of airway secretions can markedly increase airflow resistance and provoke obstruction. Furthermore, many affected children exhibit bronchial hyperreactivity, characterized by an exaggerated airway response to various stimuli. This phenomenon may develop independently of atopy and can arise following repeated viral respiratory infections.

Immunological studies have demonstrated that children with recurrent obstructive bronchitis frequently exhibit elevated serum immunoglobulin E levels, peripheral eosinophilia, and early sensitization to inhalant allergens. These findings are particularly common among children who subsequently develop asthma. Differentiating ROB from transient viral-induced wheezing and early persistent asthma remains challenging in routine clinical practice. The Asthma Predictive Index (API), which incorporates factors such as parental asthma, atopic dermatitis, eosinophilia, and allergic sensitization, is widely used as a practical tool for estimating the future risk of asthma.

The long-term outcome of recurrent obstructive bronchitis largely depends on the underlying clinical phenotype and the effectiveness of early intervention. Evidence from longitudinal studies, including the Tucson Children's Respiratory Study, indicates that many children with wheezing during the first years of life experience spontaneous symptom resolution by school age. This transient phenotype is often associated with relatively small airway dimensions rather than persistent allergic inflammation. In contrast, children with atopic sensitization, eosinophilia, and positive predictive indices are considerably more likely to develop persistent wheezing and physician-diagnosed asthma.

Management strategies for ROB focus on both symptom control and prevention of disease progression. Short-acting inhaled β_2-agonists remain the primary treatment during acute obstructive episodes, whereas inhaled corticosteroids may be considered in children with frequent recurrences or evidence of bronchial hyperresponsiveness. Preventive measures, including avoidance of relevant allergens, elimination of tobacco smoke exposure, and improvement of indoor environmental conditions, are essential components of comprehensive care. Regular follow-up with pulmonary function testing, when age-appropriate, together with allergy assessment, facilitates early identification of children at increased risk of asthma and enables timely implementation of targeted therapeutic interventions aimed at improving long-term respiratory health.

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