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CLINICAL COURSE AND COMPLICATIONS OF ACUTE RESPIRATORY VIRAL INFECTIONS IN CHILDREN

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Abstract. Acute respiratory viral infections are among the most frequent causes of morbidity in childhood and remain a major reason for outpatient visits, school absence and hospitalization. The clinical spectrum ranges from self-limited upper respiratory tract disease to bronchiolitis, pneumonia, hypoxemic respiratory failure and exacerbation of chronic pulmonary disorders. The severity of illness is determined by the causative virus, age, prematurity, nutritional status, comorbidities and immune competence. This thesis summarizes the characteristic clinical course of common pediatric viral respiratory infections, identifies warning signs of complicated disease and emphasizes early clinical assessment, rational diagnostic testing and prevention. Particular attention is paid to respiratory syncytial virus (RSV) and influenza because of their substantial contribution to severe lower respiratory tract disease in young children.

Keywords: children, acute respiratory viral infection, RSV, influenza, bronchiolitis, pneumonia, complications, prevention.

Introduction

Acute respiratory viral infections (ARVIs) comprise a heterogeneous group of illnesses caused by influenza viruses, respiratory syncytial virus, rhinoviruses, adenoviruses, parainfluenza viruses, human metapneumovirus, seasonal coronaviruses and other respiratory pathogens. In children, these infections are especially common because of frequent close contact in families and educational settings, developing immune responses and narrow airways that are more vulnerable to obstruction. Most episodes are mild and resolve spontaneously, but a clinically important proportion progress to lower respiratory tract involvement, particularly in infants and children with underlying disease (1,2).

RSV deserves particular attention because it is a leading cause of bronchiolitis and pneumonia in infancy. A global analysis estimated about 33 million RSV-associated acute lower respiratory infections, 3.6 million hospital admissions and more than 100,000 RSV-attributable deaths among children younger than five years in 2019, with the greatest mortality burden in low- and middle-income countries (3). Influenza also contributes substantially to pediatric respiratory morbidity and may cause severe pneumonia, encephalopathy, myocarditis, secondary bacterial infection or decompensation of chronic illness (4,5). Therefore, recognizing the expected clinical course and the signs of deterioration is essential in pediatric practice.

Main Body

The clinical course of an uncomplicated viral upper respiratory infection usually begins with nasal congestion, rhinorrhea, sneezing, sore throat and cough. Fever is common but is neither universal nor specific. Young children may present with irritability, reduced feeding and disturbed sleep rather than clearly localized symptoms. In influenza, systemic manifestations such as abrupt fever, headache, myalgia and marked fatigue are often more prominent, whereas RSV in young infants may initially manifest as rhinorrhea and feeding difficulty followed by cough, tachypnea,

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wheezing or chest retractions (1,2,6). Very young infants with RSV may have apnea and may not develop fever, which makes age-specific assessment especially important (2).

Progression to lower respiratory tract disease is the most important clinical turning point. Bronchiolitis is characterized by viral inflammation and obstruction of small airways and typically presents with tachypnea, wheeze, crackles, increased work of breathing and feeding difficulty. RSV is the dominant cause in infants, although other viruses may produce a similar syndrome. Most cases are managed with supportive care, but oxygen supplementation, enteral or intravenous hydration and, in severe cases, respiratory support may be required (2,7). Prematurity, age below six months, congenital heart disease, chronic lung disease, neuromuscular disorders and immunodeficiency increase the probability of severe RSV infection (2).

Pneumonia represents another major complication. Viral pneumonia can present with persistent fever, tachypnea, hypoxemia, focal or diffuse crackles and respiratory distress. Mixed viral-bacterial infection should be considered when a child deteriorates after initial improvement, develops persistent high fever, focal findings or signs of sepsis. In a large study of children hospitalized with community-acquired pneumonia, respiratory viruses were detected frequently, illustrating the central role of viral pathogens in pediatric lower respiratory tract disease (8). However, viral detection does not completely exclude bacterial coinfection, and clinical judgment remains necessary.

Influenza may be complicated by primary viral pneumonia, secondary bacterial pneumonia, otitis media, sinusitis, dehydration, febrile seizures and, more rarely, myocarditis, myositis or neurologic complications. Children younger than five years, especially those under two years, and children with chronic pulmonary, cardiac, neurologic, metabolic or immunosuppressive conditions are at increased risk of severe influenza outcomes (4,5). Persistent dyspnea, cyanosis, reduced consciousness, repeated vomiting, dehydration, seizures or a return of fever after apparent recovery are warning signs requiring urgent reassessment.

Diagnostic testing should be targeted rather than routine in every mild case. The diagnosis of an uncomplicated ARVI is usually clinical. Molecular testing can be useful in hospitalized children, immunocompromised patients, severe disease, suspected influenza when antiviral treatment is being considered, and situations in which identifying the virus affects isolation or outbreak control. Pulse oximetry is valuable in children with signs of lower respiratory tract involvement. Chest radiography is not routinely required for typical mild bronchiolitis, but it may be indicated when pneumonia, complications or an alternative diagnosis is suspected (7).

Treatment of most viral respiratory infections is supportive: adequate fluids, age-appropriate antipyretics, nasal saline and monitoring of breathing and hydration. Antibiotics should not be prescribed for uncomplicated viral infections because they do not shorten viral illness and unnecessary use contributes to antimicrobial resistance. Influenza antiviral therapy is most beneficial when started early in children with severe disease or high-risk conditions according to national and international guidance. For RSV bronchiolitis, routine use of antibiotics, systemic corticosteroids or bronchodilators is not supported in otherwise typical cases; management focuses on oxygenation and hydration when needed (7,9).

Prevention is therefore a central component of pediatric care. Annual influenza vaccination is recommended for eligible children and helps reduce disease severity and complications (1,4). Hand hygiene, respiratory etiquette, improved ventilation and avoidance of exposure to tobacco smoke reduce transmission or severity of respiratory illness. In recent years, maternal RSV vaccination and long-acting monoclonal antibodies for infants have expanded prevention options against severe RSV disease in many settings (2,10). The availability of these measures increases the importance of identifying infants at highest risk and integrating preventive counseling into routine pediatric visits.

Conclusion

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Acute respiratory viral infections in children usually have a favorable course, but RSV, influenza and other respiratory viruses can cause bronchiolitis, pneumonia, hypoxemia, dehydration, secondary bacterial infection and exacerbation of chronic disease. Age, prematurity and comorbidities strongly influence clinical severity. Early recognition of tachypnea, increased work of breathing, poor feeding, hypoxemia, apnea, altered consciousness and recurrent fever is essential for timely referral and treatment. Rational use of diagnostic tests, avoidance of unnecessary antibiotics and implementation of vaccination and RSV prevention strategies can substantially improve pediatric outcomes.

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