Respiratory syncytial virus: pervasive yet evasive

Background and epidemiology: Respiratory syncytial virus (RSV) is a ubiquitous paramyxovirus that infects the ciliated epithelial cells lining the airways. Nasal epithelial cells are infected initially and fuse with adjacent uninfected cells, forming epithelial cell "syncytia" that permit the virus to spread while evading host antibodies. Infection results in extensive destruction of respiratory tract epithelium, which may be limited to cells in the upper airway. However, in previously uninfected individuals (usually infants) and in immunocompromised individuals, the infection may involve the lower airways and cause bronchiolitis and pneumonia. The combination of local destructive effects of the viral infection and the release of inflammatory mediators as a result of the host immune response produces increased airway resistance, air trapping and the wheezing characteristic of severe RSV infection in the lower respiratory tract.[1]

Half of all North American children are infected during their first RSV season, and virtually all are infected by the age of 2 years.[2] Premature infants and infants with bronchopulmonary dysplasia or congenital heart disease are at increased risk for severe infection, as are infants, older children and adults who are immunocompromised or have cystic fibrosis. Primary infection does not confer complete immunity, and reinfection is possible.[3]

Outbreaks occur in the winter and spring in North America and last 22 weeks on average.[2] The virus is highly infectious and is transmitted through large-particle aerosols (e.g., from sneezing) or through contact with secretions on environmental surfaces such as counters and crib rails. The virus can survive on surfaces for up to 12 hours, with subsequent infection occurring as a result of hand-to-eye or hand-to-nose contact. Nosocomial transmission by health care workers is common.[2]

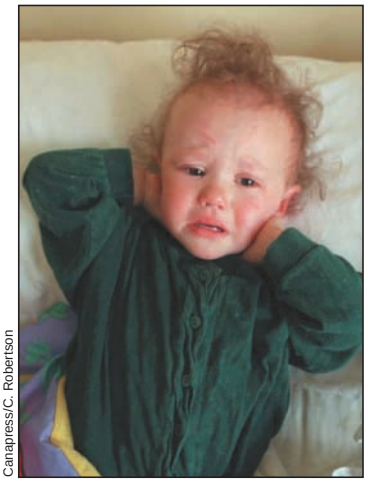
The incubation period for RSV infection is typically 4–6 days but may be as short as 48 hours or as long as 8 days. Adults shed the virus for up to 1 week after infection, whereas infants may shed it for 2–3 weeks.[2]

Clinical management: The infection begins with mild-to-moderate nasal congestion, a low-grade fever and productive cough. These symptoms may persist for several weeks and then resolve, particularly in people who have had a previous RSV infection. In infants the cough may be more severe, with thick respiratory secretions. Chest auscultation reveals coarse rales and, in up to three-quarters of infants, wheezes. A chest radiograph may show hyperinflation and interstitial infiltrates. Apnea accompanied by bradycardia is a serious finding in very young infants. Low oxygen saturation (less than 93%) on pulse oximetry, uncontrolled vomiting, dehydration, apnea or signs of impending respiratory failure are indications for hospital admission.[2]

Diagnosis is by means of viral culture of nasopharyngeal secretions or identification of viral antigens through immunofluorescence or enzyme immunoassay. Care is primarily supportive and aimed at managing respiratory compromise and bronchospasm. Randomized controlled trials have not shown consistent evidence that treatment with corticosteroids improves short- or long-term outcomes of infected infants.[4] Limited data suggest a benefit associated with the antiviral drug ribavirin, but the utility of this drug may be counterbalanced by its high cost and potential teratogenicity.[2]

The most frequently noted sequela of severe RSV infection in children is wheezing, which can persist for up to 5 years. Although this link is well established, the relation between RSV infection and subsequent asthma and atopy remains unclear.[2]

Prevention: Development of an effective vaccine against RSV is an important challenge, as none currently exists for clinical use. In June 2002 Health Canada approved a monoclonal anti-RSV antibody (palivizumab) for the prevention of RSV infection in pediatric populations at high risk of disease, and in September 2003 the National Advisory Committee on Immunization released a statement on its recommended use.[5] Meticulous handwashing or use of alcohol-based hand sanitizers, limited contact with newborns and individuals with "colds," and adherence to infection control procedures in the institutional setting may also help to reduce the risk of transmission.[2]



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