



Pediatric Clips

Bronchiolitis: evaluation and management — Fred H. Royce, MD

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Pediatric Clips from The Children's Medical Center are quick reviews of common pediatric conditions.

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CASE: INFANT PRESENTS WITH DIFFICULTY BREATHING

Michael is an 8-month-old who presents with a three-day history of cough and rhinorrhea and a one-day history of respiratory distress consisting of wheezing

and retractions. Medical history is only remarkable for maternal smoking. Presently, the parents "only smoke outside." A review of systems reveals no history of cough

or wheeze during sleep, in the morning, with activity or following changes in temperature or humidity.

CASE DISCUSSION

DIAGNOSIS

The above scenario is a common one. New onset wheezing before the age of 2 years is usually due to bronchiolitis, a viral infection involving the tracheobronchial tree that causes inflammation and edema leading to airway obstruction and wheezing. Differential diagnoses to be considered include foreign body aspiration, asthma, gastroesophageal reflux and aspiration and certain congenital anatomic abnormalities. A careful history that establishes the absence of chronic cough or history of wheezing usually rules these diagnoses out.

Bronchiolitis occurs in children less than 24 months of age following infection with viruses that attach to and infect respiratory epithelial cells. This leads to epithelial cell necrosis, inflammation and endobronchial plugging from sloughed debris. Respiratory syncytial virus (RSV) as well as adenovirus, parainfluenza virus, influenza virus and enterovirus are the usual causative agents. Non-viral pathogens that present similarly and also cause airway injury and inflammation through attachment to the respiratory epithelium include chlamydia and pertussis. Bronchiolitis is difficult to differentiate from asthma; however, asthma can be distinguished from bronchiolitis by a lack of history of recurrent wheezing and the absence of symptoms when well. The term "reactive airway disease" should be discouraged because it does not add to the understanding of the pathophysiology of wheezing and does not specify a particular course of treatment.

TREATMENT

Supplemental oxygen will increase oxygen delivery to ventilated alveoli and thereby lower respiratory rate and potentially allow for some reduction in gas trapping by allowing longer expiratory times. Except for oxygen, no therapy studied to date has shown a high level of efficacy for the treatment of bronchiolitis.

Recently, a one month course of montelukast (Singulair) in infants hospitalized with RSV has been shown to reduce symptoms between two and four weeks following infection with RSV, but it did not reduce the length of hospital stay (1). Racemic epinephrine has been shown to improve clinical score (2, 3), presumably due to a decrease in airway resistance due to alpha agonist mediated vasoconstriction (4). But, in a large multicenter randomized double-blind controlled trial, racemic epinephrine did not reduce the length of hospital stay (5). Beta agonist bronchodilators (eg, albuterol) do not have a role in the treatment of bronchiolitis (6, 7) and may result in mismatched ventilation and perfusion by causing increased pulmonary vasodilatation in poorly ventilated areas. Ipratropium bromide is also not efficacious (8).

Corticosteroids, either nebulized (9) or systemic (10), exhibit very little efficacy in the treatment of bronchiolitis even though airway inflammation is a principle feature of bronchiolitis. Humidity from nebulizers or mist tents is not efficacious, because little additional water reaches the lower respiratory tract to liquefy secretions. Antibiotics

are not indicated (11, 12). Hydration by intravenous routes may be necessary, depending on degree of respiratory distress. Therapies for bronchiolitis are therefore supportive in nature.

OUTCOME

Outcome is generally good for infants with bronchiolitis. Although nearly half of infants presenting with bronchiolitis go on to have asthma, bronchiolitis does not appear to be causally related to the development of asthma. Infants who go on to have asthma are more likely to wheeze when they are infected with a respiratory virus and be initially diagnosed with bronchiolitis. Evidence shows that small deficits in lung function are evident in those who have a history of bronchiolitis, even in children who do not develop asthma. These differences may identify underlying genetic differences in airway reactivity, function or size rather than injury from the viral infection (13). For instance, maternal smoking increases the susceptibility for wheezing early in life, possibly through effects on lung growth and development. Bronchiolitis associated morbidity occurs in infants who experience respiratory failure that requires intubation and assisted ventilation. Usually, these are infants with chronic lung disease or congenital heart disease. Rarely, a severe chronic form of bronchiolitis known as bronchiolitis obliterans leads to persistent airway inflammation and irreversible injury that can lead to

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Continued from the front.

chronic lung disease consisting of bronchiectasis, fibrosis and loss of lung tissue. Bronchiolitis obliterans is not typical of infection with RSV, but it can be seen as a complication of adenovirus, influenza and enterovirus infections. Even with these considerations families may be reassured that children who develop bronchiolitis will return to their previous state of health in the weeks following an episode of bronchiolitis.

RESOURCES

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FEATURED SPECIALIST



Fred H. Royce, MD, is associate director of pulmonary medicine at The Children's Medical Center of Dayton. Dr. Royce is board certified in

pediatrics and pulmonary medicine. He received his medical degree from the University of Washington in Seattle, completed his residency at

Rainbow Babies and Children Hospital, Case Western Reserve University in Cleveland and completed a fellowship in pediatric pulmonology at the University of California in San Francisco.

PULMONARY MEDICINE

The Children's Medical Center division of pulmonary medicine is staffed by pediatric specialists experienced in handling the care of children with a variety of respiratory problems. They serve infants, children and adolescents with acute and chronic pulmonary diseases.

After hours, pediatric pulmonologists are available by phone to address urgent patient care needs. The staff at Children's developed the Asthma Care Program, successfully ensuring children with asthma receive consistent, high-quality care as well as patient/family education.

CONTACT INFORMATION

To speak to Dr. Royce or to make a referral, call pulmonary medicine at 937-641-3440 or e-mail roycef@childrensdayton.org.



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