November 2015

Guidelines Reviewed:

Topic Owner: Kristi Kiyonaga, M.D. (kkiyonaga@everettclinic.com)

**Objectives:**
1. Provide criteria for accurate diagnosis
2. Provide criteria for hospitalization
3. Outline appropriate, evidence-based therapies
4. Reduce unnecessary antibiotic and other medication use, radiography, laboratory testing, and hospitalization

**Summary:**
1. Diagnose bronchiolitis based on clinical assessment without the routine use of laboratory or radiographic studies.
2. Do not routinely prescribe antibiotics in the absence of concomitant bacterial infection.
3. Do not routinely administer albuterol for a diagnosis of bronchiolitis.
4. Use respiratory scoring tool to determine management and disposition
5. Suctioning of nares is an important part of supportive care.

1. **Inclusion Criteria**
   a. Age < 2 years (peak age 3-6 months)
   b. Viral upper respiratory symptoms (rhinorrhea, cough, low-grade fever) followed by lower respiratory tract symptoms (increased work of breathing, tachypnea, difficulty feeding, wheeze, crackles on auscultation)

2. **Exclusion Criteria**
   a. Hemodynamically significant cardiac disease
   b. Chronic lung disease
      i. Patients with recurrent wheeze in the setting of viral symptoms may be included in guideline. Recurrent wheeze is most often viral in children less than 2 years of age, but consider alternative diagnosis and management of asthma
   c. Anatomic airway defects
   d. Neurologic disease
   e. Immunodeficiency

3. **Assessment**
a. **Definition:** Acute infectious inflammation of the bronchioles resulting in obstructive airway disease
   i. Almost always caused by a virus, rarely by bacteria such as mycoplasma
   ii. Pathophysiology includes inflammation, edema, and necrosis of epithelial cells lining small airways, and increased mucus production.
   iii. Symptoms are caused by small airway edema and sloughing of epithelial cells resulting in mucus production, bronchospasm, and hyperinflation.

b. **Epidemiology:**
   i. Children are less than 2 years old and most often less than 12 months old.
   ii. Highest incidence December – March
   iii. Symptoms last 2 – 4 weeks
   iv. Self-limited unless comorbidities are present
   v. Nearly always caused by a virus, usually respiratory syncytial virus (RSV)
      1. Also caused by human rhinovirus, adenovirus, influenza, coronavirus, human metapneumovirus, parainfluenza virus.
      2. Occasionally associated with Mycoplasma
   vi. Reinfection with RSV and multiple, separate diagnoses of bronchiolitis within the same viral season are common

c. **Diagnosis:**
   i. Bronchiolitis is a clinical diagnosis made based on history and physical exam.
   ii. Signs and symptoms usually begin with upper airway symptoms: rhinorrhea, nasal congestion, cough.
   iii. Illness may progress to lower airway respiratory symptoms: tachypnea, wheezing, intermittent crackles, respiratory distress = grunting, nasal flaring, retractions.
   iv. Other common symptoms include feeding difficulty, post-tussive emesis, low grade fever.
   v. Auscultation includes harsh rhonchi, rales, crackles, wheezes, prolonged expiratory phase. “Coarse” breath sounds are often heard. Respiratory noises can be loud enough to obscure heart sounds and can often be heard without the aid of a stethoscope.
   vi. Exam may change frequently due to varying clearance of obstruction.

d. **Diagnostic testing:**
   i. Do not routinely obtain chest radiograph. If considering a diagnosis of pneumonia, refer to University of Washington Division of General Pediatrics outpatient acute pneumonia guideline: http://depts.washington.edu/uwgenped/outpatient-clinical-guidelines/pneumonia.php
   ii. Do not routinely obtain labs.
   iii. Do not routinely obtain virologic testing for identification of pathogen.

e. **Other diagnoses to consider**
   i. Viral-triggered asthma. Risk factors for asthma include age > 12 months with wheeze, history of recurrent wheeze, strong family history of atopy or asthma
   ii. Bacterial infection (pneumonia, pertussis)
iii. Irritant (reflux, aspiration)
iv. Anatomic (foreign body, congenital airway anomaly)
v. Congestive heart failure

4. **Outpatient Management**
   a. Obtain respiratory score [link to table: same table used for scoring in SCH ED/inpatient guideline]
   b. Suction bilateral nares if respiratory score >4
      i. Helps clear secretions from the airway that the child can’t clear himself/herself
      ii. Generally thought to reduce work of breathing and improve oral intake. Caregiver can continue suctioning at home:
         a. Prior to feeding
         b. If there is suspicion that nasal secretions are causing difficulty breathing
   c. Repeat respiratory score to help determine disposition (see below)
   d. Consider measuring oxygen saturation, particularly for respiratory score >4 after suctioning
      i. Supplemental oxygen to maintain saturation > 90%
   e. Do not routinely administer albuterol for a diagnosis of bronchiolitis
      i. Consider albuterol trial to help determine whether bronchiolitis or reactive airway disease / asthma is the primary pathology in the following patients:
         1. >12 months old with wheeze
         2. History of recurrent wheeze
         3. Personal and/or family history of atopy or asthma
         4. Respiratory score 9-12 after suctioning
      ii. Continue albuterol as needed ONLY if there is a significant improvement in respiratory score (2 or more points improvement) after albuterol administration
      iii. Refer to University of Washington Division of General Pediatrics outpatient acute asthma guideline: http://depts.washington.edu/uwgenped/outpatient-clinical-guidelines/acute-mgmt.php
   f. For febrile infants less than 2 months of age, refer to the Seattle Children’s Hospital Neonatal Fever pathway: www.seattlechildrens.org/pdf/neonatal-fever-pathway.pdf
   g. **Therapies NOT routinely recommended in the outpatient setting:**
      i. Antibiotics. For discussion of concomitant bacterial infections, see below “Other Considerations.”
      ii. Albuterol. Bronchodilators may transiently improve clinical symptoms, but do not affect disease resolution or need for hospitalization.
      iii. Corticosteroids
      iv. Leukotriene receptor antagonists
      v. Epinephrine
      vi. Nebulized hypertonic saline
5. Disposition
   a. **Outpatient management recommended if:**
      i. Tolerating oral feeds.
      ii. Not hypoxemic (SaO2 >90%)
      iii. Normal or mildly increased work of breathing with respiratory score of 1-4 before or after suctioning.
      iv. No history of apnea
   b. **Indications for hospitalization:**
      i. Moderate/severe respiratory distress with a respiratory score 8-12 after suctioning requires hospitalization
      ii. Consider hospitalization for patients with a respiratory score of 5-7 after suctioning
      iii. Hypoxemia (oxygen saturation <90%)
      iv. Consider hospitalization if respiratory rate is persistently >60 (likely unsafe for oral feeds)
      v. Dehydration, vomiting, not tolerating oral feeds
      vi. Lethargy, inappropriately low respiratory rate, apnea, poor perfusion
      vii. Concerns for the family’s ability to adhere to recommended therapy including frequent suctioning, return for appropriate follow up, or seek/access emergency care

6. Other Considerations
   a. Prematurity and / or age < 12 weeks: Expect a more severe course of illness
   b. Concomitant bacterial infections are generally uncommon, and therefore antibiotics are not routinely indicated
      i. Otitis media most common
      ii. Pneumonia uncommon

7. Prevention
   a. **Palivizumab (Synagis) prophylaxis for high risk infants:** refer to most recent American Academy of Pediatrics policy statement available at: http://www.cdc.gov/rsv/clinical/
   b. **Hand washing** recommended with either hand sanitizer or soap and water:
      i. After direct contact with patients
      ii. After contact with inanimate objects in the direct vicinity of the patient
      iii. After removing gloves
   c. **Decrease infant or child’s exposure to tobacco smoke:** Tobacco smoke exposure increases risk and severity of bronchiolitis as well as risk of hospitalization related to bronchiolitis
   d. **Encourage exclusive breastfeeding for the first 4-6 months of life:** respiratory infections are less common in breastfed children