Bronchiolitis in Infants and Children
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May 29, 2019

Case: 4 month old
• https://youtu.be/TUWk4t_RTq4
• https://emdaily.cooperhealth.org/content/back-backs‐pediatric-respiratory‐distress

Objectives

Overview
Overview of bronchiolitis

Review
Review the diagnosis and management based upon current AAP guidelines

Discuss
Discuss areas for future research
Bronchiolitis

**Definition**
- Viral infection and inflammation of the small airways (bronchioles) with typical presentation

**Diagnosis**
- Purely clinical
  - Less than 2 years of age
  - URI with
    - Signs of middle respiratory tract disease

**Bronchiolitis**

- **Scope**
  - Exposure
  - Hospitalization
  - Cost

- **Causes**
  - RSV
  - Parainfluenza
  - Influenza
  - Human Metapneumovirus
  - Rhinovirus
  - Mycoplasma

**Seasonal variation**

[Graph showing seasonal variation]
Respiratory Syncitial Virus (RSV)

Pathophysiology

- Infection of broncholar epithelial cells
- Edema, cell damage, sloughing, obstruction
- Mucous production, smooth muscle reactivity

Bronchiolitis in an infant with RSV

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Clinical Presentation

- Symptoms occur 5-7 days after exposure
- Parents report rhinorrhea, cough, wheeze
- +/‐fever, vomiting, decreased ps, fussiness
- Young infants/‐apnea
- Older children/‐adults: URI symptoms, sore throat, cough

Diagnosis and Management

- Bronchiolitis is a clinical diagnosis
- Little utility for laboratory or radiologic studies
- Use of viral testing

Bronchiolitis: Do’s and Don’ts

**DO**
- DO: Support hydration
- DO: Pediatric Respiratory Score (PRS)
  - 'yes' routinely, AND
  - Before and after any intervention to assess efficacy
- DO: Second-Hand-Smoke and Smoking Cessation counseling by RT
- DO: Use hand sanitizer

**DON’T**
- DON’T obtain RVPs!
  - Diagnosis and isolation based on CLINICAL SYMPTOMS
- DON’T give albuterol
- DON’T give epinephrine
- DON’T give steroids
- DON’T give antibiotics

The More That Changes, The More It Stays The Same


Bronchiolitis

- "The white blood count is usually within normal limits."
- "Treatment is symptomatic."
- "Patients with dyspnea, whether cyanotic or not should receive oxygen."
- "...oral intake of fluids must often be supplemented by parenteral fluids."
- "...antimicrobial agents have no therapeutic value."
- "Nor is there evidence that the use of corticosteroids is useful in bronchiolitis."
- "Bronchodilating drugs are of no value..."
- "When bronchial asthma is considered a diagnostic possibility, trial of a single small dose of hypodermically administered epinephrine may be tried. If there is no response to this therapy in a short time, no additional epinephrine or other bronchodilators should be administered.

Outpatient Management

**Counsel parents on disease course**

- Signs/symptoms of respiratory distress
- No utility of bronchodilators/steroids

**Ensure ability to feed orally**

- Nasal suctioning before feeds
- Signs/symptoms of dehydration

Bacterial Infections and Bronchiolitis

**Acute Otitis Media**

- Very common - 50-60%
- Usual organisms
- Treat according to accepted guidelines

**Serious Bacterial Infections**

- Risk is low but not absent
- Rates of 0-10%
- Meningitis very rare
- UTI most common
- Question of asymptomatic bacteruria
Assessing Risk

Severe Disease
- Respiratory distress
- Apnea
- Need for iv hydration
- Need for mechanical ventilation

Risk Factors for Severe Disease
- Age less than 12 weeks
- History of prematurity
- Underlying cardiopulmonary disease
- Underlying immune deficiency

Indications for Hospitalization
- Respiratory distress or respiratory difficulties requiring close monitoring
- Hypoxia- consistently <90%
- Severe symptoms interfering with feeding and/or dehydration
- Apnea
- Infant with risk factors for severe disease
- Unstable social situation and/or lack of outpatient support and follow-up

Diagnosis and Management
- Bronchiolitis is a clinical diagnosis
  - little utility for laboratory or radiologic studies
  - use of viral testing
Inpatient Management

- Oxygenation
  - Goal to keep saturations 90% or higher
  - Nasal cannula
  - High flow nasal cannula

**High-Flow Nasal Cannula**

- Gas source
- Pressure relief valve
- Humidifier
- Nasal interface

Inpatient Management

- Hydration and fluids
- Suctioning
- Monitoring
- Chest PT
- Deep suctioning

Controversies

- Ribavirin
  - Multiple studies with small sample size
  - Variable quality
  - Several show modest improvements
  - Very cumbersome delivery
  - Expensive
  - Potentially toxic to providers
  - Indicated for severely immune compromised patients
<table>
<thead>
<tr>
<th>Tried and Failed</th>
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<tbody>
<tr>
<td><strong>Bronchodilators</strong></td>
</tr>
<tr>
<td>• Beta agonists</td>
</tr>
<tr>
<td>• Albuterol</td>
</tr>
<tr>
<td>• Alpha agonists</td>
</tr>
<tr>
<td>• Racemic epi</td>
</tr>
<tr>
<td>• Hypertonic saline</td>
</tr>
<tr>
<td><strong>Other</strong></td>
</tr>
<tr>
<td>• Corticosteroids</td>
</tr>
<tr>
<td>• Monteleukast</td>
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<td>• Antibiotics</td>
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<tr>
<th>Prevention</th>
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<tbody>
<tr>
<td>• Palivizumab</td>
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<tr>
<td>• Decreasing risks</td>
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<tr>
<td>• Vaccine</td>
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<tr>
<th>Prevention - Palivizumab</th>
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<tbody>
<tr>
<td>• Palivizumab</td>
</tr>
<tr>
<td>• Monoclonal anti-RSV antibody</td>
</tr>
<tr>
<td>• Offer passive immunity</td>
</tr>
<tr>
<td>• Effectiveness</td>
</tr>
<tr>
<td>• Cost</td>
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<tr>
<td>• Infants with the following risk factors should receive up to 5 doses of palivizumab in their first year</td>
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<td>• Infants born at 29 0/7 weeks or less</td>
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<td>• Infants with symptomatic chronic lung disease</td>
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<td>• Infants with hemodynamically significant heart disease</td>
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<td>• When given prophylactically, palivizumab should be given at 5 monthly doses, at a dose of 15 mg/kg per dose intramuscularly</td>
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Prevention

- Hand hygiene
- Infants should not be exposed to passive smoking
- Providers should inquire about and counsel caregivers re risks
- Breastfeeding is recommended to decrease a child’s risk of having lower respiratory tract disease.
Burden to Healthcare Systems

Office Visits
EMS Calls
Hospitalizations
Morbidity and Mortality

What may help

Clinical Pathway Adherence
Inpatient ED
Seasonal staffing
Observation Units
Home Oxygen

Future Studies

- Algorithms to predict course/severity
- Nasogastric hydration
- Toxicity of iv fluids
- Incidence of true AOM
- Deep suctioning
- Monitoring oxygen saturation
- Use of home O2
- Oxygen for high altitude
- High flow nasal cannula
- RSV vaccine and antivirals
Suggested Reading


- Viral bronchiolitis Todd A. Florin, Dr; Amy C Plint MD, and Joseph J Zorc Prof. Lancet, The, 2017-01-14, Volume 389, Issue 10065, Pages 211-224

References

- Shaker A, Prince H, and Young S. Clinical and health-economic burden of respiratory syncytial virus disease among children under 2 years of age in 7 defined geographical areas. Arch Dis Child 2014;99:786–790

