Managing Bronchiolitis: Just Stand There or Do Something?

Michele Long, MD
Associate Clinical Professor
Pediatric Hospitalist

Disclosures
I have nothing to disclose

Case: Emma

- Emma is a 4 month old who is brought to your AM clinic by Mom. She has a 3 day history of rhinorrhea and a 1 day history of cough. She has had no fever and is taking PO well. On exam she appears well hydrated. She has retractions that clear when she coughs and diffuse expiratory wheezing on exam. She is breathing faster than normal per Mom. You count her respiratory rate at 50. O2 saturation is 97%.

- Her Mom is very concerned...

...does Emma need a CXR?

A. Yes to help with diagnosis
B. Yes because Mom is so concerned
C. No it is not necessary for diagnosis
D. No the risks outweigh the benefits
Bronchiolitis

- Most common lower respiratory tract infection in infants
- At least 1 in 7 normal infants will develop symptomatic bronchiolitis before age one
- Cardinal pathophysiologic features:
  - Increased mucous production
  - Edema and necrosis of small airway epithelial cells
  - Acute inflammation
  - Air-trapping

Symptoms

- Upper resp infection
  - Rhinitis, Congestion

- Lower resp infection
  - Tachypnea
  - Cough
  - Wheezing
  - Crackles
  - Nasal flaring
  - Accessory muscle use
  - Fever in only 30%

Emma has bronchiolitis

- Clinically consistent with mild presentation
- AAP Bronchiolitis Guidelines for CXR
  "Clinicians should diagnose bronchiolitis and assess disease severity on the basis of history and physical examination. Clinicians should not routinely order laboratory and radiologic studies for diagnosis"
- Note: CXR in bronchiolitis is between 20% and 89%

CXR for bronchiolitis?

- Only 2 films missed by ED had findings of concern without other warning sign (like hypoxia or severe respiratory distress)
- One lobar PNA found by radiologist, not ED (RSV+)
- 31 Children in the study were hospitalized (11%)

* "Diagnosis and Management of Bronchiolitis" Pediatrics 2006

Schuh S et al J Peds 2007

Adapted from Alverson, Hasbro Children's
Emma Continued

- Emma and her mom leave clinic. Later that evening Emma is brought to the emergency department for fast breathing and poor PO intake.

- In the emergency department, she appears well hydrated, RR 55, and her oxygen saturation is 94%. Rest of exam unchanged (retractions that clear when she coughs and diffuse expiratory wheezing on exam). She drinks ½ a bottle.

- What would you do next?

What would you do?

A. Oxygen
B. Bronchodilator trial
C. Single-dose dexamethasone
D. Suction
E. Observe

2006 AAP guidelines

- Oxygen: Warranted if Pulse ox < 90%
- Bronchodilator: Consider trial; continue only if documented clinical response
- No routine steroids
- No routine antibiotics
- No routine chest physiotherapy
The bronchodilator story

- Helpful: Schweich et al & Schuh et al improvement in O2 sat and clinical score after 2 albuterol treatments
- Equivocal/not helpful: Klassen et al noted improved clinical scores at 30 minutes – not sustained beyond 1 hour. Gadomski et al saw no benefit Inpatient by Dobson et al saw no benefit
- Meta-analysis (Flores et al) with no change in length of stay

Bronchodilators: 2006

- AAP Bronchiolitis Guideline*
  "Bronchodilators should not be used routinely in the management of bronchiolitis. A carefully monitored trial ...is an option...and should be continued only if there is a documented positive clinical response to the trial using an objective means of evaluation
- Rate of bronchodilator use is as high as 70%

* Diagnosis and Management of Bronchiolitis. Pediatrics 2006

Summary of Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Where</th>
<th>#</th>
<th>Bronchodilator Helps?</th>
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<td>92</td>
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<td>&lt;50</td>
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<td>IP</td>
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<td>IP/OP</td>
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Reasons for avoiding

- Pharmacology: infants don’t have well-developed bronchial wall smooth muscle
- Pathophysiology: primary cause of wheezing secretion-related
- Side effects: tachycardia, tremors
- Cost
**Take home**

Cochrane- Gadomski et al 2010: “Bronchodilators produce small short-term improvements in [outpatient] clinical scores. However, given their high cost, adverse effects and lack of effect on oxygen saturation and other outcomes...bronchodilators cannot be recommended for routine management of first-time wheezers who present with...bronchiolitis, in either inpatient or outpatient settings.”

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**Controversy: hypertonic saline**

<table>
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<td>52</td>
<td>3%+ epi</td>
<td>1 day Length Of Stay</td>
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<td>IP</td>
<td>41</td>
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<td>IP</td>
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<td>3%</td>
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<td>93</td>
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**Wanting to Do Something**

While limited data supports many bronchiolitis interventions, there are times providers still ‘intervene’ or ‘test’

- Parental insistence
- Standard of care for location (ED), medico-legal
- Fear of change
- Peer/community pressure
- Supervisor preference

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**PHM Choosing Wisely**

Adapted from Monash & Le, UCSF Grand Rounds 2013
PHM Choosing Wisely

Adapted from Monash & Le, UCSF Grand Rounds 2013

[Images of healthcare scenarios marked with 'X' symbols]
PHM Choosing Wisely

QI Approach
- Consensus
- Measure current
- Define a shared goal (achievable)
- Intervention
- Re-measure
- Modify intervention

VIP Inpatient Data

- Bronchodilators
- CXR
- Steroids
- Chest PT

http://www.choosingwisely.org
Summary

- Current best evidence does not support ordering CXR’s or routine use of bronchodilators in uncomplicated bronchiolitis
- Hypertonic Saline shows promise but further evidence is needed
- Good hand washing and avoiding cigarette smoke are among the best evidence-supported advice we can provide patients
- Changing practice patterns takes time and may be more effective with QI approaches and if we commit to ‘Choosing Wisely’

Acknowledgements

- Tim Kelly MD
- Karen Sun MD
- Brad Monash MD
- Brian Alverson MD
- Emily Whitgob MD

Key References and Resources

- Gadomski AM, Brower M. Bronchodilators for bronchiolitis. Cochrane Database of Systematic Reviews 2010.

References and Resources

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References and Resources

- PEM Bronchiolitis Blog pemcincinnati.com
- AAP Section on Hospital Medicine Listserv

Extra NOTES