Common Respiratory Infections

Lauri Jankowski, MN, RN-BC, CCRN-K
Missy Lein, MSN, ARNP-CS, PCNS-BC, CPN

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Disclosure Statement

• We do not have any conflict of interest, nor will we be discussing any off-label product use.

• This class has no commercial support or sponsorship, nor is it co-sponsored.
Purpose:

The Purpose of this activity is to enhance nursing knowledge of caring for children with common respiratory infections.
Course Objectives:

- Identify common infectious respiratory illnesses seen in children
- Differentiate signs and symptoms of respiratory distress vs. respiratory failure
- Discuss escalation of care for children with respiratory distress and impending respiratory failure
• Nasal Cavity,
• Nasopharynx
• Oropharynx
• Larynx
LOWER

- Trachea
- Bronchi
- Bronchioles
- Alveoli
- Smallest airway
- Where gas exchange occurs
- Damage can result in inability to provide adequate gas exchange.

LOWER:
Bronchioles and Alveoli
Non-Airway Causes of Respiratory Distress:

CNS
- Traumatic Brain Injury
- Central Hypoventilation

Abdominal Competition
- Reflux
- Full belly d/t overzealous mechanical ventilation
## Common Pediatric Respiratory Illnesses

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Precipitating factor</th>
<th>Age Range</th>
<th>Upper vs Lower Airway</th>
<th>Symptoms</th>
<th>Onset /Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma / Reactive Airway</td>
<td>Can have viral trigger</td>
<td>RAD &lt; 5 yrs</td>
<td>Lower</td>
<td>Exp. Wheeze +/- cough SOB</td>
<td>Variable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Asthma with dx &gt; 5 yrs</td>
<td>Lower</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bronchiolitis</td>
<td>Viral, often RSV respiratory syncytial virus</td>
<td>3 mo – 2 yrs</td>
<td>Lower</td>
<td>+/- Fever Wheezing, Cough Mucous!</td>
<td>Like common cold but worsens 2 wks to 1 mo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>At risk kids may be younger</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croup</td>
<td>Viral, often parainfluenza</td>
<td>6 mo - 6 yrs</td>
<td>Upper</td>
<td>Fever Cough – seal stridor</td>
<td>Preceded by cold symptoms</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Gradual worsening of cough, stridor</td>
</tr>
</tbody>
</table>
## Common Pediatric Respiratory Illnesses – cont.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Precipitating factor</th>
<th>Age Range</th>
<th>Upper vs Lower Airway</th>
<th>Symptoms</th>
<th>Onset /Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epiglottitis</td>
<td>Bacterial</td>
<td>2 to 6 years</td>
<td>Upper</td>
<td>Drooling, fever, Sniff position, anxious, Hot potato speech</td>
<td>Rapid – may develop over few hours</td>
</tr>
<tr>
<td></td>
<td>H-flu &amp; others</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumonia</td>
<td>Viral, bacterial, or fungal</td>
<td>Variable</td>
<td>Lower</td>
<td>Work of Breathing</td>
<td>Variable</td>
</tr>
<tr>
<td></td>
<td>Strep. Pneumoniae, Mycoplasma, Chlamydia</td>
<td></td>
<td></td>
<td>Unable to p.o. Hypoxia &lt; 90 admit, &lt;50 - PICU</td>
<td></td>
</tr>
<tr>
<td>PARDS</td>
<td>Can have infectious component</td>
<td>Variable</td>
<td>Lower</td>
<td>Hypoxemia</td>
<td>May follow w/in 7 days pneumonia or sepsis</td>
</tr>
</tbody>
</table>
Signs & Symptoms

- Tachypnea/ Dyspnea (one or both)
- Retractions & use of accessory muscles
  - Subcostal
  - Intercostal
  - Supraclavicular
  - Suprasternal
  - Nasal flaring
  - Head bobbing
- Cough – character
Signs & Symptoms (cont.)

- **Adventitious Breath Sounds**
- Crackles (fine or coarse),
  - Wheezes - on expiration
  - Rhonchi
  - Stridor
  - Stertor (snoring)
- Tachycardia
- Decreased SaO2
• 4 month old admitted for increased WOB
  • Ex-37 weeks
  • Fully Immunized
  • 3 day history of cough/congestion.
  • Seen in PCP clinic and sent home suction teaching and PO intake assessment.
  • On DOA, brought to ED for increased WOB, cough, and vomiting.
What do you think? Based on presenting history, what is the most likely diagnosis?
Bronchiolitis - Background

- Incidence
  11-15% of children less than 2 years
- Viral illness
- URI symptoms preceding inflammation of and mucous buildup in bronchioles
- Common causes
  Respiratory syncytial Virus
  Rhino/Enterovirus
  Human Metapneumovirus
  Other viruses
NOTE: Inflammation and mucous buildup causes obstruction. Leads to air trapping and wheezing.
• Thoughts about diagnosis?
• What other information do you want?
  • Length of symptom presentation
  • Hydration status
    • How often is the baby feeding?
    • How many wet diapers?
• Responsiveness to treatment?
  • What has been done already? Did it help?
• What are you most worried about with this child?
  • Development of Respiratory Failure
Baby was admitted to Acute Care Unit.

Admission Assessment:
- 37, 164, 46, 76/52 (64), 98% on RA
- Moderate retractions x2 (subcostal, intercostal).
- BS clear, moderate thick, white secretions with OT suction
- PIV placed and 10cc/kg bolus given.

BF Q 3-4 hours.
What interventions do you want to perform for this baby?
Treating Bronchiolitis: Supportive Care

Suction

Olive tip: at regular intervals

Suctioning is not a linear activity

NP: indicated for severe respiratory distress in infants not improving with olive tip suction

Olive Tip vs NP

Consider the risk vs. benefit

Give the patient what they need
Treating Bronchiolitis: Supportive Care

Hydration

- Consider insensible losses
- Tachypnea, fever
- Does your patient have an IV? Do they need one?
- Consider NG
- Is the patient feeding normally?
Treating Bronchiolitis: Supportive Care

- Additional Therapies:
  - HFNC
    - CO2 washout
    - Provides small amounts of PEEP
  - Albuterol
    - May trial for patients with Wheeze
    - Discontinue if no improvement
8 hours after admission
Admission Assessment:
• 37.2, 182, 44, 122/61 (79), 93-94% on RA
• Moderate retractions x3 (subcostal, intercostal, suprasternal) +grunting and nasal flaring.
• Irritable
• BS coarse

What does this baby need now?
Respiratory Decompensation and Intervention
Respiratory Decompensation

- Increased severity in WOB
- Apnea
- Changing Mental Status
  - Irritability, inconsolable
  - Utilize parental expertise
- Changes in RR
  - Increasing tachypnea, then bradypnea
- Change in breath sounds
- Get help - Call RRT/Escalate care
Signs & Symptoms of Impending Respiratory Failure:

- Bradypnea
- Bradycardia
- Decreased SaO2
- Decreased LOC - Lethargy
- Decreased Perfusion
- Patient now requires NIPPV or Intubation to maintain adequate ventilation
• Baby was transferred to the PICU and started on HFNC briefly before requiring NIPPV for respiratory failure.
• Remained in the PICU for 2 days before transferring back to Acute Care.
  • Back on HFNC
  • Good PO
  • Improving
  • Respiratory status
• Baby discharged on day 5 of hospital stay
Special Considerations for Patient with Respiratory Illnesses
• Patient history
  • Baseline health status, prematurity, comorbidities, immunizations
• Inpatient history:
  • Prior admissions
  • Previous ICU admissions
• Response to treatment
• Utilize Parental Expertise
  • Is this normal for your baby/child?
  • Better, same or worse?
Case Study #2
19 month old male

- Previously healthy
- Immunizations UTD
- 1 week of fever, rhinorrhea and increasing cough
- 1 day PTA
  PMD gave 1X dose steroids & started oral Amox.
- Now in ED due to increased cough
- Received racemic epi x3 with transient decrease in cough
- **Admit to Medical** for continued observation
Thoughts about diagnosis and treatment?
• What other information do you want?  
  • Character of cough?  
  • Fever – how high?  
  • Onset of illness gradual versus sudden  
  • Responsiveness to treatment?  
  • CXR?  
• What are you most worried about with this child?  
  • Loss of Airway!!!
Croup/
Laryngotrathecobronchitis
Croup - Background

- Incidence impacts 3% of children ages 6 months-3 years
- Usually viral
- Late fall to early winter
- Upper airway obstruction inflammation
- Common causes
  - Para influenza
  - RSV
  - Mycoplasma
  - Other viruses

https://radiopaedia.org/
Croup - Symptoms

- Barky cough
- Inspiratory Stridor
- Hoarseness of speech
- Respiratory Distress
- May have fever
- May follow URI symptoms

Photo from 2019 iStockphoto LP.
Croup – usual course

- Symptoms worse at night
- Resolves within 48 hours
- Often followed by URI symptoms

Not Recommended
(No evidence supporting the use of)

- Viral PCR
- Radiographs
- Repeat Dexamethasone
- Cool Mist
Reasons to Transfer to ICU

- Concern for respiratory failure
  Complete obstruction of airway
  Hypoxemia is uncommon – take it seriously
- Decrease LOC
- Decrease respiratory effort including decreased stridor
Case Study cont.

- Increasingly less responsive to Racemic – relief not lasting 2 hours
- Stridor, barking cough at rest
- Moderate intercostal retractions
- Tachypnea & tachycardia
- Restless!

- RRT called to transfer to PICU for airway management & closer observation
What next?

Plan in the PICU
  Close observation
  Coordinate with OTO for eval
  Consider blood gas
  Consider alternative diagnosis
    Epiglottitis
    Foreign Body Aspiration
    Tracheitis
Case Study cont.

- Admit to PICU
- Stridor, barking cough at rest
- Moderate intercostal retractions
- Tachypnea & tachycardia
- Increasing restlessness
- Concern for lack of response to therapies
- OTO called to consult
- Plan to move to OR for intubation
Case Study cont.

- While planning for controlled intubation – patient dropped his \( \text{SaO}_2 \) and became bradycardic
- Emergent Intubation in PICU
- Bronchoscopy w/ trach asp via ETT
Case Study - Outcome

• Bacterial Tracheitis from tracheal aspirant on Day 2
  Steroids & antibiotic coverage
• Extubated after Day 4
  Required Heliox via HFNC
• To OR for bronchoscopy on Day 5
• Bacterial Tracheitis
• Transferred out to Medical at 9 days
Discharged on Day 10
Conclusion

• No matter which type of respiratory infection or illness you’re treating...
• Reassess frequently
• If your interventions aren’t working...
• What are you missing?
• Are you on the right track?
Any Questions?
References


- Seattle Children’s Hospital Croup Pathway V3.0 (2019) retrieved from http://child.seattlechildrens.org/


- Smith, D DO, McDermott, A MD., Sullivan, J. DO; Croup: Diagnosis and Management, Am Fam Physician. 2018 May, 1; 97(9); 575-580. retrieved from https://www.aafp.org/afp/2018/0501/p575.html