49th Emergency Care Trauma Symposium

Pediatric Respiratory Emergencies

June 20, 2017

Michael Kim, MD
FOREIGN BODY
Epiglottitis
BRONCHIOLITIS
Asthma
cold
pertussis
CROUP
FOREIGN BODY
Epiglottitis
objectives

• Pediatric assessment Triangle
• Recognition of respiratory distress
• Arriving at working diagnosis
• Determining immediate intervention
• Evidenced approach to pediatric respiratory distress
Take Home Points

• Staying awake
• Completing and submitting your evaluation
• Returning next year with your partners
Causes for pediatric respiratory emergencies

- Asthma
- Bronchiolitis
- Croup
- FB aspiration
- Pneumonia
- Retropharyngeal abscess
- Peritonsillar abscess
- Epiglottitis
- Bacterial tracheitis
1. Sick or not sick?
2. ABC
3. Clinical assessment
4. Working diagnosis
5. Interventions
6. Reassessment
   • Call a friend...
1. Sick or not sick?

• Pediatric Assessment Triangle
**Pediatric Assessment Triangle**

- **Appearance**
  - Tone
  - Interactiveness
  - Consolability
  - Look/Gaze
  - Speech/Cry

- **Work of Breathing**
  - Abnormal Breath Sounds
  - Abnormal Positioning
  - Retractions
  - Nasal Flaring

- **Circulation to the Skin**
  - Pallor
  - Mottling
  - Cyanosis
2. ABC

• “Do the ABC”
• Know
  • Stable airway
  • Unstable maintainable airway
  • Unstable/unmaintainable way
• Oxygen
• BVM, Non-visualized airway, intubate
• IV, IO
3. Clinical assessment (History and Exam)

- **History**
  - What happened
  - Onset of symptom
  - Severity
  - Home interventions
  - Past medical history
  - Medications
  - Allergies
  - Immunizations

- **Exam**
  - Alertness
  - Respiratory effort
  - Color
  - VS (Pox)
  - **Look with shirt off**
  - Listen
  - Auscultation
4. **DIAGNOSIS**
5. Interventions based on diagnosis

- Airway support
  - Positioning
  - Suctioning
  - Oxygen
  - Non-visualized airway
  - Intubation

- Medications
  - Albuterol
  - Epinephrine
  - Racemic Epinephrine
  - Steroids
6. Reassessment

• ABC again
• Improvement?
• Possibly another cause?
• Repeat interventions?
7. Call a friend

- Protocol
- Your partner
- Medical control
- Intercept
- Call ED/Pediatric ED
1. Sick or not sick?
2. ABC
3. Clinical assessment
4. Diagnosis
5. Interventions
6. Reassessment
   • Call a friend...
Case 1:
2 YO with respiratory distress for 1 day with noisy breathing and retractions

- History of wheezing
- On albuterol
- Not diagnosed with asthma
- Exposed to smoke recently
- Albuterol given without effect

- Alert in moderate distress
- P 145, RR 40, Pox 93%
- Minimal retractions
- Decreased BS with moderate wheezing
Checklist

1. Sick or not sick?
2. ABC
3. Clinical assessment
4. Diagnosis
5. Interventions
6. Reassessment

• Call a friend...

Case 1:
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- Decreased BS with moderate wheezing
Case 1.5:
2 YO with respiratory distress for 1 day with noisy breathing and retractions

- History of wheezing
- On albuterol
- Not diagnosed with asthma
- Exposed to smoke recently
- Albuterol given without effect
- **Sleepy with severe resp distress**
- P 164, RR **25**, Pox 91%
- **Moderate** retractions
- **Minimal air entry and no wheezing**
Checklist

1. Sick or not sick?
2. ABC
3. Clinical assessment
4. Diagnosis
5. Interventions
   • Call a friend...
6. Reassessment

Case 1.5:
2 YO with respiratory distress for 1 day with noisy breathing and retractions

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• Moderate retractions
• Minimal air entry and no wheezing

Dead man don’t wheeze!
Asthma

• Recurrent wheezing, cough, SOB, or chest tightness
• Affects bronchus and bronchioles
• Reversible airway obstruction
  • Bronchospasm
  • Inflammation
  • Mucus production
Asthma

• Risk factors
  • Multiple hospitalizations & ICU admission
  • Intubation
  • Multiple medications
  • No air movement
  • Tripod seating
  • Altered mental status
  • Elevated pCO2

• Treatment
  • Position of comfort
  • Albuterol
  • Oxygen
  • Steroids
  • Magnesium Sulfate
  • Epinephrine
Case 2:
6 mo old with nasal congestion for 3 days and now with worsening respiratory distress, poor fluid intake.

- Started attending day care 2 weeks ago
- 34 weeks premie
- Low grade fever
- Decreased urine output
- Irritable

- Alert in moderate resp distress
- P 180, RR 64, Pox 92%
- Dry mucus membrane
- Severe nasal congestion and coughing
- Moderate retraction and rhonchi
- Moderate air entry
Checklist

1. Sick or not sick?
2. ABC
3. Clinical assessment
4. Diagnosis
5. Interventions
6. Reassessment
   • Call a friend...

Case 2:
6 mo old with nasal congestion for 3 days and now with worsening respiratory distress, poor PO intake and irritable.

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• Moderate air entry
Bronchiolitis *not Bronchitis*

- Viral infection of medium to small airway
- Respiratory Syncytial Virus (RSV) >85%
- Winter to Spring
- Peak incidence in 3-6 months
- Clinically symptomatic up to 2 years
  - URI
  - RR, wheeze, retraction and flaring
  - APNEA
  - Lasts 7-10 days
Acute interventions & escalation: bronchiolitis

- Nasal suction
- Albuterol (?)
- Oxygen
- Hydration
- High risk: premie & neonates
Nasal suction

- 3 person job
- One nose method
- Circuit suction method
Case 3:
2 yo with 2 days of URI now with fever, barky cough and respiratory distress

- Woke up with stridor and barky cough
- Fever for 2 days
- Vomited with coughing

- Alert irritable and in moderate distress
- P 180, RR 60, Pox 96%
- Audible marked inspiratory stridor
- Severe retraction
- Occasional barky cough
- Air entry adequate
Checklist

1. Sick or not sick?
2. ABC
3. Clinical assessment
4. Diagnosis
5. Interventions
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   • Call a friend...

Case 3:
2 yo with 2 days of URI now with fever, barky cough and respiratory distress

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• Alert irritable and in moderate distress
• P 180, RR 60, Pox 96%
• Audible marked inspiratory stridor
• Severe retraction
• Occasional barky cough
• Air entry adequate
Croup

- Viral infection of upper airway causing subglottic edema
- Parainfluenza 1,2 mostly
- Usually in winter in younger children (3 mo – 36 mo)
- Barky cough and stridor
- Fever

- Interventions
  - Cool air
  - Racemic or Epi nebulized, if retraction or stridor at rest
  - Steroid
  - Oxygen if needed
Case 4:
12 mo old with sudden onset of respiratory distress with stridor

- Healthy
- Mom heard gagging and choking from playroom
- Turned blue and having moderate respiratory distress
- Alert infant in distress
- Audible stridor
- P 192 RR 28 Pox 88%
- Severe retraction with minimal air entry
## Checklist

1. Sick or not sick?
2. ABC
3. Clinical assessment
4. Diagnosis
5. Interventions
6. Reassessment
   • Call a friend...

### Case 4:
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- Healthy
- Mom heard gagging and choking from playroom
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- P 192 RR 28 Pox 88%
- Severe retraction with minimal air entry
Foreign body aspiration

- 1 of 100,000 children 0-4 YO die
- **Sudden onset** of respiratory symptoms
  - Choking, coughing, stridor
- Usually food or coins and toys...
- 80% in 1-3 YO
- Possible diminished BS on affected side
- Stridor

- Supportive care
- If not moving any air, back blows / chest or abd thrusts
- Remove FB if visible
- Transport ASAP
## Comparison table

<table>
<thead>
<tr>
<th></th>
<th>Asthma</th>
<th>Bronchiolitis</th>
<th>Croup</th>
<th>FB aspiration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age group</strong></td>
<td>&gt;2 years</td>
<td>Birth to 2 years</td>
<td>3 – 3 years</td>
<td>Up to 3 years</td>
</tr>
<tr>
<td><strong>Cause</strong></td>
<td>Allergen, infection, others</td>
<td>RSV and other virus</td>
<td>Parainfluenza and others</td>
<td>FB</td>
</tr>
<tr>
<td><strong>Structure affected</strong></td>
<td>Bronchus/bronchioles</td>
<td>Bronchioles</td>
<td>Subglottic area</td>
<td>Pharynx to bronchus</td>
</tr>
<tr>
<td><strong>Findings</strong></td>
<td>Dyspnea, wheezing or decreased or no BS</td>
<td>Nasal congestion, retraction, rhonchi, rales, wheeze, decreased BS</td>
<td>Barky cough, retraction, and stridor</td>
<td>Varies (choke, cough, dyspnea...)</td>
</tr>
<tr>
<td><strong>Presentation</strong></td>
<td>Varies</td>
<td>Gradual over days</td>
<td>1-2 days of URI</td>
<td><strong>Acute onset</strong></td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
<td>O2, Albuterol, steroid</td>
<td>Nasal suction, O2, (albuterol)</td>
<td>Cool air, epinephrine neb</td>
<td>Supportive , O2</td>
</tr>
<tr>
<td><strong>Warning</strong></td>
<td>Risk factors</td>
<td>Apnea</td>
<td>Epiglottitis or FB</td>
<td>Maybe clinically well</td>
</tr>
</tbody>
</table>

Dead don’t wheeze

Apnea
Your goals

• Rapid evaluation with checklist
• Restoration of airflow
• Maximize ventilation and oxygenation
• Stabilization/monitoring
Take home Points

• Pediatric assessment triangle
• Checklist approach
• Reassessment
• Call a friend
• Dead man don’t wheeze
• Nasal suction in Bronchiolitis
7. Additional interventions

• Asthma
  • Repeat Albuterol
  • Steroids
  • Magnesium Sulfate

• Bronchiolitis
  • Nasal suction
  • Oxygen if needed
  • Bronchodilator is not indicated...

• Croup
  • Racemic Epi or Epi Neb
  • Steroids

• FB
  • Supportive only
Checklist approach to respiratory distress

1. Sick or not sick?
2. What is likely cause?
3. Intervention
4. Stabilization
5. Escalation of care
Case 3.5:
Ill appearing 2 yo with 1 day of fever, stridor, drooling and respiratory distress

- Fever started today to 39.5
- No immunizations
- Drooling and will not lie down
- Noisy breathing

- Alert toxic appearing child drooling in severe distress
- P 196, RR 60, Pox 96%
- Audible marked inspiratory stridor
- Severe retraction and stridor
- Unable to swallow secretions
- Minimal breath sounds
Checklist

1. Sick or not sick?
2. ABC
3. Clinical assessment
4. Diagnosis
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Epiglottitis: true medical emergency

- Hemoph