Pediatric Assessment Triangle

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Objectives

1. Discuss why the Pediatric Assessment Triangle might be a useful tool in the prehospital setting
2. Discuss the 3 components of the Pediatric Assessment Triangle
3. Explore how the Pediatric Assessment Triangle can be used to recognize an ill child and guide management
4. Sample cases
Pediatric Emergency Care: The Experience Gap

- Children account for 5 to 10% of all EMS patients
  - Only 0.5 -1% are critically ill/injured
  - Limited experience for paramedics
- Children make 25-30 million ED visits per year
  - Less than 5% require 30 care
  - Nearly 90% of children are cared for in general hospital EDs
  - Many of these EDs see few children
    - 50% of EDs care for < 10 kids/day
    - Limited experience with sick kids
Pediatric Care and Patient Safety

• Children have unique needs:
  – Equipment
  – Policies and procedures
  – Weight-based dosing

• Communication Challenges
  – Developmental stage
  – Children with special healthcare needs

• Deficiencies:
  – Pediatric readiness
  – Provider experience and competencies

• Low frequency of critically ill or injured children
  – Failure to recognize a critically ill or injured child
# Age-Specific Vital Signs

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Tachycardia</th>
<th>Bradycardia</th>
<th>Respiratory Rate</th>
<th>Systolic BP mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn</td>
<td>&gt;180</td>
<td>&lt;100</td>
<td>&gt;50</td>
<td>&lt;65</td>
</tr>
<tr>
<td>Neonate</td>
<td>&gt;180</td>
<td>&lt;100</td>
<td>&gt;40</td>
<td>&lt;75</td>
</tr>
<tr>
<td>Infant</td>
<td>&gt;180</td>
<td>&lt;90</td>
<td>&gt;34</td>
<td>&lt;100</td>
</tr>
<tr>
<td>Toddler</td>
<td>&gt;140</td>
<td>NA</td>
<td>&gt;22</td>
<td>&lt;94</td>
</tr>
<tr>
<td>Child</td>
<td>&gt;130</td>
<td>NA</td>
<td>&gt;18</td>
<td>&lt;105</td>
</tr>
<tr>
<td>Adolescent</td>
<td>&gt;110</td>
<td>NA</td>
<td>&gt;14</td>
<td>&lt;117</td>
</tr>
</tbody>
</table>
Pediatric Emergency Care

- Children at increased risk for safety events
- Providers have limited experience with pediatric patients
- Low frequency of critically ill and injured children
- May be a failure to recognize a critically ill or injured child and subsequent failure to act
Pediatric Assessment Triangle

- A tool to rapidly assess children
- Uses visual and auditory clues
- Does not require equipment
Pediatric Assessment Triangle

• The PAT is intended to allow the EMT and Paramedic to:
  – Establish the child’s severity of illness
    • Sick or not sick
  – Recognize the general category of pathophysiology
    • Basically - what is going on with the child
  – Determine the urgency of interventions
  – Begin emergent management priorities
Pediatric Assessment Triangle

Appearance

Work of Breathing

Circulation to the Skin
Appearance

• Is the child alert?
• Is the child consolable?
  – Irritability or restlessness may be a sign of poor oxygenation
• Is the child responding to you?
• Are they able to speak?
Appearance

- **Tone**
- **Interactiveness**
- **Consolability**
- **Look/Gaze**
- **Speech/Cry**
Work of Breathing

• Is there evidence of increased work of breathing?
• Are there abnormal airway sounds?
• Are they apneic or gasping?
Work of Breathing

- Abnormal airway sounds
  - Stridor
  - Wheezing
  - Grunting

- Abnormal positioning

- Retractions

- Flaring

- Apnea/Gasping
Work of Breathing
Work of Breathing

Normal nostrils

Flared nostrils
Head Bobbing and Tripod Position

• Head and neck extension to open airway followed by relaxation

• Neck extensor muscles are not strong enough to stabilize the head

• Tripod positioning is common in older adults and children in respiratory distress
Circulation

• How is the child’s color?
• Is the child mottled?
• Is the child cyanotic?
• Is the child pale?
Circulation to the Skin

- Pallor
- Mottling
- Cyanosis
Circulation to the Skin
The Pediatric Assessment Triangle

**APPEARANCE**
- Abnormal Tone
- \( \downarrow \) Interactiveness
- \( \downarrow \) Consolability
- Abnl. Look/Gaze
- Abnl. Speech/Cry

**CIRCULATION**
- Pallor
- Mottling
- Cyanosis

**BREATHING**
- Abnormal Sounds
- Abnormal Position
- Retractions
- Flaring
- Apnea/Gasping
General Category of Pathophysiology: General Impression

• PAT assessment can be used to determine the general impression:
  – Stable
  – Respiratory distress
  – Respiratory failure
  – Shock
  – CNS/Metabolic disorder
  – Cardiopulmonary failure
<table>
<thead>
<tr>
<th>Component</th>
<th>Stable</th>
<th>Resp. Distress</th>
<th>Resp. Failure</th>
<th>Shock</th>
<th>CNS/Metabolic</th>
<th>Cardio-pulmonary failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Normal</td>
<td>Normal</td>
<td>Abnormal</td>
<td>Normal/Abnormal</td>
<td>Abnormal</td>
<td>Abnormal</td>
</tr>
<tr>
<td>Work of Breathing</td>
<td>Normal</td>
<td>Abnormal</td>
<td>Abnormal</td>
<td>Normal</td>
<td>Normal</td>
<td>Abnormal</td>
</tr>
<tr>
<td>Circulation to the Skin</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal/Abnormal</td>
<td>Abnormal</td>
<td>Normal</td>
<td>Abnormal</td>
</tr>
</tbody>
</table>

**What is going on with the patient?**
General Impression

- \( \Delta \) = STABLE
- \( \Delta \) = RESPIRATORY DISTRESS
- \( \Delta \) = RESPIRATORY FAILURE
- \( \Delta \) = SHOCK
- \( \Delta \) = CNS / METABOLIC
- \( \Delta \) = CARDIO-PULMONARY FAILURE
<table>
<thead>
<tr>
<th>General Impression</th>
<th>Management Priorities</th>
</tr>
</thead>
</table>
| Stable            | • Monitor and transport  
                     • Specific therapy based on possible etiologies |
| Respiratory Distress | • Position of comfort  
                             • Supplemental oxygen/suction as needed  
                             • Specific therapy based on possible etiologies: (albuterol, diphenhydramine, epinephrine) |
| Respiratory Failure | • Position the head and open the airway  
                              • Provide 100% oxygen  
                              • Initiate bag-mask ventilation as needed  
                              • Initiate foreign body removal as needed  
                              • Advanced airway as needed |
| Shock             | • Provide oxygen as needed  
                              • Obtain vascular access  
                              • Begin fluid resuscitation  
                              • Specific therapy based on possible etiologies (epinephrine, spinal stabilization, cardioversion) |
| CNS/Metabolic     | • Provide oxygen as needed  
                              • Obtain rapid glucose as needed  
                              • Consider EKG, IV fluids |
| Cardiopulmonary Failure/Arrest | • Position the head and open the airway  
                                   • Initiate bag-mask ventilation with 100% oxygen  
                                   • Begin chest compressions as needed  
                                   • Specific therapy as based on possible etiologies (defibrillation, ...) |
Case 1: 9 year-old boy

- You receive a call for a 9 year-old boy with shortness of breath
- He has asthma and became SOB after developing a fever and cough today
- No allergies
- Medications: Albuterol as needed, ran out yesterday
- What is your assessment?
  - Appearance?
  - Breathing?
  - Circulation?
Case 1: 9 year-old boy

APPEARANCE
Abnormal Tone
↓ Interactiveness
↓ Consolability
Abnl. Look/Gaze
Abnl. Speech/Cry

CIRCULATION
Pallor
Mottling
Cyanosis

BREATHING
Abnormal Sounds*
Abnormal Position*
Retractions*
Flaring*
Apnea/Gasping
General Impression

- Appearance
- Work of Breathing
- Circulation to skin

- = STABLE
- = RESPIRATORY DISTRESS
- = RESPIRATORY FAILURE
- = SHOCK
- = CNS / METABOLIC
- = CARDIO-PULMONARY FAILURE
Management Priorities: Pediatric Respiratory Distress

- Position of comfort
- Maintain airway
- Supplemental oxygen as needed
- Administer albuterol nebulized for wheezing, consider atrovent, steroids, benadryl, magnesium sulfate, Epi, CPAP, and NS bolus
- Monitor en route to ED
Case 2: 4 month-old infant

- You are dispatched to the home of a 4-month-old girl with trouble breathing
- He has a history of fever and cough and was just started on an antibiotic for pneumonia
- What is your assessment?
  - Appearance?
  - Breathing?
  - Circulation?
Case 2: 4 month-old infant

APPEARANCE
Abnormal Tone*
↓ Interactiveness*
↓ Consolability
Abnl. Look/Gaze*
Abnl. Speech/Cry

BREATHING
Abnormal Sounds
Abnormal Position
Retractions*
Flaring
Apnea/Gasping

CIRCULATION
Pallor
Mottling
Cyanosis
General Impression

- **STABLE**
- **RESPIRATORY DISTRESS**
- **RESPIRATORY FAILURE**
- **SHOCK**
- **CNS / METABOLIC**
- **CARDIO-PULMONARY FAILURE**
Management Priorities: Respiratory Failure

- Position the head and open the airway
- Suction the airway
- Provide supplemental oxygen
- Initiate bag-mask ventilation, advanced airway as needed
- Consider albuterol, epinephrine neb
- Consider checking glucose, vascular access and fluid bolus, antipyretics
Case 3: 9 month-old infant

• You respond to the home of a 9 month-old girl
• She has vomited 8 times today and cannot keep any fluids down
• What is your assessment?
  – Appearance?
  – Breathing?
  – Circulation?
Case 3: 9 month-old infant

**APPEARANCE**

- Abnormal Tone*
- ↓ Interactiveness*
- ↓ Consolability
- Abnl. Look/Gaze*
- Abnl. Speech/Cry

**CIRCULATION**

- Pallor*
- Mottling
- Cyanosis

**BREATHING**

- Abnormal Sounds
- Abnormal Position
- Retractions
- Flaring
- Apnea/Gasping
General Impression

- **STABLE**: ▲
- **RESPIRATORY DISTRESS**: ▲▲
- **RESPIRATORY FAILURE**: ▲▲▲
- **SHOCK**: ▲ ▲
- **CNS / METABOLIC FAILURE**: ▲
- **CARDIO-PULMONARY FAILURE**: ▲ ▲
Management Priorities: Shock

- Maintain airway, consider supplemental oxygen as needed
- Check glucose
- Consider IV access and fluid resuscitation
- Consider pressors if hypotensive
- Consider EKG/cardiac monitor
- Monitor and reassess en route to ED
Case 4: 6 month-old infant

• EMS is called to an apartment for a 6 month-old infant who is “not acting right”
• Mother returned from shopping 3 hours ago and found the baby difficult to arouse.
• She called a neighbor who told her to call 9-1-1
• What is your assessment?
  – Appearance?
  – Breathing?
  – Circulation?
Case 4: 6-month-old infant

APPEARANCE
- Abnormal Tone*
- \(\downarrow\) Interactiveness*
- \(\downarrow\) Consolability
- Abnl. Look/Gaze*
- Abnl. Speech/Cry

BREATHING
- Abnormal Sounds
- Abnormal Position
- Retractions
- Flaring
- Apnea/Gasping

CIRCULATION
- Pallor
- Mottling
- Cyanosis
General Impression

- **STABLE**
- **RESPIRATORY DISTRESS**
- **RESPIRATORY FAILURE**
- **SHOCK**
- **CNS / METABOLIC FAILURE**
- **CARDIO-PULMONARY FAILURE**

Diagram:
- Appearance
- Work of Breathing
- Circulation to skin
Management Priorities: CNS/Metabolic

• Maintain airway, assess pulse oximetry
• Provide supplemental oxygen as needed
• Obtain rapid glucose
• Consider EKG/cardiac monitor
• Obtain vascular access – fluid resuscitation as needed
• Consider non-accidental trauma
Case 5: 12-year-old adolescent

- You respond to a call for a 12-year-old who was out on a “joy ride” in his ATV when he rolled
- Patient ambulatory at scene, no LOC
- What is your assessment?
  - Appearance?
  - Breathing?
  - Circulation?
Case 5: 12-year-old adolescent

**APPEARANCE**
- Abnormal Tone
- ↓ Interactiveness
- ↓ Consolability
- Abnl. Look/Gaze
- Abnl. Speech/Cry

**CIRCULATION**
- Pallor
- Mottling
- Cyanosis

**BREATHING**
- Abnormal Sounds
- Abnormal Position
- Retractions
- Flaring
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General Impression

= STABLE

= RESPIRATORY DISTRESS

= RESPIRATORY FAILURE

= SHOCK

= CNS / METABOLIC

= CARDIO-PULMONARY FAILURE
Management Priorities: Stable

• Monitor en route – transport
• Provide specific therapy based on further assessment
Case 6: 2-month-old boy

• EMS is called to the home of a 2 month-old boy found unresponsive by parents.
• The infant is unresponsive, cyanotic, and apneic
• What is your assessment?
  – Appearance?
  – Breathing?
  – Circulation?
Case 6: 2-month-old boy

**APPEARANCE**
- Abnormal Tone*
- ↓ Interactiveness*
- ↓ Consolability
- Abnl. Look/Gaze*
- Abnl. Speech/Cry*

**BREATHING**
- Abnormal Sounds
- Abnormal Position
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- Apnea/Gasping*

**CIRCULATION**
- Pallor
- Mottling
- Cyanosis*
General Impression

= STABLE

= RESPIRATORY DISTRESS

= RESPIRATORY FAILURE

= SHOCK

= CNS / METABOLIC

= CARDIO-PULMONARY FAILURE
Management Priorities: Cardiopulmonary Failure

• Position the head and open the airway
• Initiate bag-mask ventilation with 100% oxygen
• Monitor
• Begin chest compressions/CPR
• Obtain vascular access
Summary

• Pediatric patients at high risk for medical errors due to developmental stage and specific management needs
• Providers have limited experience with critically ill pediatric patients
• The PAT is a rapid assessment tool to help you recognize and evaluate a sick child
• When evaluating a child use appearance, breathing, and circulation to help guide your management