thank you
Pediatric Assessment

Presented by:
Jason Haag, CCEMT-P, CIC
Pulse Check Pre-Conference
September 12th, 2019
Suffern, NY
Pediatric Resuscitation

MultiMed
Disclaimer, Brief Bio

This presenter has no financial interest in any topic being covered in this presentation, nor is her receiving any compensation from any party not affiliated with this conference.


Currently employed as a Quality Assurance Analyst and Clinical Educator for MultiMed Billing and as a Fly-Car Paramedic and Tactical Medic for Wayne County Advanced Life Support. Also an instructor for EMS Plumbline.
“Being a Dad is my most important job...”
- Mark Dominik
Facts and Stats

- Children fare worse than adults in the out-of-hospital phase of resuscitation
- 70% of all pediatric trauma deaths occur in the field
- Survival rate for out-of-hospital cardiac arrest is half that of adults
- Failure rate for resuscitative interventions in field is 2x that of adults
- Failure rates for prehospital ET intubation for injured children is near 50%
Think...

• When was the last time you had a pediatric patient?
• When was the last time you had a critical pediatric patient?
• When was the last time you had to resuscitate a pediatric patient?
Facts and Stats

- Injury: leading cause of death 1-14
- 8% of kids die prior to EMS arrival
- 10% of all calls for kids
- Optimal pre-hospital management is of major importance to reduce M & M
- Most common errors in peds management:
  - Failure to manage the Airway
  - Failure to provide fluid resuscitation
  - Failure to recognize and treat internal bleeding
Overview

• Trauma is leading cause of death and disability in children
• Blunt injury represents 80-90%
• Penetrating injury less common
Mechanism of Injury

• Most common for peds:
  • Falls
  • MVCs
  • Car –vs- ped
  • Drownings and near-drownings
  • Burns
  • Physical abuse
### Concerns Due to MOI

<table>
<thead>
<tr>
<th>Concern</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shock</td>
<td></td>
</tr>
<tr>
<td>Musculoskeletal Injuries</td>
<td></td>
</tr>
<tr>
<td>Blunt Trauma</td>
<td></td>
</tr>
<tr>
<td>Burns</td>
<td>Thermal</td>
</tr>
<tr>
<td></td>
<td>Electrical</td>
</tr>
<tr>
<td></td>
<td>Chemical</td>
</tr>
</tbody>
</table>
Peds vs. Auto

Single Injury
• Lower extremity

Multiple Injury
• Head / neck
• Internal chest / abdomen
• Lower extremity fractures

Figure 14: Pedestrian Struck
Typical pattern of injuries affecting upper leg (1), chest/abdomen (2), and head (3)
Blunt Trauma

Number one cause of death in infants and children

50% of pediatric deaths occur within the first hour

Most injuries result from blunt trauma

Higher incidence of penetrating injuries in urban areas

Thinner body walls allow greater energy transfer
Falls

- Low height
- Upper extremity fracture
- Medium height
- Head/neck injury
- Face/scalp injury
- Upper extremity fracture
Falls

High height
- Head / neck injury
- Scalp / facial laceration
- Internal chest / abdominal injury
- Upper / lower extremity fracture
Bicycle Injuries

Helmeted
• Upper extremity fractures

Unhelmeted
• Head/neck injuries
• Scalp/facial lacerations
• Upper extremity fractures

Handlebar
• Internal abdominal injury
Motor Vehicle Crashes
Occupant

Restrained
• Internal abdominal Injuries
• Lower spine fractures
  • Especially if restraints are not size appropriate

Unrestrained
• Head/neck injuries
• Scalp/facial lacerations
Spinal Injuries
Specific Injuries: Head

Head and brain
- Involved in 60% of blunt injuries
- Head, face and neck
  - Head injuries: #1 cause of trauma death in pediatrics
  - Soft skull
  - 60-70% of pediatric cervical fractures occur at C1-C3
Head and Neck Injuries
Concussion

Mechanics: direct blow to head/face/neck or indirect force transmission (body blow)

Timecourse: rapid onset, short-lived impairment, spontaneous resolution

Pathophysiology: function > structure

Symptoms: graded syndromes, may or may not include LOC, sequential resolution
Post-Concussion Symptom Scale

• Headache
• Nausea
• Vomiting
• Balance problems
• Dizziness
• Fatigue
• Trouble falling asleep
• Sleeping more than usual
• Sleeping less than usual
• Drowsiness
• Sensitivity to light

• Sensitivity to noise
• Irritability
• Sadness
• Nervousness
• Feeling more emotional
• Numbness or tingling
• Feeling slowed down
• Feeling mentally “foggy”
• Difficulty concentrating
• Difficulty remembering
• Visual problems
Clinical Signs of Concussion

- Consciousness (LOC) – not required
- Memory – post-traumatic/retrograde amnesia
- Cognition
- Neurological (physical)
- Personality (emotional)
Specific Injuries: Chest

- Softer, more flexible ribs
- Soft, pliant airways
- Greater mobility of heart and great vessels
Specific Injuries: Abdomen

- Small abdominal cavity size concentrates injury forces
- Softer, more flexible ribs allow upper abdominal organs to be injured
- Thinner muscles of abdominal wall transmit injury forces directly to internal organs
- Internal organs - Involved in 10% of blunt injuries
Musculoskeletal Injuries

- Connective tissues are stronger than bones
  - Fractures at growing ends more common
- Softer bones
  - Greenstick fractures
- Force required to cause a clean break is significant and cause for concern
Forearm Fracture
Give Comfort – Give Pain Meds
Pediatric Assessment Triangle

- Appearance
- Work of Breathing
- Circulation to Skin
Boys, you must strive to find your own voice.
First Impressions

- "Across the room" assessment
- Pediatric assessment triangle
  - *Unstable vs stable
  - *Sick vs not sick
  - *Urgent vs non-urgent
PAT - Appearance

• TICLS.....pronounced Tickles
• Tone
• Interactivity
• Consolability
• Look
• Speech
PAT - Breathing

- Body Position
- Visible movement of chest and abdomen
- Respiratory rate and effort
- Audible airway sounds
Assessment: Breathing

- Increased rate and effort
- Ensure oxygenation and ventilation
- Hypoxia can cause hypoperfusion
- Chest trauma can cause obstructive shock
- Treat any cause of respiratory distress
PAT - Circulation

- Skin Temperature
- Pulse strength
- Capillary refill time
Primary Survey

• Assessment and management occur simultaneously
• Determine any life-threatening conditions
Primary Survey

A – Airway
B – Breathing
C – Circulation
D – Da Brain
E – Exposure
Any Airway Red Flags?

- Vocalization
- Drooling
- Abnormal airway sounds
- Preferred posture
- Tongue obstruction
- Loose teeth or foreign objects
- Bleeding/vomitus
AAAAAAND .....
What’s green with red?

A very rare airway obstruction....

Or so I’ve been toad.
Initial Assessment: Airway

• Patent and maintainable?
  • Position
    • Occipital region until 4 years
    • Neutral in-line position
  • Suction
    • Infants < 6 months are nose-breathers
      • Suctioning nasopharynx improves breathing significantly
      • Small enough catheter
      • Do not insert too deeply
      • As briefly as possible

• Airway adjuncts
  • OPA
  • NPA
Any Breathing Red Flags?

- Level of consciousness
- Rate and depth of respirations
- Breath sounds
- Symmetric chest rise and fall
- Work of breathing
  - Nasal flaring
  - Head bobbing
- Retractions
  - Grunting
- Accessory muscle use
Any Circulation Red Flags?

- Central and peripheral pulse rate and quality
- Skin color, temperature, and moisture
  (most reliable indicator of perfusion)
- Capillary refill <2
- Mental status
- External bleeding
Hypoperfusion

- Second major cause of pediatric cardiopulmonary arrest
- Unusual because of efficient pediatric vessel constriction
- Fast decompensation
Causes

- Heat loss (newborns, neonates)
- Dehydration
- Infection, sepsis, anaphylaxis
- Trauma
- Blood loss
- EMS care focuses on suspecting shock before it develop
Bleeding and Shock

The total blood volume is smaller (80 mL/kg)

- 1 y/o ~ 10 kg: Blood volume
  800 mL = 27 oz = 2 cans of soda
- 6 y/o ~ 20 kg: Blood volume
  1,600 mL = 54 oz = 4.5 cans of soda

Child’s loss is proportionally greater
## Compensated Shock

<table>
<thead>
<tr>
<th>Symptom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irritability or anxiety</td>
</tr>
<tr>
<td>Tachycardia</td>
</tr>
<tr>
<td>Tachypnea</td>
</tr>
<tr>
<td>Weak peripheral pulses, full central pulses</td>
</tr>
<tr>
<td>Delayed capillary refill (&gt;2 sec in &lt;6 y/o)</td>
</tr>
<tr>
<td>Cool, pale extremities</td>
</tr>
<tr>
<td>Systolic BP within normal limits</td>
</tr>
<tr>
<td>Decreased urinary output</td>
</tr>
</tbody>
</table>
Decompensated Shock

- Lethargy or coma
- Marked tachycardia or bradycardia
- Absent peripheral pulses, weak central pulses
- Markedly delayed capillary refill
- Cool, pale, dusky, mottled extremities
- Hypotension
- Markedly decreased urinary output
- Absence of tears
Reminder.....
First Impressions

Ill-appearing children are in decompensated shock

Compensated shock presents with more subtle findings
Assessment: Mental Status

Key indicator of perfusion
Treatment Plan

- HIGH FLOW O₂
- AGGRESSIVE AIRWAY/VENTILATION MANAGEMENT
- VOLUME REPLACEMENT (20 ML/KG BOLUSES)
- RAPID TRANSPORT TO DEFINITIVE CARE
Secondary Survey

F – Full set of vitals and family
G – Give comfort
H – Head to toe and history
I – Inspect

“It ain’t over until the patient is over”
Memorize their vitals.
Transport Decision

- All patients with shock require immediate transport
  - Further Assessment enroute
  - Continue treatments
Immobilization and Transport

- Immobilize small children
  - C-collar
  - Layer of padding
  - KED
  - Other devices
- Keep warm
  - Blankets
  - Head coverings
  - Cold weather
  - Near drowning
How’s the pediatric patient doing who swallowed 10 quarters last night?
No change yet...
Summary

1. **Maintain Airway, Breathing, and C-spine control**
2. **Give high-flow, high concentration O₂**
3. **Assist ventilations if child demonstrates altered mental status or respiratory distress**
**Summary**

<table>
<thead>
<tr>
<th>Action</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consider</td>
<td>Consider length-based resuscitation tape</td>
</tr>
<tr>
<td>Immobilize</td>
<td>Immobilize as appropriate</td>
</tr>
<tr>
<td>Transport</td>
<td>Transport to pediatric tertiary care if possible</td>
</tr>
<tr>
<td>Keep</td>
<td>Keep the child warm</td>
</tr>
</tbody>
</table>
Additions / Clarifications?
Inside YOU is untapped potential
Thank You!!!

jhaag@multimedbilling.com
315.544.9193 – Direct
800.927.5845 x 56
www.freshems.com
www.multimedbilling.com