

Trauma



Objectives

- Explain the unique anatomic features of children leading to specific injury patterns
- Outline the initial assessment of the injured child
- Integrate trauma resuscitation in the ABCDE's

Anatomic and Physiologic Differences

- Recognition of anatomic and physiologic differences between adults and children is a critical component of trauma care
- Children may present with subtle signs or symptoms of serious injury

Anatomic and Physiologic Differences

Anatomic/Physiologic Differences

- Proportionally larger head
- Smaller diameter of the airway
- Poorly protected abdominal organs

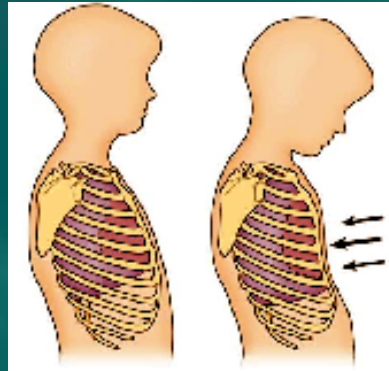
Clinical Correlation

- Higher frequency of head trauma
- Higher frequency of obstruction
- Higher risk of abdominal bleeding

Anatomic and Physiologic Differences

Anatomic/Physiologic Differences

- Softer, thinner chest wall
- Compensatory vasoconstriction
- Larger body surface/mass ratio



Clinical Correlation

- Lung injury more frequent
- Normal blood pressure with early shock
- Multiple system injury common; heat loss

3-year-old child

- You are called to the street where a 3-year-old child is found lying after a 20-foot fall from a third-story window.



3-year-old child

Appearance

Unresponsive

Work of Breathing
Tachypnea, retractions



Circulation to Skin

Pale skin color

What is your assessment of this patient?

- The Pediatric Assessment Triangle (PAT) reveals critical injury.
 - Abnormal appearance is due to head injury or shock.
 - Tachypnea is a response to poor perfusion and metabolic acidosis and retractions may indicate chest injury.
 - Pale skin is due to hemorrhage.

Initial Assessment

ABCDE'S

- **Airway** - Clear, no stridor
- **Breathing** – RR 40 breaths/min with good air movement bilaterally
- **Circulation** – HR 190 beats/min; pulses thready; CRT 4 seconds; BP 70 mm Hg/palp

What is the child's perfusion status?

This patient is in decompensated shock due to hemorrhage.

Initial Assessment (continued)

- **Disability** - AVPU=U
 - Right pupil larger than left and unresponsive
- **Exposure** - Right parietal scalp contusion, abdomen distended and tender to palpation, right thigh deformity

What do unequal pupils indicate?

- Unequal pupils may reflect severe brain injury due to intracranial hemorrhage or swelling and increased intracranial pressure.

What are the likely injuries and initial management priorities?

Management Priorities



Injuries

- Traumatic brain injury
- Abdominal injury
- Long bone fracture

BLS Management Priorities

- Open airway and maintain spinal immobilization
- Suction as needed
- Assist ventilation with BVM
- Control external bleeding
- Immobilize injured extremity
- Transport

Management Priorities



- BLS priorities plus...
- Airway management — continue BVM ventilation, consider ETI
- Obtain IV or IO access en route
- Fluid resuscitation with 20 ml/kg normal saline or Lactated Ringer's

- During transport, the child's color improves with initial interventions. There is no change in the size of the right pupil.

What additional treatment measures are indicated at this point?

What are additional management priorities during transport?

Transport Priorities

Discussion

- Perform frequent reassessment of the PAT, ABCDEs, pulse oximetry, and ECG
- Prevent hypothermia
- Defer focused history and physical exam, and detailed physical exam

- Child is transported and further resuscitated in the emergency department.
- Child admitted to a pediatric intensive care unit.

14-year-old adolescent

- You are called to a school where a 14-year-old adolescent has sustained a single gunshot wound to the chest.
- You find a wound in left anterior chest, just below the nipple line, no other wounds noted



14 year-old adolescent

Appearance
Unconscious

Work of Breathing
Labored respirations;
retractions present



Circulation to Skin
Pale skin color

Initial Assessment

- **Airway** - Open
- **Breathing** - RR 40 breaths/min, no air movement left chest
- **Circulation** - HR 160 beats/min; peripheral pulses absent; skin cool and moist; CRT 4 seconds; BP 50 mm Hg/palp
- **Disability** - AVPU=P
- **Exposure** - No additional injuries

Based on the PAT and initial assessment, what is this patient's condition?

What are your initial interventions?

- PAT and initial assessment indicate respiratory failure and shock.

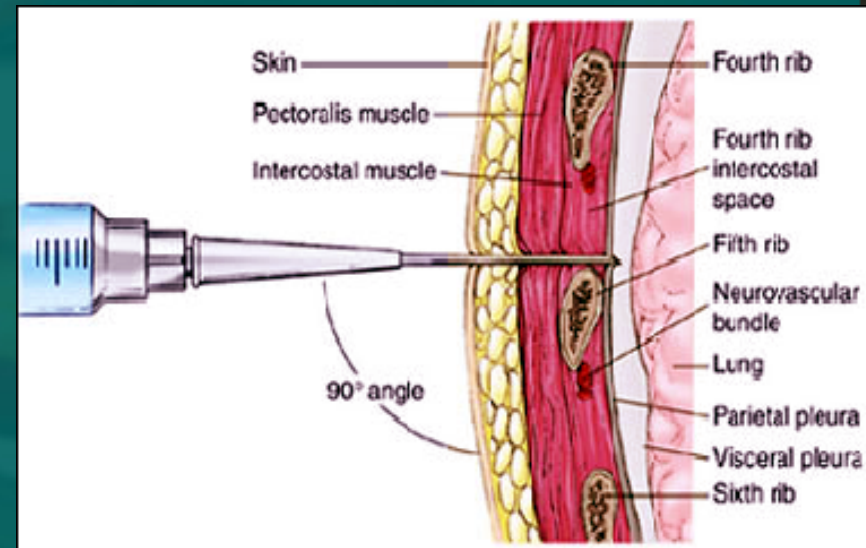
BLS Management Priorities:

- BVM ventilation with 100% oxygen
- Place patient in shock position
- Place occlusive 3 side dressing over wound
- Rapid transport

Management Priorities

BLS priorities plus...

- Perform needle thoracostomy, left chest
- Transport
- Obtain IV access en route
- Infuse 20 ml/kg normal saline rapidly



- Respiratory failure is due to tension pneumothorax.
- Assisted ventilation may worsen status
 - Shock is caused by chest or abdominal injury.
- Penetrating injury below the nipple line can lead to injuries in both body cavities.

Communication with the “Injured Family”

- Consider the emotional impact of serious injury or death on family members
- Provide caregivers/parents with facts, but avoid speculation
- Provide uninjured children with a safe disposition
- Attempt to keep family members together

Conclusion

- Unique anatomic features of childhood predispose to different injury patterns
- Following the PAT and initial assessment, perform life- or limb-saving interventions and transport
- Defer further history and exams in any child with respiratory failure or shock