Pediatric Assessment

Shock and Disorders of Hydration

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Shock

Inadequate peripheral perfusion where oxygen delivery does not meet metabolic demand
Adult vs. Pediatric Shock

Same causes/different frequencies
Adult vs. Pediatric Shock

- Hypovolemic
  - Most common cause of pediatric shock
  - Small blood volumes (80cc/kg)
Adult vs. Pediatric Shock

- Sepsis
  - Second most common cause of pediatric shock
  - Immature immune system
Adult vs. Pediatric Shock

• Cardiogenic
  – Primary pump failure RARE
  – Secondary failure from:
    • Hypoxia
    • Acidosis
    • Hypoglycemia
    • Hypothermia
    • Drug toxicity
Adult vs. Pediatric Shock

- Neurogenic
  - Rare
  - Low incidence associated with low pediatric spinal cord trauma rates
Adult vs. Pediatric Shock

- Hypoglycemia
  - Mimics shock
  - Altered level of consciousness
  - Pallor
  - Tachycardia
  - Diaphoresis
Pediatric Shock

- Early shock - Very difficult to detect.
- Pediatric cardiovascular system compensates well.
Pediatric Shock

• Early Signs/Symptoms
  – Tachycardia - carry chart of normals
  – Slow capillary refill ( > 2 seconds)
  – Pale or mottled skin, cool extremities
  – Tachypnea
Pediatric Shock

- Late Signs/Symptoms
  - Weak or absent peripheral pulses
  - Decreasing level of consciousness
  - Hypotension
Pediatric Shock

Hypotension = Late Sign of Shock
Pre-Arrest State
Pediatric Shock

Reassess, Reassess, Reassess

Pediatric patients in compensated shock “crash” quickly
Pediatric Shock

- Initial assessment may detect shock, but not its cause
- When in doubt, treat for Hypovolemia
Shock Management

• Airway
  – Open, clear, maintain
  – Non-invasive (chin lift, jaw thrust)
  – Invasive (ETT)
  – Trauma patient - ? C-spine injury
Shock Management

• Breathing
  – 100% oxygen indicated for all shock
  – Ventilation
    • Reduce work of breathing
    • Do not “fight” patient
Shock Management

- Circulation
  - Apply cardiac monitor
  - Control obvious hemorrhage
  - Elevate lower extremities
Shock Management

- Fluid Resuscitation
  - Consider scene time -- Rapid transport
  - Consider IO access
  - Fluid bolus: 20 cc/kg
  - Most common error -- Too LITTLE fluid
  - Reassess for:
    - Improved perfusion
    - Respiratory distress
Shock Management

- Check blood glucose
  - Give D25 if D-stick < 80 mg/dL
  - Do NOT use D50 in children
Cardiac Arrest/Arrhythmias

- Pedi cardiac arrest
  - Usually complication of respiratory failure
  - NOT primary cardiac disease
Arrhythmias

- Sinus Tachycardia
  - Usually physiologic response to non-cardiac problem
    - Hypovolemia
    - Fear
    - Pain
    - Fever
  - Find, correct underlying problem
Bradycardia

- Physiologic response to hypoxia
- Treat with:
  - Oxygenation
  - Ventilation
- Epinephrine may be useful in stimulating depressed myocardium
- Atropine usually unnecessary
Arrhythmias

- Ventricular arrhythmias
  - Very rare
  - Imply drug toxicity, electrolyte problems
Congenital Heart Disease

- Know your patient population
- Get good history from parents:
  - Baseline status
  - Cyanosis
  - Medications
  - Surgical history
Congenital Heart Disease

- Signs/Symptoms
  - Poor feeding
  - Decreased oral intake
  - Sweating during feeding
  - Tachypnea
  - Rales/wheezing
  - Weak pulses, mottled extremities
Congenital Heart Disease

• Management
  – 100% oxygen
  • May not relieve cyanosis
  – Assist ventilation if respiratory distress present
  – Limit fluids
Congenital Heart Disease

- **Management**
  - Cardiac monitor
  - Conduction disorders/bizarre arrhythmias
    - Possible digitalis toxicity
    - Electrolyte imbalances
  - Avoid pharmacologic intervention except epinephrine in instances of cardiac arrest
Disorders of Hydration
Disorders of Hydration

• Causes
  – Vomiting
  – Diarrhea
  – Fever
  – Poor oral intake
  – Diabetes mellitus
Disorders of Hydration

• Mild dehydration (<5% weight loss)
  – Mild increased thirst
  – Slight mucous membrane dryness
  – Slight decrease in urinary frequency
  – Slight increase in pulse rate
Disorders of Hydration

• Moderate dehydration (5 - 10% weight loss)
  – Moderate increase in thirst
  – Very dry, “beefy red” mucous membranes
  – Decrease in skin turgor
  – Tachycardia
  – Oliguria, concentrated urine
  – Sunken eyes
Disorders of Hydration

- Severe dehydration (10 - 15% weight loss)
  - Severe thirst
  - Tenting of skin
  - No tears when crying
  - Weak, thready pulses
  - Marked tachycardia
  - Sunken fontanelle
  - Hypotension
  - Decrease in LOC
Hypotension

Late Sign of Shock

Impending Cardiovascular Collapse
Disorders of Hydration

- Management
  - Oxygen
  - 20 cc/kg NaCl bolus
  - Repeat boluses as needed to
    - Restore peripheral pulses
    - Decrease tachycardia
    - Improve LOC
Disorders of Hydration

- Management
  - Monitor for:
    - Respiratory distress
    - Pulmonary edema
  - Reassess, Reassess, Reassess