

Shock – Summary

Learning Objectives

- 1. Define shock. 2. Know stages, classifications of shock. 3. Know the initial management of shock.

Definition, stages of shock

- **Shock:** Inadequate perfusion to meet tissue demands.
 - Eventually cell death; eventually organ failure, cardiac arrest, death.
- **Compensated shock:**
 - Cardiac output (HR x SV) and systemic vascular resistance keep BP WNL.
 - Signs: Tachycardia, ↓ pulses, cool extremities, oliguria, lactic acidosis
- **Hypotensive (uncompensated) shock:**
 - Compensatory mechanisms are overwhelmed.
 - Signs: Hypotension, altered mental status, increased lactic acidosis
- **Irreversible shock:**
 - Irreversible organ damage, death occur.

Classifications of shock

- **Hypovolemic Shock:** Decreased preload due to internal or external losses.
 - **Etiologies:** Dehydration (diarrhea, burns, nephrotic syndrome), hemorrhage
- **Distributive Shock:** Decrease in SVR, with abnormal distribution of blood flow → functional hypovolemia, decreased preload. Typically, NL or ↑ CO.
 - **Etiologies:** Sepsis, anaphylaxis, CO/cyanide poisoning, neurogenic, mitochondrial
- **Cardiogenic Shock:** “Pump failure.” ↓ CO, systolic function.
 - **Etiologies:** Cardiomyopathies, ischemia, dysrhythmias, CHD
- **Obstructive Shock:** Outflow from left or right side of heart physically obstructed.
 - **Etiologies:** Large PE, critical coarctation, tamponade, tension pneumothorax

Initial management of shock: Goal to normalize BP, perfusion.

- ABCDs. Attach cardiovascular-respiratory monitor, change vital sign measurements to appropriate interval (q 15 min), alert nurses of concerns, ensure sufficient access: 2 large bore PIVs if possible; ensure established lines are working.
 - If insufficient IV access and uncompensated, PALS says obtain I/O immediately.
 - Does the patient emergently need a higher level of care?
- **General management algorithm**^{1, 2}
 - May initially be applied to any patient in shock. Search for exact etiology.

| Continually | First 5-15 min | First 15-30 min |
|---|---|---|
| <ul style="list-style-type: none"> • Monitor ABCDs. • Monitor physiologic goals (BP, skin perfusion, pulses, mental status, UOP) pre and post interventions • Consider advanced airway | <ul style="list-style-type: none"> • Identify life-threatening conditions • Establish access • 20 ml/kg crystalloid over 5-10 min (10 ml/kg if DKA, cardiogenic shock) • Give IM epinephrine (0.01 mg/kg of 1:1,000 solution) if anaphylaxis (max 0.5 mg) | <ul style="list-style-type: none"> • Identify and start to correct abnormal glucose, lytes • Give antibiotics in suspected septic shock (broad coverage) • Give inotropes if cardiogenic shock • Continue 20 ml/kg boluses up to 60 ml/kg; consider PRBCs |

1. Pediatric Advanced Life Support Provider Manual. Ralston, M, et al (Eds), American Heart Association, Subcommittee on Pediatric Resuscitation, Dallas 2006. p.61.
2. Carcillo, JA, Fields, AI. Clinical practice parameters for hemodynamic support of pediatric and neonatal patients in septic shock. Crit Care Med 2002.