



Pediatric Hypotension/ Shock

History

- Blood loss
- Fluid loss
- Vomiting
- Diarrhea
- Fever
- Infection

Signs and Symptoms

- Restlessness, confusion, weakness
- Dizziness
- Tachycardia
- Hypotension (Late sign)
- Pale, cool, clammy skin
- Delayed capillary refill
- Dark-tarry stools

Differential

- Shock
 - Hypovolemic
 - Cardiogenic
 - Septic
 - Neurogenic
 - Anaphylactic
- Trauma
- Infection
- Dehydration
- Congenital heart disease
- Medication or Toxin

Age Specific Blood Pressure indicating possible shock

Age 0 – 28 days: SBP < 60
Ages ≥ 1 month: SBP < 70
Age 1 – 9: SBP < 70 + (2x Age)

Ages 10 – 64: SBP < 90
Ages ≥ 65: SBP < 110

All ages Shock Index:
HR > SBP

	Blood Glucose Analysis Procedure
	IV or IO Access Protocol UP 6
P	Cardiac Monitor
	Pediatric Airway Protocol(s) <i>if indicated</i>
	Diabetic Protocol PM 2 <i>if indicated</i>

History and Exam Suggest Type of Shock

Cardiogenic

Hypovolemic

Distributive

Obstructive

Chest Pain: Cardiac and STEMI
 Protocol AC 4
 Appropriate Pediatric Arrhythmia Protocol(s)
if indicated

A Normal Saline Bolus
 5 – 10 mL / kg IV / IO
 Titrate to age appropriate
 SBP ≥ 70 + (2 x Age)
 Maximum 10 mL / kg

Pediatric Allergy Protocol PM 1
if indicated
 Suspected Sepsis Protocol UP 15
if indicated
 Multiple Trauma Protocol TB 6
if indicated

A Normal Saline Bolus
 20 mL / kg IV / IO
 Titrate to age appropriate
 SBP ≥ 70 + (2 x Age)
 Maximum 60 mL / kg

P Chest Decompression-Needle Procedure
if indicated

P Push Dose Vasopressor - Epinephrine 1:100K Give 1cc (10 mcg) q 2 – 3 minutes to effect SBP > 90 Use in patients with BP < 80 & Heart Rate < 200.

Norepinephrine
 Starting Dose: 0.1 mcg / kg / min IV / IO
 Titrate to: SBP ≥ 70 + (2 x Age)
 Max = 2 mcg / kg / min

Notify Destination or Contact Medical Control



Hypotension/ Shock

Dose for pediatric hypotension/shock:

Epinephrine Drip = 0.1 to 1 mcg / kg / minute – 3rd line

Norepinephrine Drip = 0.1 to 2 mcg / kg / minute

For either epinephrine or norepinephrine, start at 0.1 mcg/kg/min and titrate up as needed until Systolic BP $\geq 70 + (2 \times \text{Age})$ OR you reach the maximum dose (1 mcg/kg/min for epi; 2 mcg/kg/min for norepi).

Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- Consider all possible causes of shock and treat per appropriate protocol. Majority of decompensation in pediatrics is airway or respiratory related.
- Decreasing heart rate and hypotension occur late in children and are signs of impending cardiac arrest.
- Shock may be present with a normal blood pressure initially or even elevated.
- Shock often is present with normal vital signs and may develop insidiously. Tachycardia may be the first and only sign.
- Consider all possible causes of shock and treat per appropriate protocol.
- **Hypovolemic Shock:**
Hemorrhage, trauma, GI bleeding, or pregnancy-related bleeding.
Tranexamic Acid (TXA):
Agencies utilizing Tranexamic acid (TXA) must submit letters from the their receiving trauma centers for approval by the OEMS Medical Director.
Receiving trauma centers must agree to continue Tranexamic acid (TXA) therapy with repeat dosing.
Tranexamic acid (TXA) is NOT indicated and should NOT be administered where trauma occurred > 3 hours prior to EMS arrival.
- **Cardiogenic Shock:**
Heart failure: MI, Cardiomyopathy, Myocardial contusion, Ruptured ventricle/ septum/ valve/ toxins.
- **Distributive Shock:**
Septic/ Anaphylactic/ Neurogenic/ Toxic
Hallmark is warm, dry, pink skin with normal capillary refill time and typically alert.
- **Obstructive Shock:**
Pericardial tamponade. Pulmonary embolus. Tension pneumothorax.
Signs may include hypotension with distended neck veins, tachycardia, unilateral decreased breath sounds or muffled heart sounds.
- **Acute Adrenal Insufficiency or Congenital Adrenal Hyperplasia:**
Body cannot produce enough steroids (glucocorticoids/ mineralocorticoids.)
May have primary or secondary adrenal disease, congenital adrenal hyperplasia, or more commonly have stopped a steroid like prednisone. Injury or illness may precipitate.
Usually hypotensive with nausea, vomiting, dehydration and/ or abdominal pain.
Adults patients:
Methylprednisolone 125 mg IM / IV / IO or
Hydrocortisone 100mg IM / IV / IO
Use steroid agent specific to your drug list. Dexamethasone 10 mg IM / IV / IO can be used if as an alternative

Pediatric patients:
Methylprednisolone 2 mg/kg IM / IV / IO (Maximum 125 mg) or
Hydrocortisone 2mg/kg IM / IV / IO (Maximum 100mg)
Use steroid agent specific to your drug list. Dexamethasone 5 mg IM / IV / IO can be used as an alternative
May administer prescribed steroid carried by patient IM / IV / IO. Patient may have Hydrocortisone (Cortef or Solu - Cortef). Administer 2 mg/kg up to 100 mg IV or dose specified by patient's physician.