



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

	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>

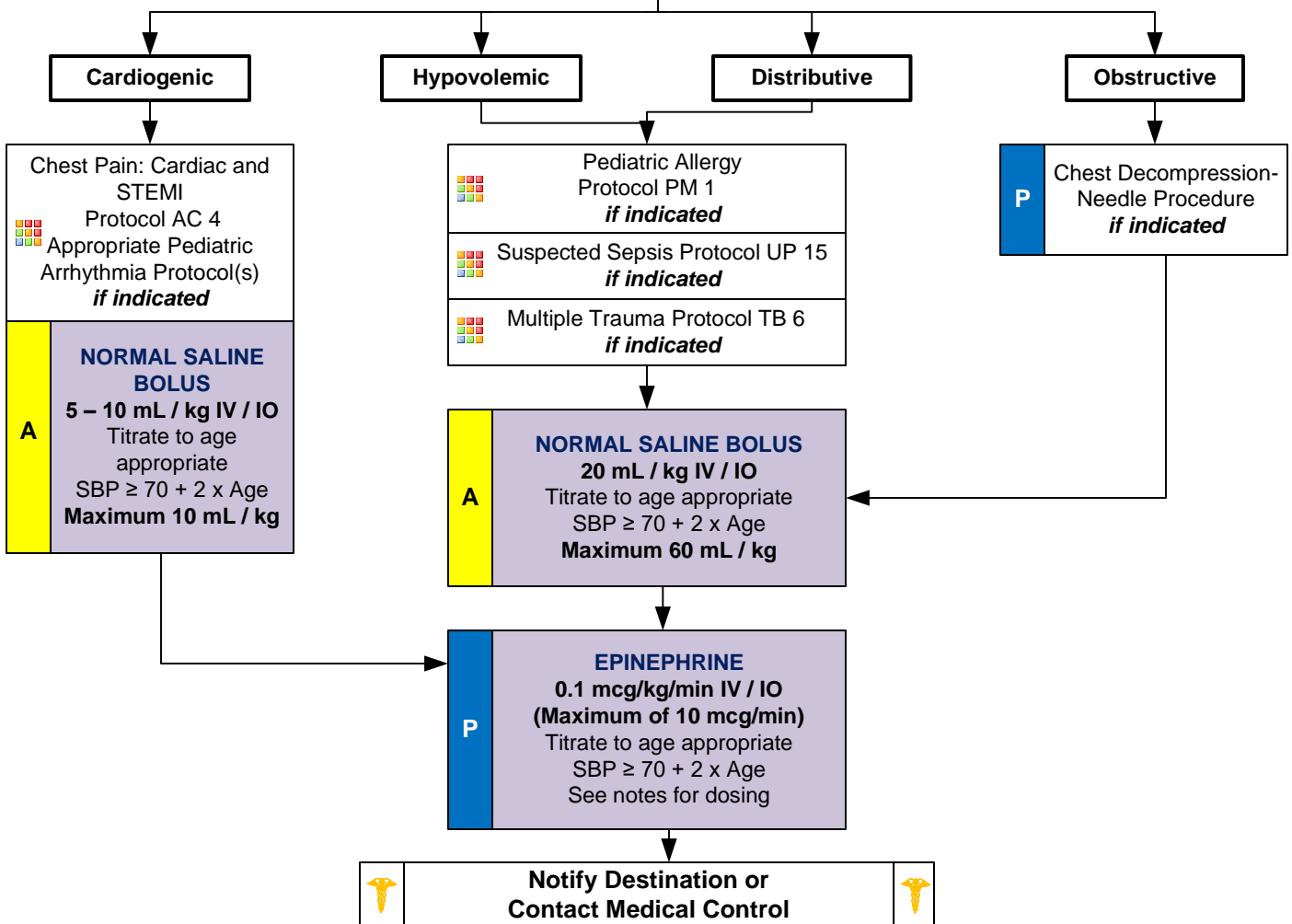
Age Specific Blood Pressure indicating possible shock

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

History and Exam Suggest Type of Shock



Pediatric Medical Protocol Section 1



PEDIATRIC HYPOTENSION / SHOCK

EPINEPHRINE DRIP INSTRUCTIONS:

* 1 mg of Epinephrine = 1 mL of Epinephrine 1:1,000 *

For precise dosing, remove 1 mL of Normal Saline from a 1 L bag
Inject 1 mg of Epinephrine 1:1,000 into the 1 L of Normal Saline
This results in a **1 mcg/mL** concentration
Reminder: Standard unit conversion: **dose (mg/mL) x 1000 (mcg/mg) = dose (mcg/mL)**

Calculation formula for **WEIGHT** based dosing:

$$\frac{\text{desired dose (mcg/kg)} \times \text{weight (kg)} \times \text{drop set (60 gtt/mL)}}{\text{concentration (1 mcg/mL)}} = \text{gtt/min}$$

UTILIZE 60 GTT SET IV TUBING FOR PEDIATRICS ≤ 20 kg

$$\frac{\text{desired dose (mcg/kg)} \times \text{weight (kg)} \times \text{drop set (10 gtt/mL)}}{\text{concentration (1 mcg/mL)}} = \text{gtt/min}$$

UTILIZE 10 GTT SET IV TUBING FOR PEDIATRICS > 20 kg

*** REFER TO DRUG CARDS FOR ADDITIONAL INFORMATION AND PRE-CALCULATED DRIP RATES ***
Contact Medical Control for Epinephrine drip dosing guidance **if needed.**

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 TXA must submit letters from their receiving trauma centers for approval by the OEMS Medical Director.
Receiving trauma centers must agree to continue TXA therapy with repeat dosing.
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.
If suspected, Paramedic should give Methylprednisolone 125 mg IM / IV / IO or Dexamethasone 10 mg IM / IV / IO. Use steroid agent specific to your drug list.
May administer prescribed steroid carried by patient IM / IV / IO. Patient may have Hydrocortisone (Cortef or Solu-Cortef). Dose: < 1y.o. give 25 mg, 1-12 y.o. give 50 mg, and > 12 y.o. give 100 mg or dose specified by patient's physician.



PEDIATRIC HYPOTENSION / SHOCK

EPINEPHRINE CONCENTRATION (1 mcg/mL) 0.1 mcg/kg/min

$(0.1 \text{ mcg/kg}) \times (\text{kg}) \times (60 \text{ gtt}) \div 1 \text{ mcg/mL}$		$(0.1 \text{ mcg/kg}) \times (\text{kg}) \times (10 \text{ gtt}) \div 1 \text{ mcg/mL}$	
PATIENT WEIGHT (kg)	USING 60 gtt SET ($\leq 20 \text{ kg}$) # gtt/min	PATIENT WEIGHT (kg)	USING 10 gtt SET ($> 20 \text{ kg}$) # gtt/min
3	18	22	22
4	24	24	24
5	30	26	26
6	36	28	28
7	42	30	30
8	48	32	32
9	54	34	34
10	60	36	36
11	66	38	38
12	72	40	40
13	78	42	42
14	84	44	44
15	90	46	46
16	96	48	48
17	102	50	50
18	108	60	60
19	114	70	70
20	120	80	80
		90	90
		100	100 – MAX DOSE