

UU. SHOCK / HYPOPERFUSION (NEW '20)

1. Inclusion Criteria

The body responds in various ways to a state of inadequate blood flow to meet the oxygen demands of the cells. A patient may exhibit an altered mental status; cool, clammy skin; diaphoresis; dilated pupils; a rapid, weak pulse; shallow, labored respirations; general weakness; and/or a decreasing pulse pressure.



2. Treatment

- a) Refer to General Patient Care.




- b) Establish IV/IO access with LR.

- c) Initiate treatment based on suspected cause of shock.

(1) Cardiogenic Shock

- (a) If rales are present, administer fluid bolus, titrate to a systolic blood pressure of 90 mmHg or greater. Maximum single bolus of 250 mL of LR IV.

- (b)  Additional fluid requires medical consultation.


(c) Initiate epinephrine infusion

- (i) Add 1 mg of epinephrine (either 1:1,000 or 1:10,000) in a 100 mL bag of LR or NS
- (ii) Use a Microdrip set (60 drops/mL) for infusion administration
- (iii) Adult epinephrine infusion dosage:
 - (1) Administer infusion through a free-flowing IV, ideally 20 gauge or larger, or by IO
 - (2) Start infusion at 1 mL/min (60 drops/min) IV/IO
 - (3) Check blood pressure every 5 minutes. If MAP is less than 65 mmHg or systolic blood pressure is less than 90 mmHg, increase to a maximum rate of 2 mL/min (120 drops/min).
 - (4) If above blood pressure goals are not met upon reaching maximum rate, obtain online medical consultation.

(2) Hemorrhagic Shock

- (a) Administer small boluses of LR (maximum single bolus of 250 mL prior to additional blood pressure check) to achieve and maintain a systolic blood pressure of 90 mmHg or greater (or mean arterial pressure of 65 mmHg). If head injury is suspected, administer small boluses of LR to maintain a systolic blood pressure of 110 mmHg or greater.

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- (3) Hypovolemic or Septic Shock
 - (a) If lungs are clear, administer fluid bolus of 20 mL/kg of LR IV. Titrate to a systolic blood pressure of 90 mmHg (or mean arterial pressure of 65 mmHg). Maximum patient dose of 2,000 mL of LR
 - (b)  If hypotension persists after 2 L of LR are provided, consider additional LR up to a maximum of 30 mL/kg total.
 - (c) Initiate epinephrine infusion if systolic blood pressure remains less than 90 mmHg (or mean arterial pressure less than 65 mmHg) after IV fluid bolus of 30 mL/kg LR.
- (4) Anaphylactic shock: Initiate epinephrine infusion for patients who are in extremis with severe hypotension or impending respiratory failure, after having administered 3 doses of IM epinephrine. (Refer to Anaphylaxis Protocol.)
- (5) Neurogenic shock (suspected spinal cord injury which typically presents with hypotension and bradycardia)
 - (a) If lungs are clear, administer fluid bolus of 20 mL/kg of LR IV. Titrate to a systolic blood pressure of 110 mmHg (or mean arterial pressure of 85 mmHg). Maximum patient dose of 2,000 mL of LR.
 - (b) Initiate epinephrine infusion if systolic blood pressure remains less than 110 mmHg (or mean arterial pressure less than 85 mmHg).




- d) The pediatric patient may present hemodynamically unstable or with hypoperfusion evidenced by hypotension and signs such as altered mental status, delayed capillary refill greater than 2 seconds, pallor, and/or peripheral cyanosis. Hypotension is defined as a systolic blood pressure less than 60 in neonates (patients birth to 28 days of age), less than 70 in infants (patients less than 1 year of age), less than $[70 \times (2 \times \text{years}) = \text{systolic BP}]$ for patients greater than 1 year of age.
- e) Continue General Patient Care.




- f) Establish IV/IO access with LR.
If age-related vital signs and patient's condition indicate hypoperfusion, administer initial fluid bolus of 20 mL/kg LR IV/IO. If patient's condition does not improve, administer the second bolus of fluid at 20 mL/kg LR IV/IO.
OR
For volume-sensitive children administer initial fluid bolus of 10 mL/kg LR IV/IO. If patient's condition does not improve, administer the second bolus of fluid at 10 mL/kg LR IV/IO.
Volume-sensitive children include: neonates (birth to 28 days), children with congenital heart disease, chronic lung disease, or chronic renal failure.
- g) Third and subsequent fluid boluses at 20 mL/kg IV/IO.

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h) Pediatric epinephrine infusion dosage

- (1)  The following dosing chart should be used for pediatric patients less than 50 kg (using approved epinephrine infusion and 60 drop set):

Weight range (kg)	Initial epinephrine dose	If goal blood pressure not achieved at 5 min, increase to
LESS than 10 kg	6 drops/min (0.1 mL/min)	12 drops/min (0.2 mL/min)
10-19 kg	12 drops/min (0.2 mL/min)	24 drops/min (0.4 mL/min)
20-29 kg	18 drops/min (0.3 mL/min)	36 drops/min (0.6 mL/min)
30-39 kg	24 drops/min (0.4 mL/min)	48 drops/min (0.8 mL/min)
40-49 kg	30 drops/min (0.5 mL/min)	60 drops/min (1.0 mL/min)

- (2) Blood pressure goal:
- (a) For patients 10 years and older (including adults), systolic blood pressure greater than 90 mmHg;
 - (b) For patients under 10 years of age, systolic blood pressure greater than $70 + 2 \times \text{age in years}$ mmHg; OR
 - (c) Systolic blood pressure ordered by the pediatric base station.
- (3)  If above blood pressure goal not met after 10 minutes, obtain online medical consultation.