SECTION: Adult General Medical Emergencies

PROTOCOL TITLE: Medical – Hypotension/Shock (Non-trauma)

REVISED: 06/2017

Protocol 3-13

SHOCK

OVERVIEW:
Shock is defined as a state of inadequate tissue perfusion. This may result in acidosis, derangements of cellular metabolism, potential end-organ damage, and death. Early in the shock process, patients are able to compensate for decreased perfusion by increased stimulation of the sympathetic nervous system, leading to tachycardia and tachypnea. Later, compensatory mechanisms fail, causing a decreased mental status, hypotension, and death. Early cellular injury may be reversible if definitive therapy is delivered promptly.

HPI	Signs and Symptoms	Considerations

• Blood loss (vaginal or gastrointestinal)
• AAA, ectopic
• Fluid loss (vomiting, diarrhea)
• Fever
• Infection
• Cardiac ischemia (MI, HF)
• Medications
• Allergic Reaction
• Pregnancy
	• Restlessness, confusion
	• Weakness, dizziness
	• Weak, rapid pulse
	• Pale, cool, clammy skin
	• Delayed capillary refill
	• Hypotension
	• Coffee-ground emesis
	• Tarry stools
		• Shock
		  ○ Hypovolemic
		  ○ Cardiogenic
		  ○ Septic
		  ○ Neurogenic
		  ○ Anaphylactic
		• Ectopic pregnancy
		• Dysrhythmia
		• Pulmonary embolus
		• Tension pneumothorax
		• Medication effect, overdose
		• Vaso-vagal
		• Physiologic (pregnancy)

	EMR	EMT	A	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Assess for signs of shock including, but not limited to: • Restlessness, altered mental status, hypoperfusion (cool, pale, moist skin), tachypnea (rapid breathing), rapid, weak pulse, orthostatic hypotension (blood pressure suddenly drops on standing up), nausea and thirst.	•	•	•	•	•
4. Administer oxygen per patient assessment to maintain *SpO_2* between 94 - 99%. Support respirations as necessary with a BVM.	•	•	•	•	•
5. Transport as soon as possible.		•	•	•	•
6. Control external bleeding with direct pressure, then *tourniquet* if direct pressure is inadequate.	•	•	•	•	•

Protocol 3-13 Continued

SHOCK

	EMR	EMT	A	I	P
7. If pregnant (uterine fundus above umbilicus), place the patient on her left side.	•	•	•	•	•
8. Maintain body temperature by protecting the patient from the environment, removing wet clothing and covering the patient with a blanket.	•	•	•	•	•
9. Establish a large bore IV or IO of Normal Saline. If time permits, establish second access. • Do not delay transport to establish vascular access.			•	•	•
10. Give a 20 mL / kg bolus. If no improvement after the first 20 mL / kg bolus, may repeat once. While administering a fluid bolus, frequently reassess perfusion for improvement. If perfusion improves, slow the IV to KVO and monitor closely. If patient develops fluid overload respiratory distress (dyspnea, crackles, rhonchi, decreasing SpO_2), slow the IV to KVO.			•	•	•
11. If patient tachycardic and/or hypotensive after IV fluid bolus, consider a. Administration of Norepinephrine Infusion 0.1-0.5 mcg / kg / minute for hypotension. Titrate to MAP > 65 mmHg. b. If Norepinephrine unavailable, consider Dopamine 5 - 20 mcg / kg / min for hypotension that remains after fluid bolus. Titrate to MAP > 65 mmHg. ****DO NOT USE PRESSORS ON HYPOVOLEMIC PATIENTS!****				•	•
12. Transport and perform ongoing assessment as indicated.		•	•	•	•

PEARLS:

1. Trendelenburg is no longer believed to increase BP and / or cardiac output in most patients, does not improve tissue oxygenation, results in displacement of only a very small amount of total blood volume, and actually decreases cardiac output in the hypotensive patient. It has also been proven to produce right ventricular stress and deterioration of pulmonary function.
2. GI bleeding may be a less obvious cause of hypovolemic shock if it has been gradual. Ask patient about possible melena, hematemesis, and hematochezia.
3. Ectopic pregnancy may be a less obvious cause of hypovolemic shock. Consider this diagnosis in all women of child bearing age if there is a complaint of abdominal, back or pelvic pain.

4. Abdominal aneurysm may be a less obvious cause of hypovolemic shock. Consider this diagnosis in patient's whose age is ≥ 50, and who have a cardiac / hypertensive history if there is a complaint of abdominal or back pain.

Norepinephrine (Levophed™) Dose/Drip Chart

(using 10 drop set)

Based on 4mg NE/250mL NS and **ADULT DOSING RANGE** starting at 0.1-0.5 mcg/kg/minute. Then, titrate to desired response.

Weight Range	mcg/min range			mL/min range			drops/min range		
	min	-	max	min	-	max	min	-	max
45 - 50 kg	4.50	-	25.00 →	0.28	-	1.56 →	3	-	16
51 - 55 kg	5.10	-	27.50 →	0.32	-	1.72 →	3	-	17
56 - 60 kg	5.60	-	30.00 →	0.35	-	1.88 →	4	-	19
61 - 65 kg	6.10	-	32.50 →	0.38	-	2.03 →	4	-	20
66 - 70 kg	6.60	-	35.00 →	0.41	-	2.19 →	4	-	22
71 - 75 kg	7.10	-	37.50 →	0.44	-	2.34 →	4	-	23
76 - 80 kg	7.60	-	40.00 →	0.48	-	2.50 →	5	-	25
81 - 85 kg	8.10	-	42.50 →	0.51	-	2.66 →	5	-	27
86 - 90 kg	8.60	-	45.00 →	0.54	-	2.81 →	5	-	28
91 - 95 kg	9.10	-	47.50 →	0.57	-	2.97 →	6	-	30
96 - 100 kg	9.60	-	50.00 →	0.60	-	3.13 →	6	-	31
101 - 105 kg	10.10	-	52.50 →	0.63	-	3.28 →	6	-	33
106 - 110 kg	10.60	-	55.00 →	0.66	-	3.44 →	7	-	34
111 - 115 kg	11.10	-	57.50 →	0.69	-	3.59 →	7	-	36
116 - 120 kg	11.60	-	60.00 →	0.73	-	3.75 →	7	-	38
121 - 125 kg	12.10	-	62.50 →	0.76	-	3.91 →	8	-	39
126 - 130 kg	12.60	-	65.00 →	0.79	-	4.06 →	8	-	41

PEDIATRIC DOSE RANGE: 0.05-0.1 mcg/kg/minute. Titrate to desired effect.
Maximum dose: 2mcg/kg/minute

Classes of Shock			
Hypovolemic	**Distributive**	**Cardiogenic**	**Obstructive**
Caused by hemorrhage, burns, or dehydration.	Maldistribution of blood, caused by poor vasomotor tone in neurogenic shock, sepsis, anaphylaxis, severe hypoxia, or metabolic shock.	Caused by necrosis of the myocardial tissue, or by arrhythmias.	Caused by impairment of cardiac filling, found in pulmonary embolism, tension pneumothorax, or cardiac Tamponade.

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