

## Approach to Shock

1. Airway, breathing, circulation – establish airway, IV access, send some labs, start with an IVF bolus
2. Perform targeted history, physical, bedside US
3. Perform life-saving intervention if needed
4. Support hemodynamics with continued IVF and/or vasopressors

## Classification of Shock

### Cardiogenic

#### Cardiomyopathy

- MI
- CHF exacerbation
- Cardiomyopathy of sepsis
- Myocarditis
- Drugs (BB)

#### Arrhythmogenic

- Atrial and ventricular tachyarrhythmias
- Bradyarrhythmias – heart block

#### Mechanical

- Valvular insufficiency (severe)
- Valve/chordae rupture
- Septal wall defect
- Atrial myxoma
- Free wall rupture

### Obstructive

#### Pulmonary Vascular

- PE with RV strain
- Severe PAH
- Pulmonic or tricuspid valve obstruction
- Air embolism

#### Mechanical

- Tension pneumothorax
- Hemothorax
- Tamponade
- Constrictive pericarditis
- Restrictive cardiomyopathy
- Intrinsic PEEP
- Abdominal compartment syndrome

### Distributive – Septic vs non-septic

#### Non-septic

- Inflammatory – burns, pancreatitis, post-bypass, post-arrest, amniotic and fat embolism
- Neurogenic – brain injury, spinal cord injury, neuro-axial anesthesia
- Anaphylactic – allergic reaction (food, meds, insect bite), exercise or heat induced
- Other – adrenal insufficiency, thyrotoxicosis, myxedema coma, heavy metal poisoning, toxic shock syndrome

### Hypovolemic – hemorrhagic vs non-hemorrhagic

#### Non-hemorrhagic

- GI losses – vomiting, diarrhea
- Skin losses – heat stroke, burns
- Renal losses – diuretics, salt-wasting nephropathy, hypoaldosteronism
- Third space losses – postop, intestinal obstruction, pancreatitis, cirrhosis

Shock Type	Cardiac output	PCWP
Hypovolemic	↓	↓
Cardiogenic	↓	↑
Obstructive	↓	Normal or ↑
Distributive	↑	↓ or normal

## Fluids and Pressors

- A good fluid bolus is about 30 cc/kg – then check for response (exam and hemodynamic changes)
- First line pressor = norepinephrine (alpha 1>beta 1)
- Second line: Epinephrine (beta 1>beta 2>alpha 1)- God's own catecholamine!
- Add to NE: Vasopressin (AVP analog; may upregulate beta 1 receptors)
- Phenylephrine AKA water (alpha 1)- use when tachyarrhythmias are a problem
- Dopamine (dose dependent effects: 5 mg = dopa, 10 mg = beta 1, 15 mg = alpha 1)
- Dobutamine (beta 2 then beta 1)- probably will need NE underneath to offset fall in peripheral vascular resistance