CIRCULATION / SHOCK PROTOCOLS

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<thead>
<tr>
<th>TYPES OF SHOCK</th>
<th>SIGNS AND SYMPTOMS</th>
</tr>
</thead>
</table>
| ANAPHYLACTIC SHOCK   | - Warm Burning Feeling  
                          - Itching  
                          - Rhinorrhea  
                          - Hoarseness / Stridor  
                          - Wheezing  
                          - Shock  
                          - Severe Respiratory Distress  
                          - Altered LOC / Coma  
                          - Cyanosis  
                          - Pulmonary Edema  
                          - Facial / Airway Edema  
                          - Urticaria / Hives  
                          - Dyspnea |
| CARDIOGENIC SHOCK    | - Cool, Clammy Skin – Mottled  
                          - Altered Mental Status  
                          - Anxiety / Restlessness  
                          - Weakness  
                          - Difficulty Breathing  
                          - Hypotension  
                          - JVD  
                          - Decreased Urine Output |
| HYPOVOLEMIC SHOCK    | - Tachycardia  
                          - Weak, Thready Pulse  
                          - Hypotension with Narrow Pulse Pressure  
                          - Hypotension or Falling Systolic B/P  
                          - Pale Skin  
                          - Clammy or Dry Skin  
                          - Dyspnea  
                          - Altered LOC / Coma  
                          - Decreased Urine Output  
                          - Restlessness  
                          - Irritability |
| NEUROGENIC SHOCK     | - Evidence of Trauma (lacerations, bruising, swelling, deformity)  
                          - Normal or Bradycardic HR  
                          - Hypotension with a Narrow Pulse Pressure  
                          - Compromise in Neurological Function  
                          - Normal or Flush Skin Color  
                          - Warm, Dry Extremities  
                          - Peripheral Vasodilation |
| SEPTIC SHOCK         | - Tachycardia  
                          - Hypovolemia  
                          - Hypotension with a Narrow Pulse Pressure  
                          - Dehydration  
                          - Altered LOC / Coma  
                          - Dyspnea  
                          - Febrile  
                          - Signs of Infection  
                          - Hx of Infection (UTI, Pneumonia, etc.)  
                          - |
## CIRCULATION / SHOCK

### SHOCK / KEY POINTS

<table>
<thead>
<tr>
<th>HISTORY</th>
<th>SIGNS AND SYMPTOMS</th>
<th>DIFFERENTIAL DIAGNOSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Blood loss - vaginal or gastrointestinal bleeding, AAA, Trauma</td>
<td>- Restlessness, confusion</td>
<td>- Shock</td>
</tr>
<tr>
<td>- Fluid loss - vomiting, diarrhea, fever</td>
<td>- Weakness, dizziness</td>
<td>- Hypovolemic</td>
</tr>
<tr>
<td>- Infection</td>
<td>- Weak, rapid pulse</td>
<td>- Cardiogenic</td>
</tr>
<tr>
<td>- Cardiac ischemia (MI, CHF)</td>
<td>- Pale, cool, clammy skin</td>
<td>- Septic</td>
</tr>
<tr>
<td>- Medications</td>
<td>- Delayed capillary refill</td>
<td>- Neurogenic</td>
</tr>
<tr>
<td>- Allergic reaction</td>
<td>- Hypotension</td>
<td>- Anaphylactic</td>
</tr>
<tr>
<td>- Pregnancy</td>
<td>- Coffee-ground emesis</td>
<td>- Ectopic pregnancy /AAA</td>
</tr>
<tr>
<td></td>
<td>- Tarry stools</td>
<td>- Dysrhythm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Pulmonary embolus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Tension pneumothorax</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Medication effect /overdose</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Vasovagal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Physiologic (pregnancy)</td>
</tr>
</tbody>
</table>

### KEY POINTS

- Exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro
- Hypotension can be defined as a systolic blood pressure of less than 90.
- Consider performing orthostatic vital signs on patients in nontrauma situations if suspected blood or fluid loss.
- Consider all possible causes of shock and treat per appropriate protocol.

**Anaphylactic Shock**
- Sudden, severe allergic reaction characterized by sharp drop in B/P, urticaria and breathing difficulty caused by exposure to a foreign substance.
- Routine assessment and supportive care of the patient’s respiratory and cardiovascular systems is required.
- DO NOT confuse epinephrine 1:10,000 IV/IO with 1:1,000 IM ONLY.
- Treat patients with a history of anaphylaxis aggressively.
- If bee sting, remove stinger (scrape, don’t squeeze it).

**Cardiogenic Shock**
- Circulatory failure is due to inadequate cardiac function.
- Be aware of patients with congenital defects.
- Cardiogenic shock exists in the prehospital setting when an MI is suspected and there is no specific indication of volume related shock.
- Pulmonary Edema, CHF, AMI, PE may cause cardiogenic shock.
- Marked, symptomatic tachycardia and bradycardia can also cause cardiogenic shock.

**Hypovolemic Shock**
- Shock caused by decreased blood volume.
- Patients suffering from hemorrhagic shock secondary to trauma, should be treated under the Trauma Criteria and should be rapidly transported to the nearest appropriate facility.
- Initiate a second large bore IV for all patients in hypovolemic shock.

**Neurogenic Shock**
- Caused by sudden loss of the sympathetic nervous system signals to smooth muscle in vessel walls leading to a decrease in peripheral vascular resistance and decreased B/P.
- To be considered in spinal cord and head trauma.
- Cushing’s Reflex is a sign of increased ICP. Cushing’s Reflex is a hypertension, bradycardia, and irregular respirations.

**Septic Shock**
- Be alert for septic shock in the elderly.
- Caused by overwhelming infection.
**CIRCULATION / SHOCK**

**ANAPHYLACTIC SHOCK**

**UNIVERSAL PATIENT CARE PROTOCOL**

Apply Cardiac Monitor and Assess Vitals

**IV/IO PROTOCOL**

- **Mild**
  - Rash, itching, No difficulty breathing or throat tightening,
  - Treatment: Oxygen per cannula
  - Consider Benadryl 50 mg IV or IM

- **Moderate**
  - Rash, Itching, Wheezing, Throat tightening, Swelling (face/lips), B/P – normal limits
  - Treatment: Oxygen per NRB
  - Assist with Epi-pen
  - Consider DuoNeb aerosol

- **Severe**
  - Rash, itching, Airway compromise
  - Wheezing
  - Swelling
  - Hypotension
  - Treatment: Oxygen per NRB
  - Assist with Epi-pen
  - Epinephrine 1:1000 0.3-0.5 mL IM ONLY
  - Benadryl 50 mg IV/IO/IM
  - DuoNeb Aerosol watch airway & breathing – may repeat

**CONTACT MEDICAL CONTROL**

**TRANSPORT**

- **Adult Any Age**
  - Impending Arrest
  - Severe hypotension
  - No response to Epi
  - Decreased level of consciousness
  - Airway compromise
  - Treatment: Epinephrine 1:10,000 Up to 0.5mg SLOW IV/IO

- **NS Bolus 20 mL/kg IV/IO**
  - Administer solumedrol 125 mg slow IV/IO
  - Control airway by whatever means possible
  - Follow ACLS

- **If HTN, CAD, CVA, Pregnant:**
  - Consider Glucagon 1mg IM/IV/IO/IN instead of Epi
  - Epinephrine 1:10,000 Up to 0.5mg SLOW IV/IO for Hypotension

****DO NOT CONFUSE****

Epi 1:10,000 IV/IO vs. 1:1,000 IM ONLY

B EMT B
A Advanced A
P Paramedic P
M MED CONTROL M

UH Protocols Chapter 3 – Circulation / Shock
CIRCULATION / SHOCK

UNIVERSAL PATIENT CARE PROTOCOL

Airway Protocol – Use NRB 100% O₂
Monitor Lung Sounds for Fluid Overload

Apply Cardiac Monitor and Assess Vitals

IV/IO PROTOCOL - TKO

Pale, cool, clammy, hypotensive
Acute MI in progress
Suspicion of Pulmonary Edema, CHF, PE

Dopamine 5 mcg/kg/min IV/IO
Titrate for increase B/P >90 systolic or to Maintain MAP >70 (if NIBP is available)
MAX 20 mcg/kg/min

Monitor and Reassess B/P

CONTACT MEDICAL CONTROL

TRANSPORT

***NOTE***
2x Diastolic + systolic
Divided by 3 = MAP

Dopamine Simple calculation for approx 5 mcg/kg/min (must be 1600 mcg/ml concentration)
*Take the Patients weight in lbs and remove the last digit (175lbs = 17)
* Subtract 2 from that figure (17-2=15)
*This gives you the number of drops per min using a 60gtts set. (titrate to desired effect)
Example: 175lbs patient. 175 remove the 5 is 17
17 – 2 = 15 drops per min (approx 5 mcg/kg/min)
CIRCULATION / SHOCK
NON-TRAUMATIC HYPOVOLEMIC AND NEUROGENIC

UNIVERSAL PATIENT CARE PROTOCOL

Airway Protocol
Monitor Lung Sounds for Fluid Overload

Apply Cardiac Monitor and Assess Vitals
Apply Oxygen via NRB or use ResQGard

IV/IO PROTOCOL

Non-traumatic Hypovolemic Shock
If hypotensive and breathing adequately
Apply the ResQGard
NORMAL SALINE BOLUS
20 mL/kg IV/IO
(To Maintain B/P > 90 Systolic or MAP >70 (if NIBP is available)

Check Glucose Level
Monitor and Reassess B/P
Treatment per Trauma Protocol if Appropriate

***NOTE***
2x Diastolic + systolic
Divided by 3 = MAP

CONTACT MEDICAL CONTROL

Neurogenic Shock
Consider Spinal Immobilization procedure if
NORMAL SALINE BOLUS
20 mL/kg IV/IO
(To Maintain B/P > 90 Systolic or MAP >70 (if NIBP is available)

If hypotensive and breathing adequately
Apply the ResQGard
Check Glucose Level
B/P < 100 Systolic

NORMAL SALINE BOLUS
20 mL/kg IV/IO
(To Maintain B/P > 90 Systolic or MAP >70 (if NIBP is available)

Monitor and Reassess B/P

CONTACT MEDICAL CONTROL

TRANSPORT

UH Protocols Chapter 3 – Circulation / Shock
UNIVERSAL PATIENT CARE PROTOCOL

Airway Protocol
Monitor Lung Sounds for Fluid Overload

Apply Cardiac Monitor and Assess Vitals
Apply Oxygen via NRB or use ResQGard if Hypotensive

IV/IO PROTOCOL

Identify if the patient has SIRS (**)

If Yes:
Does Patient have a prior history of any of the following: Pneumonia, Urinary Tract Infection, Cellulitis, Septic Arthritis, Diarrhea, ABD pain, Wound Infection, Decubitus ulcer, Meningitis, Indwelling Device, Fever

If Yes, Patient has Sepsis
DOES THE PATIENT HAVE SEVERE SEPSIS?

If Yes - Patient has Severe Sepsis
Begin Resuscitation

APPLY ResQGard for hypotension
if not already done

IV/IO FLUID RESUSCITATION
AT LEAST 20cc/kg

Still Hypotensive ?? Dopamine 5 mcg/kg/min IV/IO
Titrate to maintain SBP >90 or to a MAP >70 (if NIBP is available)
MAX 20 mcg/kg/min

CONTACT MEDICAL CONTROL
Advise that you have a patient with severe sepsis

***NOTE***
2x Diastolic + systolic Divided by 3 = MAP

**SIRS – Systemic Inflammatory Response System**
Patient has 2 or more of the following:
- Temp >38 C (100.4) F or <36 C (96.8 F)
- Heart Rate >90
- Respiratory Rate >20 BPM or PaCO₂ <32mmHg

Are any of the following present and new to the patient?
- BP <90
- Oxygen Sat < 90
- No urine output in the last 8 hours
- Prolong Bleeding from the gums
- Lactate levels ≥4

No Organ Dysfunction
Sepsis is likely, but severe sepsis is unlikely
Continue Current Treatment

CONTACT MEDICAL CONTROL

TRANSPORT

UH Protocols Chapter 3 – Circulation / Shock
### MEDICATIONS

**DOPAMINE (Intropine)**

#### ACTIONS
- Alpha and beta adrenergic receptor stimulator
- Dopaminergic receptor stimulator
- Dilates renal and mesenteric blood vessels
- Vasoconstriction
- Arterial resistance
- Increases cardiac output
- Increases preload

#### INDICATIONS
- Cardiogenic shock
- Distributive Shock
- Cyanide poisoning (contact Medical Control)

#### CONTRAINDICATIONS
- Known hypersensitivity /Allergy
- Hypovolemic hypotension
- VF or VT

#### PRECAUTIONS
- Do not mix with bicarbonate, dopamine may be inactivated by alkaline solutions
- Extravasation may cause tissue necrosis

#### SIDE EFFECTS
- Ectopic beats, palpitations
- Tachycardia, angina
- Nausea/vomiting
- VF or VT
- Dyspnea
- Headache

#### ADULT DOSAGE
2 -20 mcg/kg/min IV drip. Start 5 micrograms/kg/minute IV/IO infusion, titrate to effect

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**Simple calculation for approx 5 mcg/kg/min (must be 1600 mcg/ml concentration)**

*Take the Patients weight in lbs and remove the last digit (175lbs = 17)*

* Subtract 2 from that figure (17-2=15)*

*This gives you the number of drops per min using a 60gtts set. (titrate to desired effect)*

Example: 175lbs patient.
- 175 remove the 5 is 17
- 17 – 2 = **15 drops per min** (approx 5 mcg/kg/min)
### MEDICATIONS

**DuoNeb**

| ACTIONS | (Albuterol)  
|         | Parasympatholytic bronchodilator  
|         | Dries respiratory tract secretions  
|         | (Ipratropium – Atrovent)  
|         | B₂ selective bronchodilator  
|         | Increases HR  |
| INDICATIONS | Asthma exacerbation  
|            | COPD exacerbation  
|            | Patients that have used their prescribed inhaler more than once  
|            | Pulmonary edema with wheezing  |
| CONTRAINDICATIONS | Known hypersensitivity /Allergy  
|                    | Allergy to peanuts  
|                    | Acute myocardial infarction  
|                    | Arrhythmias  |
| PRECAUTIONS | Cardiovascular disease  
|             | Hypertension history  
|             | CHF  |
| SIDE EFFECTS | Palpitations  
|             | Anxiety  
|             | Nausea  
|             | Dissiness  |
| ADULT/PEDS DOSAGE | Unit dose inhaled via nebulizer. May repeat as needed  |
**MEDICATIONS**

**EPINEPHRINE (Adrenaline)**

### ACTIONS
- Alpha and Beta adrenergic agonist
- Bronchodilation
- Increases heart rate and automaticity
- Increases cardiac contractility
- Increases myocardial electrical activity
- Increases systemic vascular resistance
- Increases blood pressure

### INDICATIONS
- Cardiac arrest
- Allergic reaction/Anaphylaxis
- Respiratory distress
- Acute Asthma
- Pediatric Bradycardia

### CONTRAINDICATIONS
- Hypersensitivity, Tachycardia, Hypertension, Hypothyroidism
- Angina / Chest pain, Coronary artery disease

### PRECAUTIONS
- Pregnancy
- Blood pressure, pulse, and EKG must be routinely monitored

### SIDE EFFECTS
- Palpitations, ectopic beats, tachycardia
- Anxiety / Tremors
- Hypertension
- VF / VT
- Angina

### ADULT DOSAGE

<table>
<thead>
<tr>
<th>Condition</th>
<th>Dosage Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asthma and Anaphylaxis</strong></td>
<td>Mild / Moderate Reaction (1-1,000) 0.3-0.5mg IM ONLY Consider 1:1000 2mg mixed with 1ml NS in nebulizer for Asthma</td>
</tr>
<tr>
<td><strong>Severe Anaphylaxis</strong></td>
<td>(1:10,000) 0.5 mg slow IV/IO over 5 minutes - EMT-P Only</td>
</tr>
<tr>
<td><strong>Cardiac Arrest</strong></td>
<td>1:10,000 1 mg IV/IO every 3-5 minutes – EMT-P Only</td>
</tr>
</tbody>
</table>

### PEDIATRIC DOSAGE

<table>
<thead>
<tr>
<th>Condition</th>
<th>Dosage Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asthma and Anaphylaxis</strong></td>
<td>Mild Reaction Ages 10-16 yrs (1:1,000) 0.03 mg/kg IM Under 10 yrs (1:1,000) 0.01mg/kg IM May use 1:1000 2mg mixed with 1ml NS in nebulizer aerosolized</td>
</tr>
<tr>
<td><strong>Severe Anaphylaxis Pending Arrest</strong></td>
<td>Ages 10-16 yrs (1:10,000) 0.01mg/kg IV/IO over 5 minutes – EMT-P Only</td>
</tr>
<tr>
<td><strong>Cardiac Arrest</strong></td>
<td>1:10,000 0.01 mg/kg IV/IO push 0.1ml/kg – EMT-P Only or 0.1 mg/kg 1:1000 ETT 0.1ml/kg – EMT-P Only</td>
</tr>
</tbody>
</table>
# MEDICATIONS

## GLUCAGON

<table>
<thead>
<tr>
<th>ACTIONS</th>
<th>Accelerates the breakdown of glycogen to glucose in the liver, causing an increase in blood glucose level. Relaxes smooth muscle of GI tract.</th>
</tr>
</thead>
<tbody>
<tr>
<td>INDICATIONS</td>
<td>Hypoglycemia when IV/IO is not able to be established and oral glucose is contraindicated. Esophageal obstruction, Beta Blocker overdose.</td>
</tr>
<tr>
<td>CONTRAINDICATIONS</td>
<td>Known hypersensitivity, Pheochromocytoma.</td>
</tr>
<tr>
<td>PRECAUTIONS</td>
<td>Glucagon is only effective in patients with sufficient stores of glycogen. Use caution in patients with renal or cardiovascular disease. Glucagon can be administered on scene, but do not wait for it to take effect.</td>
</tr>
<tr>
<td>SIDE EFFECTS</td>
<td>Nausea/Vomiting</td>
</tr>
<tr>
<td>ADULT DOSAGE</td>
<td>1mg IM/IN for Hypoglycemia. 2mg IV/IO/IM/IN in esophageal foreign body obstruction. 2 mg IV/IO/IM/IN for hypotension / bradycardia in Betablocker overdose and Calcium Channel overdose.</td>
</tr>
<tr>
<td>PEDIATRIC DOSAGE</td>
<td>&lt;20kg give 0.5mg IM / IN. &gt;20kg give 1mg IM / IN.</td>
</tr>
<tr>
<td>KEY POINTS</td>
<td>Response is usually noticed in 5-20 minutes. Glucagon is NOT a substitute for D25, or D12.5. IV must be attempted prior to administering Glucagon.</td>
</tr>
<tr>
<td><strong>ACTIONS</strong></td>
<td>Anti-inflammatory steroid</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td><strong>INDICATIONS</strong></td>
<td>Anaphylaxis</td>
</tr>
<tr>
<td></td>
<td>Asthma</td>
</tr>
<tr>
<td></td>
<td>COPD</td>
</tr>
<tr>
<td><strong>CONTRAINDICATIONS</strong></td>
<td>NONE in emergency setting</td>
</tr>
<tr>
<td><strong>SIDE EFFECTS</strong></td>
<td>GI bleeding</td>
</tr>
<tr>
<td></td>
<td>Prolonged wound healing</td>
</tr>
<tr>
<td></td>
<td>Suppression of natural steroids</td>
</tr>
<tr>
<td><strong>ADULT DOSAGE</strong></td>
<td>125 mg IV/IO</td>
</tr>
<tr>
<td><strong>PEDIATRIC DOSAGE</strong></td>
<td>1-2 mg/kg IV/IO</td>
</tr>
<tr>
<td><strong>KEY POINTS</strong></td>
<td></td>
</tr>
</tbody>
</table>
### MEDICATIONS

**DIPHENHYDRAMINE HCL (Benadryl)**

#### ACTIONS
- Antihistamine
- Sedative
- Inhibits motion sickness (antiemetic)

#### INDICATIONS
- Anaphylactic shock and severe allergic reaction
- Acute dystonia
- Nausea/vomiting (contact Medical Control)
- Extrapyramidal reaction (Parkinson-like movement disorders)

#### CONTRAINDICATIONS
- Known hypersensitivity / Allergy
- Pregnancy or lactating

#### PRECAUTIONS
- Avoid the use of Diphenhydramine in nursing mothers
- May induce vomiting
- Carefully monitor patient while awaiting for medication to take effect (effect of medication begins 15 minutes after administration)

#### SIDE EFFECTS
- Drowsiness, confusion
- Blurring of vision
- Dry mouth
- Wheezing; thickening of bronchial secretions
- Hypotension

#### ADULT DOSAGE
- **Allergic Reaction or Anaphylaxis**
  - 25-50 mg IV/IO/IM
- **Behavioral Psychiatric Emergencies**
  - 50 mg IM

#### PEDIATRIC DOSAGE
- **Allergic Reaction or Anaphylaxis**
  - 1 mg/kg (without hypotension) IV/IO/IM Max 50mg