

5 Things You Need to Know about



SHOCK



Presented by

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*Adapted from JB Learning
Emergency Care of the Sick and Injured 11th Edition*

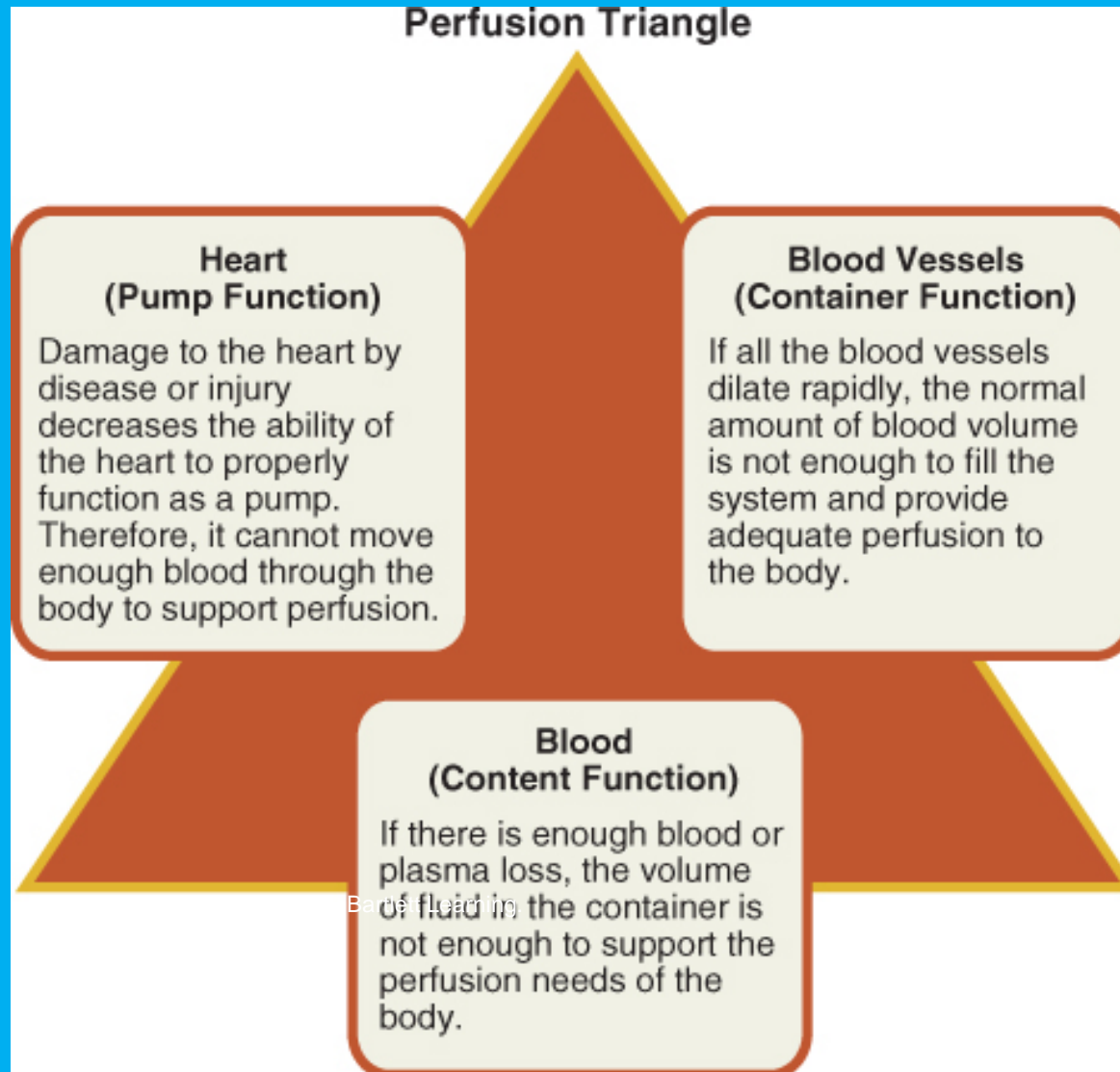
#1 BLOOD PRESSURE IS NOT THE REAL PROBLEM

- Shock (of any kind) is defined as ***“INADEQUATE TISSUE PERFUSION”***
- Hypotension is a contributing factor, but the real problem is on the cellular level
- Cells deprived of oxygen either die or do not function normally
- Simply raising blood pressure does not solve the problem

Pathophysiology

- Adequate perfusion is required to provide cells with oxygen and nutrients and remove waste products
- In cases of poor perfusion, transportation of carbon dioxide out of tissues is impaired.
- Wastes build up altering normal body functions

Pathophysiology



Pathophysiology

- The three basic causes of shock are problems with the:
 - Pump
 - Fluid
 - Pipes

Pathophysiology

- Blood pressure is the pressure of blood within the vessels at any moment in time.
 - Systolic: peak arterial pressure
 - Diastolic: pressure in the arteries while the heart rests between heartbeats
- Pulse pressure is the difference between the systolic and diastolic pressures.

Pathophysiology

- Blood flow through the capillary beds is regulated by the capillary sphincters.
 - Under the control of the autonomic nervous system
 - Sphincters respond to other stimuli:
 - Heat
 - Cold
 - The need for oxygen and waste removal

Pathophysiology

- *Perfusion requires more than just having a working cardiovascular system.*
 - *Adequate oxygen exchange in the lungs*
 - *Adequate nutrients in the form of glucose in the blood*
 - *Adequate waste removal, primarily through the lungs*

Table 12-1**Causes of Shock**

Cause	Type of Shock
Pump Failure	Cardiogenic shock Obstructive shock <ul style="list-style-type: none">■ Tension pneumothorax■ Cardiac tamponade■ Pulmonary embolism
Poor Vessel Function	Distributive shock <ul style="list-style-type: none">■ Septic shock■ Neurogenic shock■ Anaphylactic shock■ Psychogenic shock
Low Fluid Volume	Hypovolemic shock <ul style="list-style-type: none">■ Hemorrhagic shock■ Non-hemorrhagic shock

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#2 YOU'D BETTER SEE IT COMING BEFORE IT GETS THERE

- **Blood pressure may be the last measureable factor to change in shock.**
 - When a drop in blood pressure is evident, shock is well developed.
 - Particularly true in infants and children
- **The stages in the progression of shock:**
 - Compensated shock
 - Decompensated shock
 - When shock has progressed too far, it is irreversible.

The Progression of Shock

- The first signs can be subtle
- Change in mental state
- Irritability/agitation
- Changes in pulse and breathing rates
- Skin Color
- Skin moisture
- Pulse oximetry
- ***Serial assessments are necessary to spot early signs of shock***

#3 KNOW THE SETTING

The situation you find the patient in will clue you in to the type of shock and determine your course of treatment and influence your transportation decisions

Cardiogenic Shock

- Signs and symptoms of shock associated with a cardiac event should raise your index of suspicion
- Myocardial Infarction resulting in loss of muscle/pumping capacity
- The continuum of heart failure-CHF/APE
- Cardiogenic shock develops when the heart cannot maintain sufficient output to meet the demands of the body.

Obstructive Shock

- Caused by a mechanical obstruction that prevents an adequate volume of blood from filling the heart chambers.
- Three of the most common examples:
 - Cardiac tamponade
 - Tension pneumothorax
 - Pulmonary embolism

Distributive Shock

- Results from widespread dilation of small arterioles, small venules, or both
- The circulating blood volume pools in the expanded vascular beds.
- Septic shock
- Neurogenic shock
- Anaphylactic shock
- Psychogenic shock

Hypovolemic Shock

Result of an inadequate amount of fluid or volume in the circulatory system

Hemorrhagic Shock

- External/Internal Bleeding
- Blood hides!!

Shock from Dehydration/Fluid Loss

- Risk of clotting
- Pediatric issues

Respiratory Insufficiency

- A patient with a severe chest injury or airway obstruction may be unable to breathe in an adequate amount of oxygen.
- Anemia can lead to tissue hypoxia because there are not enough red blood cells to deliver adequate amounts of oxygen to the cells.

Respiratory Insufficiency

- Certain types of poisoning may affect the ability of cells to metabolize or carry oxygen:
 - Carbon monoxide poisoning
 - Cyanide poisoning

#4 KEEP LOOKING, KEEP ASKING BUT START DOING

- Your history and physical exam skills are key
- You cant get by with one exam or one set of vital signs
- The earlier you treat, the more you delay the progression of shock
- Oxygenation/ventilation
- Fluids? (Maybe....it depends)
- Keep them warm, even when it's hot!

Emergency Medical Care for Shock

- As soon as you recognize shock, begin treatment.
 - Follow standard precautions.
 - Control all obvious external bleeding.
 - Make sure the patient has an open airway.
 - Maintain manual in-line stabilization if necessary, and check breathing and pulse.

Emergency Medical Care for Shock

- As soon as you recognize shock, begin treatment. (cont'd)
 - Comfort, calm, and reassure the patient.
 - Never allow patients to eat or drink anything prior to being evaluated by a physician.
 - Provide oxygen and monitor patient's breathing
 - Spend only the time on scene needed for definitive care-make transport decisions early.

Treating Cardiogenic Shock

- The heart cannot pump blood throughout the circulatory system.
- Chronic lung disease will aggravate cardiogenic shock.
- Patients in cardiogenic shock should not receive nitroglycerin; they are hypotensive.

Treating Obstructive Shock

- *For cardiac tamponade:*
 - Increasing cardiac output is the priority.
 - Apply high-flow oxygen.
 - Pericardiocentesis in ER
- *For tension pneumothorax:*
 - Apply high-flow oxygen to prevent hypoxia.
 - Chest decompression is required.
 - Ask for ALS early in call if available, but do not delay transport.

Treating Septic Shock

- Use standard precautions and transport.
- Administer high-flow oxygen.
- Ventilatory support may be necessary.
- Use blankets to conserve body heat.
- Alert “sepsis team” if available.

Treating Neurogenic Shock

- Emergency treatment:
 - Obtain and maintain a proper airway.
 - Provide spinal motion restriction
 - Assist inadequate breathing.
 - Conserve body heat.
 - Ensure the most effective circulation possible.

Treating Anaphylactic Shock

- Administer epinephrine.
- Promptly transport the patient.
- Provide high-flow oxygen and ventilatory assistance en route.
- A mild reaction may worsen suddenly or over time.
- Consider requesting ALS backup, if available.

Treating Psychogenic Shock

- In uncomplicated cases of fainting, brain circulation is restored as the patient becomes supine.
- Can worsen other types of shock
- If the patient falls, check for injuries.

Treating Psychogenic Shock

- If the patient reports being unable to walk after a fall, suspect another problem.
 - Transport the patient promptly.
 - All patients with loss of consciousness should be transported for evaluation

Treating Hypovolemic Shock

- Control all obvious external bleeding.
- Keep the patient warm.
- Recognize internal bleeding and provide aggressive support.
- Secure and maintain an airway, and provide respiratory support.
- Transport as rapidly as possible.

Treating Respiratory Insufficiency

- Secure and maintain the airway.
- Clear the mouth and throat of obstructions.
- If necessary, provide ventilations with a BVM.
- Administer supplemental oxygen.
- Transport the patient promptly.

#5 IT'S WORSE IF YOU'RE OLD, UNLESS YOU'RE YOUNG

- Geriatric patients may have limited ability to compensate
- They may be on medications which can mask causes of shock OR may mimic shock signs and symptoms
- Shock may exacerbate other underlying medical conditions, and vice versa

- **Pediatric patients compensate well, but crash suddenly**
- **The very young have less volume**
- **The very young have very different baseline vital signs and shock thresholds**
- **Blood pressure is a poor indicator of pediatric shock**
- **Mental state/irritability**

Review

1. The term “shock” is MOST accurately defined as:
 - A. a decreased supply of oxygen to the brain.
 - B. cardiovascular collapse leading to inadequate perfusion.
 - C. decreased circulation of blood within the venous circulation.
 - D. decreased function of the respiratory system leading to hypoxia.

Review

Answer: B

Response: Shock, or hypoperfusion, refers to a state of collapse and failure of the cardiovascular system, or any one of its components (eg, heart, vasculature, blood volume), which leads to inadequate perfusion of the body's cells and tissues.

Review

2. Anaphylactic shock is typically associated with:
- A. urticaria.
 - B. bradycardia.
 - C. localized welts.
 - D. a severe headache.

Review

Answer: A

Rationale: Urticaria (hives) is typically associated with allergic reactions—mild, moderate, and severe. They are caused by the release of histamines from the immune system. In anaphylactic shock, urticaria is also accompanied by cool, clammy skin; tachycardia; severe respiratory distress; and hypotension.

Review

3. Signs of compensated shock include all of the following, EXCEPT:
- A. restlessness or anxiety.
 - B. pale, cool, clammy skin.
 - C. a feeling of impending doom.
 - D. weak or absent peripheral pulses.

Review

Answer: D

Rationale: In compensated shock, the body is able to maintain perfusion to the vital organs of the body via the autonomic nervous system. Signs include pale, cool, clammy skin; restlessness or anxiety; a feeling of impending doom; and tachycardia. When the body's compensatory mechanism fails, the patient's blood pressure falls; weak or absent peripheral pulses indicates this.

Review

4. When treating a trauma patient who is in shock, **LOWEST** priority should be given to:
- A. spinal protection.
 - B. thermal management.
 - C. splinting fractures.
 - D. notifying the hospital.

Review

Answer: C

Rationale: Critical interventions for a trauma patient in shock include spinal precautions, high-flow oxygen (or assisted ventilation), thermal management, rapid transport, and early notification of a trauma center. Splinting fractures should not be performed at the scene if the patient is critically injured; it takes too long and only delays transport.

Review

5. Potential causes of cardiogenic shock include all of the following, EXCEPT:
- A. inadequate heart function.
 - B. disease of muscle tissue.
 - C. severe bacterial infection.
 - D. impaired electrical system.

Review

Answer: C

Rationale: Cardiogenic shock is caused by inadequate function of the heart, or pump failure. Within certain limits, the heart can adapt to these problems. If too much muscular damage occurs, however, as sometimes happens after a heart attack, the heart no longer functions well. Other causes include disease, injury, and an impaired electrical system.

Review

6. A 60-year-old woman presents with a BP of 80/60 mm Hg, a pulse rate of 110 beats/min, mottled skin, and a temperature of 103.9°F. She is MOST likely experiencing:
- A. septic shock.
 - B. neurogenic shock.
 - C. profound heart failure.
 - D. a severe viral infection.

Review

Answer: A

Rationale: In septic shock, bacterial toxins damage the blood vessel walls, causing them to leak and rendering them unable to constrict. Widespread dilation of the vessels, in combination with plasma loss through the injured vessel walls, results in shock. A high fever commonly accompanies a bacterial infection.

Review

7. A patient with neurogenic shock would be LEAST likely to present with:
- A. tachypnea.
 - B. hypotension.
 - C. tachycardia.
 - D. altered mentation.

Review

Answer: C

Rationale: In neurogenic shock, the nerves that control the sympathetic nervous system are compromised. The nervous system is responsible for secreting the hormones epinephrine and norepinephrine, which increase the patient's heart rate, constrict the peripheral vasculature, and shunt blood to the body's vital organs. Without the release of these hormones, the compensatory effects of tachycardia and peripheral vasoconstriction are absent.

Review

8. A 20-year-old man was kicked numerous times in the abdomen during an assault. His abdomen is rigid and tender, his heart rate is 120 beats/min, and his respirations are 30 breaths/min. You should treat this patient for:
- A. a lacerated liver.
 - B. a ruptured spleen.
 - C. respiratory failure.
 - D. hypovolemic shock.

Review

Answer: D

Rationale: The patient may have a liver laceration or ruptured spleen—both of which can cause internal blood loss. However, it is far more important to recognize that the patient is in hypovolemic shock and to treat him accordingly.

Review

9. A 33-year-old woman presents with a generalized rash, facial swelling, and hypotension approximately 10 minutes after being stung by a hornet. Her BP is 70/50 mm Hg and her heart rate is 120 beats/min. In addition to high-flow oxygen, this patient is in MOST immediate need of:
- A. epinephrine.
 - B. rapid transport.
 - C. an antihistamine.
 - D. IV fluids.

Review

Answer: A

Rationale: This patient is in anaphylactic shock—a life-threatening overexaggeration of the immune system that results in bronchoconstriction and hypotension. After ensuring adequate oxygenation and ventilation, the MOST important treatment for the patient is epinephrine, which dilates the bronchioles and constricts the vasculature, thus improving breathing and blood pressure, respectively.

Review

10. All of the following are potential causes of impaired tissue perfusion EXCEPT:
- A. increased number of red blood cells.
 - B. pump failure.
 - C. low fluid volume.
 - D. poor vessel function.

Review

Answer: A

Rationale: An increased number of red blood cells would allow adequate oxygen and nutrients to be delivered to the cells.