DEFINITIONS

- Aerobic metabolism is energy using oxygen into cells.
- Anaerobic metabolism is energy not using oxygen. 18 times less effective than aerobic and produces acids.
- Cardiac Output is amount of output per minute.
- Stroke Volume is the amount ejected in one contraction of heart.
- Perfusion means movement.
- Hypoperfusion is inadequate movement of blood. Also known as SHOCK.
- SHOCK IS DEFINED AS INADEQUATE TISSUE PERFUSION.
- Hypotension means low BP.

FICK PRINCIPLE

- Getting oxygen into lungs, into body, into cells, back to lungs and out. If one is not working we fall apart.

VESSELS

- Arteries are the most muscular and carry blood away from heart.
- Capillaries are the smallest vessels and are where gas exchange takes place.

- Veins returns to heart and have valves to prevent back flow.

BLOOD CELLS

- Red Blood Cells – produced in bone marrow and contain hemoglobin that bonds the oxygen.
- White Blood Cells – fight infection.
- Platelets – produce coagulation when in contact with air
- Plasma is the fluid of blood (55%). Plasma is not a formed element of blood.

CAUSES OF SHOCK

- Pump (heart) failure – MI, CHF, drugs, valve damage leaking.
- Container (blood vessels) failure – vessels relax and dilate, BP drops.
- Volume (blood) failure – loss of plasma.

TYPES OF SHOCK

- Hypovolemic – loss of volume. Diarrhea, heat stroke, vomiting. A sister shock of hypovolemic is hemorrhagic shock in which the fluid is blood specifically.
- Cardiogenic – Failure of the heart to pump. Cannot keep cardiac output up. CHF, MI, damage.
- Septic – Infection that goes systemic throughout the body. Irritates vessels and they swell and leak plasma making BP drop. Example is pneumonia not treated may go septic. Has FEVER.

- Anaphylactic – severe allergic reaction in which vessels leak (hives) to release histamines and the BP goes down as result.
- Neurogenic – spinal cord severed and blood vessels dilate and loose their tone and BP drops.
- Psychogenic – NO SUCH THING. THIS IN NOT A TRUE SHOCK. This is known as syncope. Transient lack of blood to the brain so you faint. Self correcting shock.

BLOOD LOSS TO CONSIDER CRITICAL

- Adults can loose 1000cc before it is considered serious.
- Children can loose 500cc before it is considered serious.
- Infants can loose 250cc before it is considered serious.
- Info: cc and mL mean the same.

QUICK BLOOD PRESSURE CHECK

- Adult only.
- Radial pulse at least 80 systolic.
- Femoral pulse at least 70 systolic.
- Carotid pulse at least 60 systolic.

PULSES

- Core pulses are "central pulses" - carotid, femoral, apical.
- Peripheral pulses are arms and leg pulses.
- Define: Apical is when you listen for the lub-dub of the heart pumping.

THREE PHASES OF SHOCK

- Shock phases are defined by blood pressure.
- Compensated (early) phase BP is above 90 systolic.
- Decompensated (late) phase BP is less than 90 systolic.
- Irreversible phase acid is killing organs because of a lack of tissue perfusion so anaerobic kicks in resulting in acid.

SIGNS AND SYMPTOMS OF SHOCK

- Think of this as a rainbow of signs and symptoms. Up the rainbow is early shock, down the rainbow is late shock and the pot of gold is irreversible.
- Early (compensated) – adrenaline release results in – Restlessness/anxiety, heart rate fast and strong, respirations fast and deep, pupils dilated, sweaty skin.Transition between early and late is that the sweat turns cold and clammy because the body shunts blood from skin, arms and legs.
- Late (decompensated) – adrenaline release slows – heart rate fast but weak, respirations fast but shallow, feeling of doom, delayed capillary refill.

- Irreversible – unresponsive and death or organ failure and die a few days later.

CARE FOR SHOCK

- Lay flat or elevate legs.
- Cover to keep warm.
- Place on high flow oxygen.
- Keep calm.

PASG (Pneumatic Anti - Shock Garment)

- People think that when placing the PASG blood is forced from the legs to vital chest areas. THIS IS NOT TRUE. Only 250cc is pushed from the legs to the chest. When in late shock the sphincter capillaries cut off flow to skin, legs and arms. These muscle sphincters get tired in time and open. By using PASG the pressure when pumped will help keep the blood from entering the legs once the sphincters relax and reopen. They can also help control major bleeding and help stabilize a fractured pelvis cavity.
- As an EMT you should inflate both legs then consider the need for the abdominal compartment. SEPTIC is include/exclude the abdominal section; Systolic over 100mmHg, abdominal Evisceration, Pregnant (2/3 trimester),Thumper used for CPR, Impaled object in chest/abdomen, Chest trauma not intubated.
- A rise in temperature will increase pressure within the device. A decrease in temperature will decrease pressure of PASG.

- Fall in atmospheric pressure will result in increase pressure of PASG. A rise in atmospheric pressure will result in a decrease in pressure of PASG.