EMT Lesson Plan: Hemostasis & Shock

I. Hemostasis The Circulatory System

A. Structure:
- Aorta, arteries, arterioles, capillaries, venules, veins, venae cavae
- Circulation through heart & lungs (review consequences of left heart failure & right heart failure)
- Blood
  * RBC's: O₂ transport by hemoglobin
  * WBC's: Immunologic protection
  * Plasma: H₂O, immunologic (fibrinogen), food
    - Protein (structure, albumin)
    - Food (lipoproteins, blood glucose
    - Platelets (clotting)
    - CO₂ / HCO₃⁻ buffer / CO₂ transport system

- Exchange in lungs & at cells (diffusion + active transport)
  (blood / brain barrier)
  - Normal adult volume: 6 liters; loss of 1 L is serious

B. Function
- Muscular arterial walls
- Valves in veins (muscular action: pumping)
- Lymph circulation ("")
  - CO = HR x SV
    - 72 x 72 = 5.1 L/min.
  - Capacitance veins; sympathetic & hormonal control of size
II. BLEEDING & HEMOSTASIS

A. BLEEDING

- ARTERIAL: BRIGHT RED SPORTS
- VENOUS: STEADY FLOW (NOTE: VENOUS BLOOD IS DARK, BUT BECOMES BRIGHT RED ON EXPOSURE TO AIR)
- CAPILLARY: Ooze

- INTERNAL: MUST BE INFERRED FROM SIGNS & SYMPTOMS

SHOCK
RIGID ("STIFF") ABDOMEN
SWELLING (THIGH, ABDOMEN, ETC.)
SIGNS OF HEMOTHORAX (DULLNESS, ETC.)
CIRCUMSTANCES (E.G. BLOW TO LUNG/SPLEEN)
BLOOD FROM AN ORIFICE (VOMITING, ETC.)

B. NORMAL RESPONSE TO INJURY

- VESSEL ENDS RETRACT (UNLESS RAGGEDLY TORN)
- CLOTTING:

\[
\text{PROTHROMBIN} \rightarrow \text{THROMBOPLASTIN} \rightarrow \text{Ca}^{++} \downarrow \text{FIBRINOGEN} \downarrow \text{THROMBIN} \rightarrow \downarrow \text{FIBRIN}
\]

- INFLAMMATION
- REPAIR

C. HEMOSTASIS

- USE DIRECT PRESSURE FIRST (WORKS ALMOST ALL CASES)
- TRY ELEVATION IF WON'T AGGRAVATE INJURIES
- TRY PRESSURE POINT ON SUPPLYING ARTERY
- USE TURNOUCET

- PEST
- CONTINUE WITH PRESSURE, ELEVATION, ETC.

- OTHER AIDS TO HEMOSTASIS

* SPLINTING
* AIR SPLINTS
* MAST
* PRESSURE DRESSING
- SPECIAL CASES
  * Scalp
    1. Pressure on edges
    2. Reflection of Tympanic Membrane
    3. Pressure on temporal or carotid
  * Epistaxis
    1. Avoid aspiration & swallowing by position
    2. Don't stop bleeding if skull fracture suspected (same with ear bleeding) "why?"

- Pressure Relieve
  - Infusion
  - Pinch nostrils
  4. Gauze roll under upper lip/press
  5. Ice
  6. Packing

- Tourniquets
  * Use BP cuff or wide bandage w/pad over artery
  * Tighten just enough to occlude arterial flow ("what happens if slightly below this pressure?"
  * Don't remove: 45 min ischemia & limb is not damaged"
  * "Tourniquet shock" from release of toxins
  * Emboli from tourniquet release possible
  * Must be obvious "TK" on forehead, I'm tight, in blood
  * In mass casualty situation, don't cover tourniquet.

- Pressure Dressings
  * Don't use ace bandage or stretch bandage. Why?
  * Gen Rule: Don't remove dressings, instead more on top
  * Place bulky sterile pad over wound
  * Bandage will with Kline
  * Check distal pulse regularly