



Emergency Trauma Care: Patient Assessment and Stabilization For MO



LEARNING OBJECTIVES



- Recognize critical injuries based on
 - Mechanisms & Injury patterns
 - Changes in vital signs
- Articulate and demonstrate the structured and sequential approach to evaluation and stabilization of the trauma patient at a primary level of care: ABCDE
- Articulate and demonstrate the procedures required to stabilize the trauma patient
- Understand and apply principles of fluid resuscitation and hemorrhage control in a trauma patient
- Understand the importance and procedure of timely and informed transfer



PATIENT SCENARIO

30 year old male was driving. Car stuck the divider at a high speed. On arrival at the hospital, the patient is semi-conscious, moaning with pain, and does not respond to commands

Exam

- Vitals: BP: 92/60, P: 126, RR: 26, T: 37.0°, pulse oximeter: 88% (room air)
- Responds only to painful stimuli
- Large scalp laceration, bleeding
- L chest deformity, trachea shifted to right, jugular venous distension present, decreased breath sounds on left
- Lower abdomen bruising in pelvic area
- L thigh deformity, profusely bleeding, with exposed bone



WHAT ARE YOUR PRIORITIES?

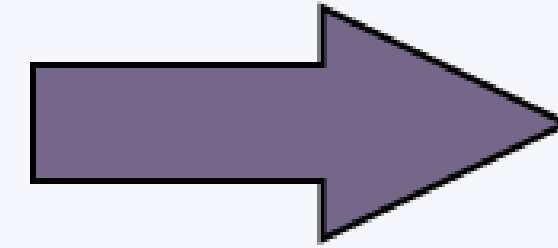
- Complex, multi-trauma patient
- Presents with many potential problems which need to be addressed
- How do you know which to address first?



THE INITIAL ASSESSMENT AND MANAGEMENT PARADIGM



**Rapid Assessment
of Patient's Physiology and
Anatomy (Injuries) in a
Prioritized Manner**



**Simultaneous
Resuscitation**





UNIVERSAL PRECAUTIONS

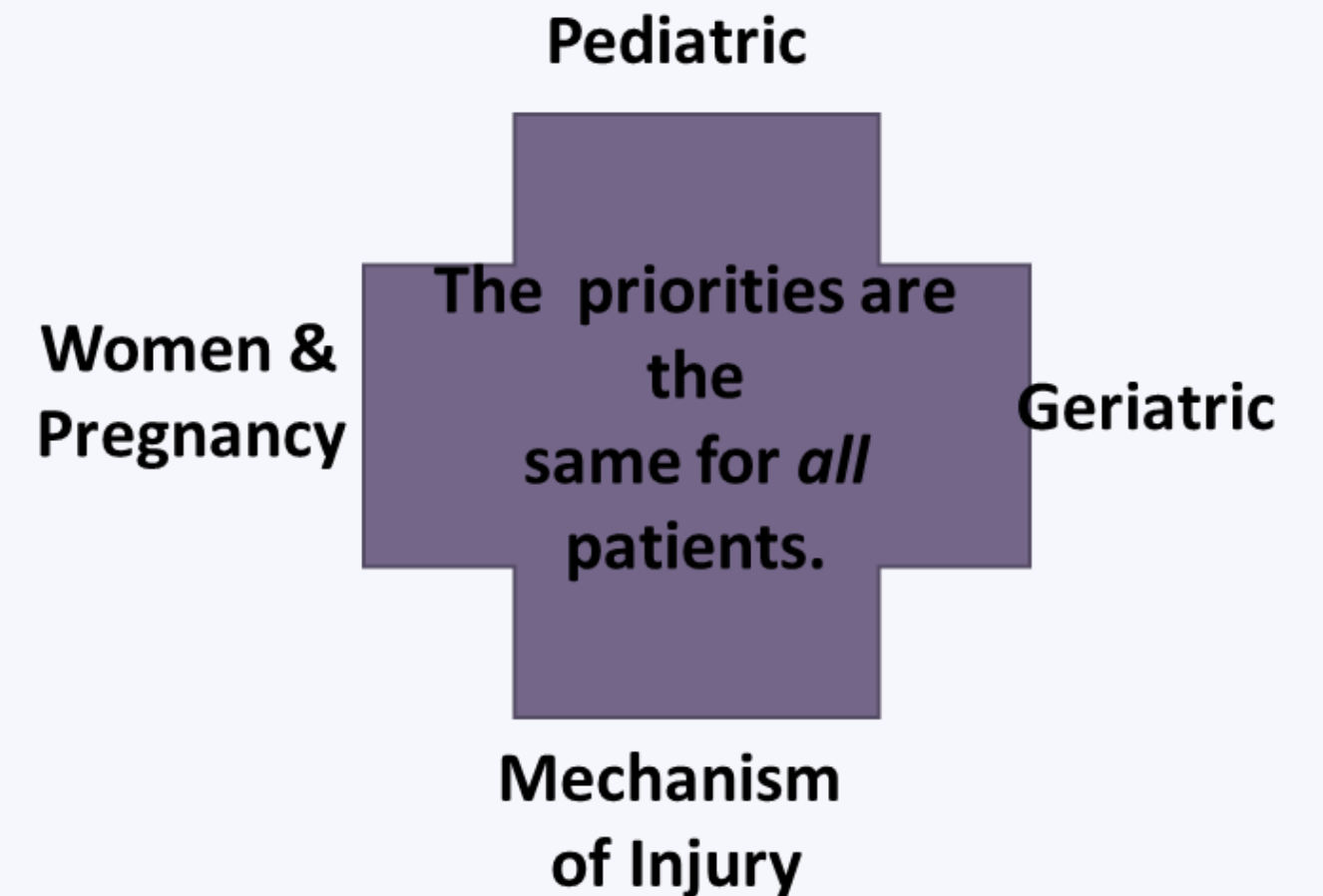
- Cap
- Gown
- Gloves
- Mask
- Shoe covers
- Goggles / face shield





THE PRIORITIES

1. **RAPID Primary Survey (Physiology of Injury)**
2. **Simultaneous Resuscitation** of Vital Functions
3. **Continuous Re-evaluation**
4. **Secondary Survey (Anatomy of Injury)**
5. **Reassessment**
6. **Transfer to Definitive Care**





PRIORITIES IN TRAUMA AT PRIMARY CARE LEVEL: ABCDE

Primary Survey

- A:** Airway with Cervical Spine Immobilization
- B:** Breathing with adequate ventilation
- C:** Circulation with hemorrhage control (H)
- D:** Disability Assessment (Neurological)
- E:** Exposure / Environment



TRAUMA ASSESSMENT: PRIMARY SURVEY

- During the Primary Survey, **immediate life threats** are identified and **IMMEDIATELY TREATED**
- Each step must be addressed in order
- Each life-threatening problem must be resolved *before* you address the next one

You have to resolve problem “A” before you address problem “B”, etc.



PRIMARY SURVEY: ABCDE

A: Airway

Aims of Assessment

- Is the airway **clear**, or is it **obstructed**?
- Is there blood or mucous preventing air movement?
- Is the patient alert enough to protect his own airway against aspiration of blood/vomitus?
- **AVPU: “P” or “U”**
 - A patient who is responsive only to **Painful** stimuli, or who is **Unresponsive**, should have his airway protected with endotracheal intubation.





REVIEW: “AVPU”

- **A**wake
- Responds to **V**erbal stimuli
- Responds only to **P**ainful stimuli
- **U**nresponsive

A	The patient is awake.
V	The patient responds to verbal stimulation.
P	The patient responds to painful stimulation.
U	The patient is completely unresponsive.

When the patient responds only to painful stimuli (P) or is unresponsive (U), consider intubation for airway protection

AIRWAY WITH CERVICAL SPINE IMMOBILIZATION

- Cervical spine: Protect with in-line manual stabilization if cervical spine injury is suspected
- May place cervical collar after airway secured

“Look, Listen, Feel”

“LOOK”

- **Obvious Airway Injury**
- **Agitation**
- **Poor Airway movement**
- **Rib Retraction**
- **Deformity**
- **Foreign Body**

“SPEECH”

- **Hoarseness**
- **Noisy Breathing**
- **Gurgle**
- **Stridor**

“FEEL”

- **Blunt/Penetrating Injury**
- **Crepitus**
- **Facial Bone**
- **Airway in Neck**
- **Tracheal Deviation**
- **Hematoma**



MANUAL IN-LINE STABILIZATION OF CERVICAL SPINE

- Do not apply traction to cervical spine
- Only stabilization to minimize movement
- Place a cervical collar, if available



AIRWAY WITH CERVICAL SPINE IMMOBILIZATION

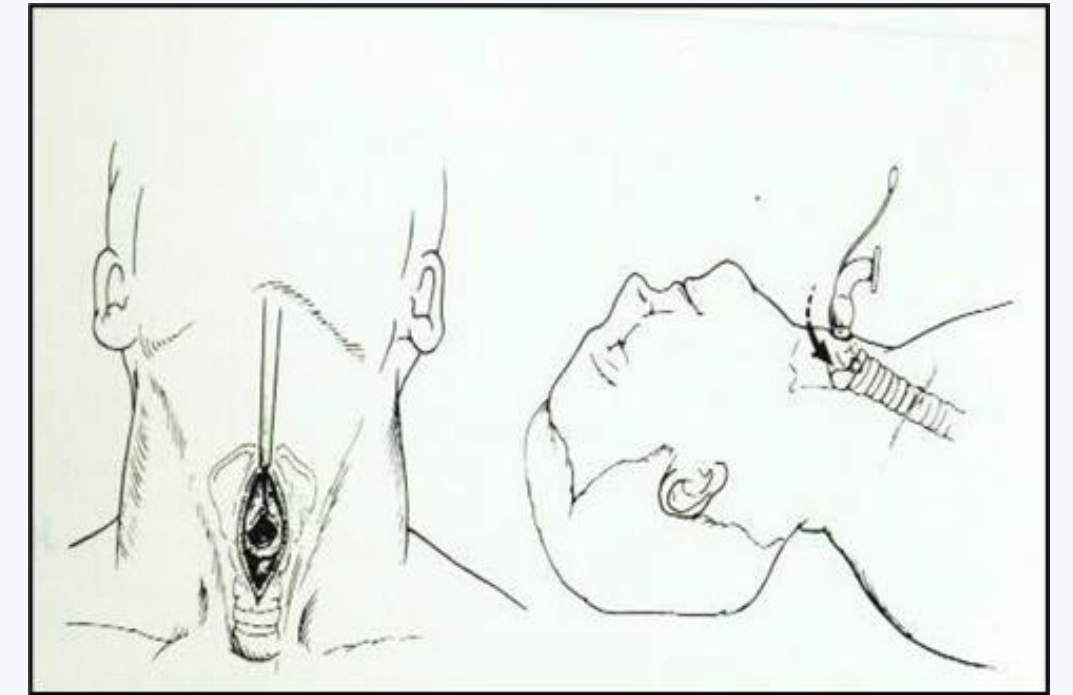
Manage in the following steps:

- Start high flow O₂ by mask : all trauma patients 11-12 l/min
- Open using jaw thrust maneuver (Safest in Trauma)
- Clear airway of foreign bodies: (Finger Swipe/Suction)
- Insert an Oro-pharyngeal Airway (Guedell's)
- Assist ventilations with Ambu (BVM)
- Establish Definitive Airway: Oro-tracheal Intubation if not confident supraglottic airways (LMA)



EMERGENCY SURGICAL AIRWAY

- If cannot intubate or Ventilate in time
- Cricothyroidotomy
- Primary Sx Airway
- Needle
- Surgical



Procedure

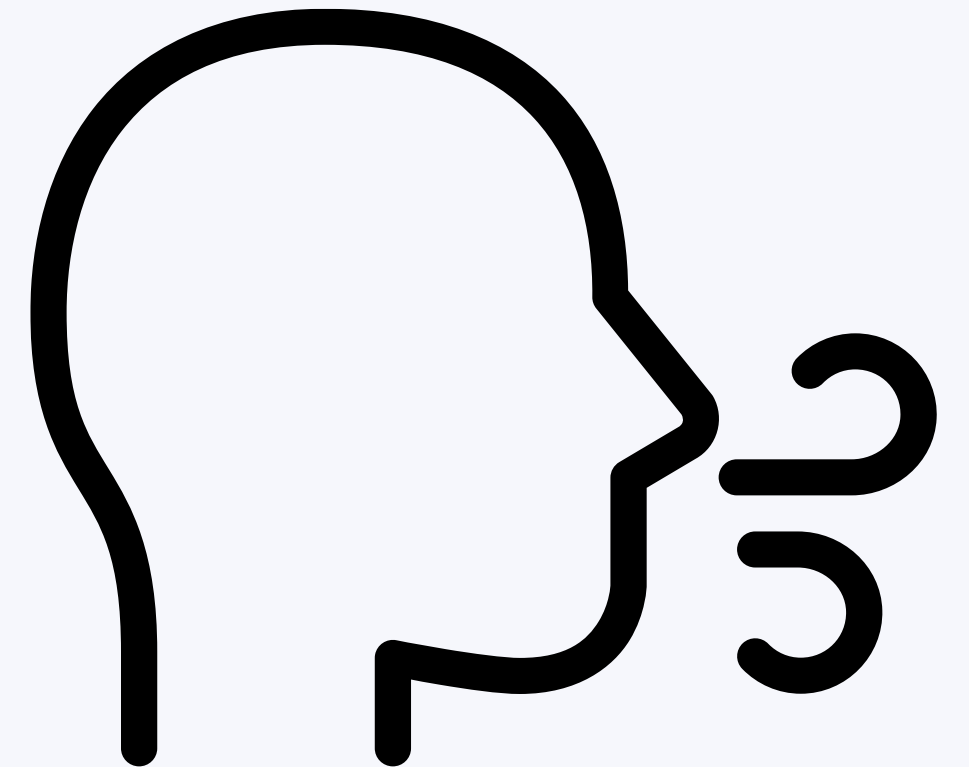


Cricothyroidotomy Set

PRIMARY SURVEY: ABCDE

B: Breathing

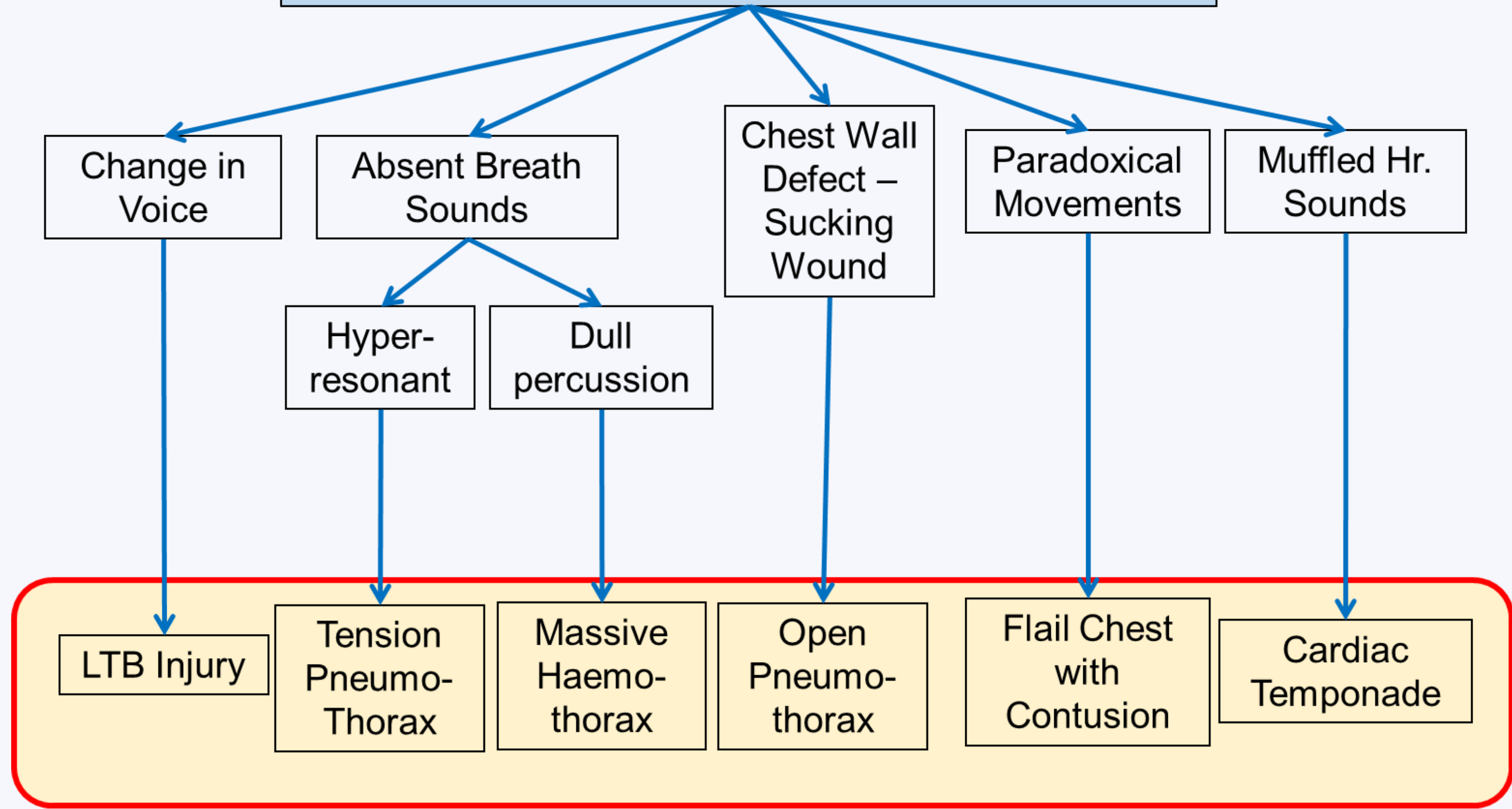
- Assess air **movement** in the chest
 - Rate and depth of respiration
 - See for engorged neck veins
 - Tracheal deviation
 - U/L and B/L chest movements
 - Use of accessory muscles
 - Any signs of open injury to the chest
 - The decline in Mental Status
- Assess lung **sounds**: are they bilateral and equal?
 - Pneumothorax
 - Hemothorax
- Assess **chest wall stability**
 - Rib
 - Flail chest





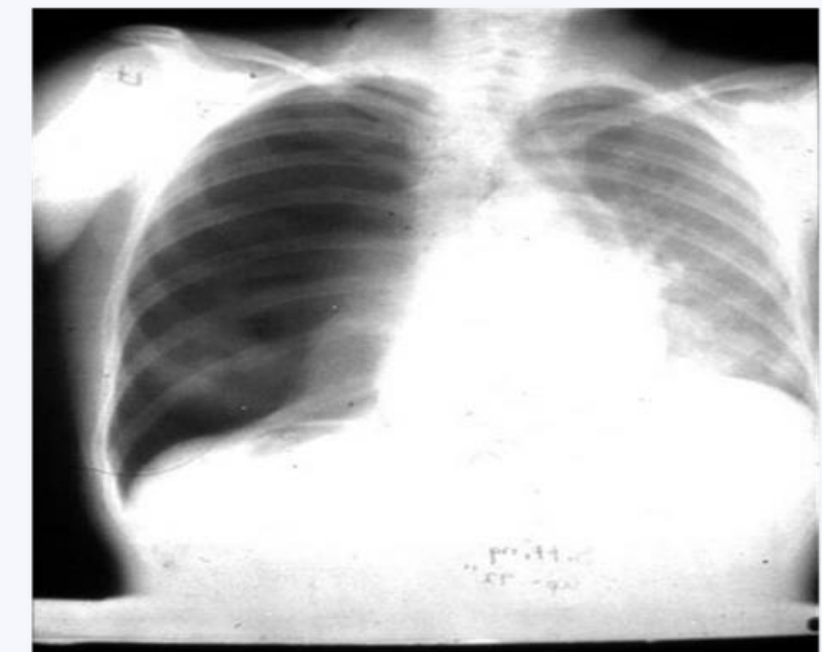
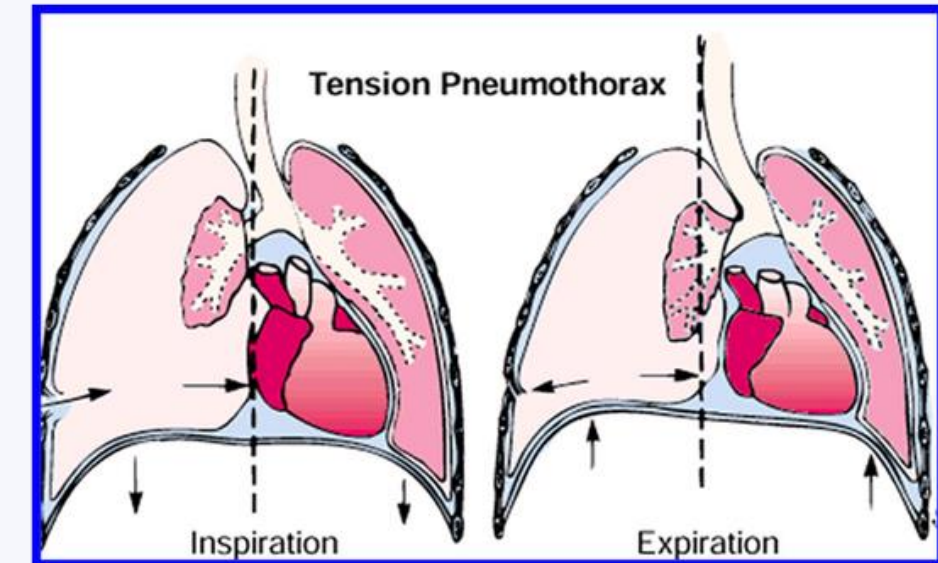
Breathing Problem in Chest Injury

Respiratory distress, Tachypnea, Low O2 sat.



TENSION PNEUMOTHORAX

- **Most dangerous:** immediately life-threatening
- Air enters pleural space during inhalation, but can't escape during exhalation
- Increased pressure develops in pleural space
- Increasing size of pneumothorax
- Increasing pressure causes:
 - Mediastinal shift to opposite side
 - Reduction of venous blood return to heart
 - Decreased cardiac output
 - Hypotension



Don't wait for the x-ray to diagnose this!

TENSION PNEUMOTHORAX



Clinical signs:

- Hypotension
- Distended neck veins
- Deviation of trachea to opposite side
- Tympanitic chest on side of pneumothorax

Treatment:

- Do not wait for x-ray!
- Immediate needle decompression of chest
- Tube thoracostomy (ICD)

Any hypotensive trauma patient with a chest injury should immediately have a needle thoracostomy performed

TENSION PNEUMOTHORAX



Immediate Management

- Immediate Needle Decompression of the Thoracic Cavity
- Adults – 4-5 Intercostal Space just Anterior to mid-axillary line
- Pediatric – 2nd Intercostal Space Mid clavicular line

If not draining

- Finger decompression

Follow it up by

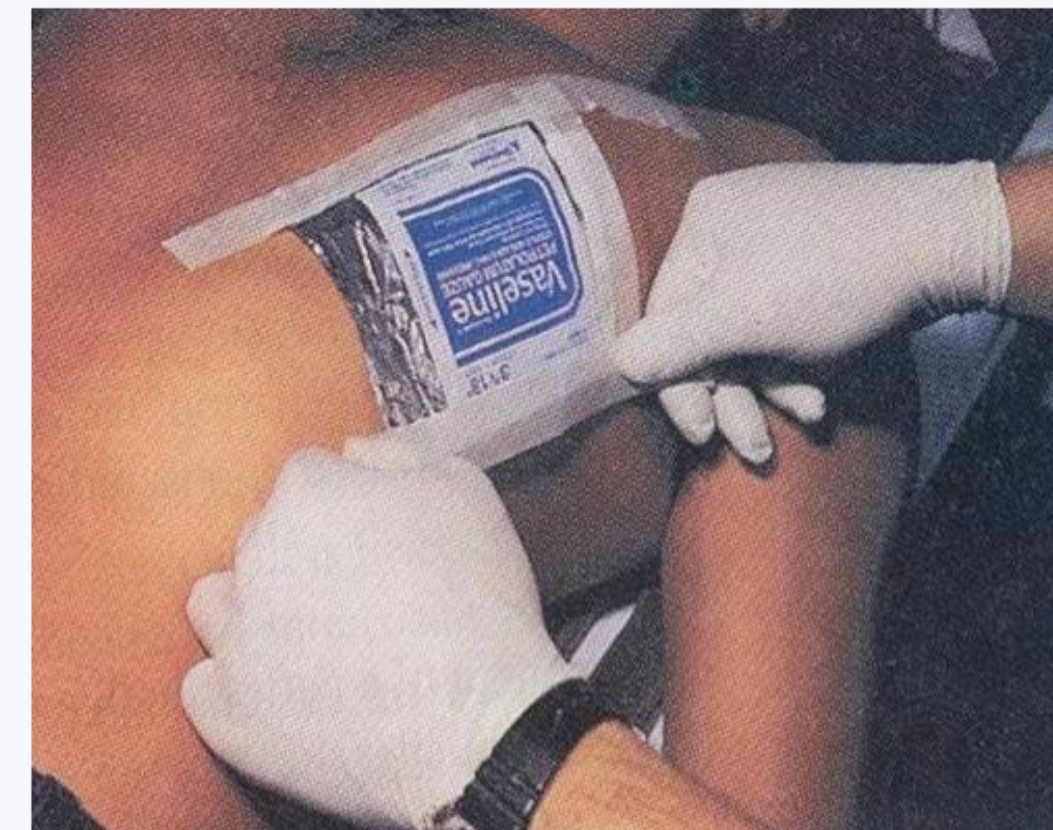
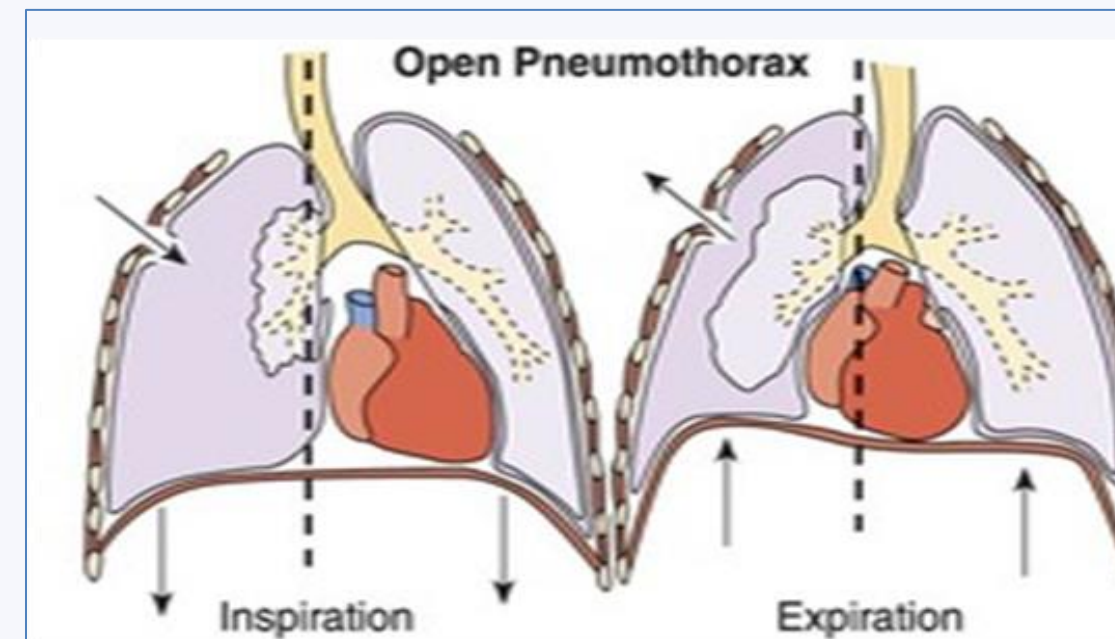
- Intercostal Tube drainage
- 4-5 Intercostal Space just Anterior to the mid-axillary line





OPEN PNEUMOTHORAX

- Open defect in chest wall
- Decreased ventilation if air preferentially enters through defect, rather than via trachea
- **Clinical signs:** Air bubbles through the defect in the chest
- **Treatment:**
 - Seal chest wound with occlusive dressing
 - Tube thoracostomy – (ICD)



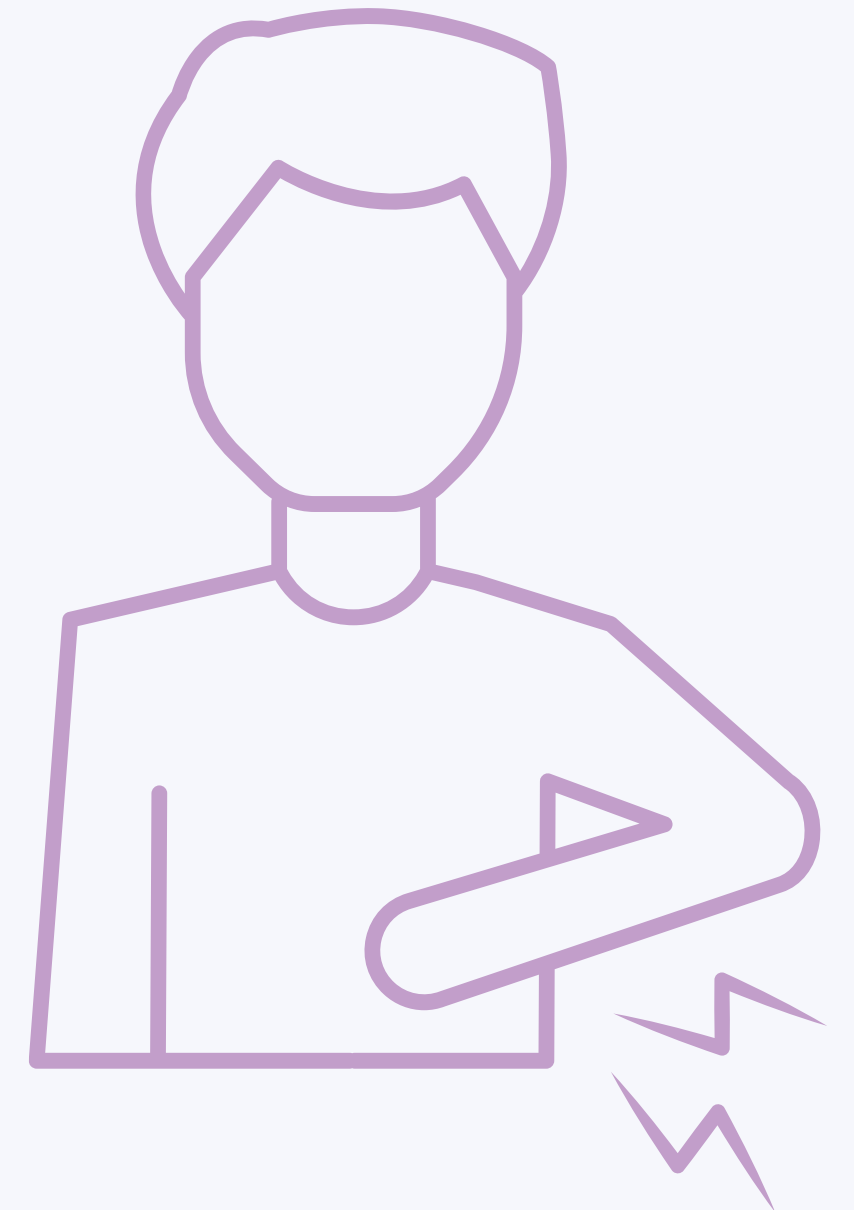


RIB FRACTURES/ FLAIL CHEST

- Very painful
- Impedes ventilation
- Frequently associated with pulmonary contusion

Treatment:

- Adequate analgesia
- IV/IM Thoracic epidural
- Chest physiotherapy
- Passive
- Active
- Serial examination
- Assist ventilation if needed





HEMOTHORAX

- Large amount of blood captured in hemi-thorax
- Decreased oxygenation

Clinical signs:

- Dullness on chest percussion
- Decreased breath sounds on affected side
- Possible Mediastinal shift and decreased venous return to heart
- Hypotension

Treatment: Tube thoracostomy (ICD) to drain blood and relieve pressure





PRIMARY SURVEY: ABCDE

C: Circulation with Hemorrhage Control

- Direct pressure
- Pressure dressing
- Tourniquet
- Wound packing



INITIAL EXTERNAL HEMORRHAGE CONTROL

- This is to be done quickly
- Not an extensive process
- Only to stop life-threatening serious hemorrhage
- Later, when patient is stabilized, lesser bleeding can be controlled

The point is that you don't want the patient to bleed to death during the initial assessment / primary survey!



HEMORRHAGE TYPES

Controllable: Extremity hemorrhage which is life-threatening

Amenable to control with:

- Direct pressure
- Pressure Dressing
- Tourniquet

Uncontrollable: Internal bleeding: chest, abdomen, pelvis

- Requires a surgeon for internal hemorrhage control
- Your role is resuscitation and transfer
- Be careful with IV fluids



EXTREMITY HEMORRHAGE CONTROL: DIRECT PRESSURE

- Extremity hemorrhage can be life-threatening
- Easily managed with direct pressure
 - Apply hand/gauze to wound and press until bleeding stops
- OK...so now I need my hand back...
 - Nurse / ward boy/family can apply direct pressure
 - Pressure dressing can be applied



EXTREMITY HEMORRHAGE CONTROL: PRESSURE DRESSING

A “Pressure Dressing” is:

- Bulky gauze dressing
- Tightly applied
- Applies direct pressure to the wound
- Must control bleeding
- Must be regularly rechecked
- As the patient is resuscitated, the wound may begin to bleed



WHAT IF A PRESSURE DRESSING DOESN'T STOP THE BLEEDING?

1. Apply a tourniquet

- Commercial tourniquet (superior)
- Improvised tourniquet (inferior, but life saving, and may be more immediately available)

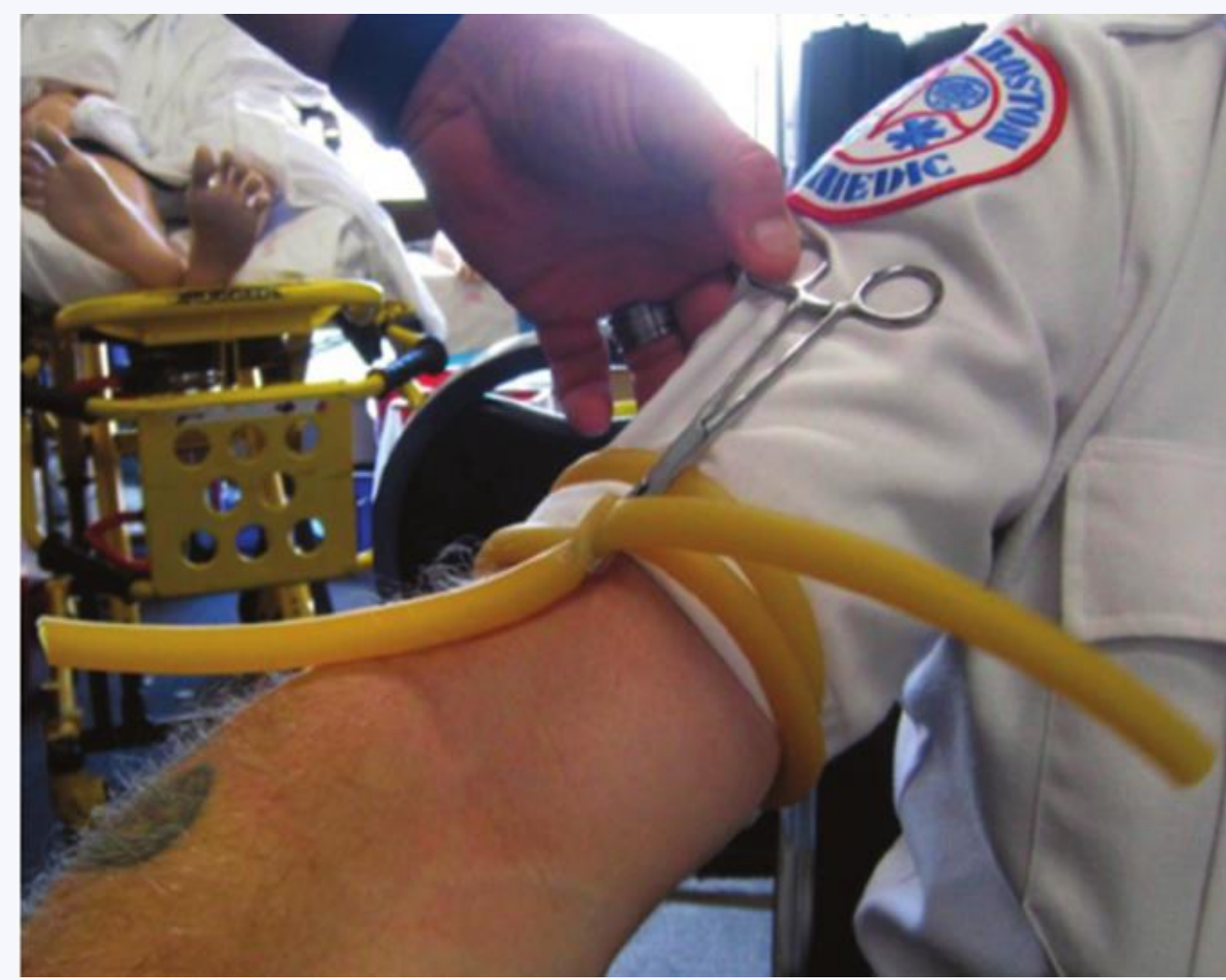
Advantages of a commercial tourniquet

- Designed to work quickly and easily
- Reliably stops bleeding and occludes distal pulse
- Minimizes damage to underlying tissues (skin, nerve, vascular structures)



RUBBER TUBING TOURNIQUET

- Wrap the tubing at least 2-3 times around the limb to provide effective compression of the bleeding vessel.
- Must eliminate the distal pulse





IMPROVISED TOURNIQUET



TOURNIQUET TECHNIQUE



- Tourniquet should be applied several centimeters proximal to the bleeding site
- It cannot be placed over a joint
- It should be tightened sufficiently to eliminate the distal pulse
- If distal pulse not eliminated, this becomes a “venous tourniquet”
 - Arterial inflow continues
 - Venous outflow prevented
 - This results in a high-pressure compartment syndrome in the limb
- Tourniquets are very painful. The patient may require pain medication for transport in the ambulance





TOURNIQUET TIME

- a. Tourniquet is certainly safe **for up to two hours**
- b. After two hours, there is some risk of ischemic injury to the limb
- c. After the patient is stabilized, an effort should be made to replace the tourniquet with a pressure dressing, if possible
- d. If a pressure dressing is ineffective, the tourniquet must be left in place (example: amputation)
- e. Intermittent loosening (open for a few seconds each hour) may minimize ischemia
- f. “Lose the limb to save the life,” if necessary, BUT this will rarely happen



SHOCK

Shock is a state of inadequate tissue perfusion leading to tissue hypoxia (generalized)

- Haemorrhagic
- Non-haemorrhagic
 - Obstructive – Tension Pneumothorax, Cardiac tamponade
 - Distributive – Neurogenic, Septic
 - Cardiogenic - Direct cardiac Injury

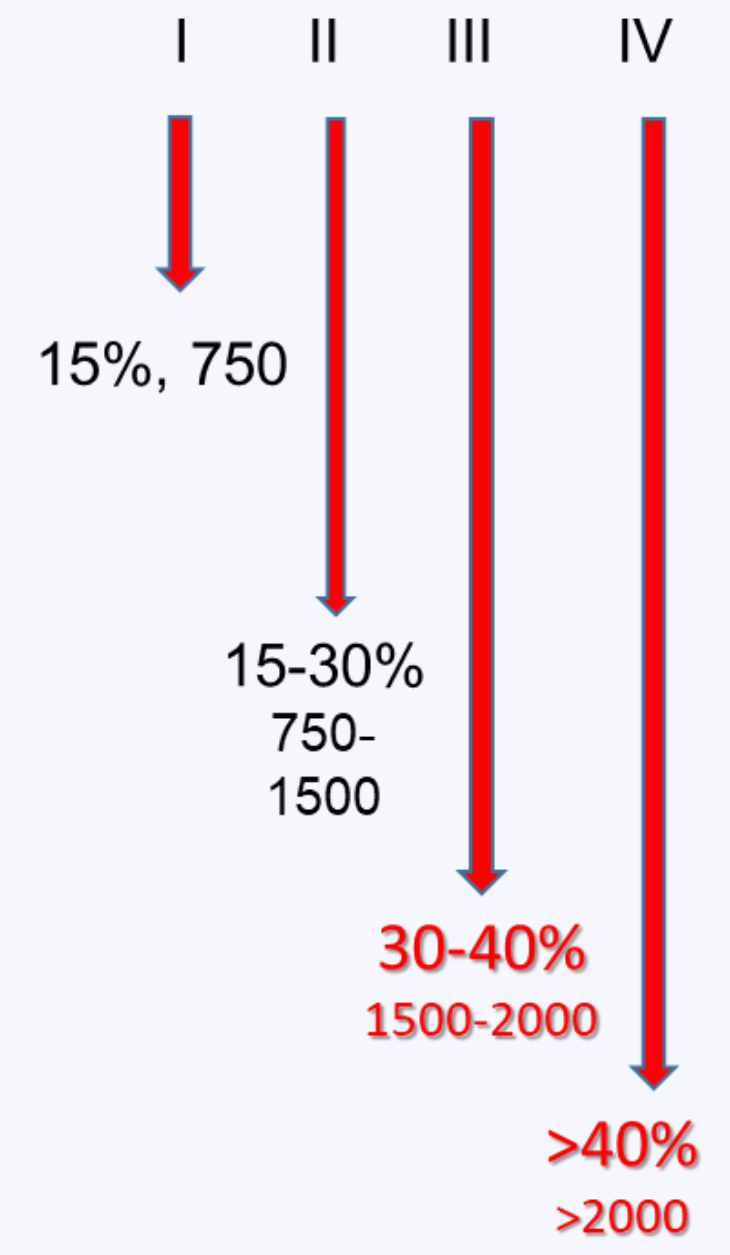




CIRCULATION WITH HEMORRHAGE CONTROL

Is the patient in **HEMORRHAGIC** shock?

- Alteration in level of consciousness, anxiety
- Cold, diaphoretic skin
- Tachycardia
- Tachypnea, shallow respirations
- Hypotension
- Decreased urinary output





CIRCULATION WITH HEMORRHAGE CONTROL

“One on the floor and four more”

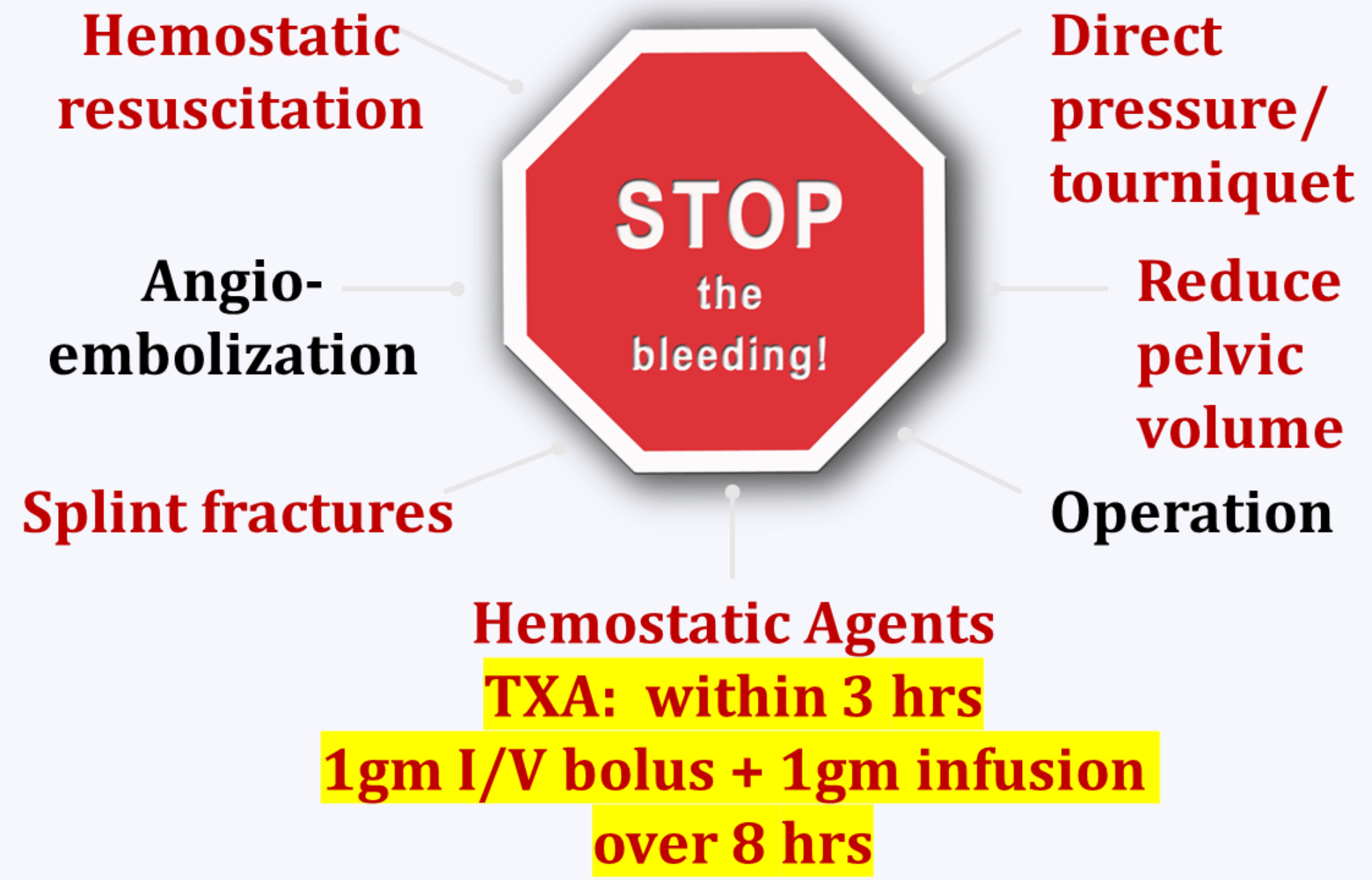
- One
 - Externally
- Four
 - Chest
 - Abdomen
 - Pelvis & Retroperitoneum
 - Long Bones (Muscle compartment)





CIRCULATION WITH HEMORRHAGE CONTROL

What can I do about hemorrhagic shock?





CIRCULATION WITH HEMORRHAGE CONTROL

What can I do about shock?

- Fluid resuscitation
- Vascular access?
- Type?
- Volume?
- Balanced
- Monitor response
- Prevent hypothermia!





TRAUMA PATIENT RESUSCITATION- CIRCULATION

- **Obtain IV access**

- 2 large-bore IVs (18 gauge or larger size)
- Both Antecubital veins
- If cant get – Venesection/ Venous Cut down
- Avoid lower limb veins
- Send blood type/Rh, complete blood count (if available)

- **IV fluid choices:**

- Normal saline or Ringer's lactate: 500 – 1000 cc bolus
- Repeat boluses as necessary until radial pulse restored
- Blood products (if available) – Balanced Resuscitation

Do not use hypotonic fluids (D5W)



PERMISSIVE HYPOTENSION

- In the adult trauma patient, the goal is to prevent/reverse shock, **NOT** to achieve a normal blood pressure
- Target BP: SBP 90 or greater (intact radial pulse)
- Problems with excess fluid:
 - Increases bleeding and mortality
 - Dilution of clotting factors
 - Hypothermia and coagulopathy
 - “Pops the clot”
- **Exceptions:**
 - **If head injury is present: target BP is SBP 110 – 120**
 - **Pediatric patients: target BP is normal BP for age**

PEDIATRIC TRAUMA PATIENT IV FLUID PROTOCOL



- Age 14 and less
- **Goal: normal blood pressure for age**
- Must prevent shock in children
- IV fluid: 20 cc/kg bolus
- Colloid: 10 cc/kg
- Reassess
- Repeat boluses until SBP is normal for age
- Administer blood (10 cc/kg) when available

Normal Pediatric
Systolic BP =

$$(2 \times \text{age}) + 70$$

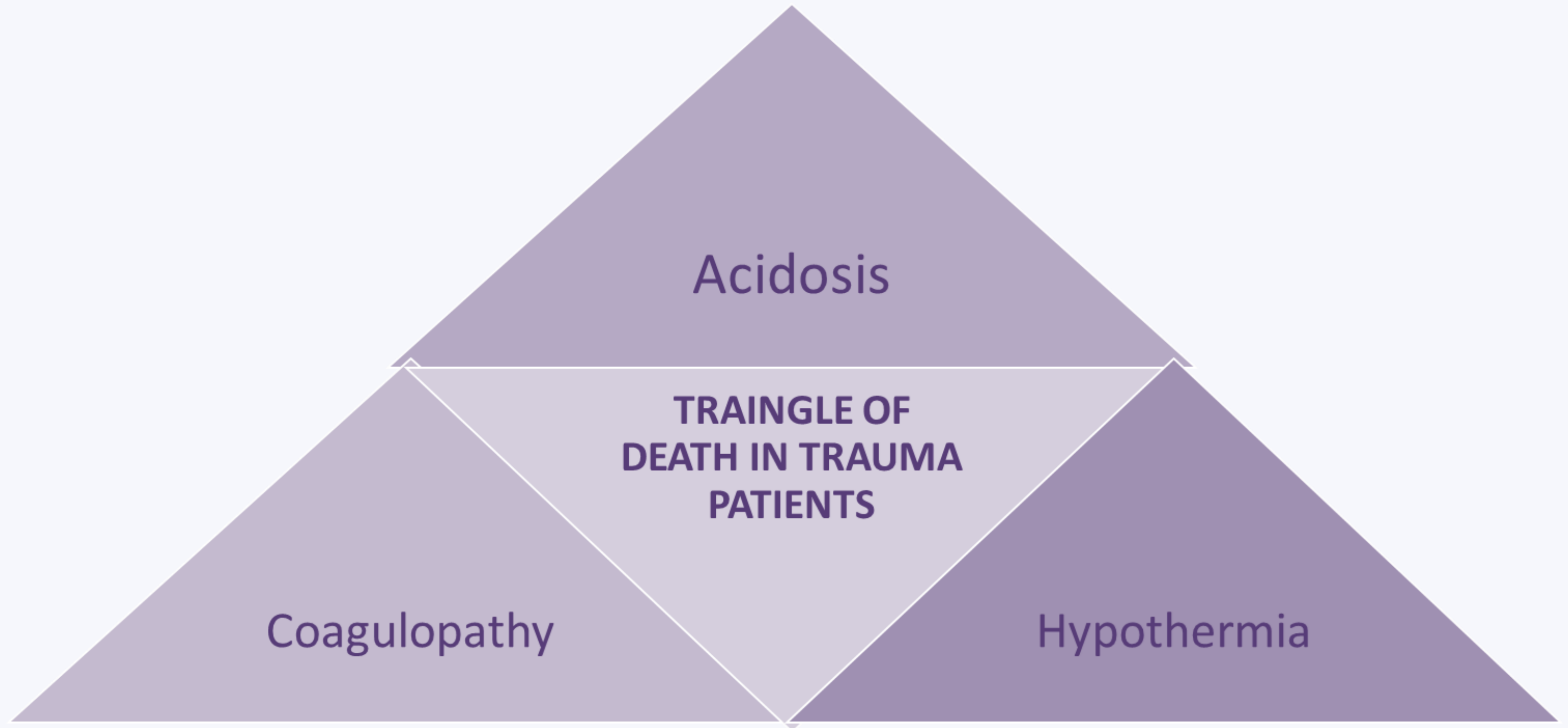
Simple Estimates:

Newborn	60 mmHg
< 1 year	70 mmHg
1 – 10 years	80 mmHg
> 10 years	90 mmHg





CONSEQUENCE OF A/B/C PROBLEM





PRIMARY SURVEY: ABCDE

D: Disability (Neurologic Status)

- Determine basic neurologic status
- Recheck level of consciousness – AVPU
- Calculate GCS
- Pupillary exam: equal/reactive?
- Gross motor exam
 - Does he move all 4 extremities?

Score	Eye Opening	Best Verbal Response	Best Motor Response
6			Obeys Commands
5		Oriented	Localizes Pain
4	Spontaneous	Confused	Flexed to Pain
3	To Speech	Inappropriate Words	Flexion of arms with ext of legs(decorticate)
2	To Pain	Incomprehensible sounds	Extension
1	None	No Verbalization	None



WHAT CAN I DO FOR LOW LEVEL OF CONSCIOUSNESS SUSPECTING HEAD INJURY??

- Prevent Secondary Brain damage (global damage to brain)
- Prevent hypoxia
- Prevent hypotension
- Maintain ABC's - Prepare for transfer

PRIMARY SURVEY: ABCDE

E: Exposure / Environment

- **Patient should ideally be completely undressed** and covered with a blanket for warmth and modesty
 - You must be able to visualize all body areas for examination
- **Assess for fracture of pelvis: bruising of perineum or tenderness to *gentle* palpation**
 - Pelvic fracture can be cause of ongoing hemorrhage
 - Excessive movement of pelvic bones can disrupt clot
 - Tightly bind pelvis with sheet or dupatta if fracture suspected
- **“Log roll” the patient to examine the back**
- **Keep patient warm!**
 - Blankets
 - Warm IV fluids (if available)
 - Cold causes coagulopathy
 - Cold increases mortality

SECONDARY SURVEY: HEAD TO TOE ASSESSMENT

- A primary survey and initial life-saving procedures have been completed
- At this point, the patient may be safely transferred if transportation is available

Do not delay transfer for diagnostic tests/ imaging

- Only - If you have time, then you may begin the secondary survey: a head-to-toe assessment of the patient
 - Documentation of positive and pertinent negative findings
 - Determination of any unsuspected life or limb-threatening injuries
 - Re-evaluation of tourniquets and pressure dressings
 - Splinting of fractures
 - Covering of wounds



KEEP MONITORING AND RE-EVALUATING

If at any time the Vital Signs deteriorate, the secondary survey must be stopped and **the primary survey reinitiated.**





RE-EVALUATION / TRANSFER PHASE



1. Re-check ABC's
 2. Begin the transfer process
 - a. Call receiving physician and give a verbal report
 - b. Complete a brief written report of the patient's injuries and care
 3. Place Foley catheter
 - a. Do not place if pelvic fracture is suspected, there is blood at the urethral meatus, or a prostate exam is abnormal
 4. Check the two large-bore IV catheters (18 gauge or larger)
 5. Consider tetanus immunization
 6. Antibiotics for open or contaminated wounds
- Give instructions to ambulance/attendance for care during transfer



SUMMARY

- Preparation – Keep Equipment in order
- Primary Survey: ABCDE
 - Identify and immediately correct life threats
- Secondary Survey:
- Head to toe examination for other injuries
- Re-evaluation Phase
- Physician-to-physician contact
- Safe transfer: instructions to medics for care en-route



Thank You

