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TRAUMA

Joint Base Lewis McChord, flickr

Objectives

- Demonstrate primary and secondary patient assessment
- Establish priorities in trauma scenarios
- Initiate primary and secondary management
- Arrange disposition of the patient

Trimodal Death Distribution of Trauma

- Trimodal death distribution
  - First peak is instant death (brain, heart, large vessel injury)
  - Second peak occurs from minutes to hours after the trauma
  - Third peak occurs days to weeks after the trauma (sepsis, Multiple Organ Failure)
- Emergency Nursing focuses on the second peak…..Deaths from:
  - Traumatic Brain Injury,
  - Skull fractures, orbital fractures…
  - Penetrating neck injuries…
  - Spinal cord injuries…
  - Cardiac tamponade, tension pneumothorax, massive hemothorax, esophageal injury, diaphragmatic herniation, flail chest, sucking chest wounds, pulmonary contusion, tracheobronchial injuries, penetrating heart injury, aortic arch injuries …
  - Pelvic fractures, femur fractures, humerus fractures…
  - Liver laceration, splenic ruptures, pancreatico-duodenal injuries, retroperitoneal injuries
  - Bladder rupture, renal contusion, renal laceration, urethral injury…
- You get the point

Treating Trauma

- Treat the greatest threat to life first
- Do not wait for a diagnosis to start treatment
- A detailed history of the trauma is not necessary to begin the care
- Always start with the "**ABCDE**" approach

Initial Assessment and Management

- An effective trauma system needs the teamwork of emergency medical services, nurses, doctors, x-ray technicians, and others
- Trauma roles
  - Trauma captain – Someone runs the trauma
  - Interventionalists – anyone who helps out
  - Nurses – who do the work ☺
  - Recorder – to document treatment

Primary Survey

- Patients are assessed and treatment priorities established based on their injuries, vital signs, and injury mechanisms
- ABCDEs of trauma care
  - A Airway and c-spine protection
  - B Breathing and ventilation
  - C Circulation with hemorrhage control
  - D Disability/Neurologic status
  - E Exposure/Environmental control

Airway

How do we evaluate the airway?

A- Airway

- Airway should be assessed for patency
  - Is the patient able to talk?
  - Inspect for foreign bodies
  - Examine for stridor, hoarseness, gurgling, pooled saliva or blood
- Assume there is a spinal injury in patients with multi-trauma
  - C-spine clearance can be both clinical(by the doctor) and/or x-ray
  - Spinal protection should remain in place until patient can cooperate with clinical exam

Airway Interventions

- Oxygen
- Suction
- Chin lift/jaw thrust
- Oral or nasal airways
- Establish a secure airway
  - Rapid intubation for agitated patients with c-spine immobilization

Breathing

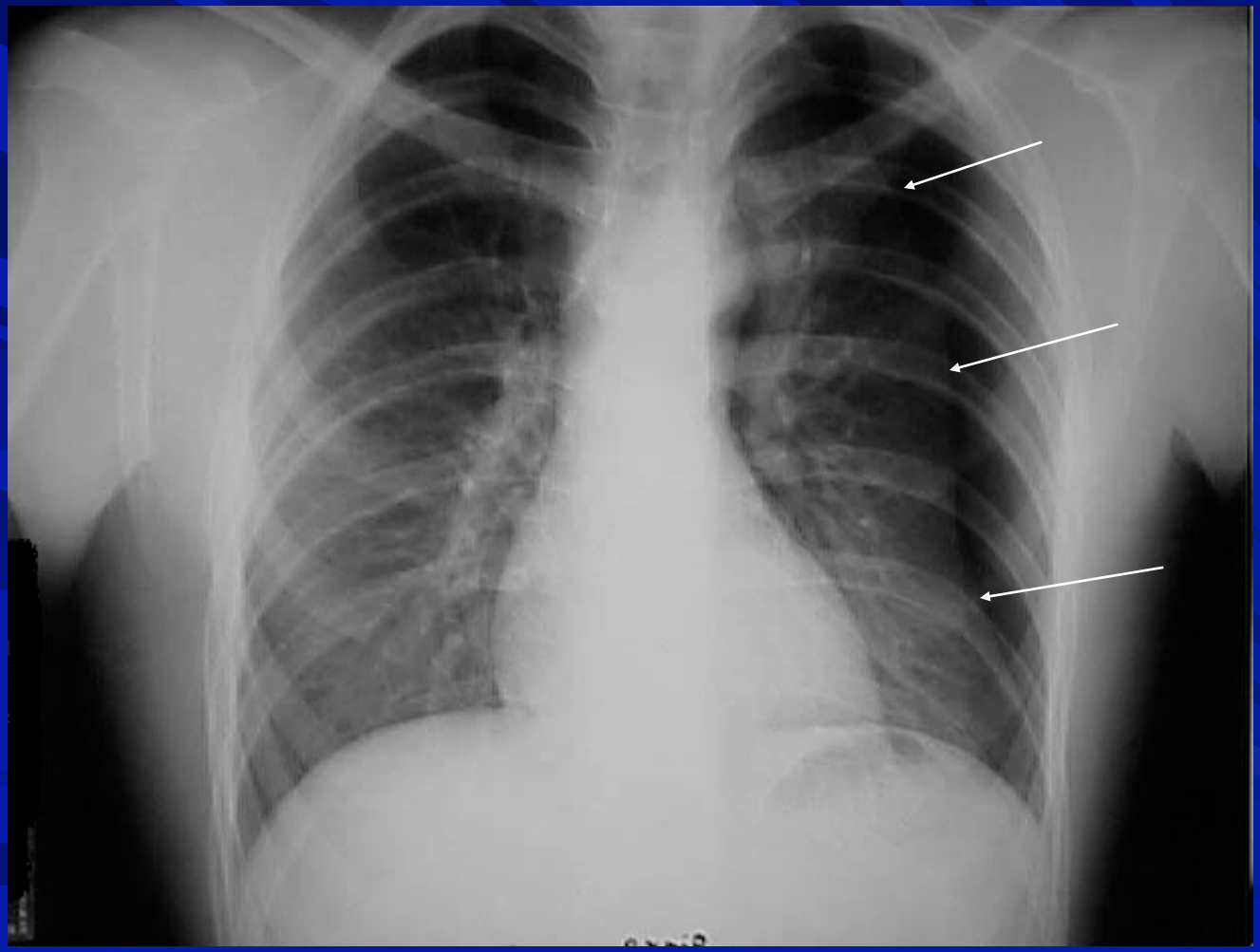
- What can we look for to assess a patient's 'breathing' status?

B- Breathing

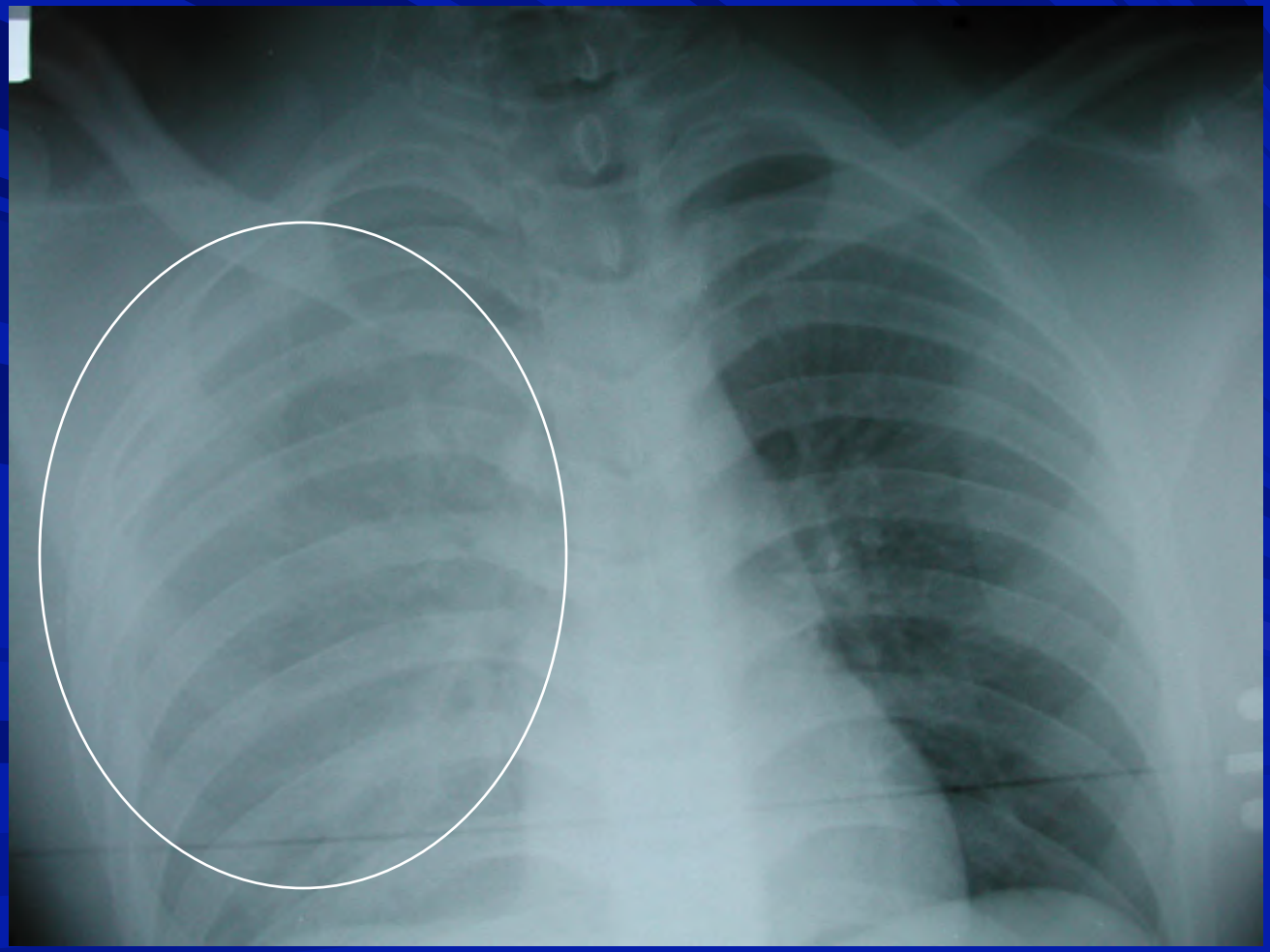
- Airway patency does not ensure adequate ventilation
- Look, Listen, and Touch
  - Deviated trachea, crepitus(popcorn chest), flail chest, sucking chest wound, absence of breath sounds
- Chest Xray if available to evaluate lungs

Flail Chest

Simple Pneumothorax



Hemothorax



Breathing Interventions

- Ventilate with 100% oxygen
- Needle decompression if tension pneumothorax suspected
- Chest tubes for pneumothorax / hemothorax
- Occlusive dressing to sucking chest wound
- If intubated, evaluate tube position

Chest Tube

C- Circulation

- Rapid assessment of hemodynamic status
  - Level of consciousness
  - Skin color
  - Pulses in arms and legs
  - Blood pressure

C- Circulation

- Shock should be considered on every Trauma patient
- Types of shock:
  - Hypovolemic – loss of blood or plasma
  - Cardiogenic – The heart is less able to pump blood
  - Obstructive – Physical obstruction reduces cardiac output
  - Distributive – Disruption to vasomotor tone

Hypovolemic Shock

- The physical loss of either
  - Blood – due to hemorrhage
  - Plasma – due to burns
- This patient will present with:
  - Decreasing Blood Pressure
  - Increasing Heart rate
  - Increasing anxiety (until lethargy and unconciousness set in)
  - Increase respiratory rate
  - Decreased urine output

Hypovolemic Shock Interventions

- Monitor pulse and blood pressure continuously
- Apply pressure to bleeding sites
- Establish IV access
  - 2 large bore IVs
- Volume resuscitation
  - Have blood and/or fluids ready if needed
  - Foley catheter to monitor output (unless there are signs of urethral injury)

IV Tips

- Easiest IV sites –
  - Antecubital
  - Wrist, next to thumb
  - Scalp or feet (on infants)
- Keep catheter TIGHT
- It is alright to miss, so don't worry.

Cardiogenic Shock

- Inadequate contractility of the heart due to
  - MI
  - Blunt trauma to the heart
  - Dysrhythmias
  - Cardiac Failure
- Rare in Trauma cases
- This pt does not necessarily need fluids

Cardiogenic Shock Interventions

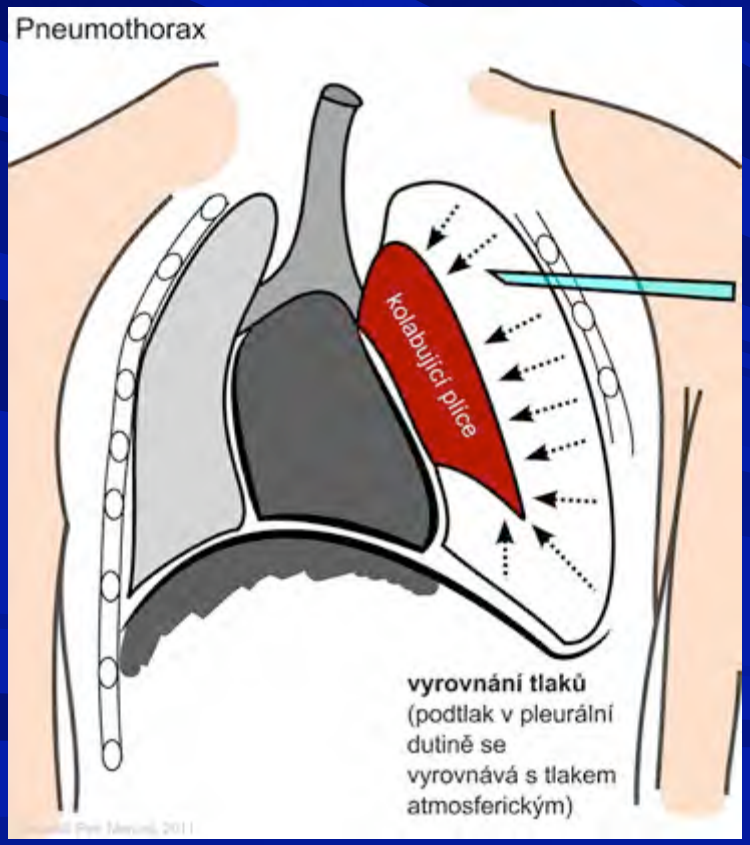
- ECG as soon as possible
- Cardiac Monitor
- Treat the appropriate dysrhythmias

Obstructive Shock

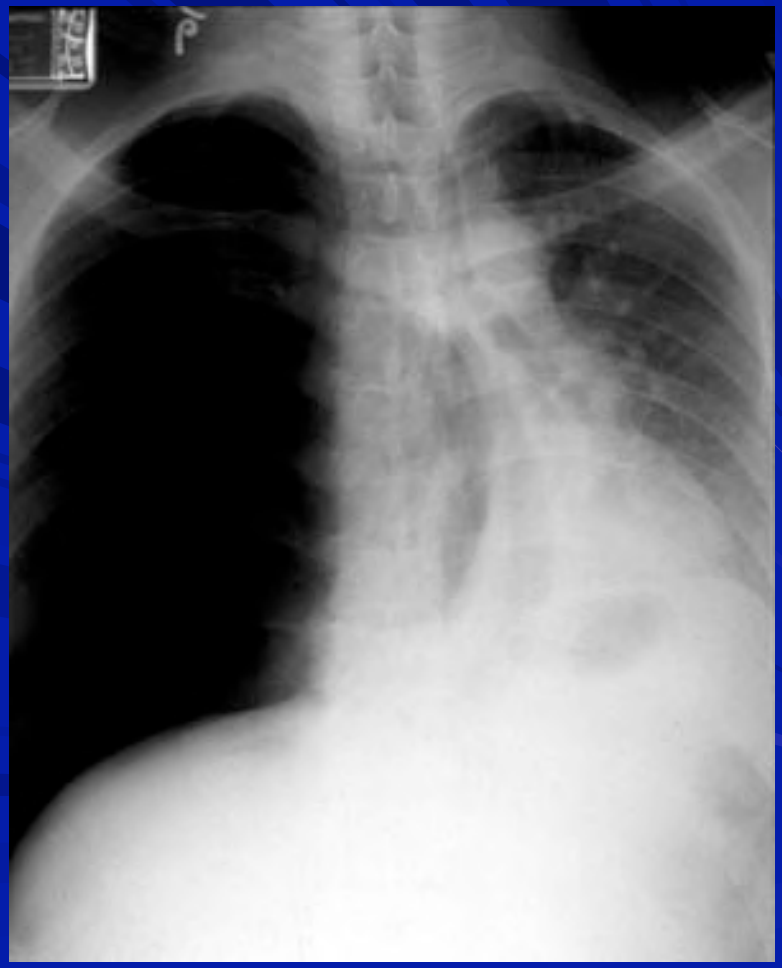
- Physical obstruction or compression of the heart or vessels around it
  - Cardiac Tamponade
  - Tension Pneumothorax
  - Tension Hemothorax

Tension Pneumothorax

How do you treat this?



Chest Tube



Obstructive Shock Interventions

- Remove the underlying obstruction:
  - Hemo/pneumothorax – Chest Tube
  - Cardiac Tamponade - needle decompression

Distributive Shock

- Loss of vessel tone due to
  - Sepsis (unlikely in an acute trauma)
  - Neurogenic (spinal damage)
- This patient will usually have
  - Dry, warm skin (not sweating)
  - Bradycardia

Distributive Shock Interventions

- Septic shock is treated with antibiotics, which we will save for another lecture
- Neurogenic shock is covered under the next step, which is…

D- Disability

- Abbreviated neurological exam
  - Level of consciousness
  - Pupil size and reactivity
  - Motor function
  - Glasgow Coma Scale
    - Utilized to determine severity of injury

GCS

EYE	VERBAL	MOTOR
Spontaneous 4	Oriented 5	Obeys 6
Verbal 3	Confused 4	Localizes 5
Pain 2	Words 3	Flexion 4
None 1	Sounds 2	Decorticate 3
	None 1	Decerebrate 2

Disability Interventions

- Spinal cord injury
  - Keep spine stabalization!
  - High dose steroids may be used
- Decreasing Mental Status may be a sign of Elevated Intercranial Pressure
  - Sit patient up
  - Hyperventilation – increase breathing and oxygen

E- Exposure

- Complete disrobing of patient
- Logroll to inspect back
- Rectal temperature
- Warm blankets to prevent hypothermia

Always Inspect the Back

Lets do a Case!

Case

- 28 year old man is involved in a high speed motorcycle accident. He was not wearing a helmet. He is groaning and utters, “my belly”, “uggghhh”.
- Heart Rate 134 Blood Pressure 87/42 Respirations 32 SaO2 89% on 100% oxygen by mask
- Patient is drowsy but arousable to voice, has large bruise over the left side of his scalp, airway is patent, decreased breath sounds over right chest, abdominal pain to touch, obvious left ankle deformity

ABCDE

- What are the priorities right now?
- What are this patient's possible injuries?
- What are the interventions that need to happen now?

Secondary Survey

- AMPLE history
  - Allergies, medications, PMH, last meal, events
- Physical exam from head to toe, including rectal exam
- Frequent reassessment of vitals
- Diagnostic studies at this time simultaneously
  - X-rays, lab work
  - FAST exam (Ultrasound)

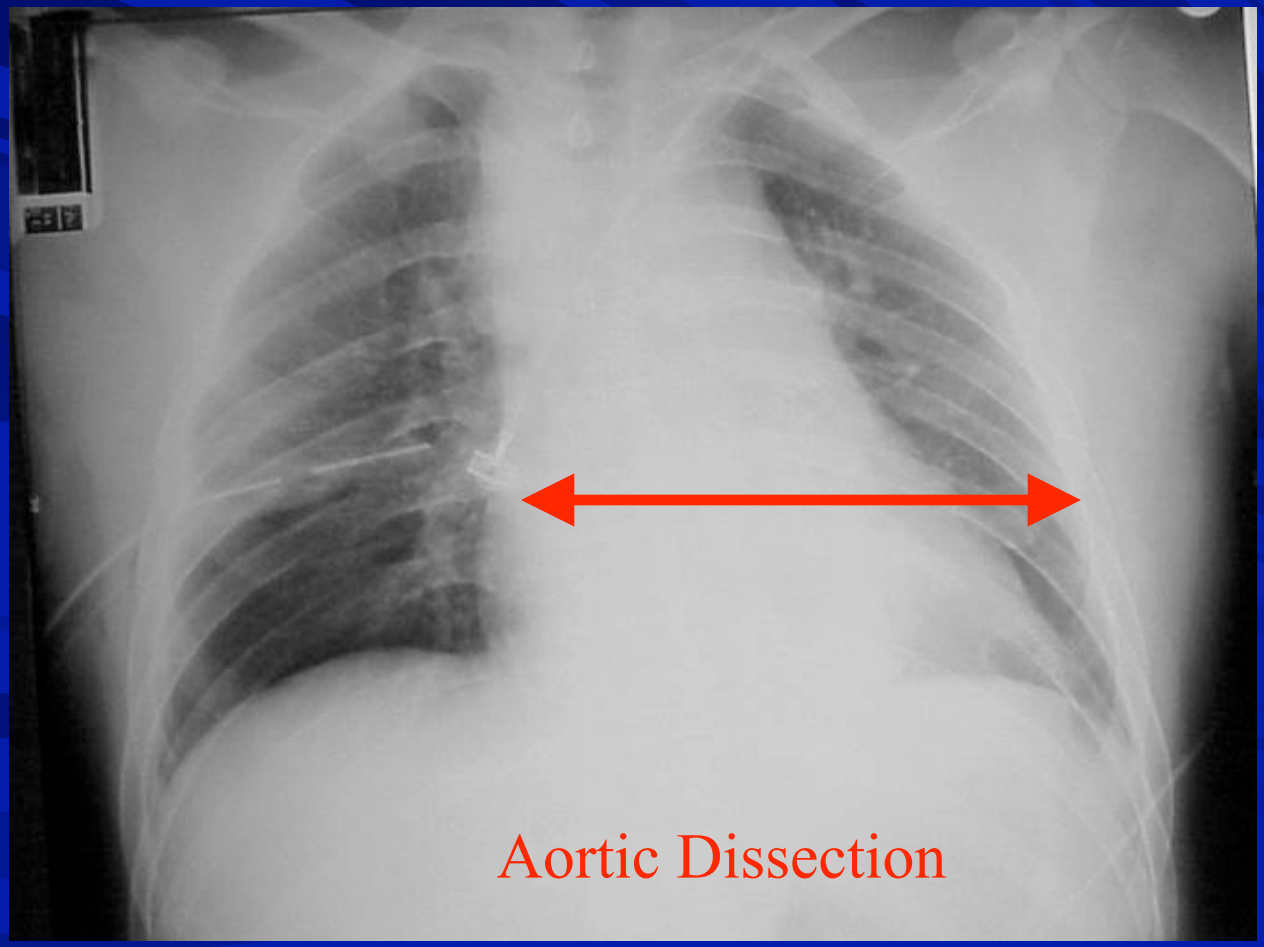
Seatbelt Sign

Diagnostic Aids

- Bloodwork
- Standard trauma radiographs
  - Chest X-ray, pelvis, lateral C-spine
- Pt should only go to radiology if stable
- Pt must be monitored in xray

Widened Mediastinum

What disease process does this indicate?



Bilateral Pubic Ramus Fractures and Sacroiliac Joint Disruption

What should this injury make you worry about?

Abdominal Trauma

- Common source of traumatic injury
- Mechanism is important
  - Bike accident over the handlebars
  - Road Traffic Accident with steering wheel trauma
- High suspicion with tachycardia, hypotension, and abdominal tenderness
- Can be asymptomatic early on
- Ultrasound can be early screening tool

Abdominal Trauma

- Look for distension, tenderness, seatbelt marks, penetrating trauma, retroperitoneal ecchymosis (Bruising on the flanks)

Splenic Injury

- Most commonly injured organ in blunt trauma
- Often associated with other injuries
- Left lower rib pain may be indicative
- Often can be managed non-operatively

Liver injury

- Second most common solid organ injury
- Can be difficult to manage surgically
- Often associated with other abdominal injuries

Pregnant Trauma Patients

- Pregnant trauma patients are at risk for:
  - Premature Labor
  - Abruptio Placentae
  - Uterine Rupture

Pregnant Trauma Patients Interventions

- Premature Labor –
  - May be hard to spot in unconscious or intubated pts
  - May be masked as trauma related back pain
  - If mother is stable, can give medications to stop labor
- Abruptio Placentae –
  - Monitor fetal heart tones for 48 hours after trauma
- Uterine Rupture –
  - May be associated with bladder rupture, with blood or meconium in the urine
  - Rarely repairable – treat mother for blood loss, possible trauma surgery needed

Pediatric Trauma Patients

- 5 months and under, assume they are obligate nose breathers
- Respiratory and heart rates differ by age
- Can be come hypoglycemic easily
- Children can maintain a normal blood pressure for much longer than adults, so BP is NOT a reliable indicator of shock. Watch the heart rate instead.

Disposition of Trauma Patients

- Dictated by the patient's condition and available resources
  - OR, admit, or send home
- Serial examinations
  - Look for Mental Status Changes
  - Abdominal exams for increased bruising or pain
  - Check lungs for changes in air movement

Summary

- Trauma is best managed by a team approach (there's no "I" in trauma)
- A thorough primary and secondary survey is key to identify life threatening injuries
- Once a life threatening injury is discovered, intervention should not be delayed
- Disposition is determined by the patient's condition as well as available resources.

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