DEFINITIONS

- Ventilation - component of respiration.
- Respiration - entire physiologic process in which O2 exchanged through the alveolar/capillary membrane.
- Ventilator Rate - The number of inhalation and exhalation (breathing) per minute.
- Respiratory Rate - Is the amount of exchange within the body. Cellular level.
- Paradoxical motion - indicated a flailed chest and the broken part moves in the opposite movement of the ventilation effort.
- Hyperresonance to percussion supports air collection in cavity.
- Dullness to percussion supports fluid collection in cavity.

PNEUMOTHORAX AND HEMOTHORAX

- Air, blood or both in the plural space.
- Air trapped in the plural space with a closed injury is also known as a "simple" or "closed" pneumothorax.
- Air in the plural space with an open injury is an "open" pneumothorax or termed sucking check wounds.
- First sign and symptom is dyspnea. Followed by decreased breath sounds, unequal chest rise.

- If pneumothorax BP will stay the same or go up.
- If hemothorax BP stays the same or goes down and no JVD. Shock is associated with hemo's.
- If hemothorax darting the chest is not a priority. Aggressive airway and intubation if needed. The blood loss may act as a tamponade. Contact medical control prior to decompressing a hemo.
- Paramedic care place needle decompression (dart the chest) to let air out of plural space. 2nd/3rd mid-clavicle and/or 5th/6th mid-axially. The needle is placed above the 3rd or 6th rib.
- EMT care ABC's and transport.

CARDIAC TAMPONADE

- A bleeding heart that collects in the sac around the heart - pericardial sac.
- Think of a Cardiac Tamponade just like a collapsed lung and plural space. As little as 150ml of blood.
- Commonly happens with penetrating trauma or deceleration shearing of the aorta where it attaches to the heart.
- BECK'S TRIAD are signs and symptoms for Cardiac Tamponade. Muffled heart tones (because of blood in the sac around heart), JVD (the heart cannot pump because of the pressure to blood backs up in vessels. This results in decrease cardiac output and increased venous pressure.), narrowing pulse pressure.
- Doctor will stick a long needle into chest and place in pericardial sac and drain the blood.
- EMS care ABC's and transport.

FLAILED CHEST

- 3 or more consecutive ribs broken in 2 or more places. Makes an island. Other books may say 2 or more consecutive ribs.
- Cause paradoxical motion.
- Also may result in pulmonary contusions leading to severe hypoxia.
- EMS care: Airway top priority - ETT, positive pressure and fluid replacement if bleeding. Try to limit external motion of flailed segment. Hold a pillow, trauma dressing on chest wall.
- NO SAND BAGS.

RIB FRACTURES

- Can kill you.
- Most commonly occur on lateral surfaces of rib cage.
- Can cause internal bleeding.
- Can cause air/blood in plural space.
- Can cause you to not inflate your lungs fully and pneumonia can develop.
- ATELECTASIS is when alveoli are not inflated and collapse decreasing the surface area.
- EMS care is ABC's
- In severe chest trauma a circumferential splint should not be used if ventilatory management is poor.

- Ribs 4 through 8 are most common fractured ribs.

- Rib fractures to the lateral 9th and 12th rib may result in spleenic bleeding.

- Age and rib fractures:

Pediatrics has less rib fractures but more underlying tissue trauma.
Elderly have calcified ribs which do not give and fracture easier.
Older patients may have underlying respiratory diseases. (COPD, etc...)
The more rib fractures the worse it is for any age.

- Pain management is a key to increase ventilations. If the pt's vitals are stable, no abdominal pain or head injury you can give morphine or diazepam. Do not give nitrous oxide in case of pneumo the gas can leave the lungs which would not be ideal.

Clavicular Fractures

- Most commonly fractured bone in body.

- Common in children who fall and athletes of all ages.

- 4 to 6 weeks to heal.

Sternal Fractures

- Massive direct trauma to sternum. i.e. Car crash and chest to steering wheel.

- Blows to the sternum may result in myocardial contusions. This can lead to cardiac tamponade, lethal rhythms or hear chamber low out.

TENSION PNEUMOTHORAX (2 questions on trauma exam)

- This is nothing new to you. This is a pneumothorax that gets bigger and gets worse. Just like hyperglycemia can turn into DKA. Same thing just worse.
- Most tension pneumothrax's are caused by medical people. When an EMT gets to the scene the patient has shallow breathing and slow. The EMT uses a BVM to increase volume and rate causing more air into plural space faster. Dead is dead, you have to breath for them in this case.
- Signs and symptoms of tension pneumothorax - since this is worse more air has collected causing no chest rise on the affected side. No breath sounds on affected side. Tracheal deviation to unaffected side (late. late sign and not a reliable sign). JVD is most common with a tension pneumo due to increased pressure exerted on the heart causing a backup of blood.
- Paramedic darts the chest or chest tube placement to fix the leak and get air out of plural space.

OPEN CHEST WOUND CARE (open pneumothorax)

- Known as sucking chest wound.
- Air can enter the plural space. Collapsing lungs.
- Transport on left side if possible.

- Think of the hole like your mouth. When you breathe in air will enter the hole. When you exhale the air will exit the hole.
- Use an occlusive dressing to cover the hole. If breathing gets worse unseal the occlusive when they exhale and seal before they inhale to let air out.
- Dressing types. Tape occlusive dressing on three sides to form a FLUTTER VALVE. By taping only three sides when the patient exhales air goes out and when they inhale the occlusive will seal. Just like the flap on a non-rebreather mask.
- Dressing types – Tape occlusive dressing on all four sides. If needed open when they exhale and close when they inhale.
- On an exam if you have to pick chose three sides (flutter) versus four sides if the choice is not both are correct.
- If after darting the chest you hear a constant release of air you should suspect an open pneumothorx.

TRAUMATIC ASPHYXIA

- A mechanism that holds or pushes the chest wall inward. Compression injury.
- Examples. A cave-in and the patient is in dirt up to chest. The pressure pushes blood to head and squashes the body. The Addison Airport when the mechanic went under the airplane and the wheels collapsed and the plane smashed his body that was under the plane and his head was out and popped.

- Signs - blue face, bulging blue tongue, blood from eyes, ears, nose. Throat triples in size. Dead if not already dead. This all depends on the force on the body. If the person is still talking what do you think will happen when the item squeezing them is removed?
- Care ABC's, PASG to keep pressure up. Load and go.
- If trapped for 20 minutes or more consider 1mEq/kg Sodium Bicarb.

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Abdominal Trauma Outline

ABDOMINAL / PELVIS INJURIES

THIS IS RELATED TO TRAUMA ONLY FROM PAGES 493.

ABDOMINAL INJURIES

- The abdominopelvis can hold lots of blood before symptoms and signs appear.
- Abdominal symptoms have a delayed presentation of hours to days as a general rule.
- Solid organs bleed. Solid organs filter things. Liver, Kidneys, Spleen.
- Hollow organs spill. Hollow organs hold something. Colon, Intestine, Gall Bladder, Stomach.

- Any trauma to abdominal injury has internal bleeding until known otherwise. Especially is heart rate is elevated.
- Peritonitis is inflammation of peritoneum. The abdominal cavity is the cleanest in the body.
- Rebound tenderness - indicates spilling.
- Unexplained shock is the most significant indicator of severe abdominal trauma.
- Abdominal distention is considered a late finding.
- Left flank area direct trauma associated with kidney trauma.
- Definitive care for traumatic intra-abdominal hemorrhage is surgery.
- Fluid replacement should not exceed 3000mL and titrate a BP to 80 mmHg.

DECELERATION INJURY

- Pulmonary vessels, Aorta, Liver, Spleen are help by ligaments that hold them in place. During a collision the organs move with the motion and the ligaments slice (shear) them like string through butter.

TRIPLE A (AORTIC ABDOMINAL ANEURISM)

- Major bleed. Pulsating abdominal motion every time the heart contracts.
- Low BP.
- Decreased/absent pulses in legs.
- Load and Go.

PELVIS INJURIES

- Male or female bleed a lot.
- Males more vulnerable to trauma.
- Any female with abdominal pain of reproductive age has tubal pregnancy until known otherwise.

BLADDER

- Fractured pelvis cavity can rupture bladder and contaminate.
- Leakage of urine into the abdominal cavity results in peritonitis.