

Injury of the Chest and Abdomen



Thoracic Trauma

- Introduction
- PRIMARY SURVEY:
life-threatening injuries
 - Airway
 - Breathing
 - Circulation
- SECONDARY SURVAY:
potentially life- threatening injuries

Introduction

- leading cause of death UNDER 40 years
- 25% of deaths from blunt trauma are due to chest injuries
- chest injuries result from
 - BLUNT or/and
 - PENETRATING trauma
- chest injuries interfere with
 - respiration,
 - circulation
 - or both

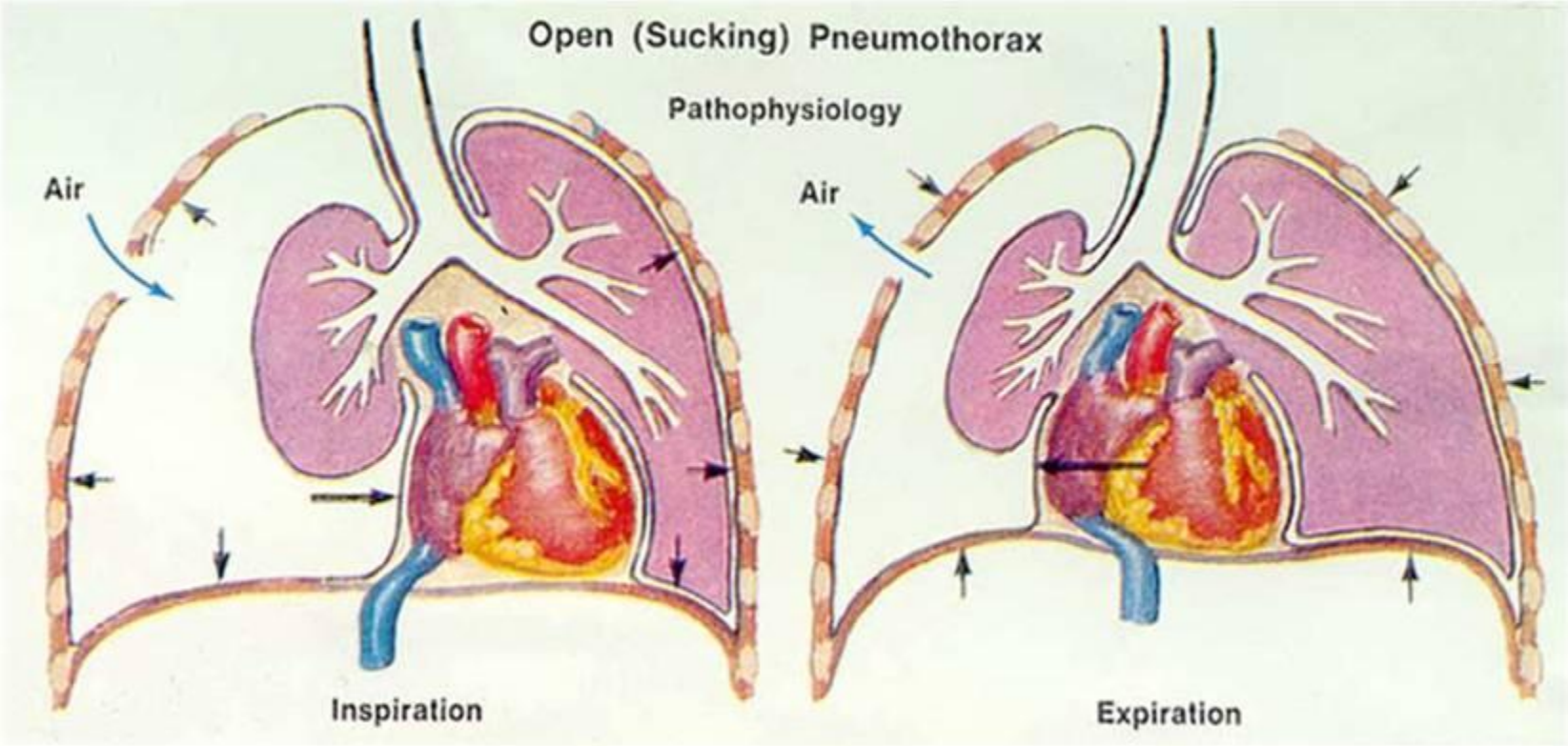
Primary Survey

- A - airway patency and air exchange should be assessed
- B - tension pneumothorax, open pneumothorax flail chest and pulmonary contusion, massive hemothorax
- C - massive hemothorax, cardiac tamponade

Open Pneumothorax

- collection of air in the pleural cavity resulting in collapse of the lung on the affected side
- follows a penetrating chest trauma such as a stab wound, gunshot injury or fractured rib
- breathing shallow, rapid, laboured. Reduced expansion of the hemithorax
- sucking chest wound – visibly bubbling
- first aid: **cover the wound with non-occlusive dressing**
- definitive: chest drain insertion

Open Pneumothorax



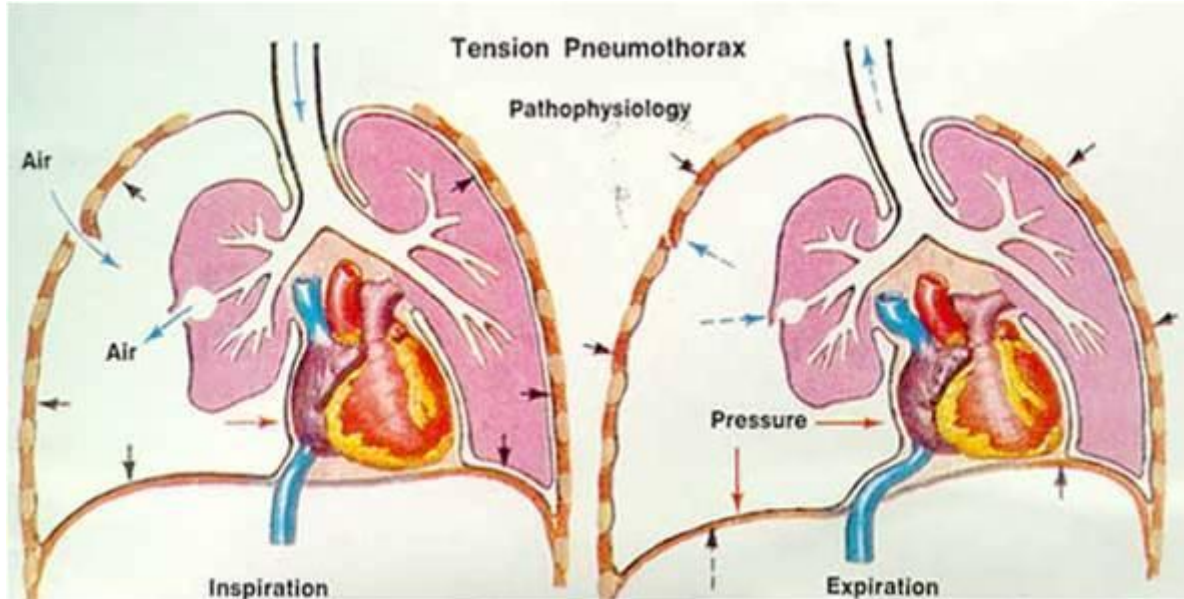
Pneumothorax



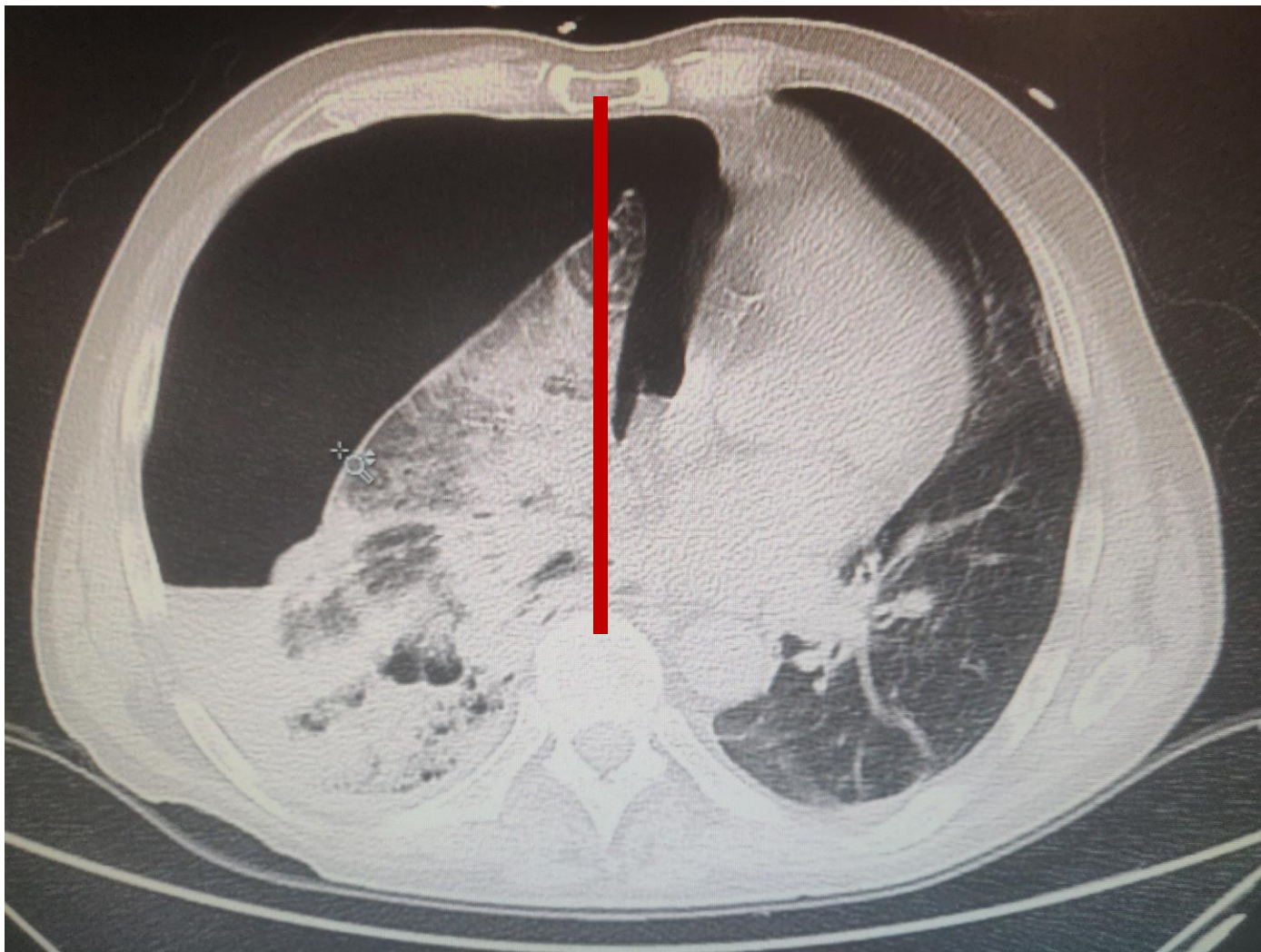
Tension Pneumothorax

- develops when a one-way valve air leak occurs from the lung or through the chest wall
- air is forced into the thoracic cavity without any means of escape
- mediastinum is displaced to the opposite side, decreasing venous return and compromising the opposite lung
- chest pain, air hunger, tachycardia, hypotension, tracheal deviation, cyanosis, neck vein distention, unilateral absence of breath sounds
- requires **immediate decompression** and **chest drain insertion**

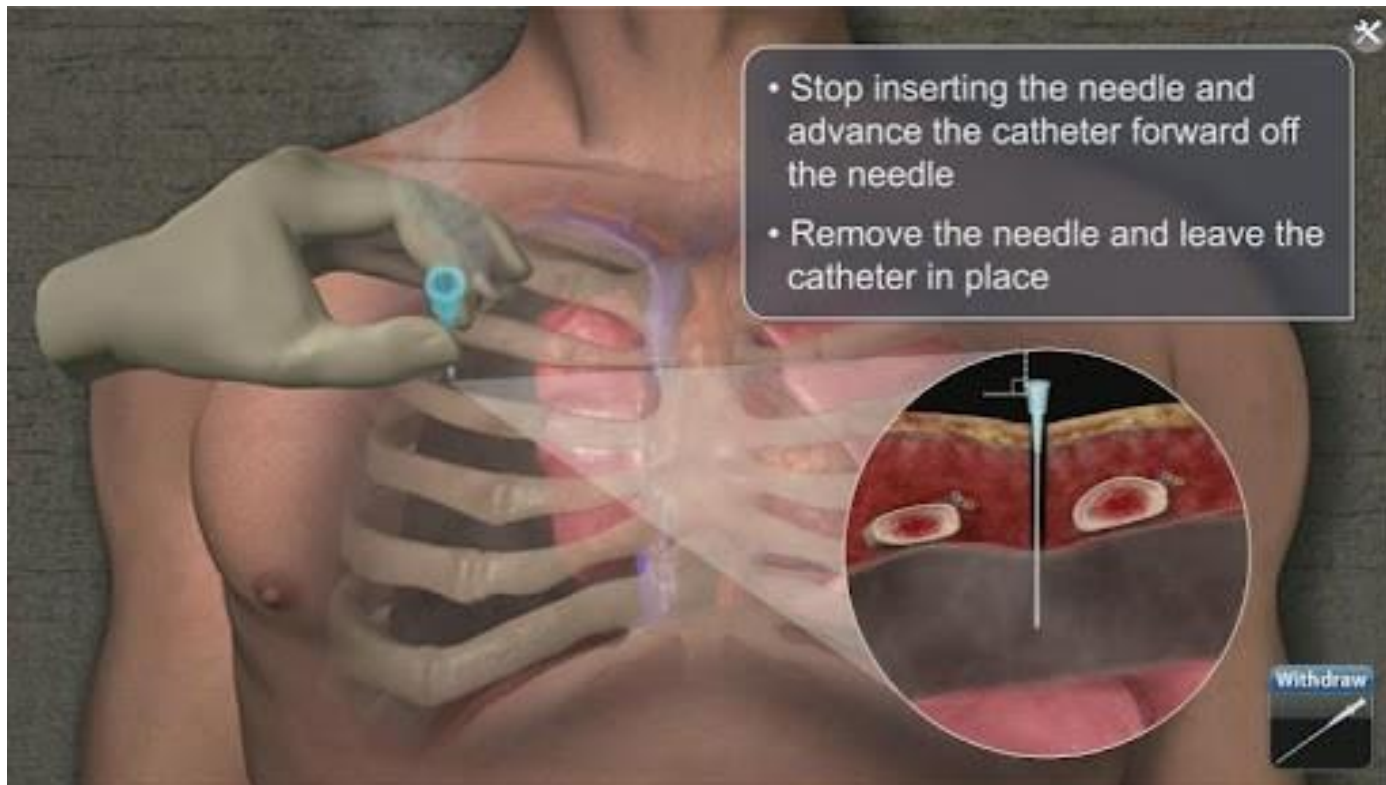
Tension Pneumothorax



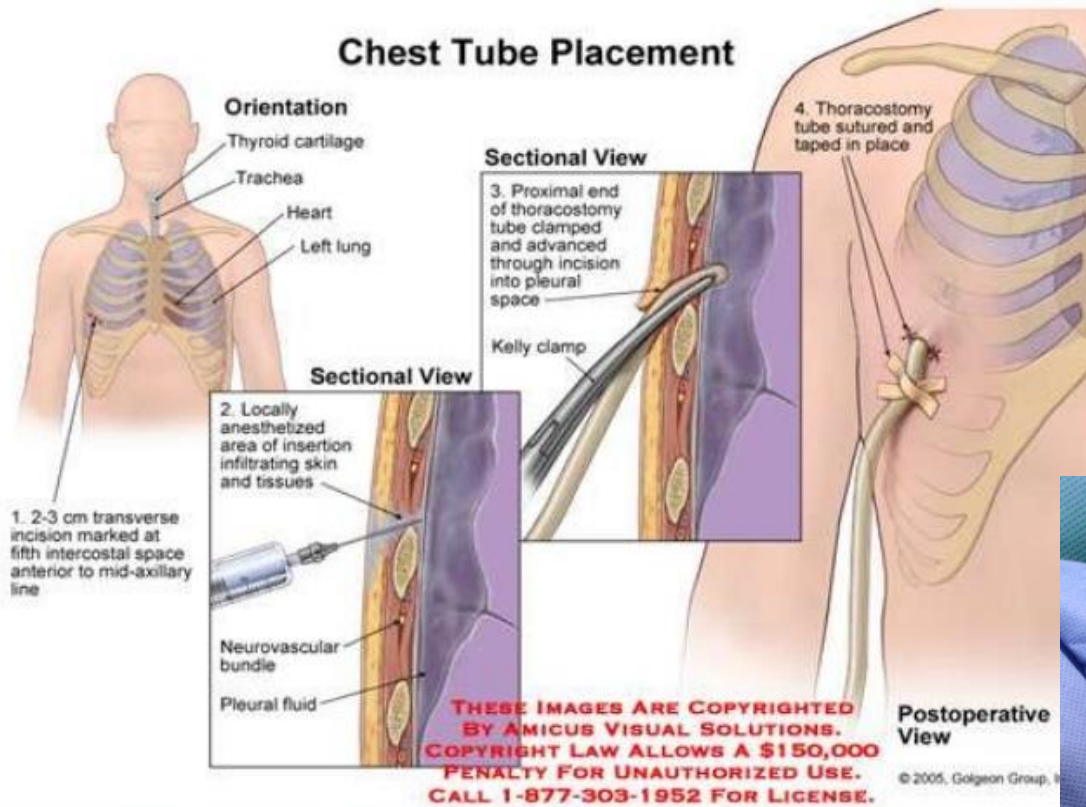
Tension Pneumothorax



Needle Decompression



Chest Drain Insertion



Flail Chest and Pulmonary Contusion

- chest wall does not have bony continuity with the rest of the thoracic cage
- unilateral fractures of four or more ribs or bilateral
- chest wall instability leads to paradoxical motion of the chest wall
- underlying lung injury - **Pulmonary Contusion**

Massive Hemothorax

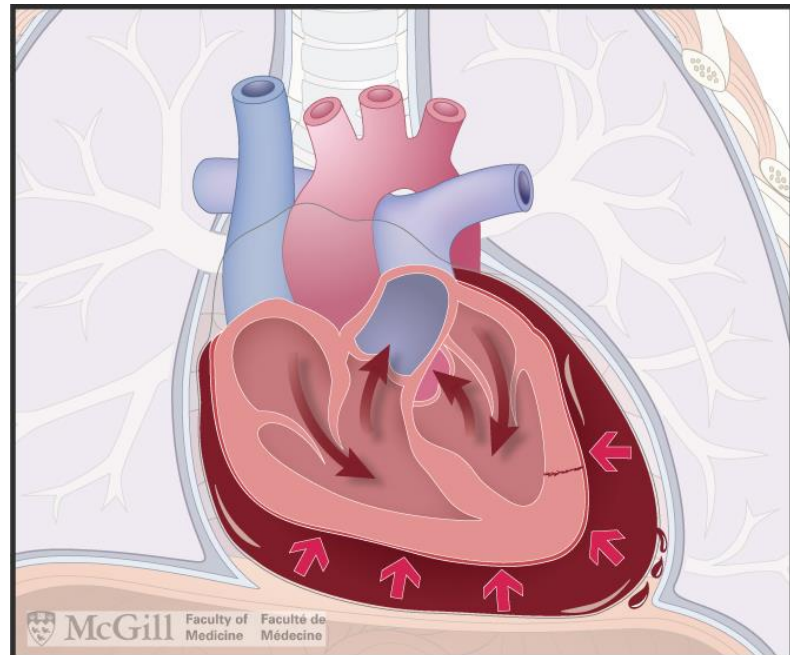
- **accumulation of blood in a hemithorax (>1500ml)**
- may significantly compromise respiratory efforts by compromising the lung and preventing adequate ventilation
- **C** - more dramatically present as hypotension and shock
- decreased breath sounds, signs of shock (pulse rate, respiratory rate, skin circulation)
- it is necessary to **place the chest tube and check the blood loss**

Hemothorax



Cardiac Tamponade

- penetrating injuries
- small amount of blood in the pericardial sac will restrict cardiac activity
- **pericardiocentesis**



Secondary survey

- simple pneumothorax
- hemothorax
- pulmonary contusion
- tracheobronchial tree injury
- blunt cardiac injury
- traumatic aortic disruption
- traumatic diaphragmatic injury
- blunt esophageal rupture

Trachea and Bronchus Injuries

- mediastinal and deep cervical emphysema, hemoptysis, tension pneumothorax
- or PNO with a massive air leak
- respiratory distress is frequent
- bronchoscopy and inserting the endotracheal tube beyond the injury
- small lesions may be managed without surgical treatment
- for an early stricture either resection or a bronchoplastic procedures /stents/

Heart and Aorta

Blunt cardiac injury

- spectrum of cardiac changes - from wall bruise to ventricular, septal or valvular rupture
- diagnosis is difficult
- arrhythmia can occur
- many cardiac contusions are unrecognised

Traumatic Aortic Disruption

- traumatic aortic rupture is a common cause of sudden death after RTA (road traffic accident)
- most patients die immediately from exsanguination
- treatment:
 - primary repair,
 - replacement with a graft or endovascular

Other injuries

- **Ruptures of diafragm** - may result of herniation of viscera
- herniation of viscera may not occur immediately

- **Esophagus** - blunt injury of oesophagus is rare

- both require surgical treatment

Abdominal Trauma

- blunt trauma- organs most frequently injured
 1. Spleen (40-55%),
 2. Liver (35-45%),
 3. Small bowel (5-10%)
- penetrating trauma
 - stab wounds, low velocity wounds:
tissue damage by lacerating and cutting
 - high velocity wounds:
transfer more kinetic energy to abdominal viscera

Assessment

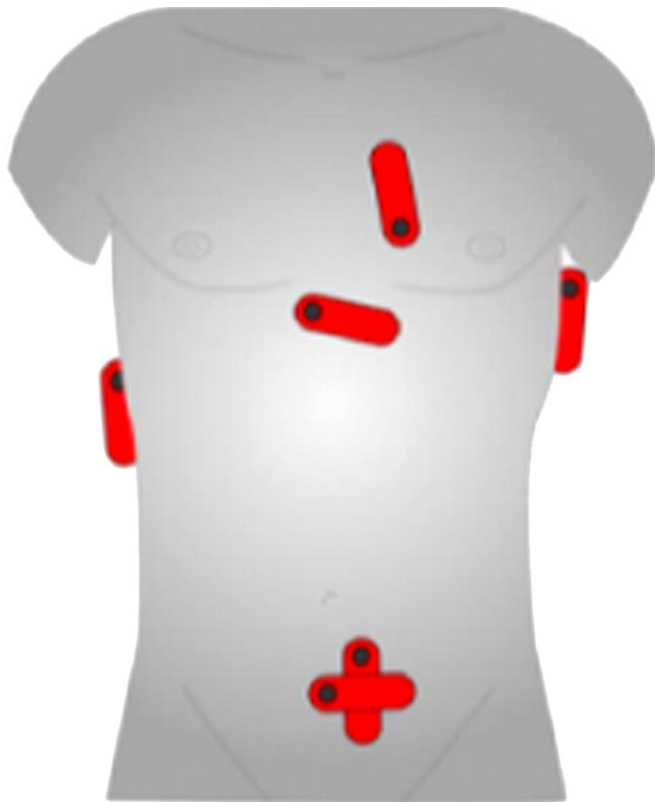
- history
- physical examination
 - inspection: abrasions, contusions from restraint devices, lacerations, penetrating wounds
 - auscultation: presence or absence of bowel sounds
 - percussion and palpation: peritoneal irritation
- FAST - Focused Assessment Sonography in Trauma
- DPL - Diagnostic Peritoneal Lavage
- CT - Computed Tomography

Ultrasonography



FAST = Focused Assessment with Sonography in Trauma

TRANSDUCER POSITION



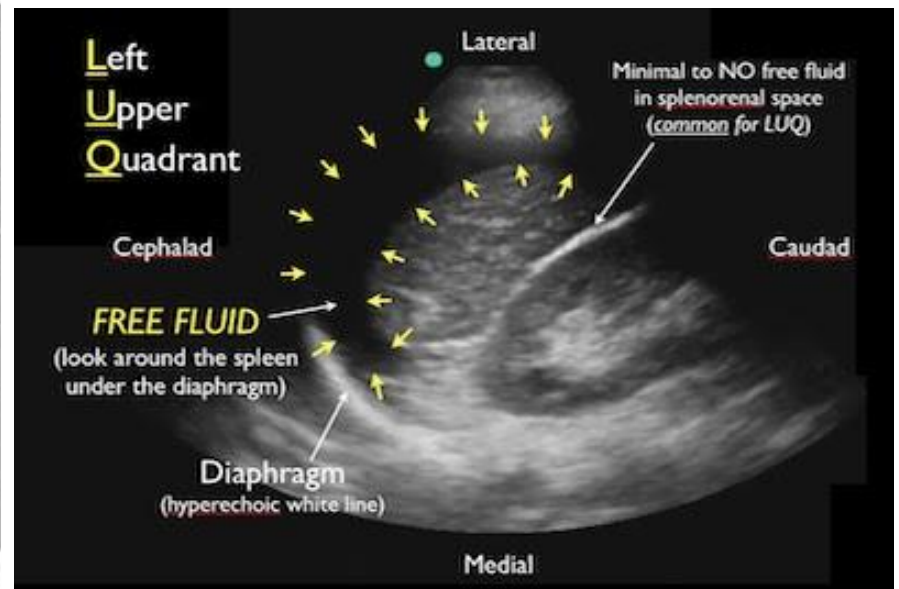
VIEW

- RUQ:hepato-renal recessus
(Morrisons pouch)
perihepatic view
- LUQ: spleno-renal recessus
perisplenic view
- PERICARDIAL SAC
subxiphoid and parasternal view
- PELVIC CAVITY
retrovesical view

FAST scan



Fig. 1. Right upper quadrant view depicting a positive FAST scan obtained during the study period with free fluid visible in Morrison's pouch.



- fast,non-invasive
- rules in,not out
- can be repeated

CT



Diagnostic Peritoneal Lavage



Spleen

- is the most commonly injured intraabdominal organ
- the diagnosis and prompt management of potentially life-threatening hemorrhage is the primary goal
- diagnosis is confirmed by CT scan
- therapy: surgical– splenectomy
- the preservation of functional splenic tissue is secondary (non operative management)

Liver and Biliary Tree

- The liver is one of the most commonly injured organ.
- definitive confirmation: CT
- operative intervention to manage the liver injury is needed in about 14 % of patients management needed in 15% of patients

Stomach

- Most gastric injuries are due to **penetrating trauma**
- Blunt trauma is rare
- If **vomit** or gastric aspirate is **bloody**, an injury to the stomach should be suspected.
- Therapy:
Laparotomy: can be treated simply with debridement and closure in layers.

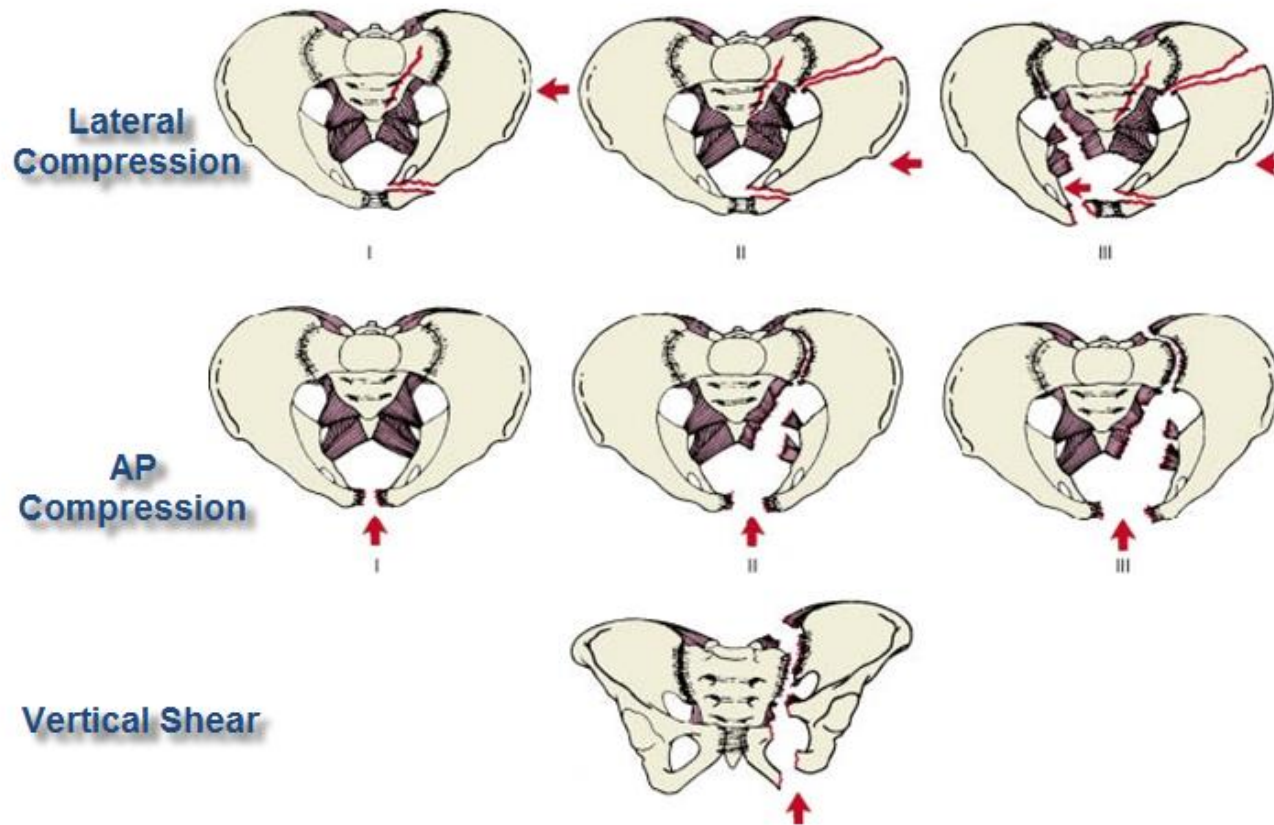
Other injuries of abdomen

- Duodenum
- Pancreas: pancreatic trauma is relatively uncommon
- Intestines
- Colon and rectum
- Major abdominal vessels
- Urinary tract: hematuria is present

Pelvic Trauma

- pelvic cavity surrounded by the pelvic bones contains rectum, bladder, iliac vessels, female reproductive organs
- pelvic fractures – with opening of the pelvic ring, there may be hemorrhage from the posterior pelvic venous complex and branches of the internal iliac artery

Mechanism of injury/Classification



Management

- splint unstable pelvic fracture
 - sheet wrapped around the pelvis as a sling
 - commercially available pelvic splints



