CHEST INJURIES

by

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Trauma remains the most common cause of death for all individuals younger than 45 years.

It is the third most common cause of death regardless of age.

Mortality from thoracic trauma accounts for 25% of all trauma deaths.
Mortality from chest wounds had progressively decreased from 90% in the beginning of the last century to approximately 5% nowadays.

Over 70% of thoracic injuries result from blunt trauma.
Types of trauma

- **Penetrating trauma:**
  - Stab wounds
  - Firearm injuries

- **Blunt trauma:**
  - Road traffic accidents
  - Fall from height
  - Direct blows
  - Crushing injury
  - Blast kinetic energy
Diagnostic tests

- Chest X-ray
- Chest CT
- Chest MRI
- Ultrasonography
- Echocardiography
- Angiography
Indications for ED thoracotomy

1) Rapid exsanguinations from the chest tube.
2) Traumatic arrest after penetrating thoracic injuries.
3) Persistent hypotension with diagnosed cardiac tamponade or air embolism.
Rib fractures

- Most common injury.
- Associated injuries.
- Diagnosis.
- Management.
- Methods of pain control.
- First rib fracture.
Flail chest

- Fracture of 4 or more ribs at 2 sites unilateral (anterior and posterior) or bilateral (anterior or costochondral) promoting enough instability → local paradoxical motion.
THE MECHANISM OF A FLAIL CHEST

- Inspiration: Mediastinum shifts with each breath.
-Expiration: Loose part of the chest wall.
Effect.

Indications of intubation.

Treatment:

- Strong analgesia (epidural catheter).
- Stabilization (operative and non-operative)
TRACTION FOR A FLAIL CHEST

towel clips with ratchets

flail area
Other fractures

- Clavicle
- Sternum
- Scapula
- Humerous
Lung contusion

- **Aetiology**: deceleration injury or crushing trauma → hemorrhage and interstitial edema → obliteration of alveolar spaces and consolidation.

- **Diagnosis**: symptoms – signs – investigations.

- **Management**: indications of ventilation.
Pneumothorax

- Open.
- Tension.
- Partial.
- Management.
Haemothorax

- Source of blood
- Diagnosis
- Management
- Indications of thoracotomy
- Autotransfusion
- Clotted haemothorax
Tracheobronchial injuries

- **Mechanisms of injury:**
  - Penetrating injury
  - Anterior compression (dashboard injury)
  - High airway pressure
  - Rapid deceleration

- **Diagnosis:**
  - Surgical emphysema
  - Bronchoscopy
  - Falling lung sign of Kumpe
Management:

- Intubation (double or single lumen)
- Endobronchial blockers
- Primary surgical repair
- Lobectomy
- Cervical incision or right thoracotomy
- Absorbable interrupted sutures
Great vessels injury

- Common site of injury at the ligamentum arteriosum.
- CT – TE – angiography.
Non operative management:
- Beta blockers
- Delay of definitive treatment
- Stents

Operative repair:
- Clamp and sew
- Passive shunting
- Left side heart bypass
Approaches for subclavian vessels:

1) Clavicular incision.
2) Clavicular and sternotomy.
3) Trapdoor incision (clavicular + upper sternotomy + 4th anterior thoracotomy).
4) High anterior thoracotomy 2nd or 3rd space.
Cardiac injury

- Penetrating.
- Blunt:
  - Sternal compression
  - Impingement between sternum and vertebral bodies
  - Increased venous return from crushed lower limb.
Grades of blunt cardiac injury

- Minor ECG changes
- Major ECG changes
- Increased cardiac enzymes
- Free wall hematoma
- Septal hematoma
- Septal defect
- Valvular insufficiency
- Free wall rupture
- Cardiac herniation
- Coronary artery injury
- Increased cardiac Troponine I and T is sensitive for myocardial injury.
- Even small cardiac injury unlikely to heal spontaneously.
- Subxyphoid approach.
- Median sternotomy for cardiopulmonary bypass.
- Pledgeted sutures.
- Coronary injury: repair or ligation if small.
- Air embolism in left sided lesions (Foley catheter).
- Pericardial tears → cardiac herniation.
Diaphragm

- Penetrating or blunt (common on left side).
- According to time of presentation: acute – latent – obstructive.
- Laparoscopy or thoracoscopy for occult lesions.
Diaphragmatic defects do not heal spontaneously.

- **Acute** → laparotomy.
- **Latent right** → thoracotomy for adhesions.
- **Latent left** → thoracotomy or laparotomy.
- **Non-absorbable 2 layers.**
Esophagus

- Penetrating injury is more common.
- Simultaneous rupture of membranous trachea is common.
- Boerhaave-like rupture due to increased intraluminal and intraabdominal pressure (more left side lower).
- X-ray with contrast – CT.
- Cervical incision.
- Right thoracotomy.
- Left thoracotomy.
- Tissue flap.
Thank you