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SHSS6067

Sports Trauma Management Breathing and Chest Trauma

*Trawsnewid Addysg; Trawsnewid Bywydau
Transforming Education; Transforming Lives*



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Major chest trauma is rare in sport, however these injuries do still occur

Objectives

1. To understand the initial assessment and management of a player with chest trauma.
2. To discuss the recognition and management of immediately life threatening conditions.
3. To discuss the recognition and management of potentially life threatening injuries.

Recognition of breathing problems

- SAFE Approach?
- ABCDE
- supplemental oxygen is delivered ASAP
- Simple On field examination of Breathing
- More thorough examination in the medical room

- The simple “on the field” examination consists of:
 - Colour and conscious level
 - Talk:
 - Can the player talk to you? If so, can he manage full sentences?
 - **R**espiratory rate:
 - Get a baseline, is the situation improving or deteriorating?
 - **E**xpansion:
 - The hands should be placed on the anterior chest wall. This allows for a rapid assessment of chest expansion
 - **S**oreness

The more thorough medical room examination will be governed by the practitioner's concerns and the player's condition, but is likely to include as a minimum:

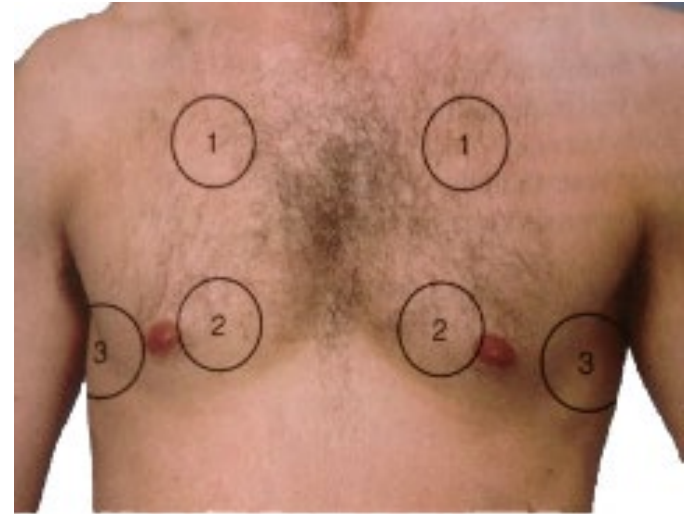
- Colour and conscious level, talk, Respiratory **R**ate, **E**xpansion & **S**oreness

Plus

- Percussion note
- Breath sounds and air entry (high and wide)
- Tracheal position

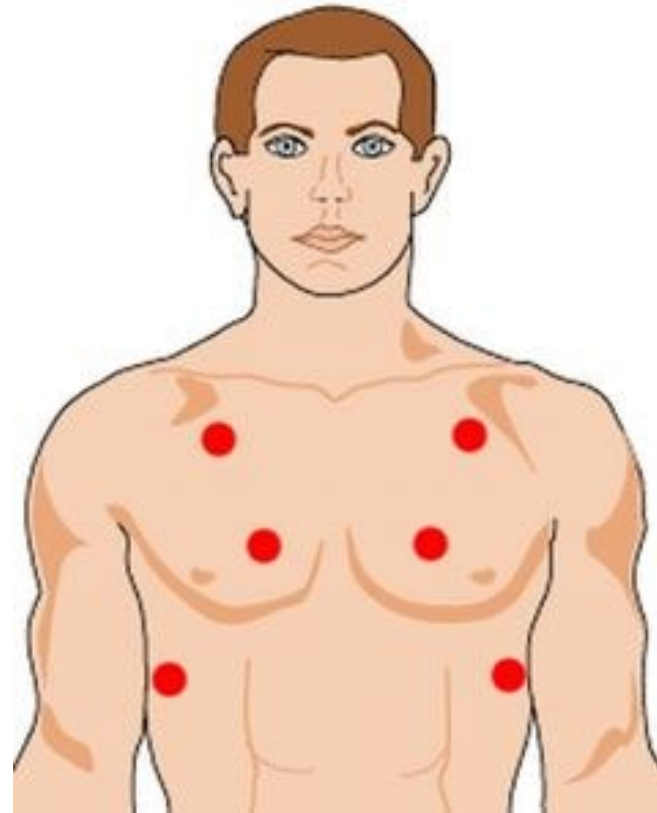
Percussion Note

- Two finger tap over the middle finger of the opposite hand
- Three positions
 - Hypo resonant - Dull
 - Resonant - Normal
 - Hyper resonant - Loud, hollow



Breath Sounds

- Use stethoscope
 - Upper L & R Lung Field
 - Middle L & R Lung Field
 - Lower L & R Lung Field
- Normal Breath Sounds
- Abnormal Breath Sounds
 - Coarse crackles
 - Fine crackles
 - Wheeze
 - Stridor
 - Absent breath sounds



Tracheal Position

- Should be located in between the heads of the clavicles
- Abnormal position would be any deviation of the trachea outside of the clavicle channels



Life threatening chest injuries

- There are six immediately life threatening chest injuries which we will consider. These are:
 - **A**irway obstruction
 - **T**ension pneumothorax
 - **O**pen pneumothorax
 - **M**assive haemothorax
 - **F**lail chest
 - **C**ardiac tamponade (Contusion)

Airway Obstruction

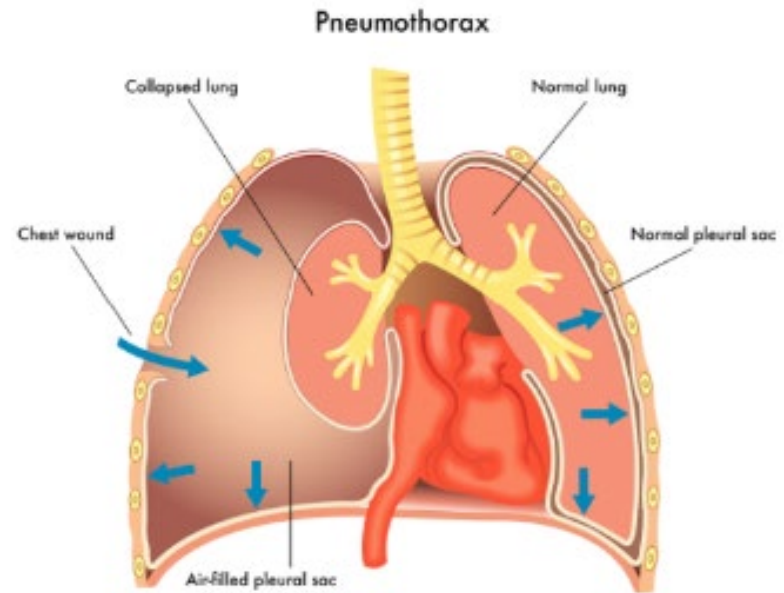
- From laryngeal trauma
- Patient will present with delayed hoarseness & Subcutaneous Emphysema (bubbling of the skin)



Figure-1: Anterior aspect of the patient's neck with ecchymosis and cervicofacial swelling are present.

Tension Pneumothorax

- Puncture of the pleura leading to air entering the pleural space
- Air can enter but cannot leave
- Collapse of the ipsilateral lung
- Life threatening as it leads to the mediastinum shifting to the contralateral side, kinking the vena cava, reduced venous return and ultimately cardiac arrest



Tension Pneumothorax

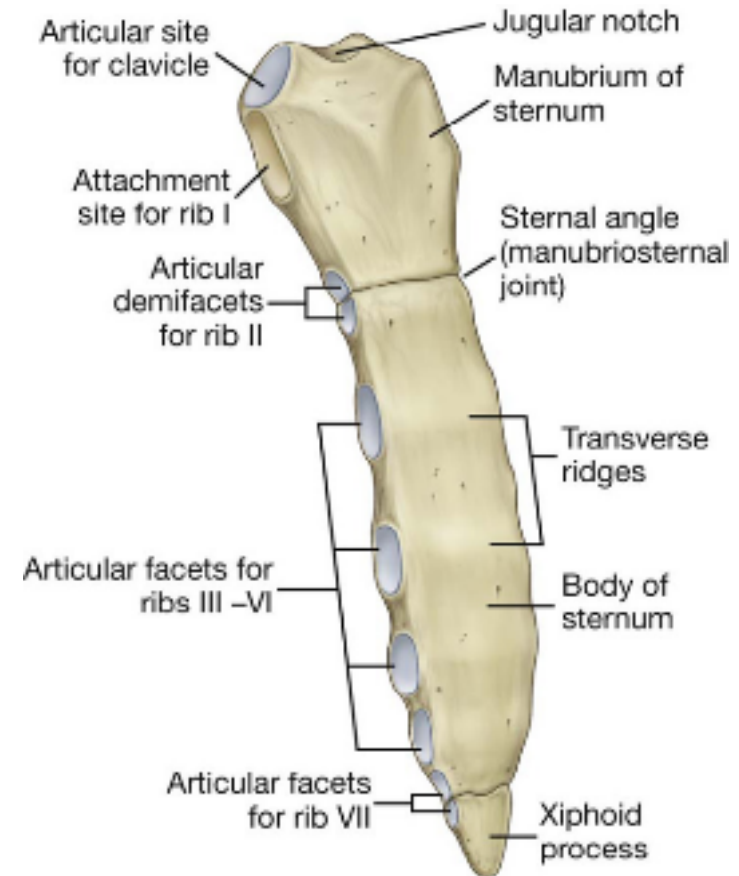
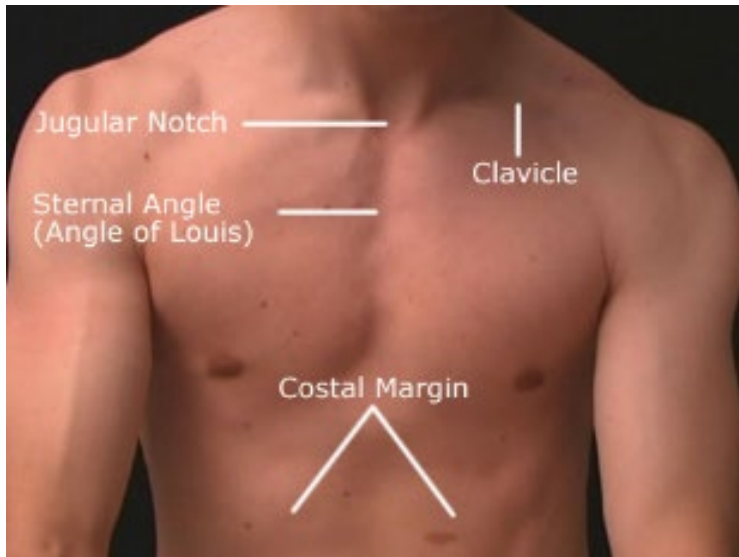
- Signs
 - Respiratory distress
 - Distended neck veins
 - Ipsilateral
 - Reduced air entry
 - Hyper-resonant percussion note
 - Reduced chest expansion (barrelling)
 - Tachycardia (HR above 100bpm)
 - Cyanosis (Late Sign)
 - Tracheal Deviation (VERY Late Sign)

Tension Pneumothorax

- Management

- High flow Oxygen via a non-rebreath mask (NRBM)
- Refer to ED
- IF NO AIR ENTRY ON ALL 3 AREAS & HYPERRESONANT IN ALL 3 AREAS
- Immediate decompression
 - Needle thoracocentesis (14-16G cannula)
 - 2nd intercostal space on the mid-clavicular line above the third rib
 - OR (not both) 5th intercostal space anterior to the mid axillary line above the sixth rib

Tension Pneumothorax treatment and surface anatomy

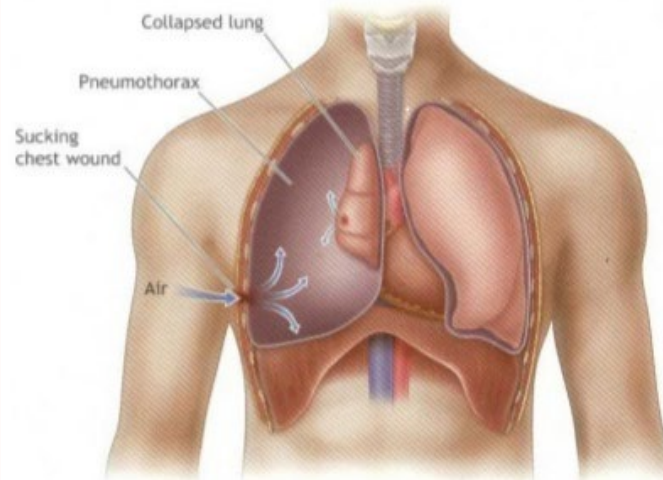


Open Pneumothorax

- Penetrating injury
- Sucking chest wound

If the wound is greater than 2/3rds of the diameter of the trachea no gaseous exchange can take place

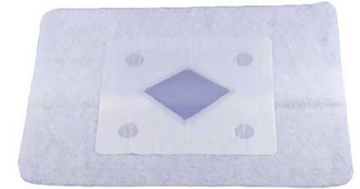
OPEN PNEUMOTHORAX: *Pathophysiology*



- Known as “sucking chest wound.”
- Air allowed to enter pleural space from the outside.
- Ineffective ventilation because air goes in and out from the chest wound, rather than from trachea.
- Leading to hypoxia and hypercarbia.

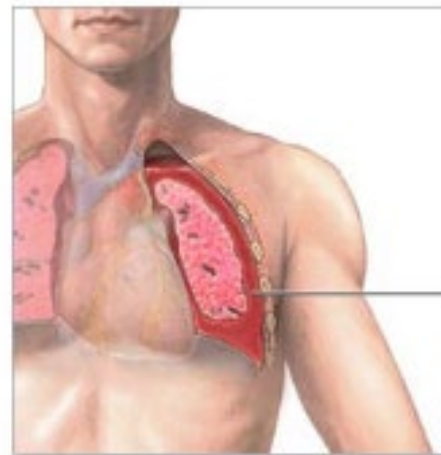
Open Pneumothorax

- Signs
 - Defect in the chest wall
- Management
 - ABCDE approach
 - High flow Oxygen via NRBM
 - Cover the defect with a Russell Chest Seal
 - Rapid transfer to ED



Massive Haemothorax

- Greater than 1500ml (30%) of circulating blood volume in the pleural space
- Affects gaseous exchange & causes hypovolemia



Blood in
pleural space

ADAM

Massive Haemothorax

- Signs

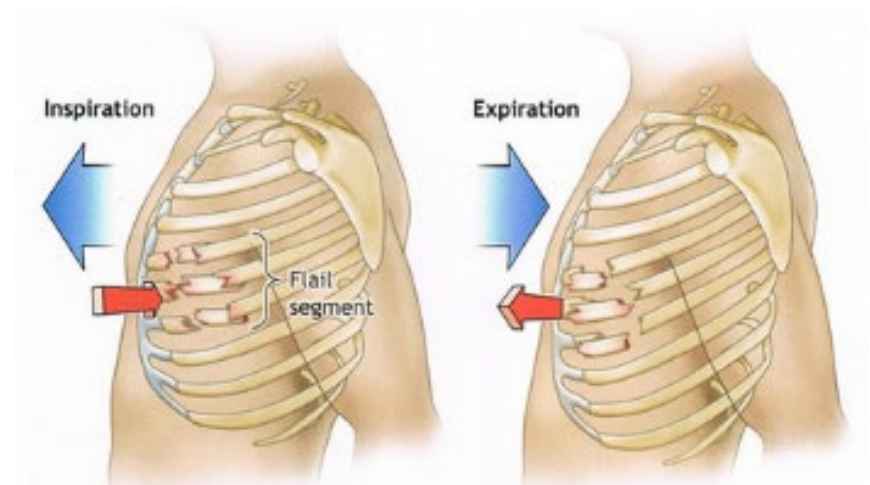
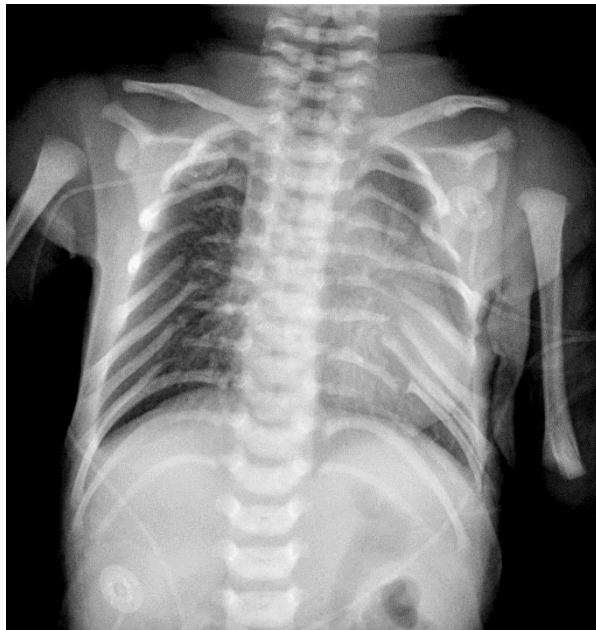
- Tachypnoea
 - Rapid breathing (>20 breaths per minute)
- Tachycardia (HR above 100bpm)
- Ipsilateral
 - Reduced air entry
 - DULL percussion note (Hypo resonant)
 - Possible loss of radial pulse (hypotension)

- Management

- High Flow Oxygen (via NRBM)
- Fluid Therapy if indicated
- Rapid transfer to ED

Flail Chest

- 2 or more ribs fractured in 2 or more places
- Pulmonary contusion must also be suspected



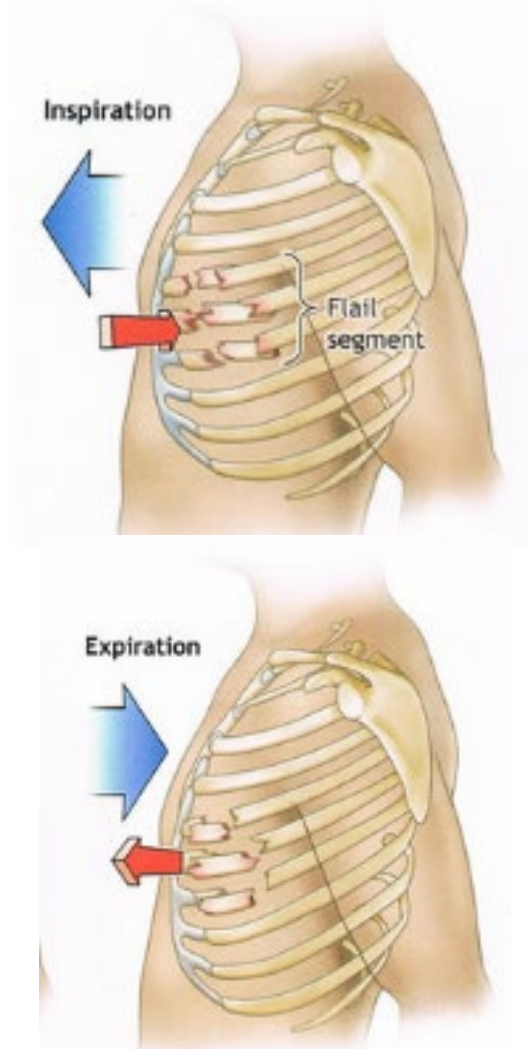
Flail Chest

- Signs

- P+++
- Palpable crepitus
- Tachypnoea (rapid breathing > 20 breaths per min)
- Shallow breaths
- Paradoxical Movement of flail segment (but watch for splinting)

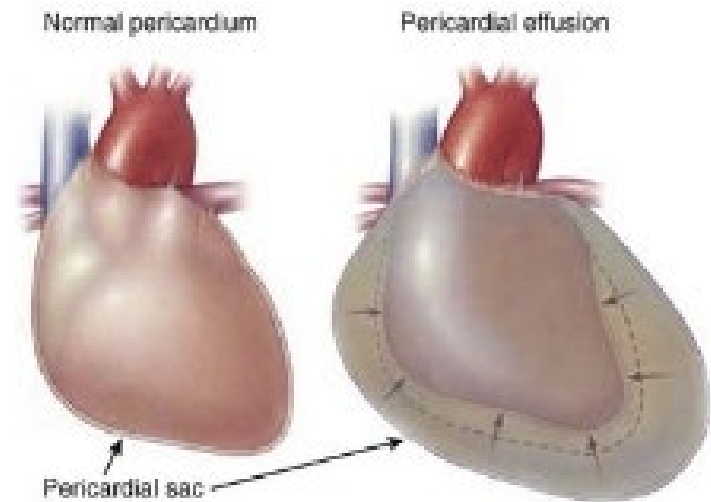
- Management

- ABCDE approach
- High flow O2 via NRBM
- Appropriate Analgesia (NO Entonox)
- Caution: fluid therapy due to ? Pulmonary contusion



Cardiac Tamponade/ Contusion

- Direct trauma may lead to a bleed in the pericardial sac
- Impairing ventricular function
- Cardiac arrest
- Signs
 - Difficult to Dx
 - High index of suspicion with ANY anterior chest wall blow



Cardiac Tamponade/ Contusion

- Signs
 - Beck's Triad
 - Hypotension
 - Distended neck veins
 - Muffled heart sounds
- Management
 - ABCDE
 - High Flow Oxygen via NRBM
 - Transfer to ED ASAP



Potentially Life Threatening Chest Injuries

– Simple Pneumothorax

- P+
- Shortness of breath
- Reduced air entry
- Hyper resonant BUT reduced distress & compromise
- Management
 - ABCDE
 - High Flow Oxygen via NRBM
 - Transfer to ED ASAP

Potentially Life Threatening Chest Injuries

- Haemothorax
 - Reduced air entry
 - Hypo resonant
 - No respiratory or haemodynamic compromise
- Management
 - ABCDE approach
 - High flow Oxygen via NRBM
 - Transfer to ED ASAP

Potentially Life Threatening Chest Injuries

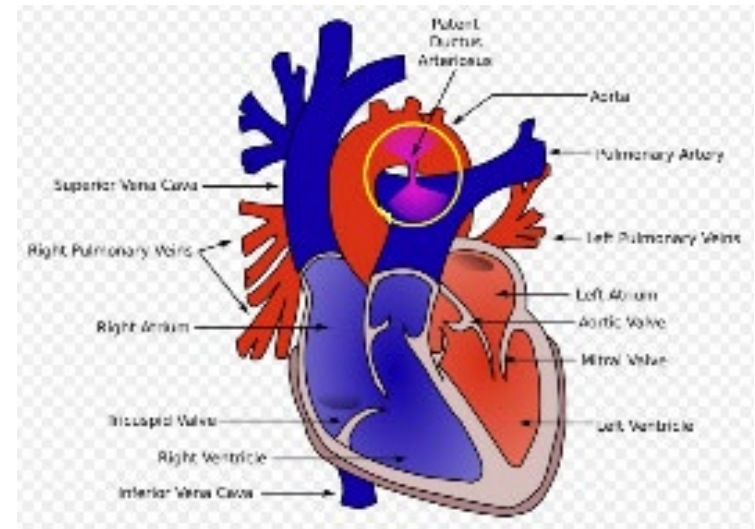
- Pulmonary Contusion
 - Bruising of the lung
 - Not immediately apparent
 - Caution re: fluid therapy
- Management
 - ABCDE approach
 - High flow Oxygen via NRBM
 - Transfer to ED ASAP

Potentially Life Threatening Chest Injuries

- Blunt Cardiac Injury
 - DDX
 - Anterior chest wall injury
 - ? Sternal fracture
 - Signs
 - P+
 - Hypotensive & Dysrhythmias
 - Management
 - ABCDE approach
 - High flow Oxygen via NRBM
 - Transfer to ED ASAP

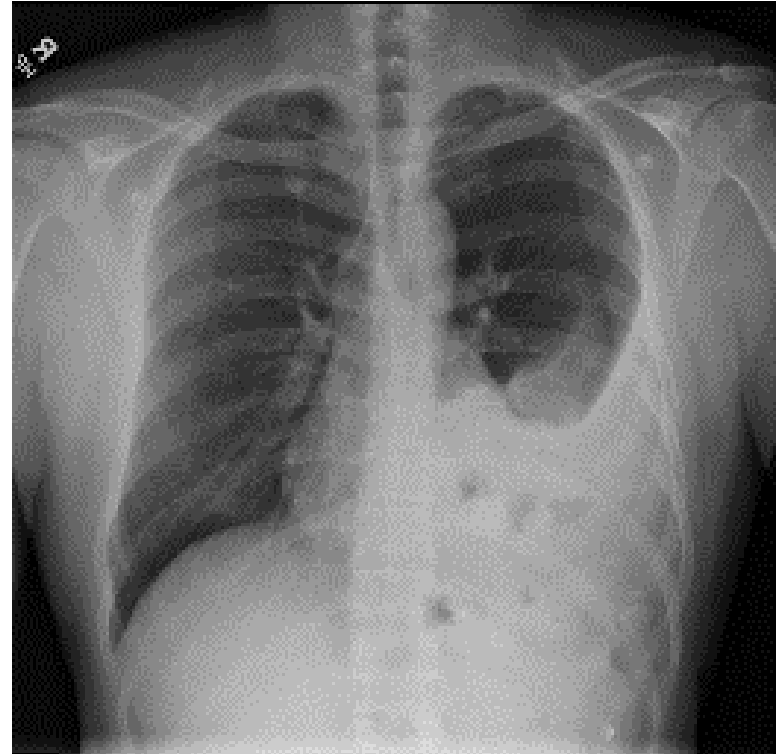
Potentially Life Threatening Chest Injuries

- Traumatic Aortic Rupture
 - Rupture of the ligamentum Arteriosum
- Management
 - ABCDE approach
 - High flow Oxygen via NRBM
 - Transfer to ED ASAP



Potentially Life Threatening Chest Injuries

- Traumatic Diaphragmatic Rupture
 - Rupture of the Diaphragm
 - Resulting in abdomen contents moving up to chest cavity
- Signs
 - Bowel sounds in the chest (Left sided)
- Management
 - ABCDE approach
 - High flow Oxygen via NRBM
 - Transfer to ED ASAP



Key learning points

- Identification of immediate life threatening thoracic trauma
- Identification of potentially life threatening thoracic trauma
- Emphasis on breathing assessment
- Early high flow oxygen
- Specific treatments
- Analgesia
- Transfer to the emergency department as soon as possible