Chest Trauma

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INTRODUCTION

- The chest contains vital organs.
- Damage to vital organs threatens life.
- . Most common consequence is hypoxia.
- Chest injuries result in a significant number of deaths each year
- One in every 4 cases of trauma death caused by chest injury.

Mechanism of injury:

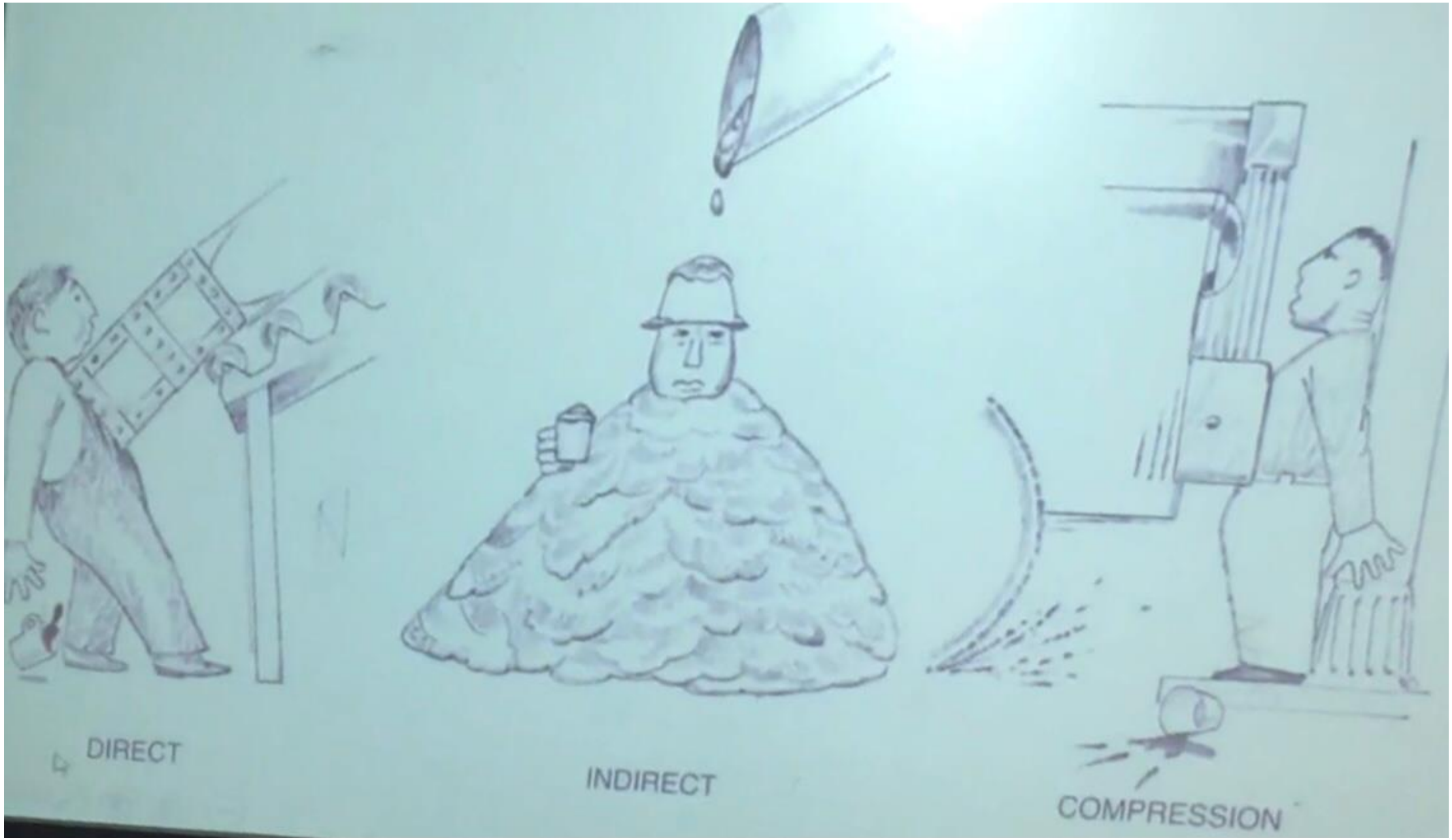
1) Blunt chest trauma

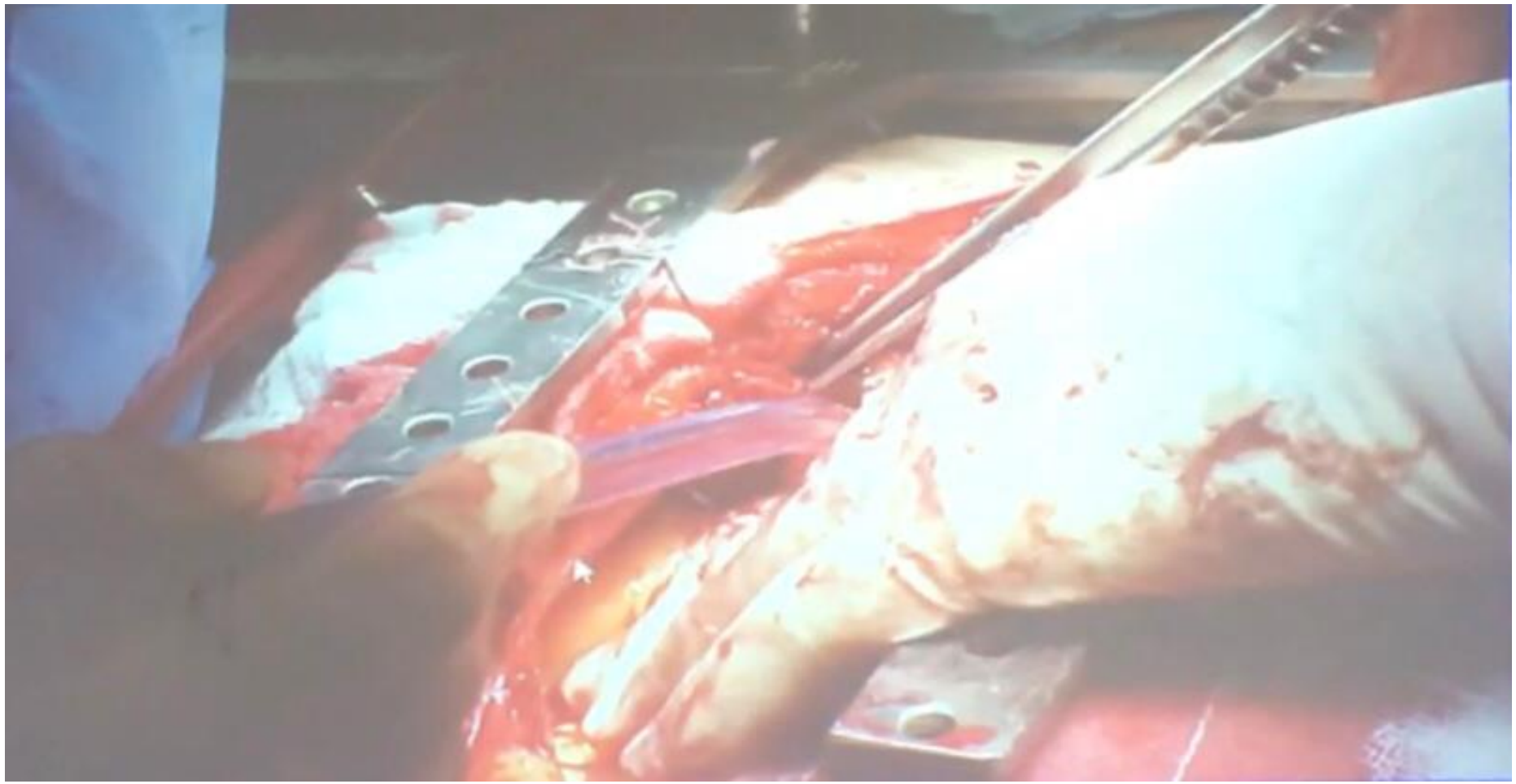
- Most common cause of serious chest injuries.
- Post RTA, falls, direct blows, injuries.
- Many injuries are not immediately apparent in the physical exam.

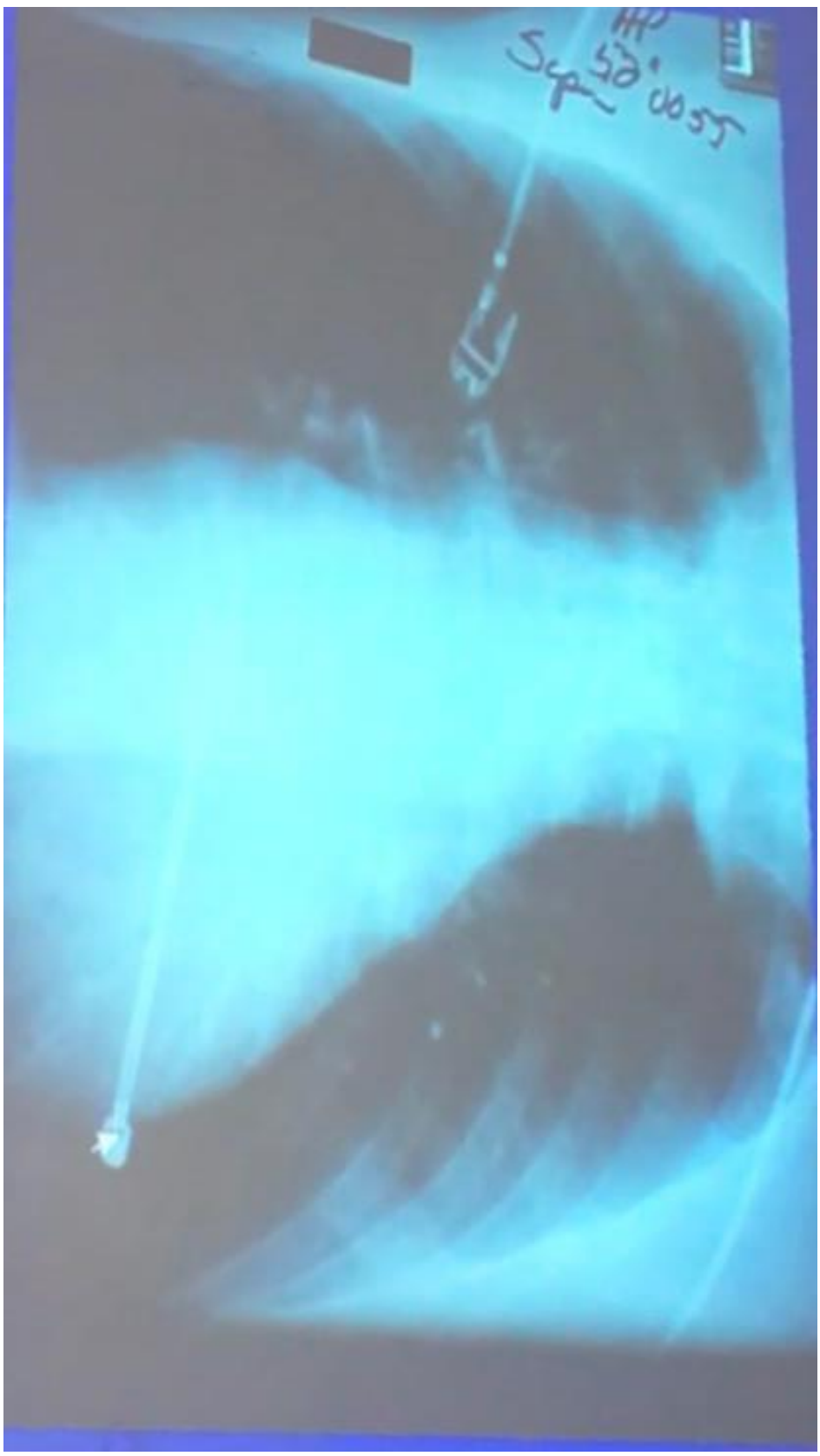
2) Penetrating trauma

- Immediate result can be severe bleeding or impaired breathing.
- Any chest wound can involve underlying organ injury.
- No matter how superficial it looks.
- Injuries to the heart, lungs, and great vessels can quickly lead to shock and cardiac arrest.

3) Iatrogenic


DIRECT
INDIRECT
COMPRESSION





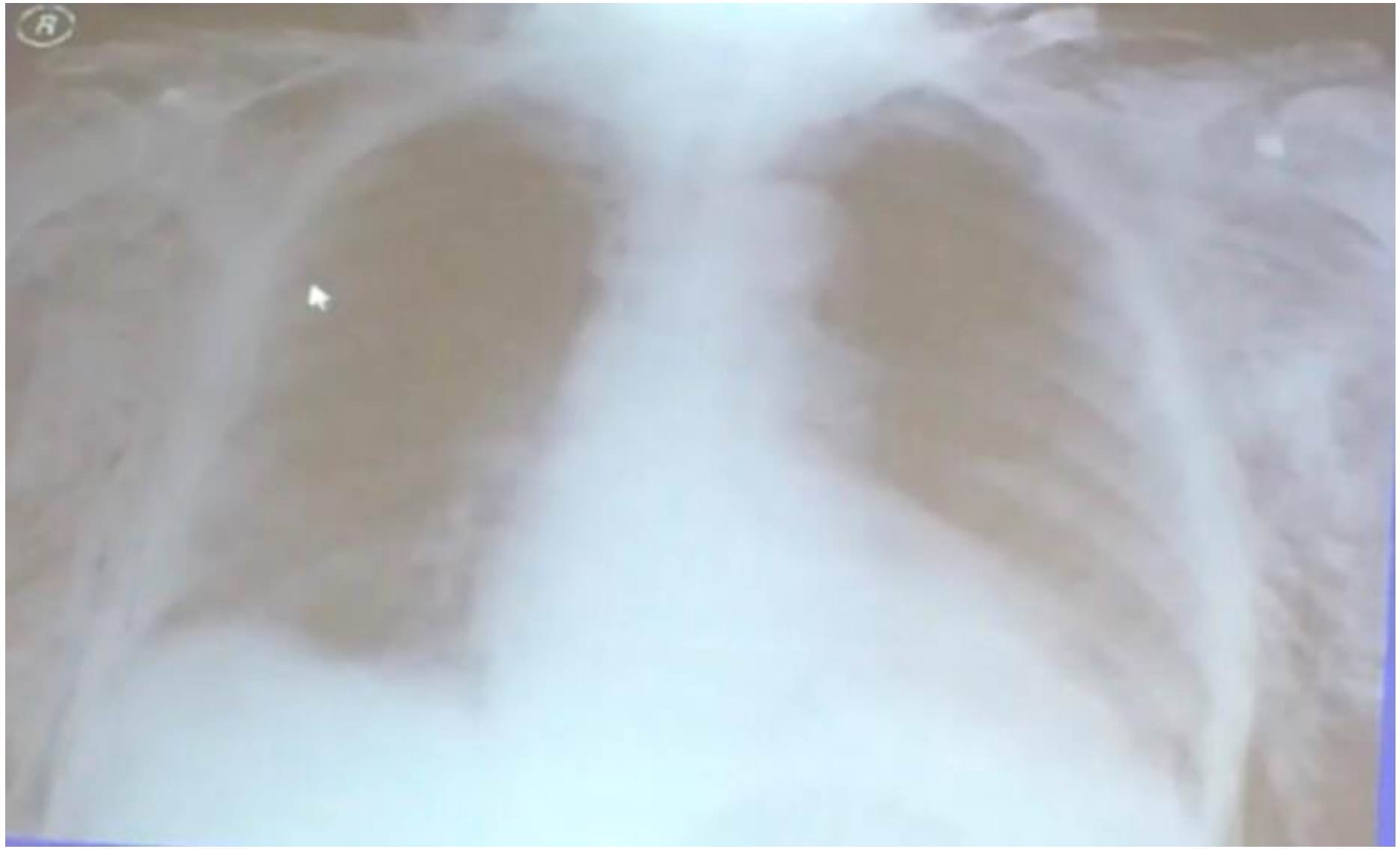
Signs and symptoms

- Most common symptoms: pain and difficulty breathing.
- Signs are obvious injury to the chest wall (looking at both the front and back of the chest).
- Note any subeutaneous emphysema, or air present under the skin

Assessment

Follow all steps in the assessment of the trauma patient:

- Primary survey(A. Airway B. Breathing C. Circulation).
- Resuscitation
- Detailed secondary survey (CXR , ABG ,ECG , CT Chest , Aortogram).



Management

- Ensure patient has adequate oxygenation and perfusio
- Provide high-flow oxygen, ventilating when necessary
- Halt any obvious bleeding
- Support circulation when needed
- Rapidly transport patient to definitive care

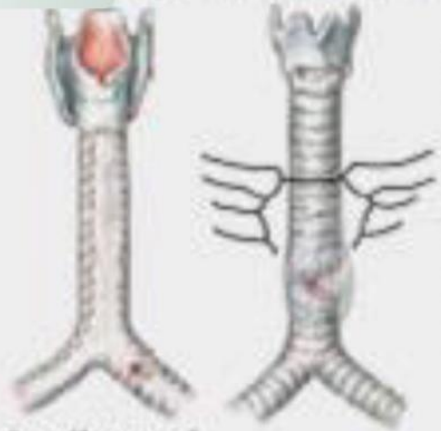
- Life-threatening chest injury identified in the primary survey:

1) Airway obstruction.
2) Flial chest.
3) Tension pneumothorax.
4) Open pneumothorax.
5)Massive hemothorax.
6)Cardiac tamponade.

- Potentially lethal chest injury:

1) Traumatic aortic rupture.
2) Myocardial contusion.
3) Tracheal bronchial injury.
4) Rupture diaphragm.
5) Esophageal,trauma.
6) Pulmonary contusion.

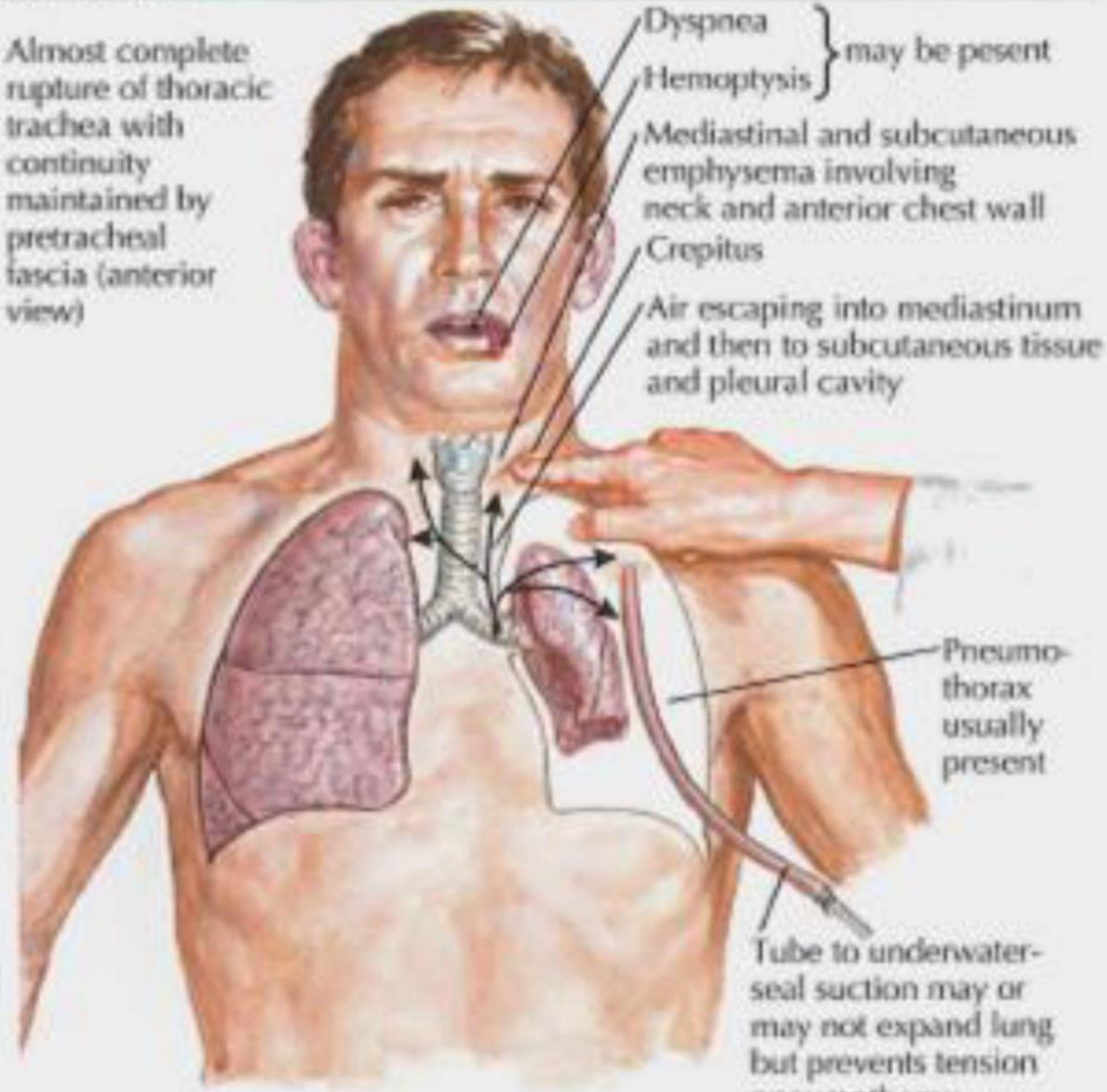
pture of trachea or major bronchi



Almost complete rupture of thoracic trachea with continuity maintained by pretracheal fascia (anterior view)

Small tear of membranous portion of right main bronchus (posterior view)

Complete rupture of cervical trachea with recession of distal segment into thorax (anterior view)



Dyspnea
Hemoptysis
} may be pesent

Mediastinal and subcutaneous emphysema involving neck and anterior chest wall

Crepitus

Air escaping into mediastinum and then to subcutaneous tissue and pleural cavity

Pneumothorax usually present

Tube to underwater-seal suction may or may not expand lung but prevents tension pneumothorax

Rib Fracture

- Most common chest injury.
- More common in adults than children.
- Especially common in elderly.
- Ribs form rings, Consider possibility of break in two places.

Rib Fracture

Fractures of 8th to 12th ribs can damage underlying abdominal solid organs:

- Liver.
- Spleen.
- Kidneys.

Rib Fracture

- Fractures of 1st, 2nd ribs require high force.
- Frequently have injury to aorta or bronchi.
- 30% will die. Rib Fracture

Rib Fracture Signs and Symptoms

- Localized pain, tenderness
- Increases when patient: -

a) Coughs
b) Moves
c) Breathes deeply

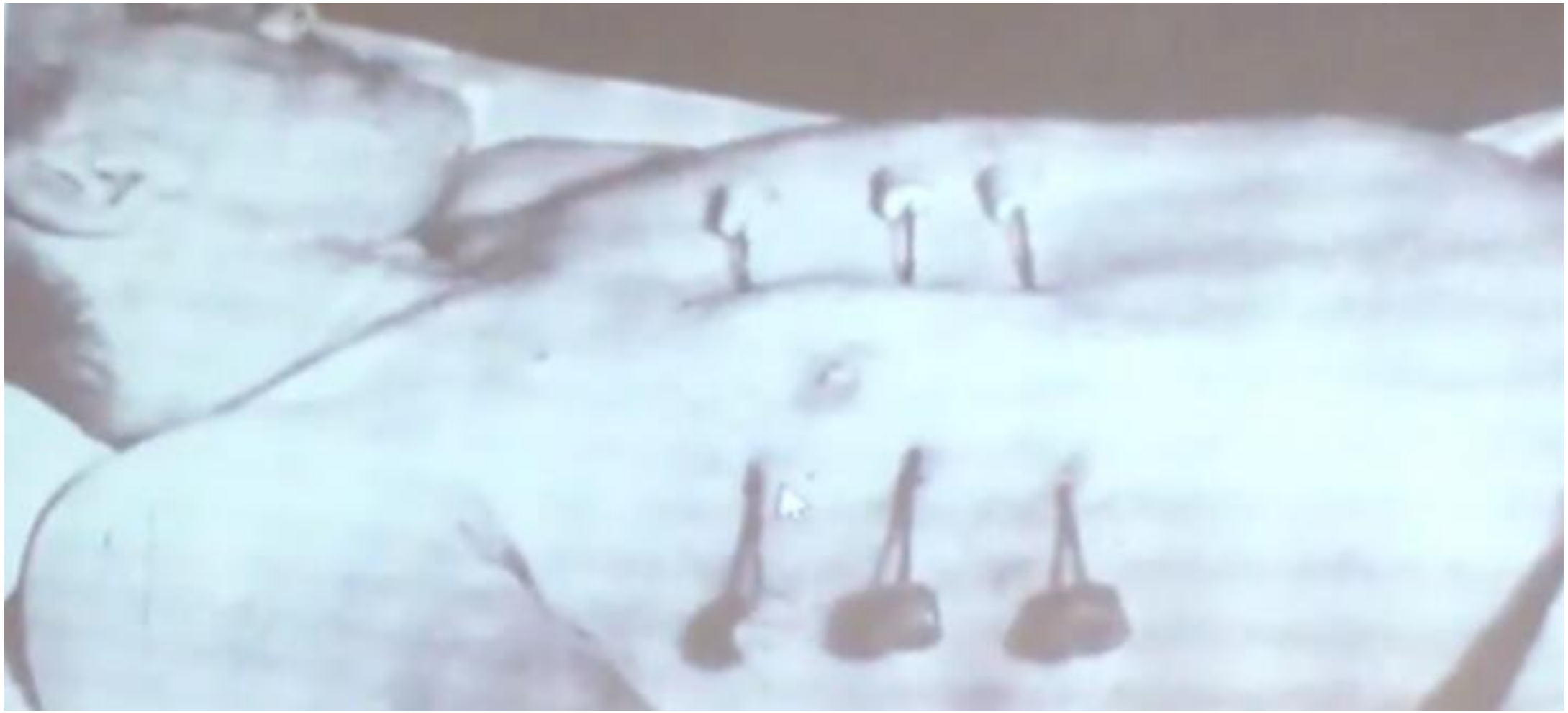
- Chest wall instability
- Deformity, discoloration
- Associated pneumo or hemothorax

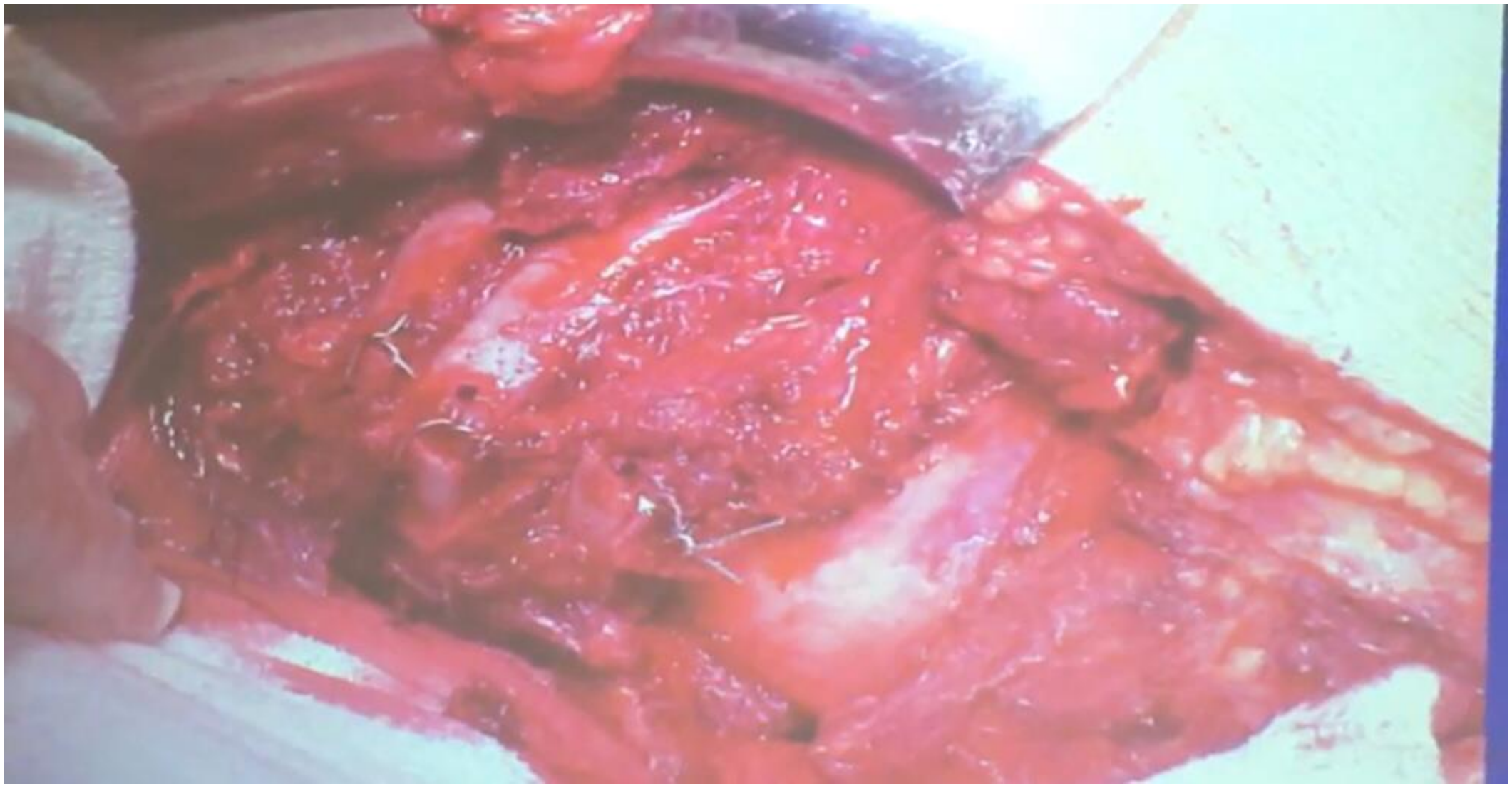
Rib Fracture:

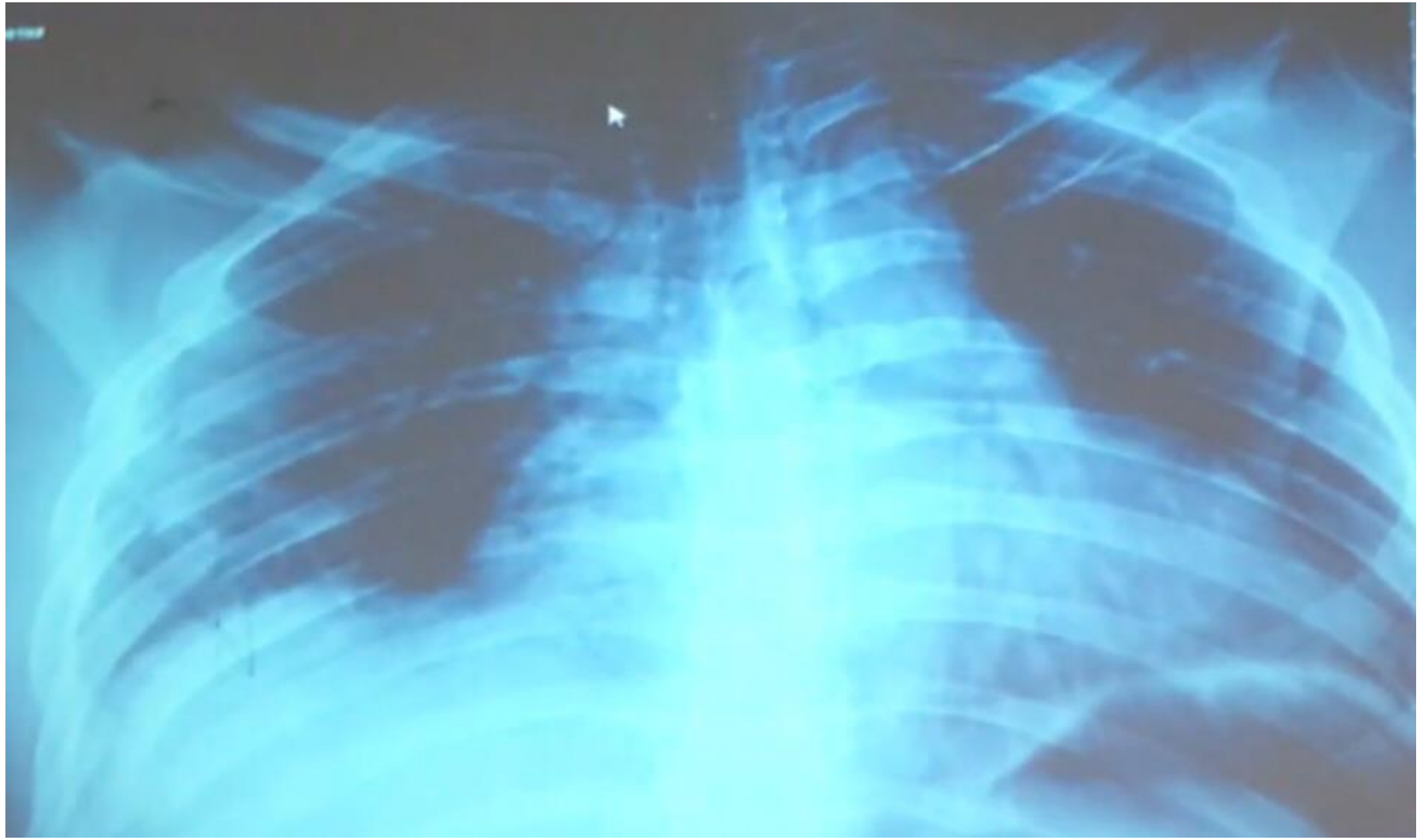
- Local swelling and tenderness may be the only sign of a broken rib.
- Can be very painful.
- Patients often presents with guarding and shallow breathing.

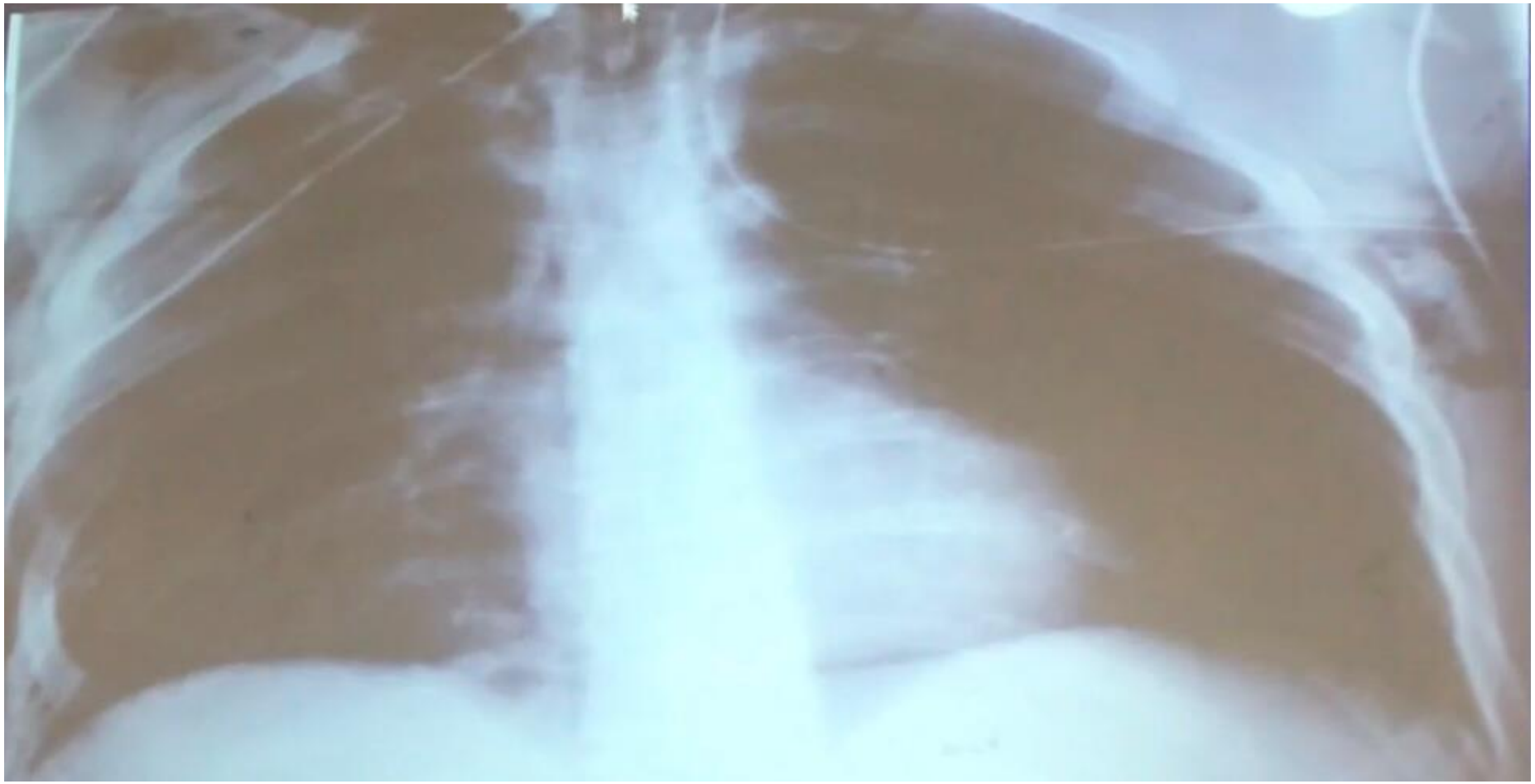
Management :

- Mova the patient carefully to prevent the bone ends from puncturing the lung.
- Administer O2
- Allow patient to self splint by assuming the most comfortable position possible.
- Encourage patient to limit movement.
- Analgesia like Morphine, PCA, Epidural.





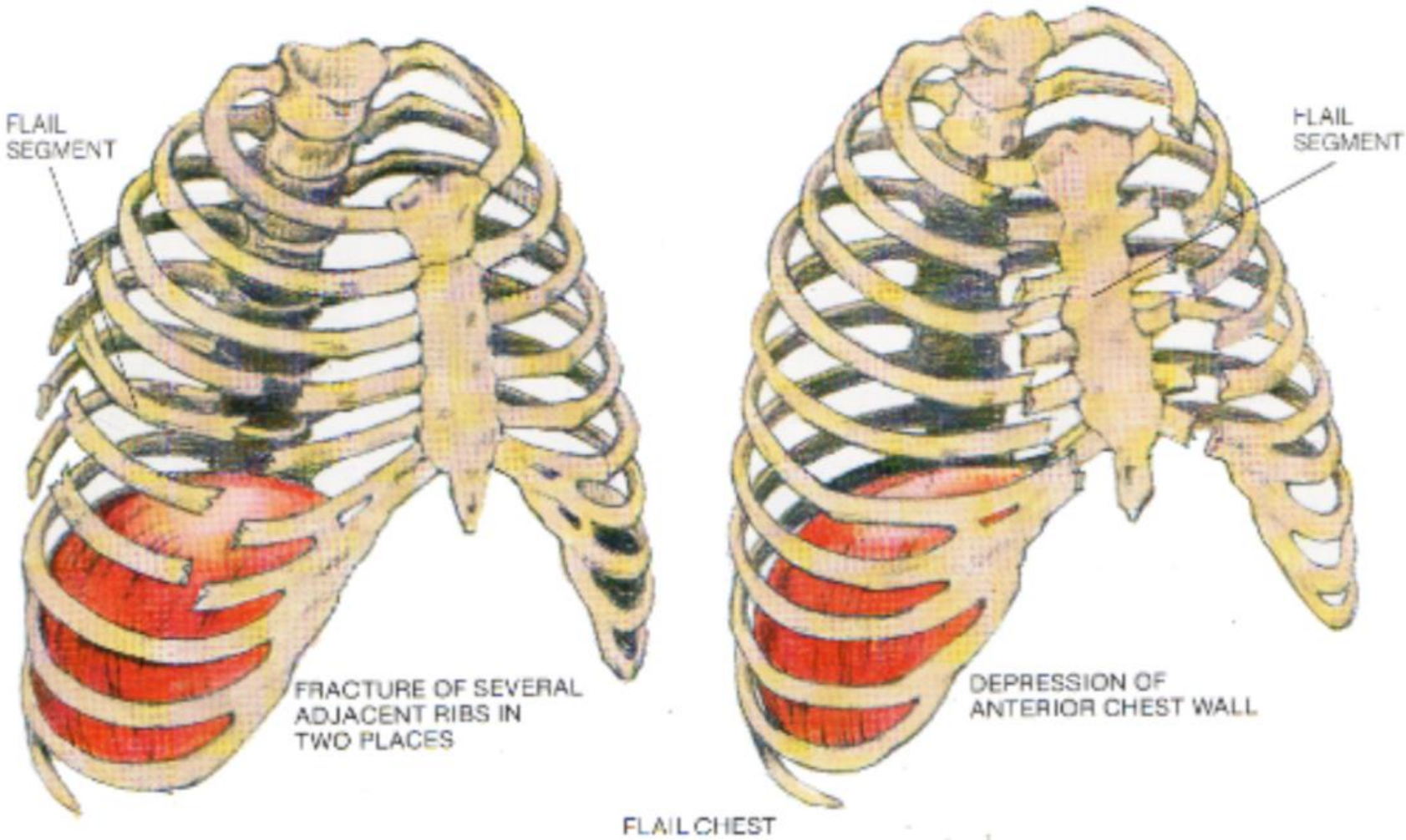




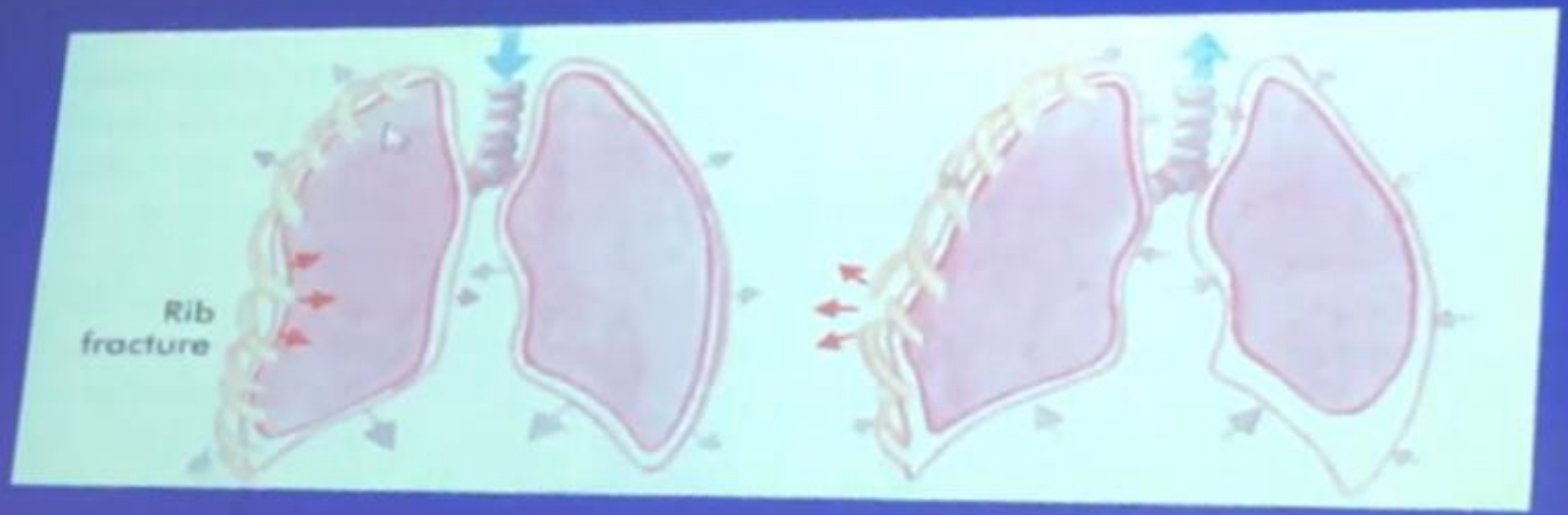
Flail Chest

(CLSM 8:13)

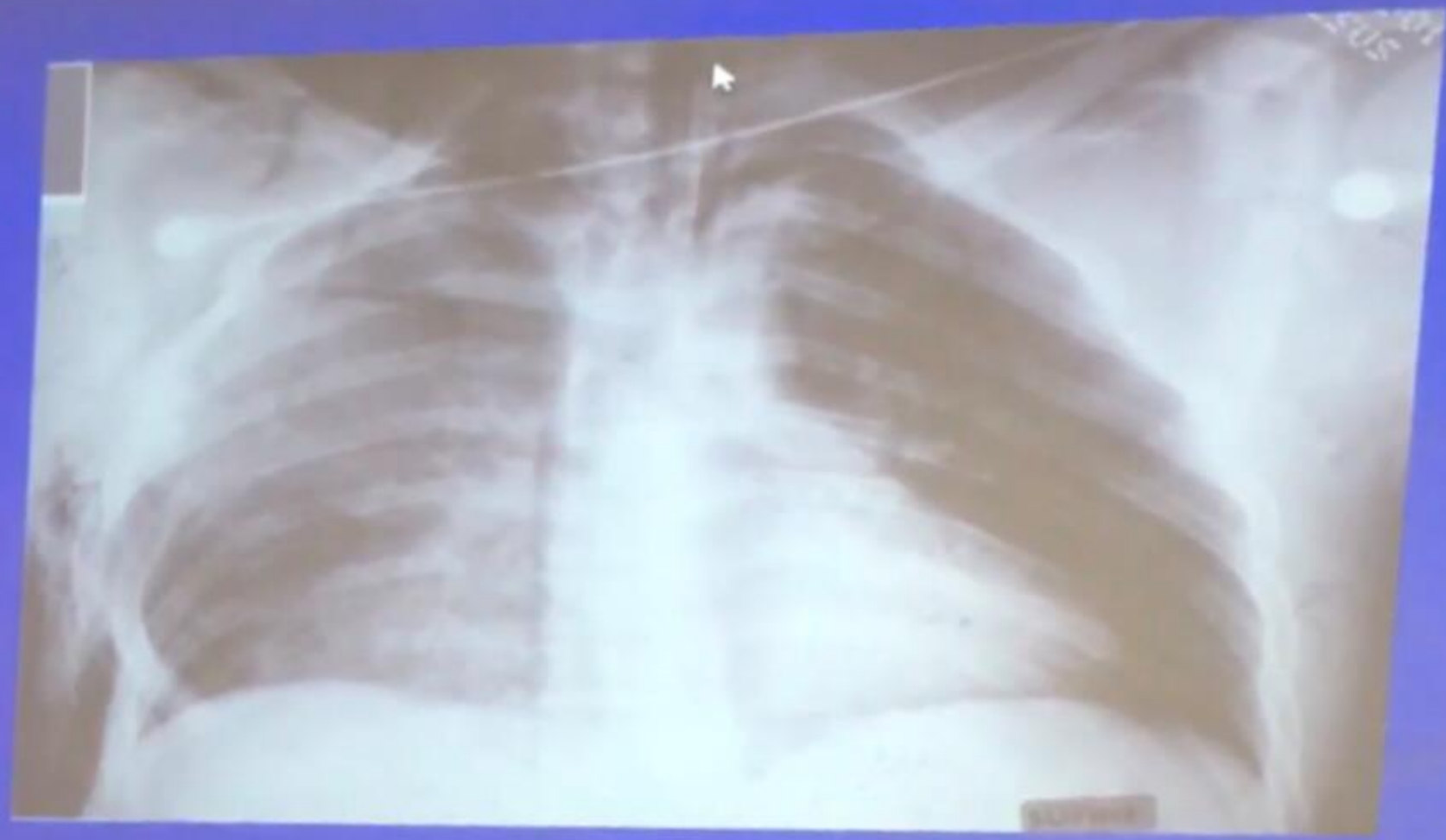
Definition:_____

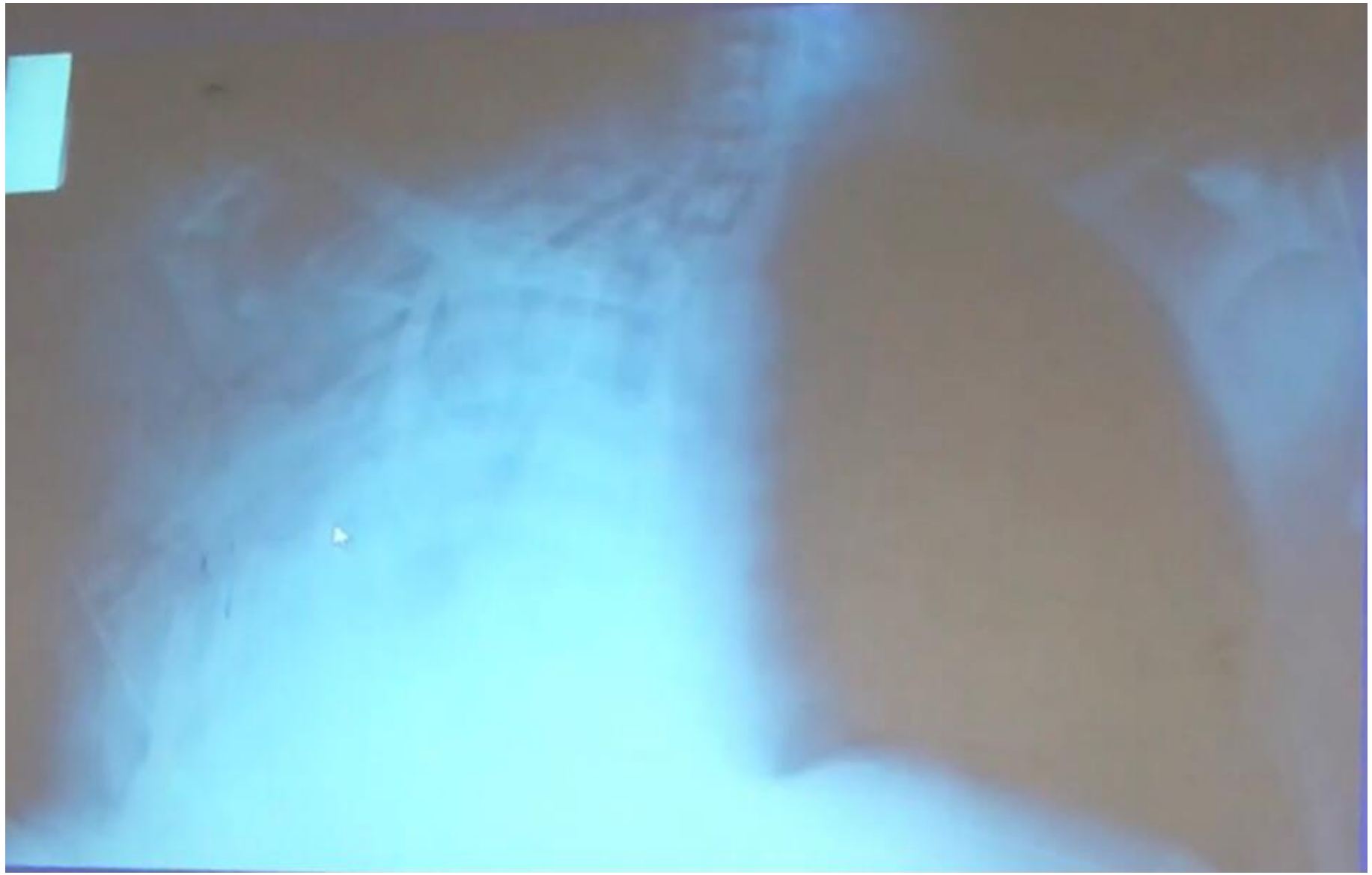


Flial Chest



Flial Chest

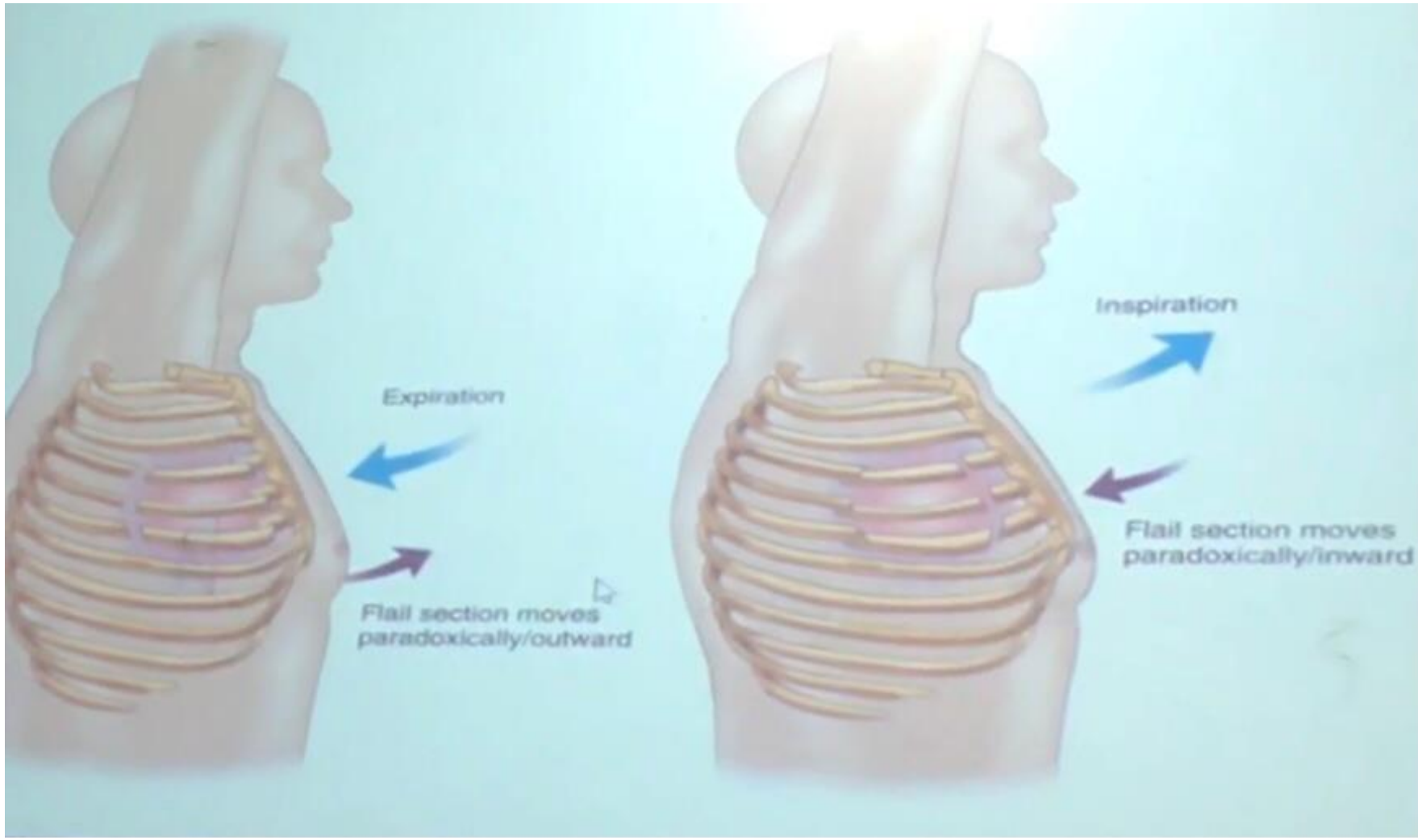


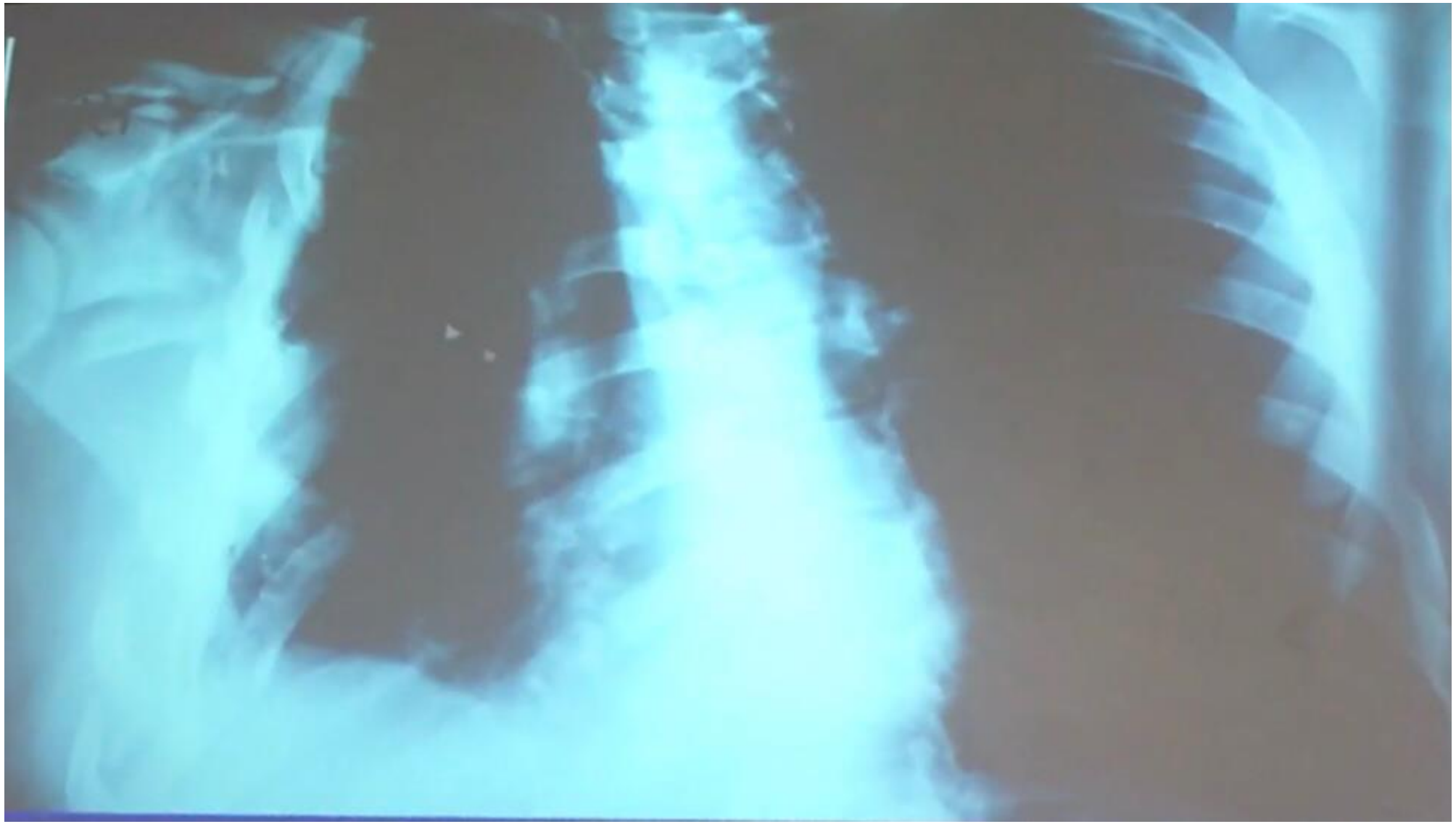


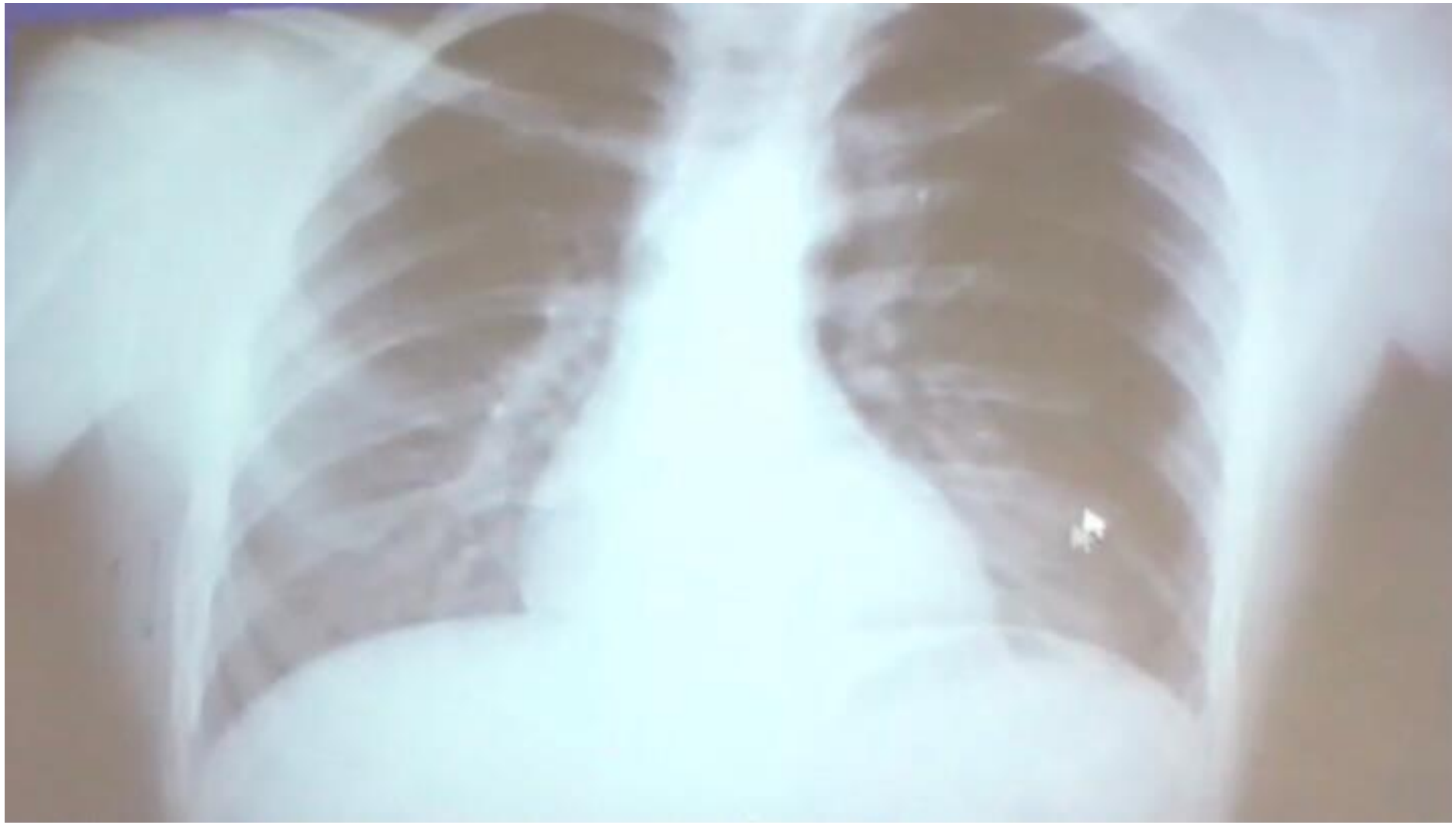
Flial Chest

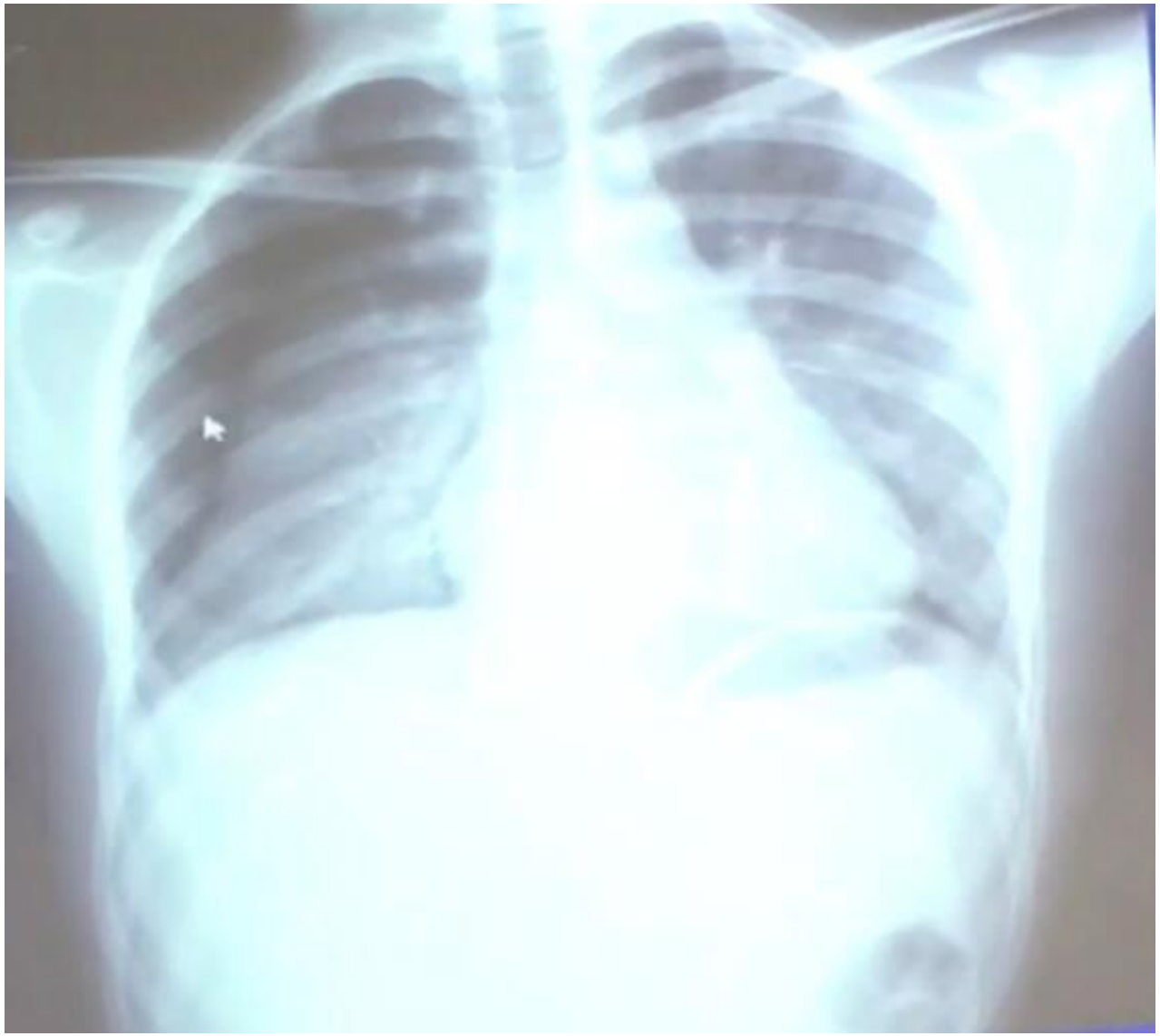
Management :

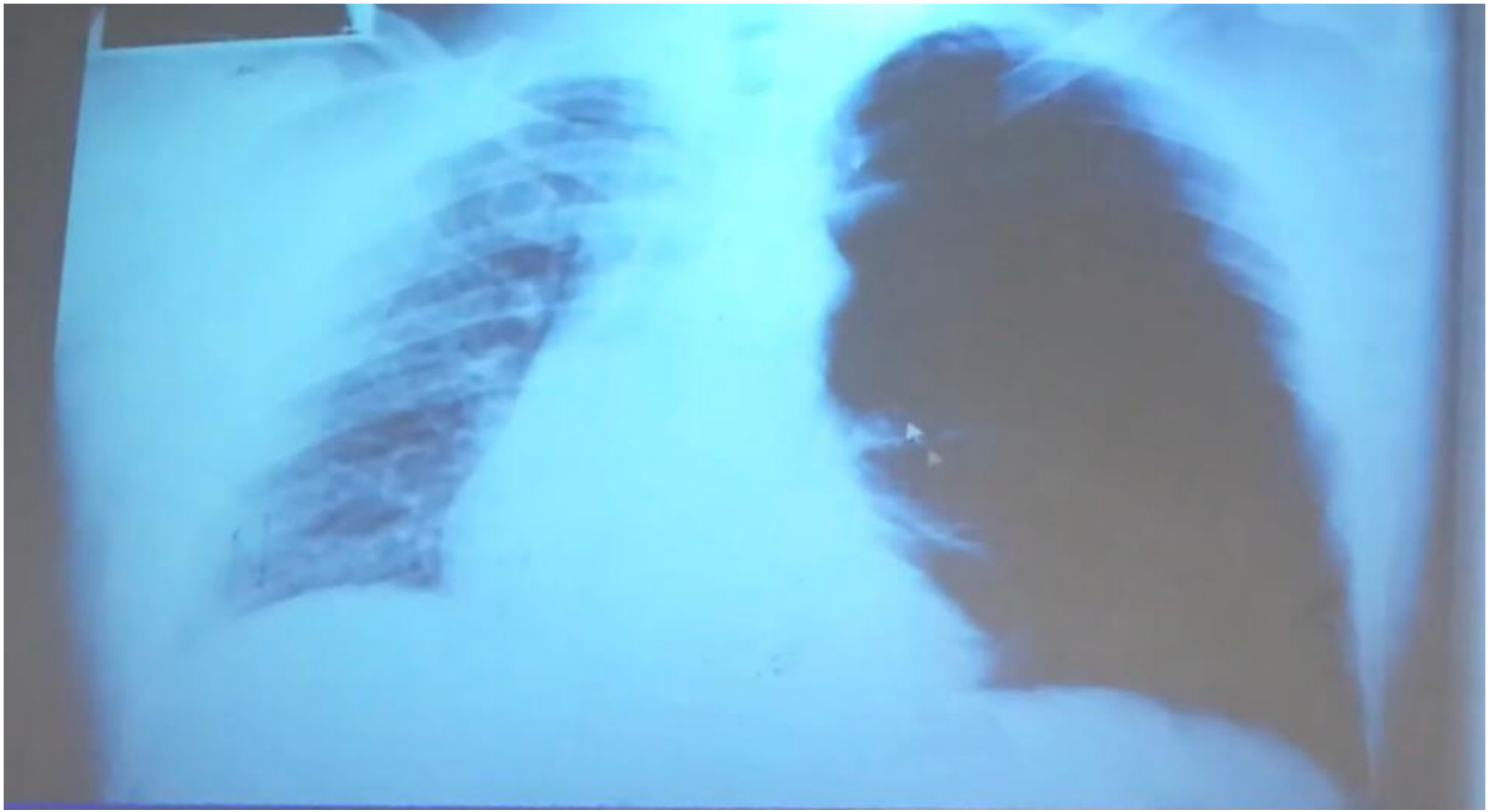
- Quickly stabilize flail segment by placing gloved hand over injured area.
- After manual stabilization, place folded universal dressing over segment and tape securely.
- Fixation (External, Internal).

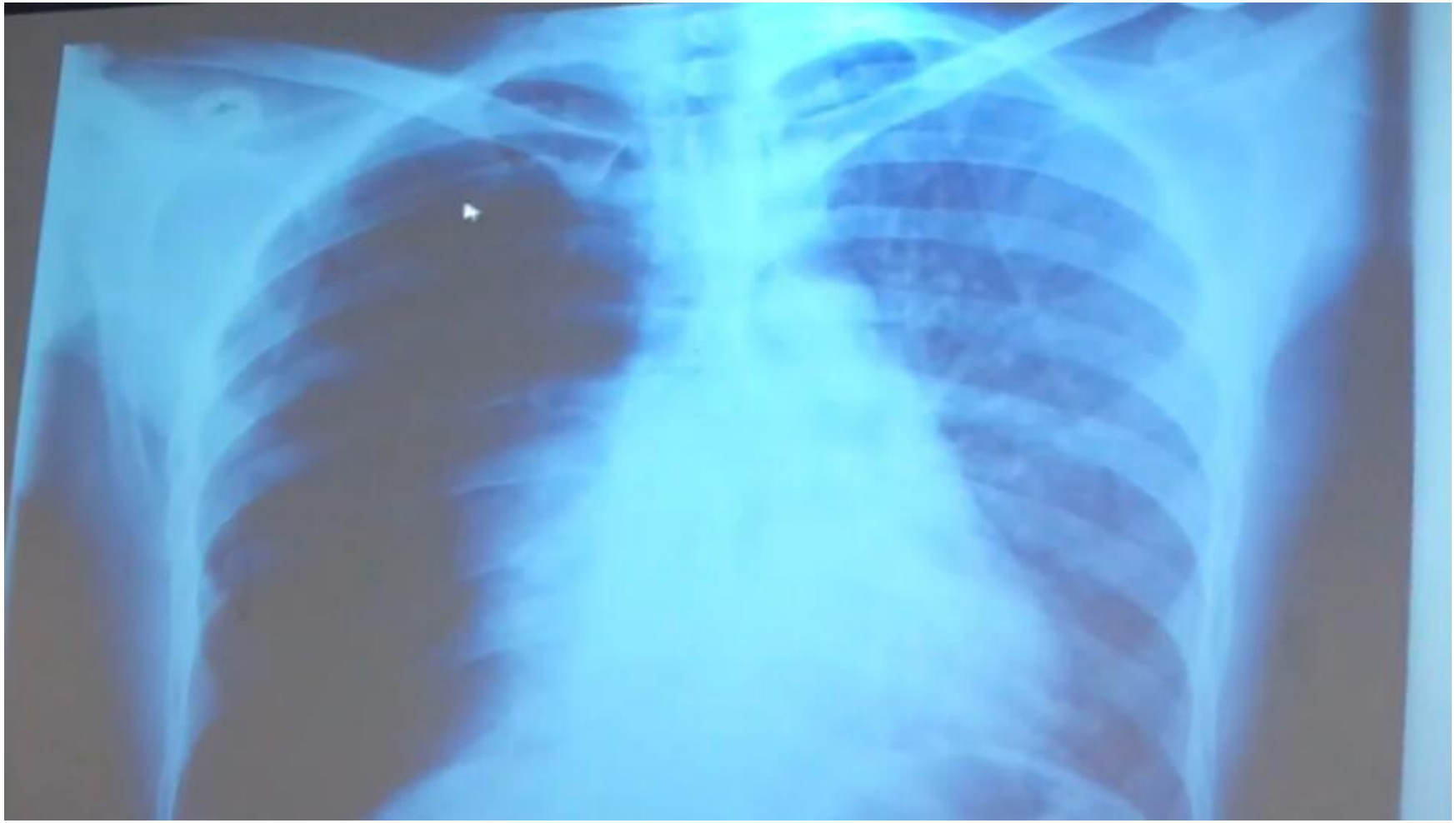

Expiration
Flail section moves paradoxically/outward
Inspiration
Flail section moves paradoxically/inward

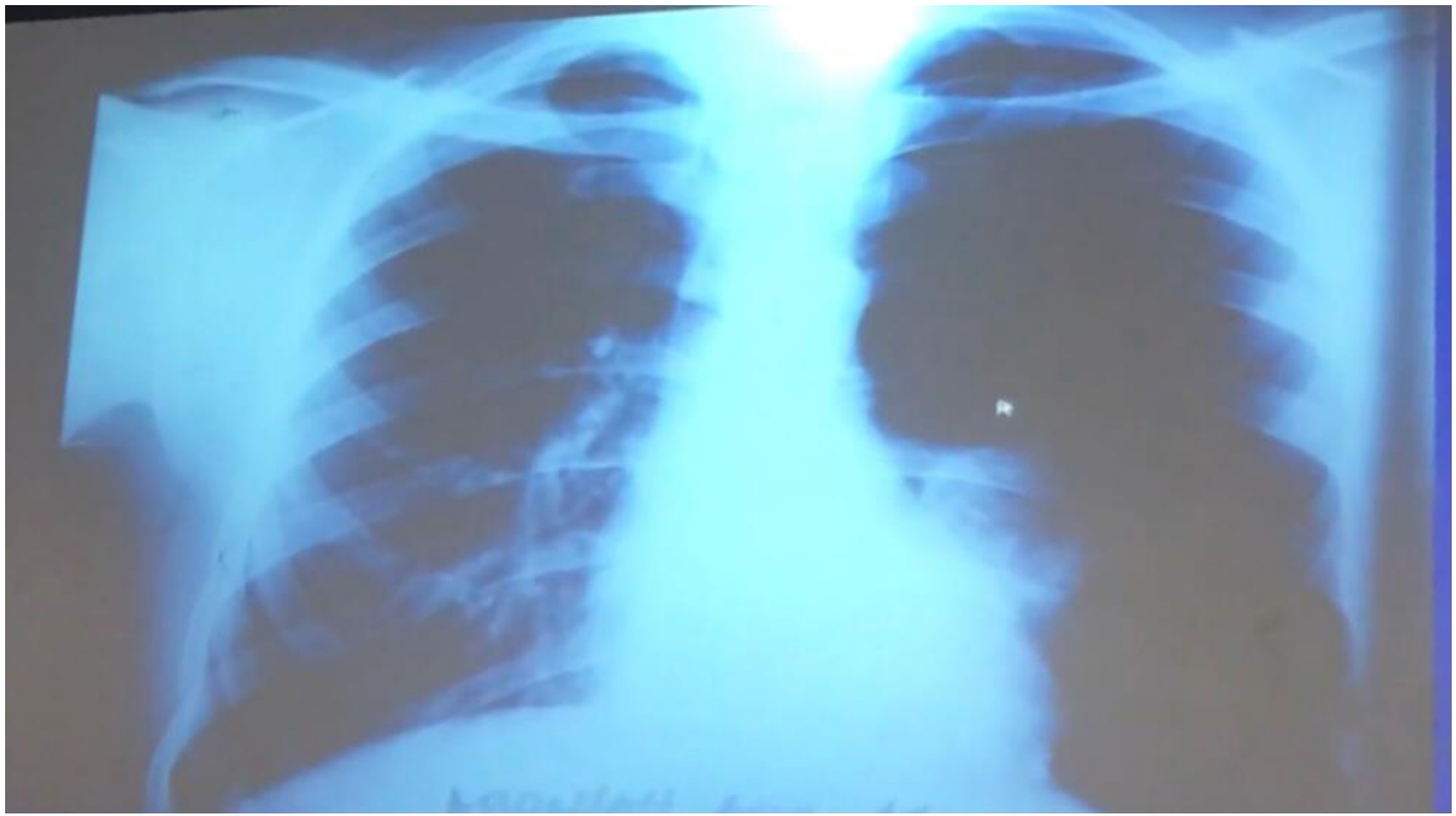


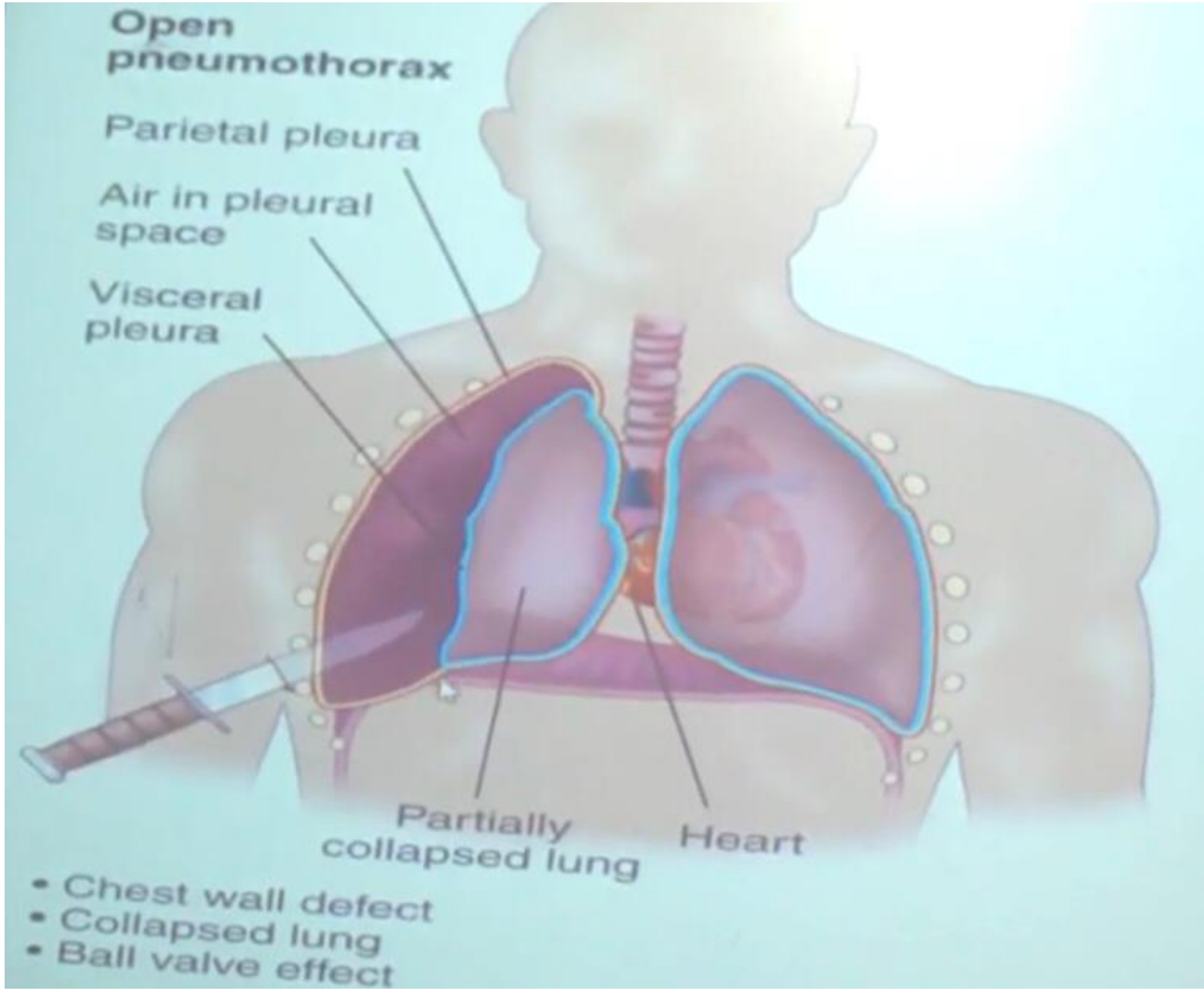


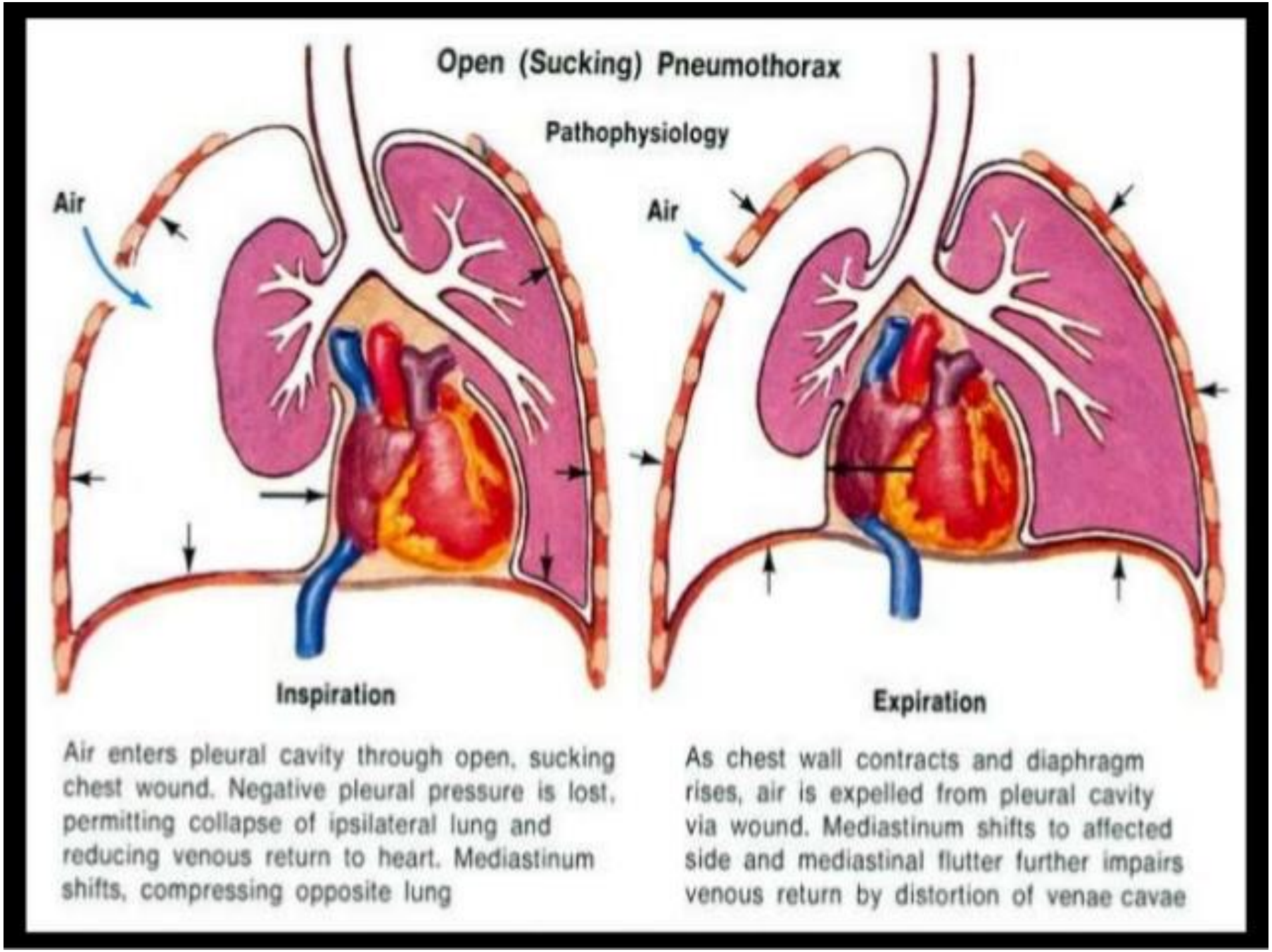


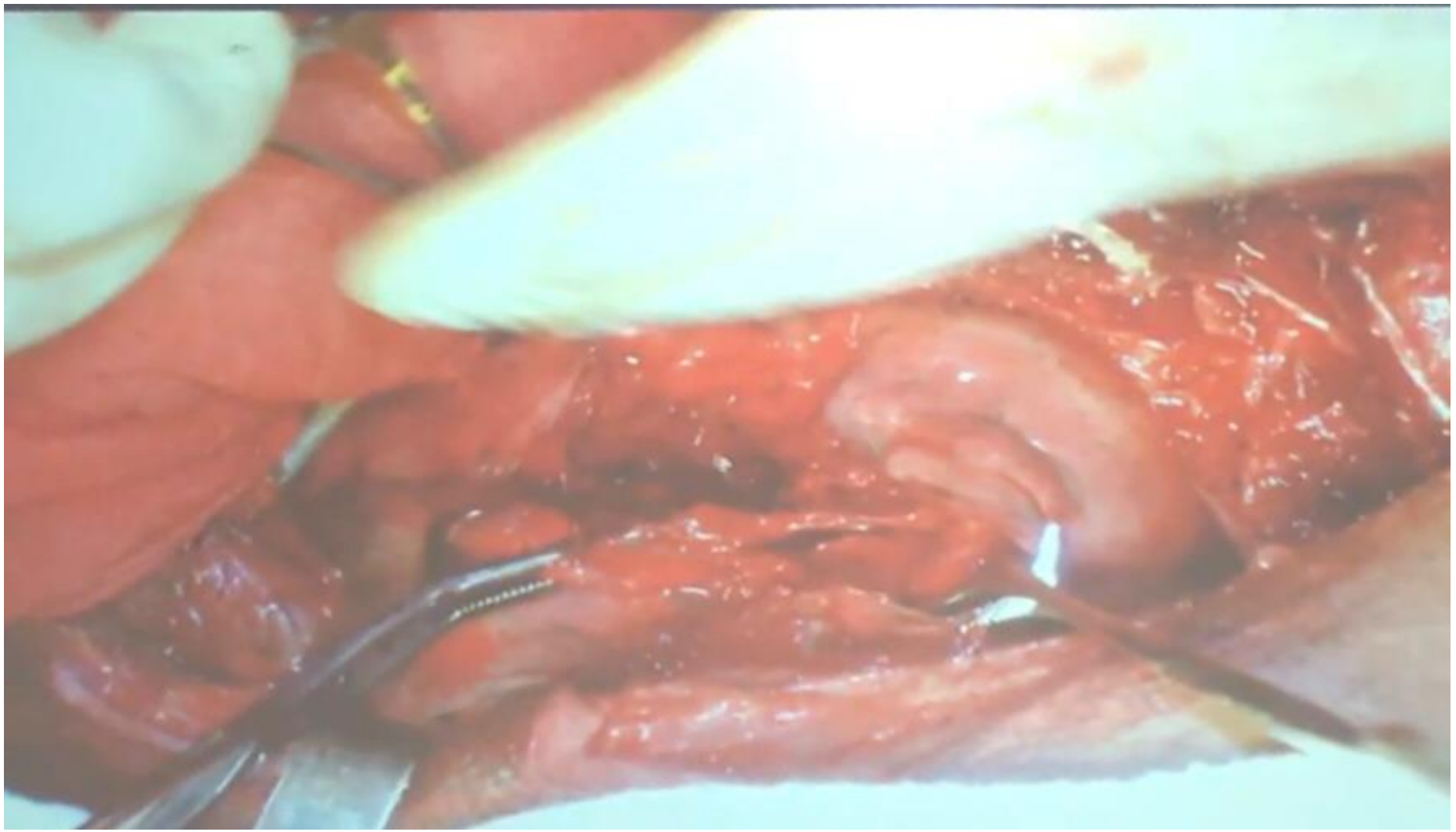




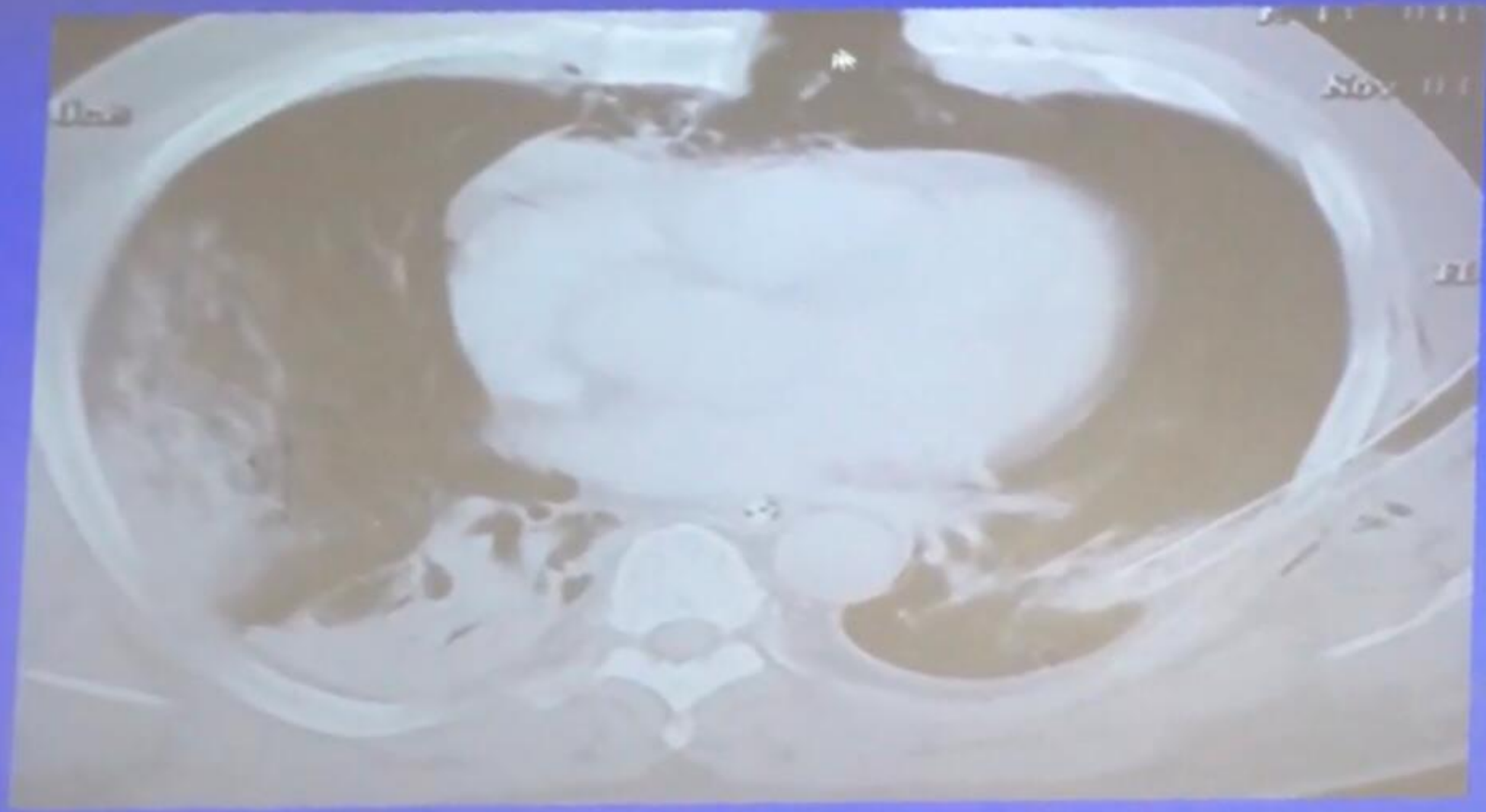



Open pneumothorax
Parietal pleura
Air in pleural space
Visceral pleura
Partially collapsed lung
Heart
• Chest wall defect
• Collapsed lung
• Ball valve effect


Open (Sucking) Pneumothorax
Pathophysiology
Air
Air
Inspiration
Expiration
Air enters pleural cavity through open, sucking chest wound. Negative pleural pressure is lost, permitting collapse of ipsilateral lung and reducing venous return to heart. Mediastinum shifts, compressing opposite lung
As chest wall contracts and diaphragm rises, air is expelled from pleural cavity via wound. Mediastinum shifts to affected side and mediastinal flutter further impairs venous return by distortion of venae cavae



Open pneumothorax



Open pneumothorax

Management

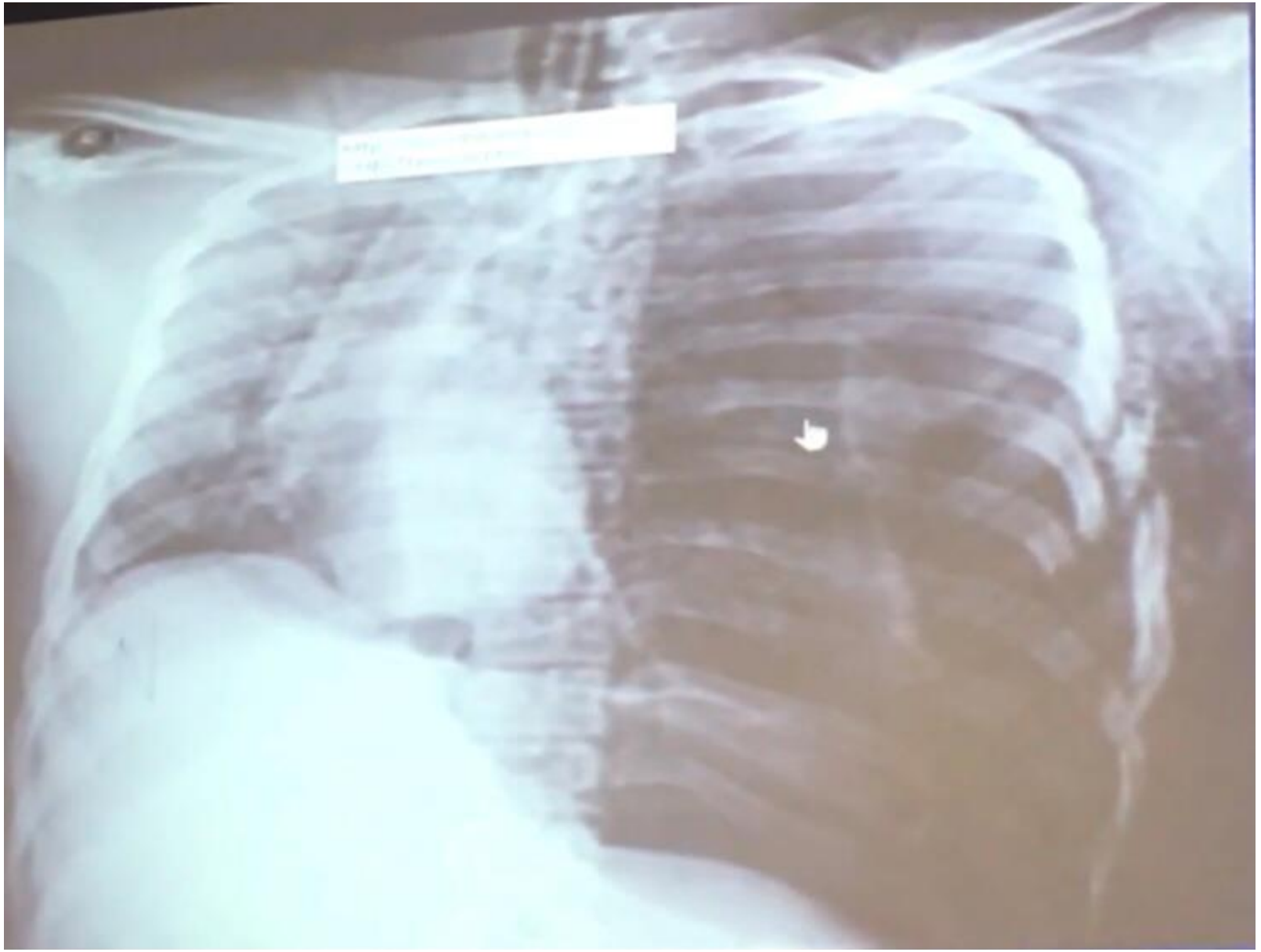
- Cover open chest wounds with occlusive dressing
- Gloved hand is an effective temporary occlusive dressing
- Secure dressing on three sides
- High-flow oxygen
- Transport with unaffected side slightly elevated

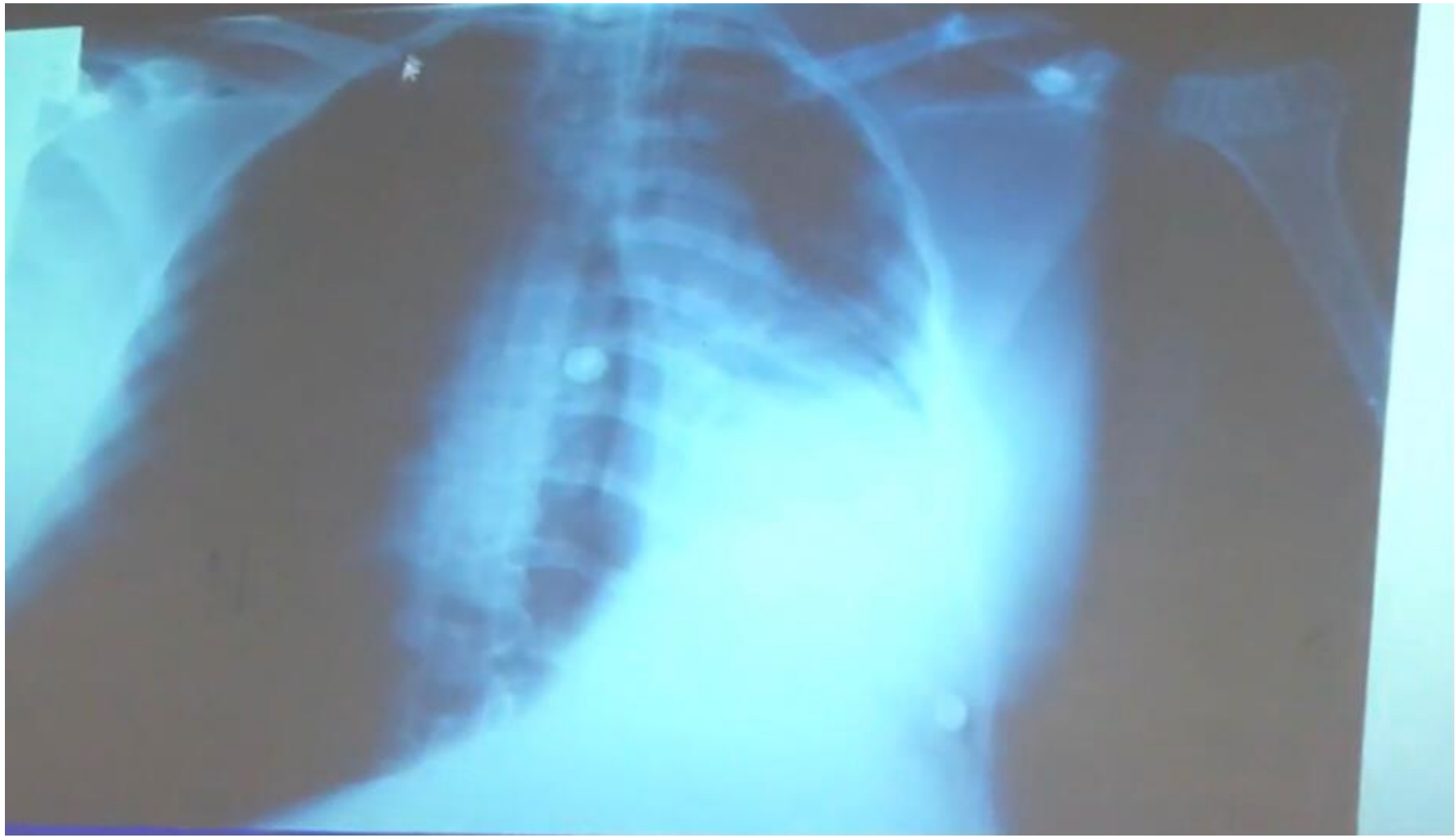
Tension pneumothorax

- Build up of pressure in pleural space resulting in decrease in blood pressure.
- Potentially life-threatening condition that must be treated immediately.
- Can occur in blunt or penetrating chest trauma.

Signs

- Include all those of a peumothorax.
- Jugular venous distension (JVD).
- If ventilating becomes more difficult, significant lung compression is indicated.



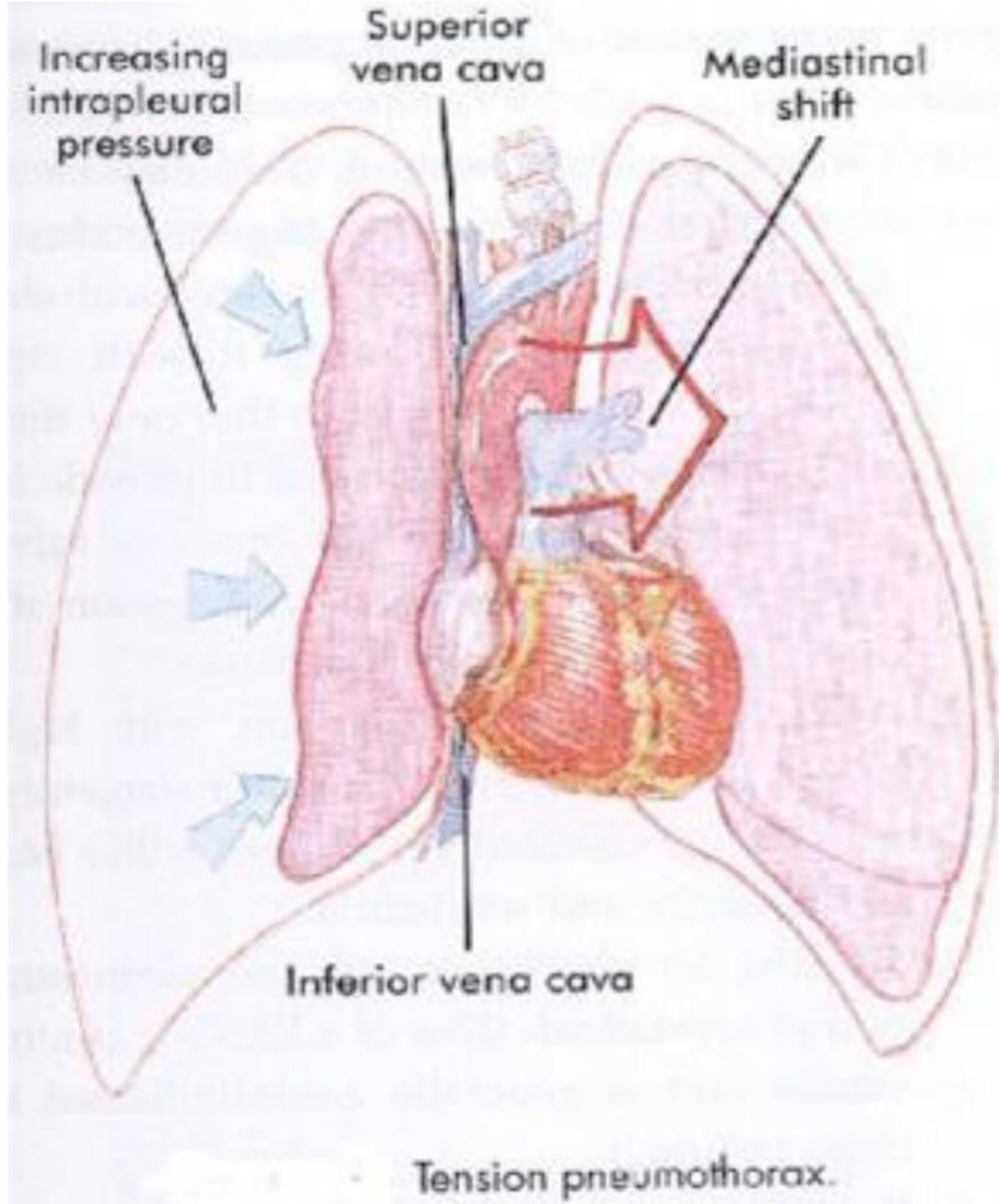


Tension Pneumothorax

Signs and Symptoms

- Extreme dyspnea
- Restlessness, anxiety, agitation
- Decreased breath sounds
- Hyperresonance to percussion
- Cyanosis
- Subcutaneous emphysema
- Rapid, weak pulse
- Decreased BP
- Tracheal shift away from injured side –
- Jugular vein distension
- Early dyspnea/hypoxia
- Late shock

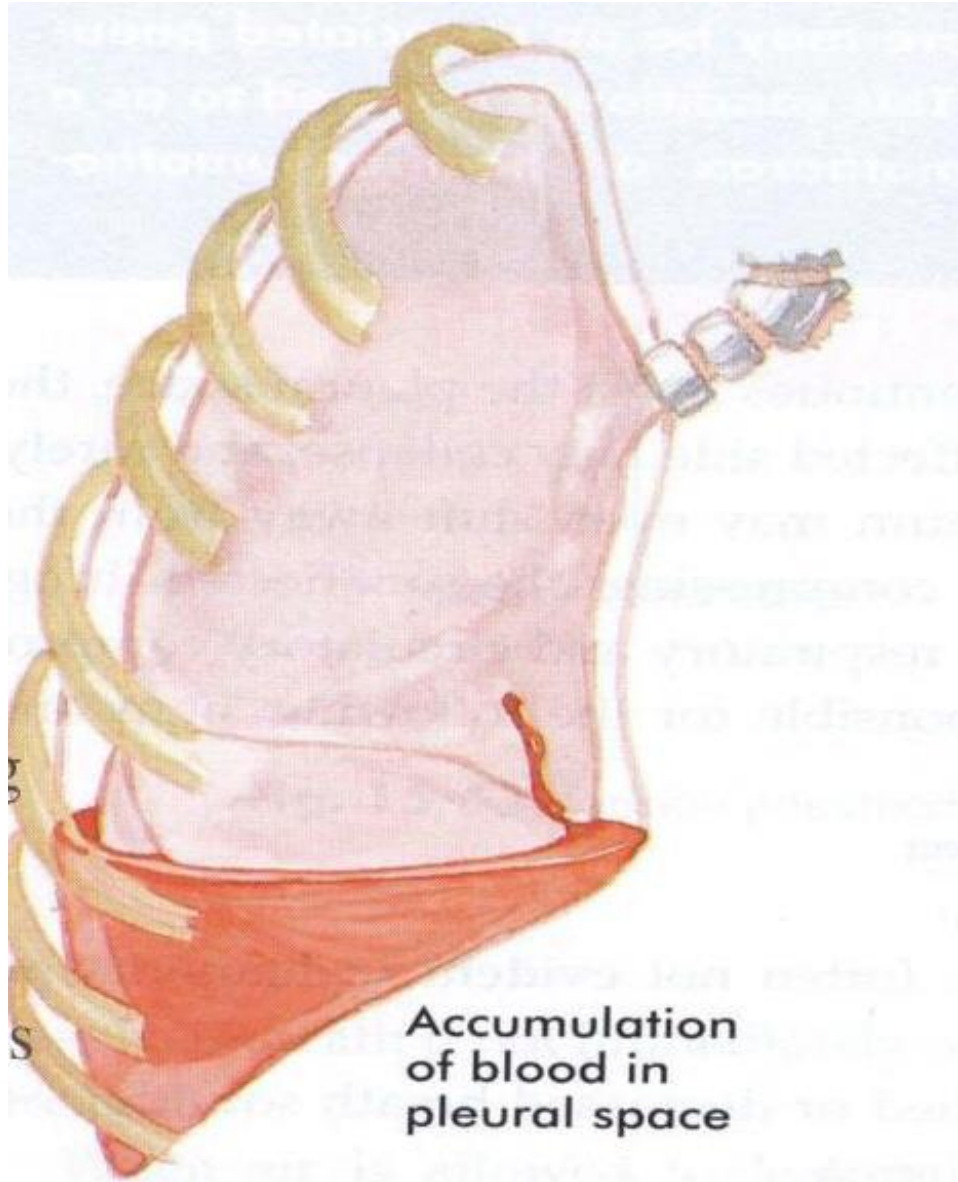
Tension Pneumothorax



Tension pneumothorax.

Haemothorax

- Blood in pleura space
- Most common result of major chest wall trauma
- Present in 70 to 80% of penetrating, major non- penetrating chest trauma



Hemothorax.

Haemothorax

Signs and Symptoms

- Rapid, weak pulse
- Cool, clammy skin
- Restlessness, anxiety
- Thirst
- Chills
- Hypotension
- Collapsed neck veins

Haemothorax

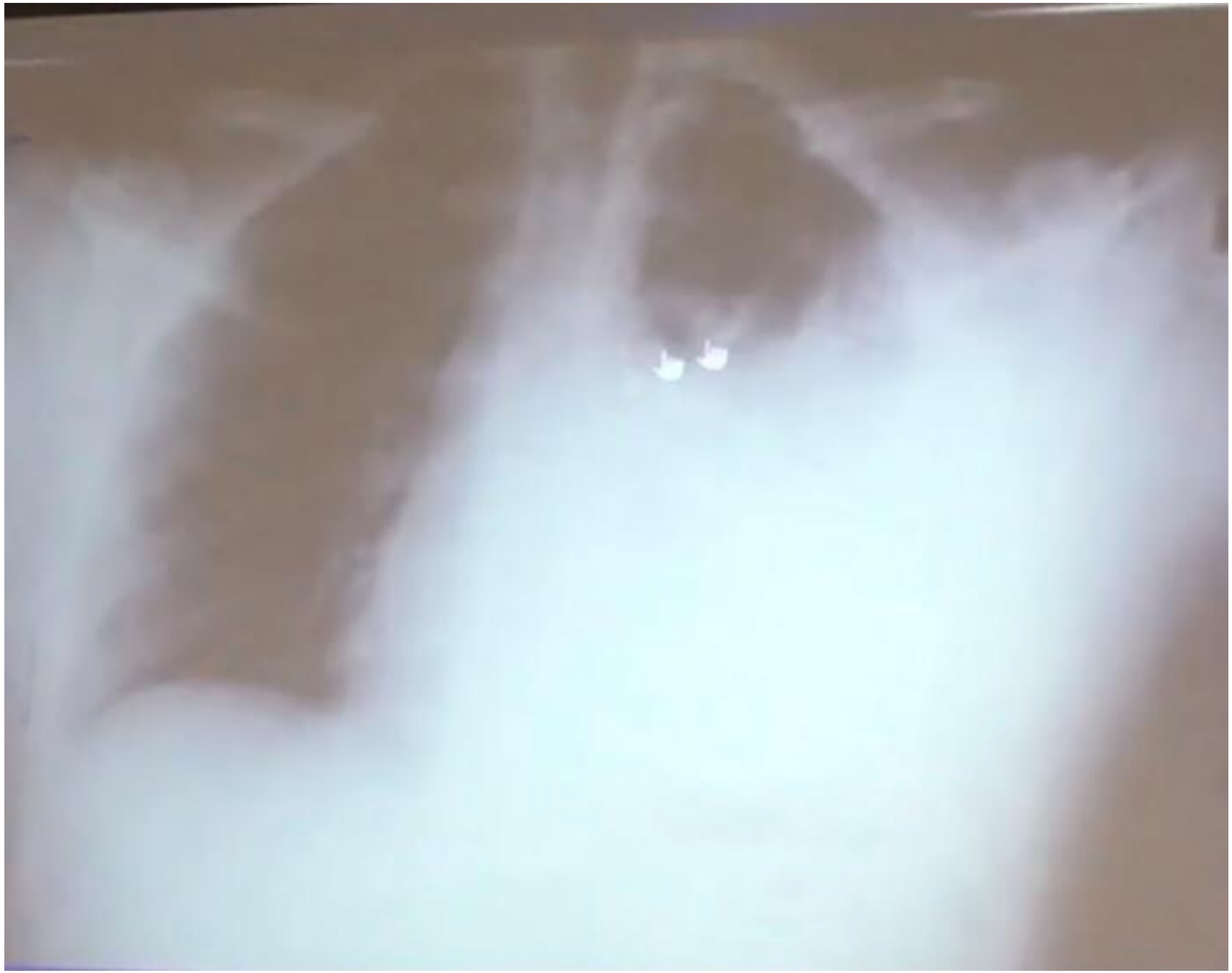
Source of bleeding

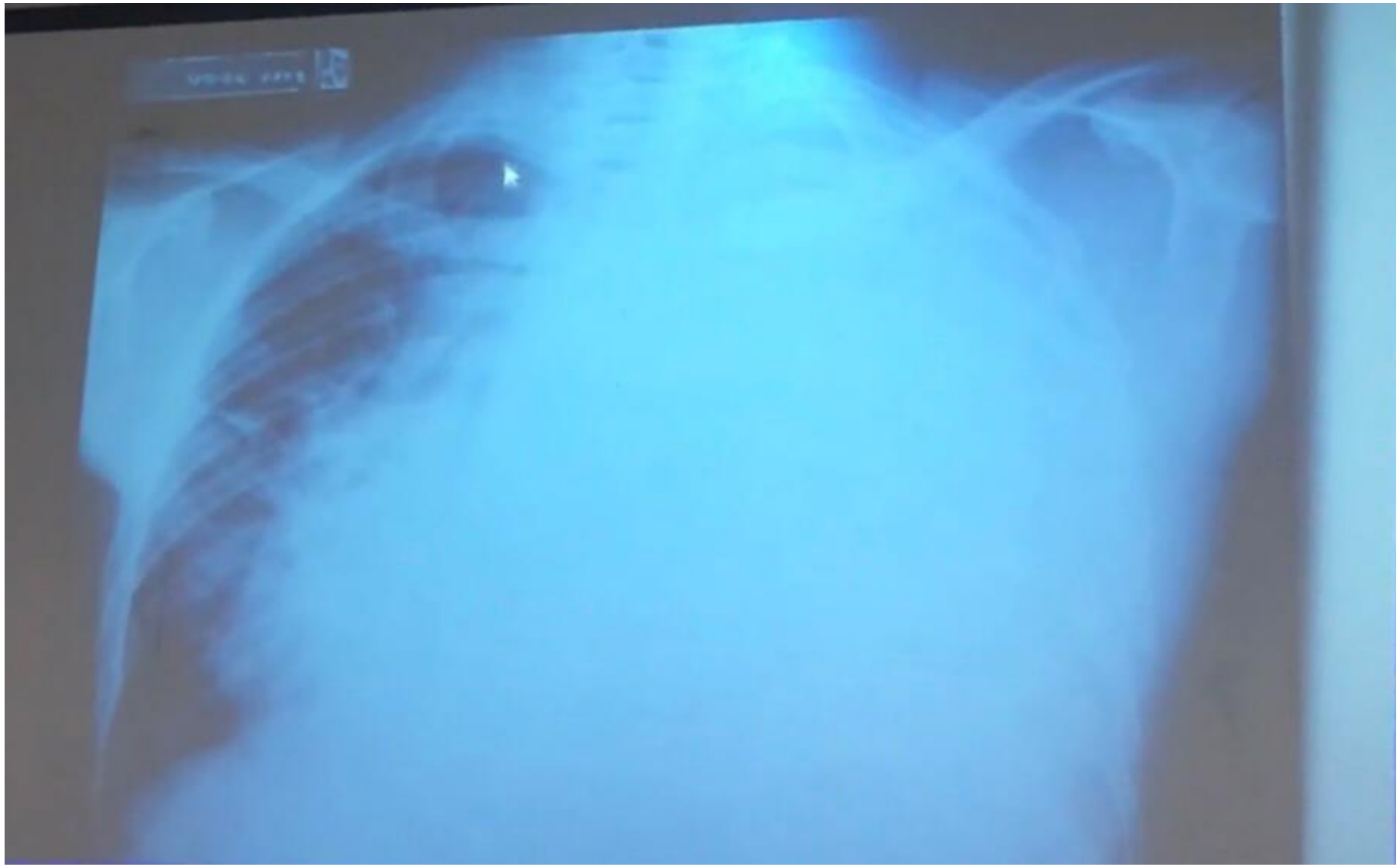
- Intercostal vessels
- Internal mammary vessels
- Lung parenchyma
- Bronchial arteries
- Major pulmonary vessels
- Heart and great vessels

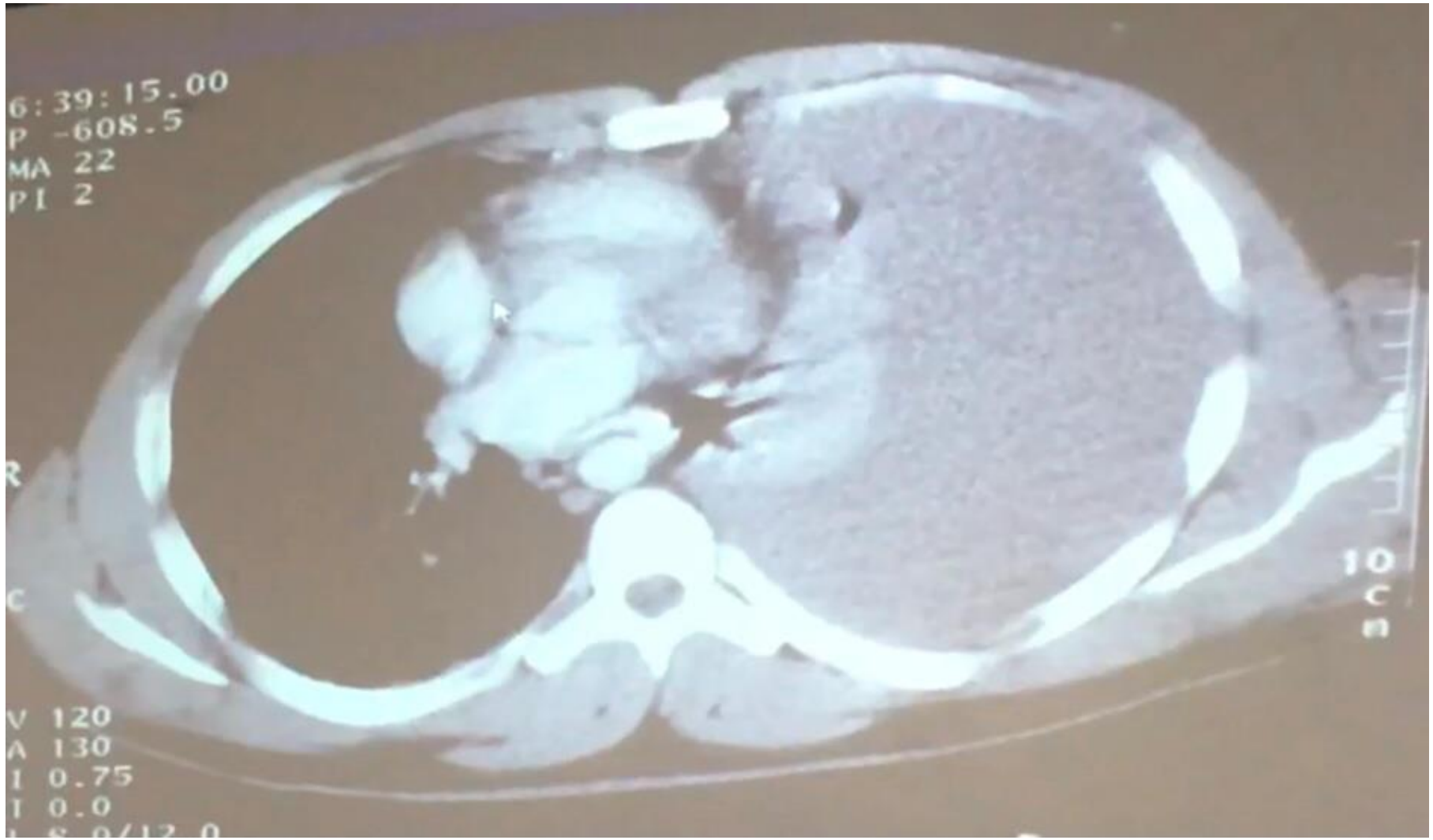
Hemothorax

Indications for Thoracotomy:

- Initial output is > 1250 ml
- Initial output is > 1000 ml with hypotension
- Output > 250 ml/h for 3 hours






6:39:15.00
P -608.5
MA 22
PI 2
R
C
V 120
A 130
I 0.75
I 0.0
10 cm

Chest tube

indicated to drain the contents of the pleural space. Usually this will be air or blood, but may include other fluids such as chyle or gastric/oesophageal contents.

Absolute Indications

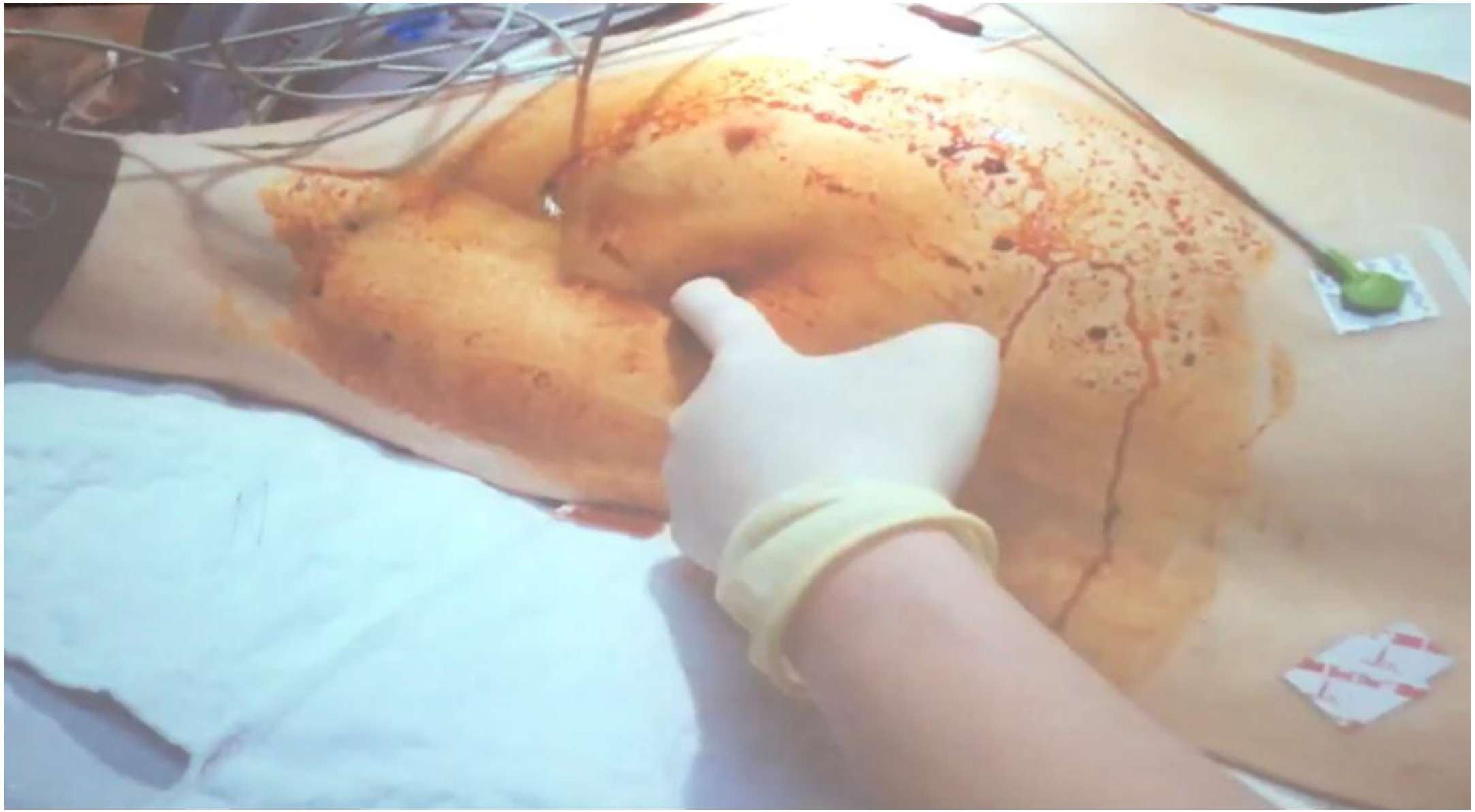
Pneumothorax (tension, open or simple)

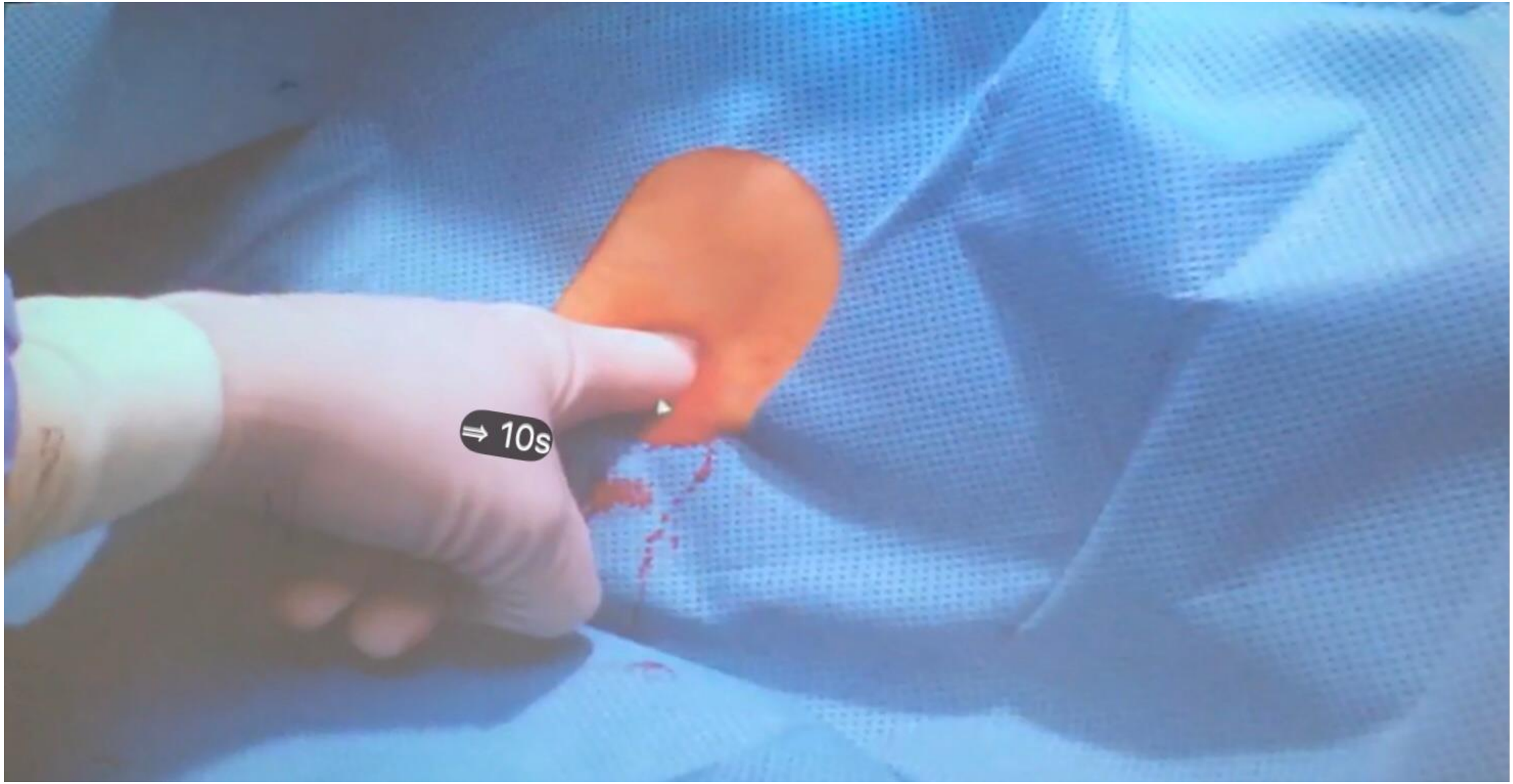
Hlaemothoras

Teaumatic Arrest (bilateral)

Relative Indications

- Rib fractures & Positive pressure ventilation
- Profound hypoxia/hypotension & penetrating chest injury
- Profound hypoxia/hypotension and unilateral signs of hemithorax

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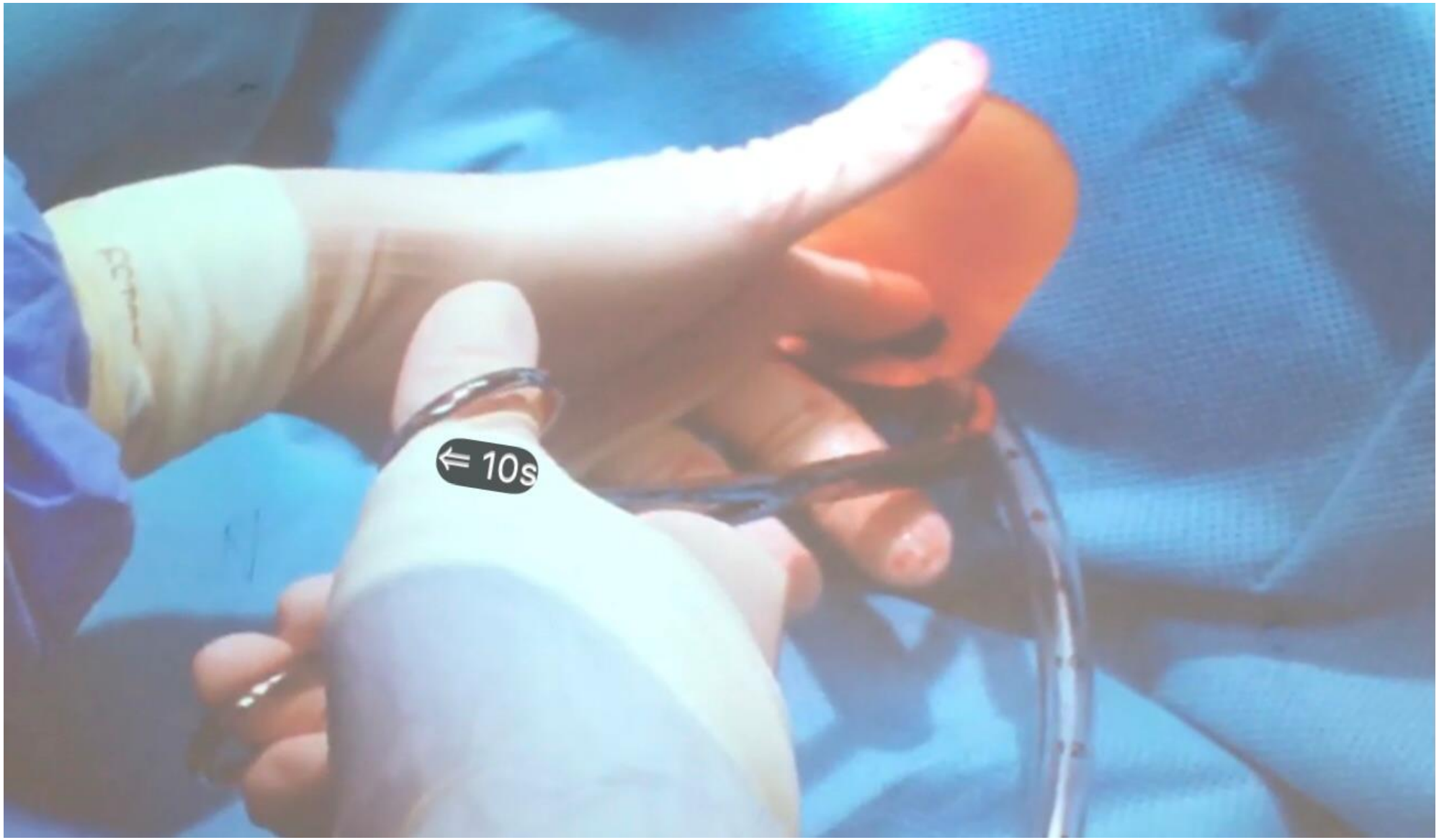
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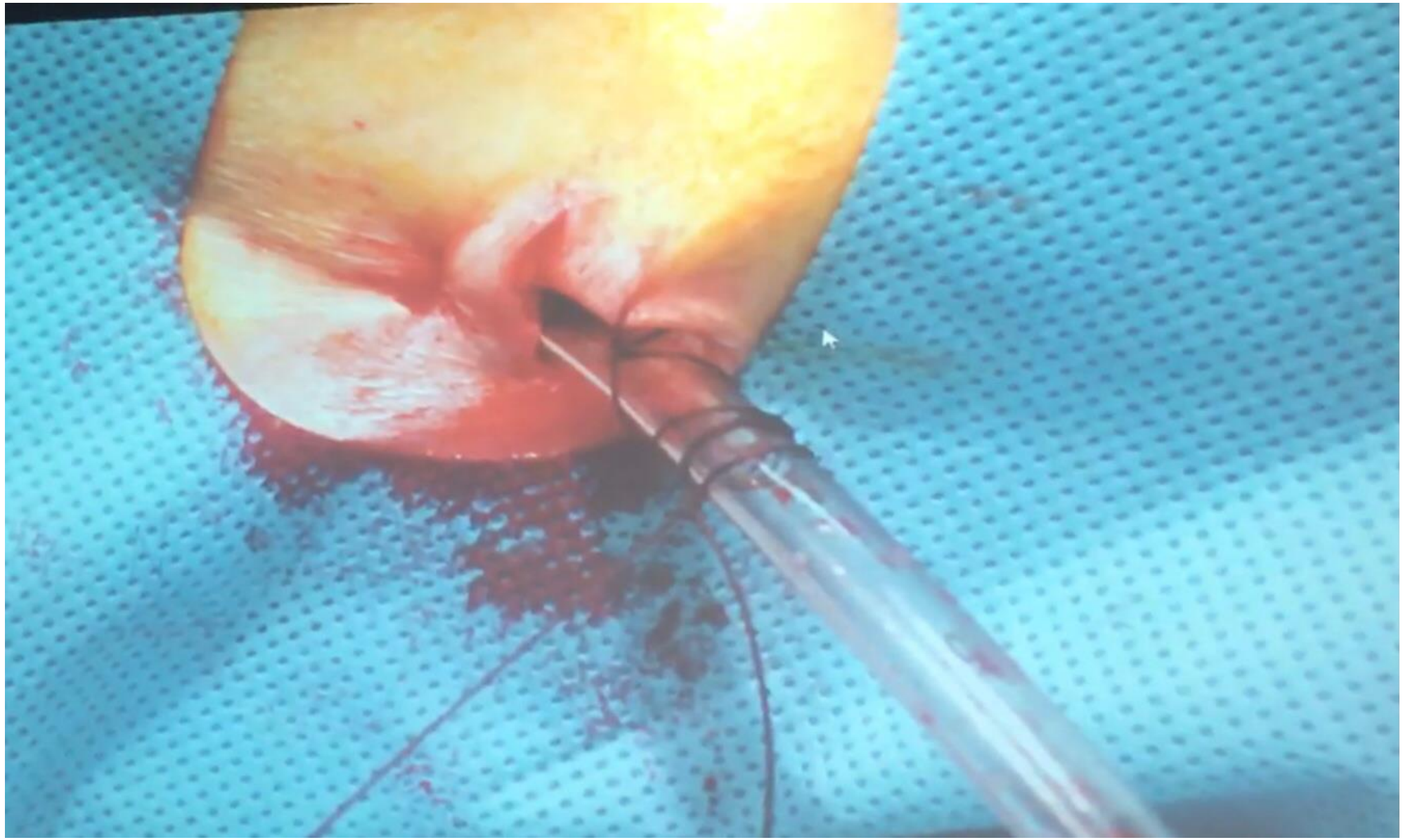
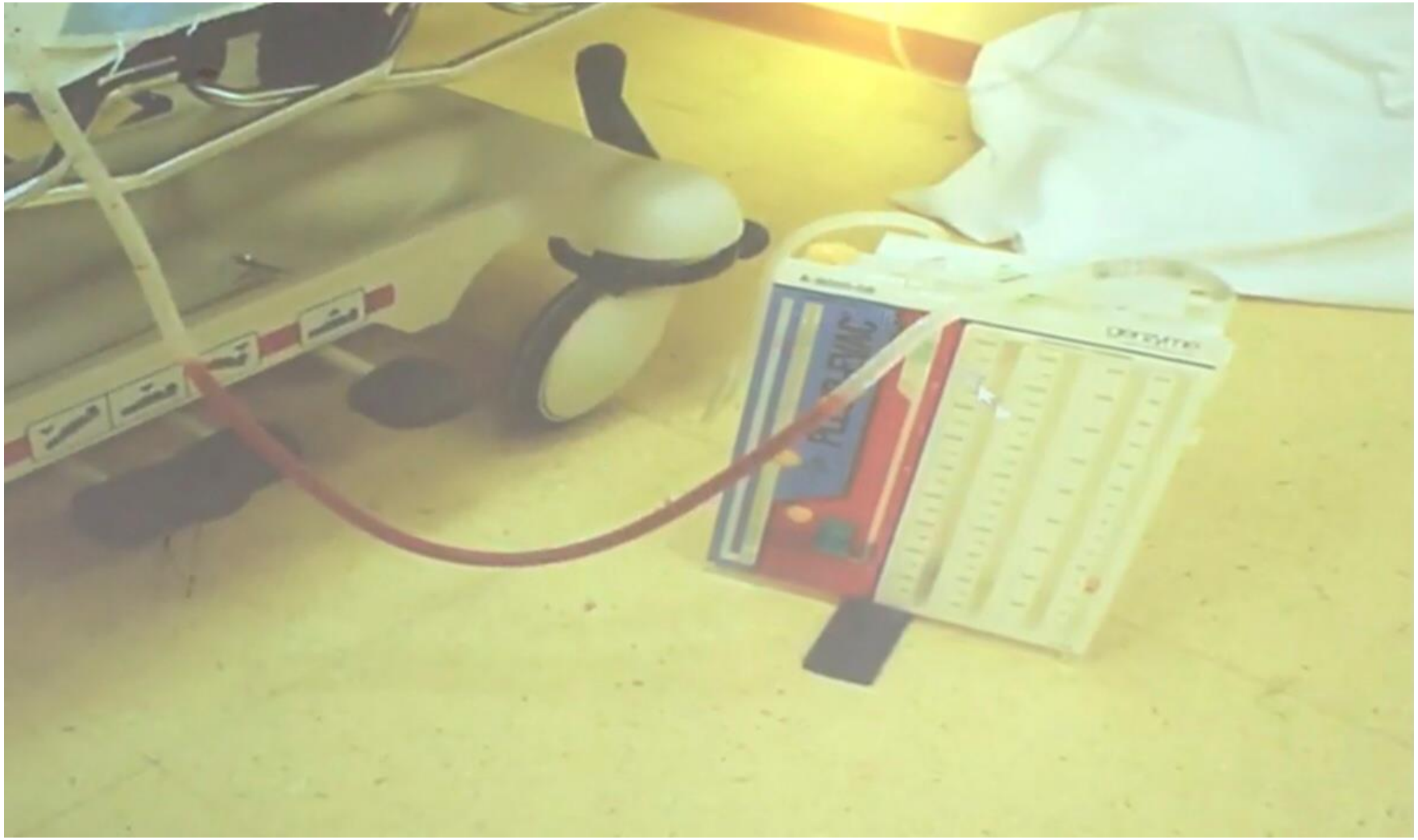
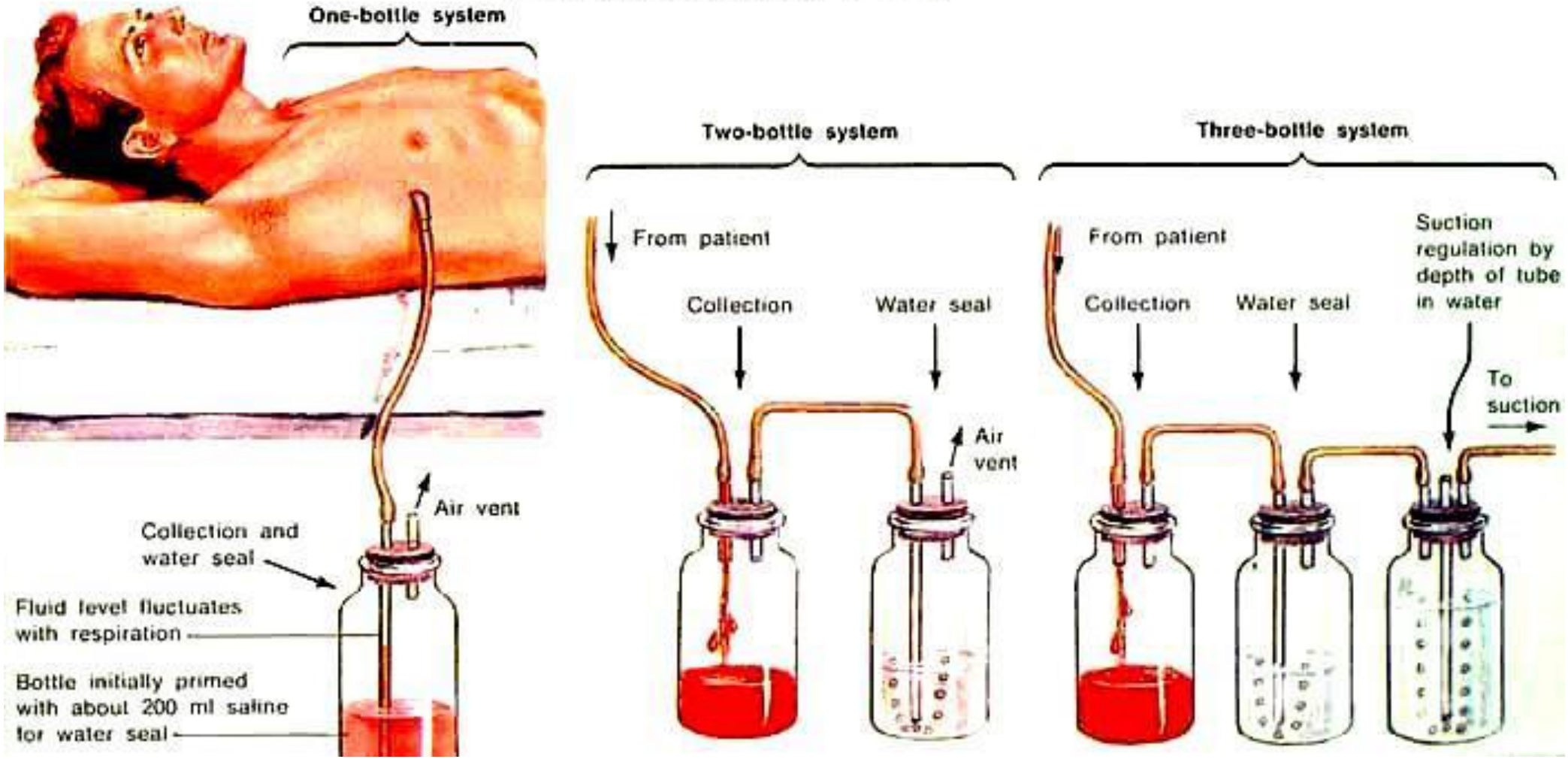




Underwater-Seal Drainage of Chest

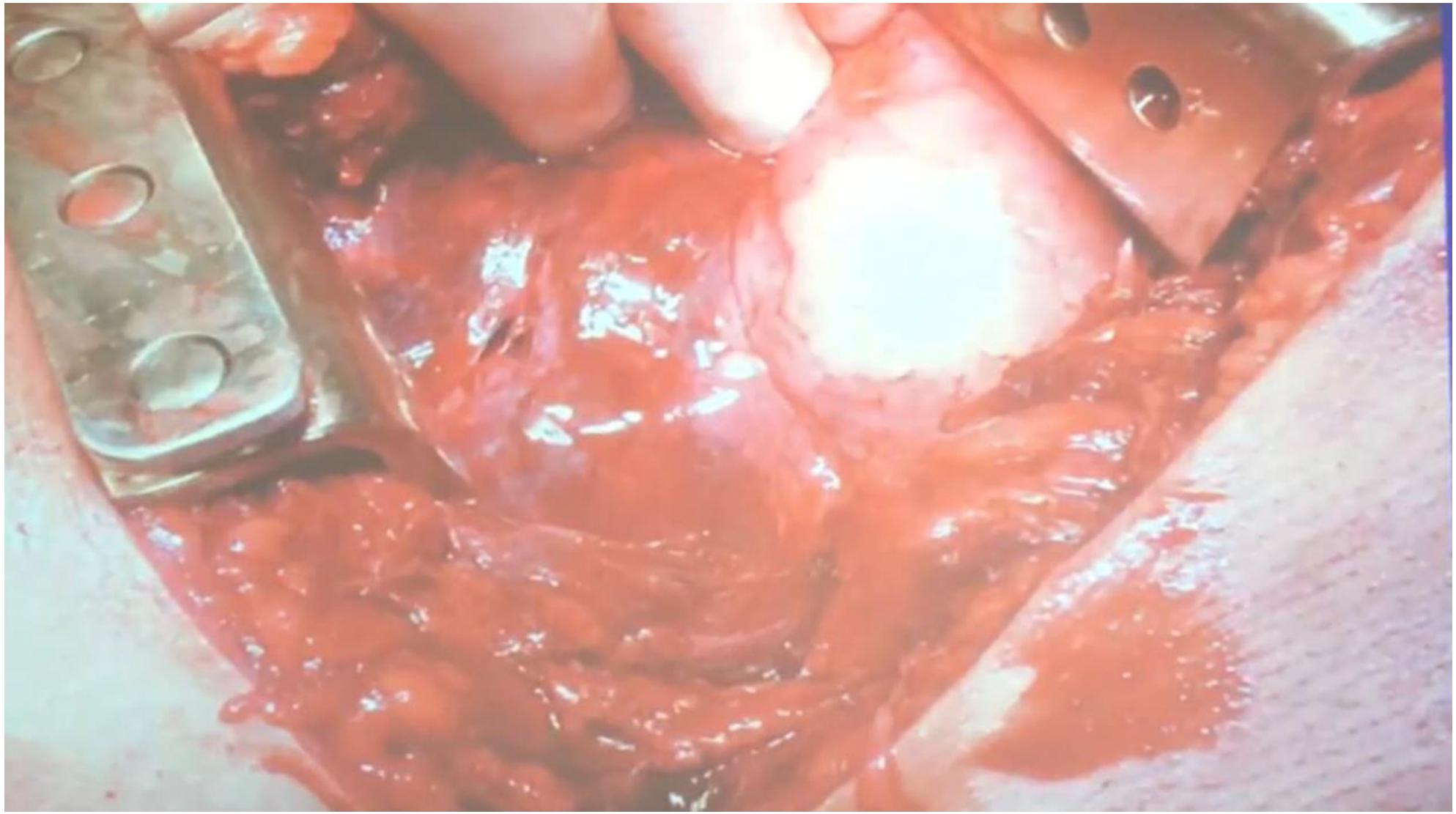


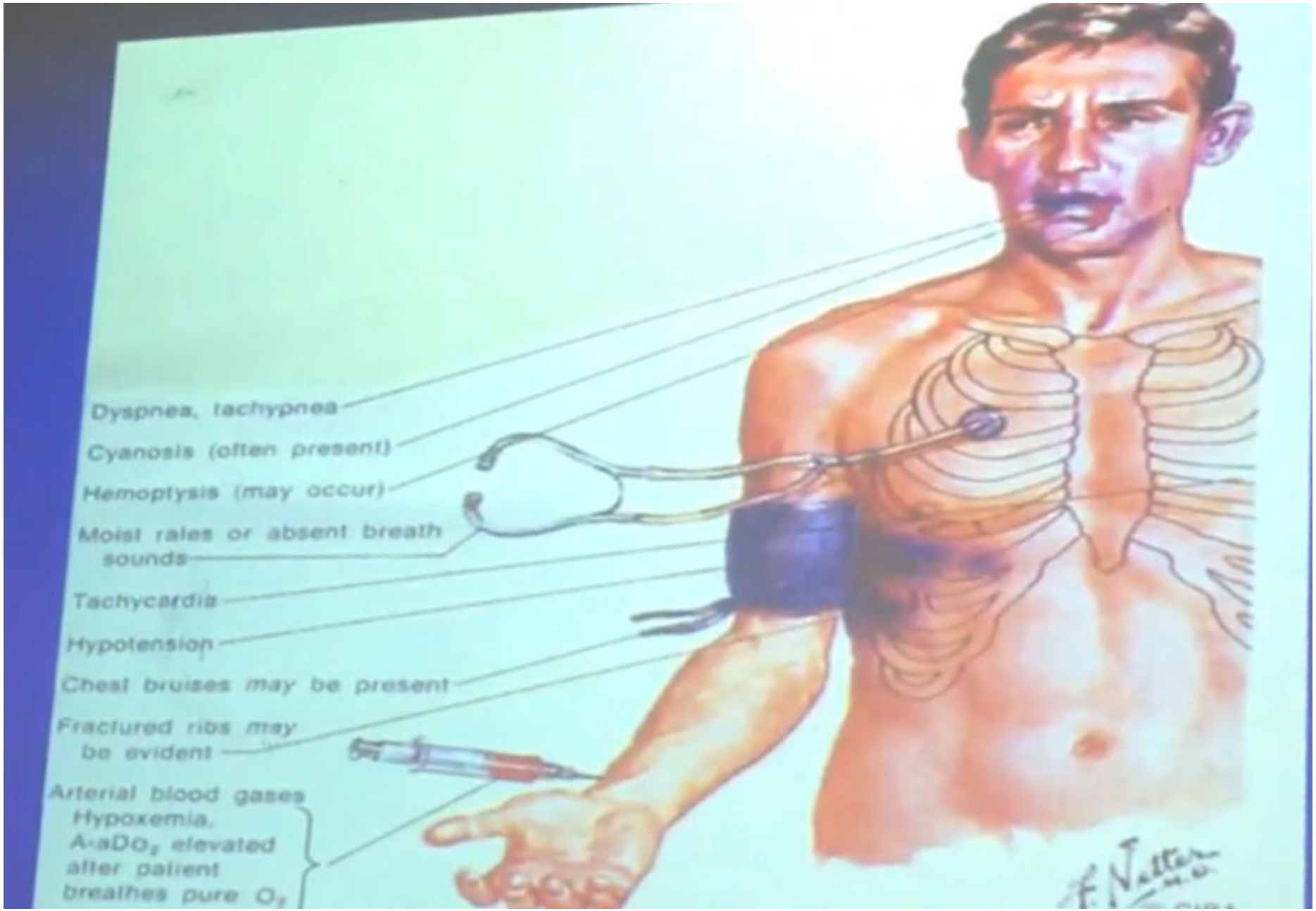
Pulmonary contusion

- Bleeding into the lung itself is a pulmonary contusion
- Bleeding and edema can impair gas exchange, causing hypoxia and respiratory faliur
- Soft crackles may be heard over injury site
- Chest pain, point tenderness, and localized swelling over area of impact

Management

- Support ventilation as needed
- Supply high-flow supplemental oxygen
- Transport to hospital--- ventilation




Dyspnea, tachypnea
Cyanosis (often present)
Hemoptysis (may occur)
Moist rales or absent breath sounds
Tachycardia
Hypotension
Chest bruises may be present
Fractured ribs may be evident
Arterial blood gases
Hypoxemia,
A-aDO2 elevated
after patient
breathes pure O2