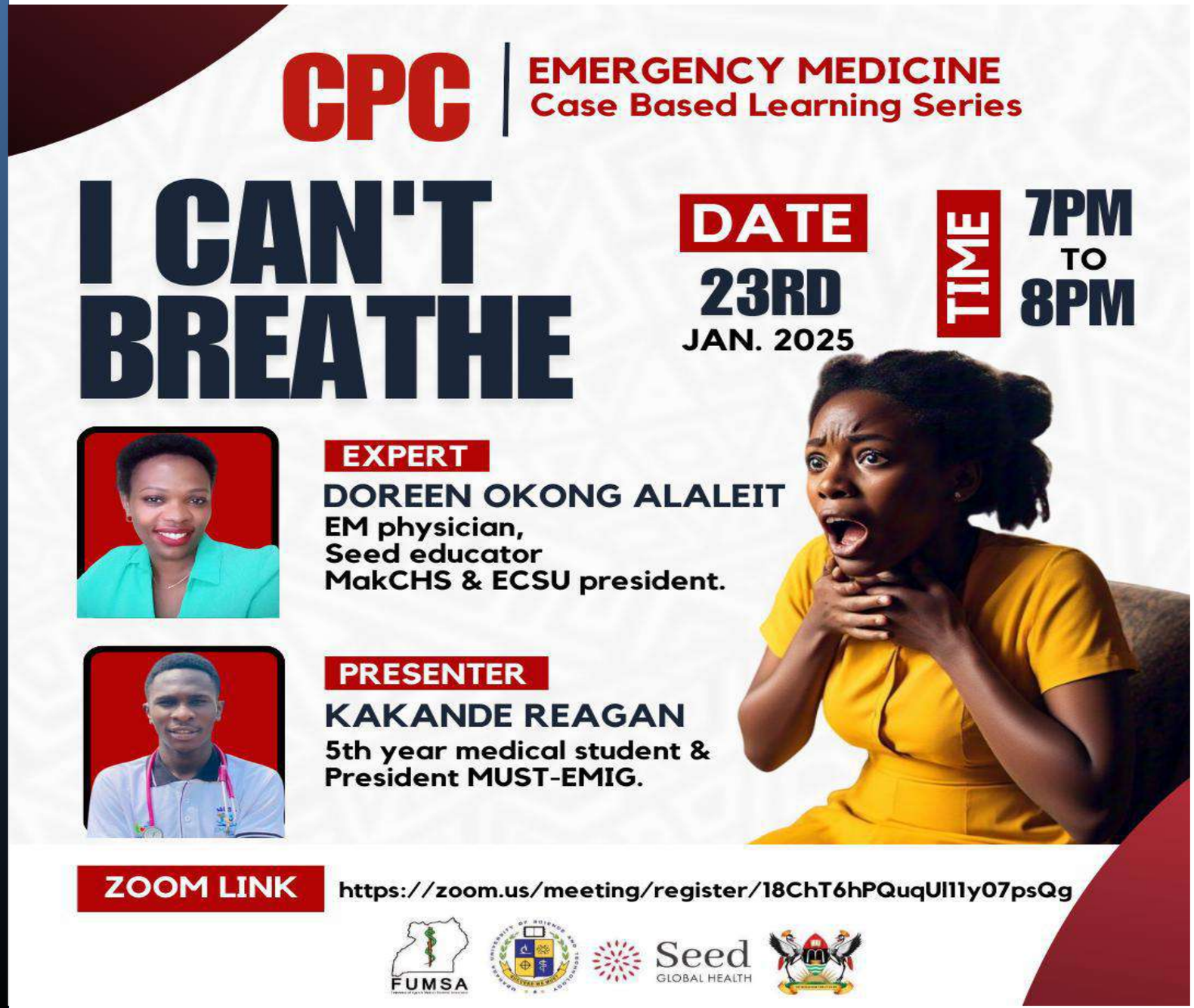
Case Based Learning Series

"Student Led Adult Learning"



Presenting Complaint

- **Patient Profile**

A 56-year-old male presents to the Emergency Department with complaints of severe difficulty breathing

- **Chief Complaint**

"I can't breathe"

Primary Survey

- **Airway:** The patient is able to speak in short sentences
- **Breathing:** Severe respiratory distress, 32 breaths/min), SPO2=92% on RA
- **Circulation:** 126 bpm, thready , B.P= 88/54 mmHg
- **Disability:** GCS=15/15, PEARLA, no focal neurological deficits.
- **Exposure :** No obvious external injuries noted, Skin is cold, clammy, and diaphoretic

SAMPLE History

- **Signs & Symptoms:** Sudden onset severe SOB, Sharp left-sided chest pain ,Dizziness and fatigue, a cough but no fever or chills.
- **Allergies:** No known drug or environmental allergies.
- **Medications:** Cardiac aspirin (low dose, 75 mg daily), unknown oral hypoglycemics
- **Past Medical History (PMH):** CAD for 2 years ago, Type 2 DM with poor glycemic control
- **Last Meal:** Had breakfast approximately 4 hours prior to symptom onset
- **Events Leading to Presentation:** Symptoms began while the patient was working in his garden. No known trauma or external injuries.

Audience

- Any additional information?

Expert

What are your initial thoughts, preparation and approach to this patient?

ED Intervention

Breathing Support: O2 therapy 5L via NP, and patient closely monitored for worsening respiratory distress

Circulation: Two large-bore IV cannulas, fluid 1L NS administered

Monitoring and Investigations: Vital signs, and urine output(catheter) continuously monitored, POCUS and a chest X-ray were done

Pain Management: IV **paracetamol** (1 g) for chest pain relief

Diabetes Management: Initial RBS= 320 mg/Dl, treated with insulin as per sliding scale protocol

Secondary survey

Head and Neck: Atraumatic, Neck veins were prominent, No tracheal deviation.

Chest: Asymmetrical chest wall movement observed, Tenderness on the left side of the chest with diminished breath sounds

Abdomen: Soft, non-tender, and non-distended, Bowel sounds present

Extremities: No obvious deformities, swelling, or bruising, Peripheral pulses weak but palpable bilaterally, Tingling sensations reported in the hands and feet, consistent with a history of diabetic peripheral neuropathy.

Neurological: Alert and oriented (GCS: 15), No focal neurological deficits noted, Reflexes were normal except for decreased sensation in hands and feet.

Skin: Cool and clammy initially, with slight improvement in warmth following resuscitation, No rashes, bruising, or visible external injuries.

Labs and imaging

- **Complete Blood Count (CBC)**

Hemoglobin: 13.2 g/dL (normal)

WBC: 10,500/µL (slightly elevated)

Platelets: 250,000/µL (normal)

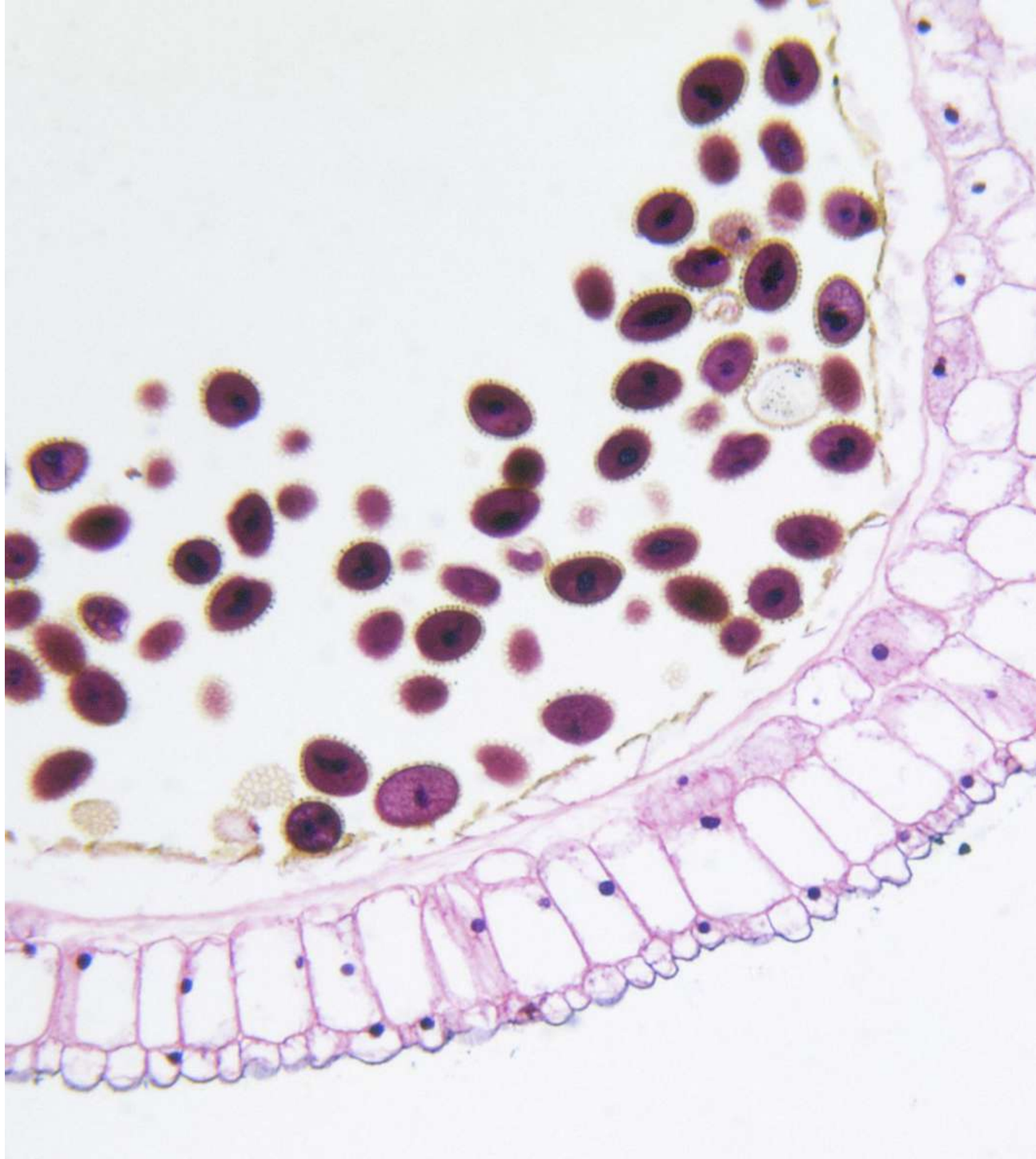
- **Arterial Blood Gas (ABG)**

pH: 7.34 (mild acidosis)

pCO_2 : 48 mmHg (elevated, hypoventilation)

pO_2 : 60 mmHg (hypoxemia)

HCO_3^- : 24 mEq/L (normal)



Labs cont’d

- **Random Blood Glucose: 320 mg/dL** (elevated)
- Troponin-I: 0.01 ng/mL (normal)
- **D-Dimer: 450 ng/mL** (slightly elevated)
- **C-Reactive Protein (CRP):** 6 mg/L (mildly elevated).

Image

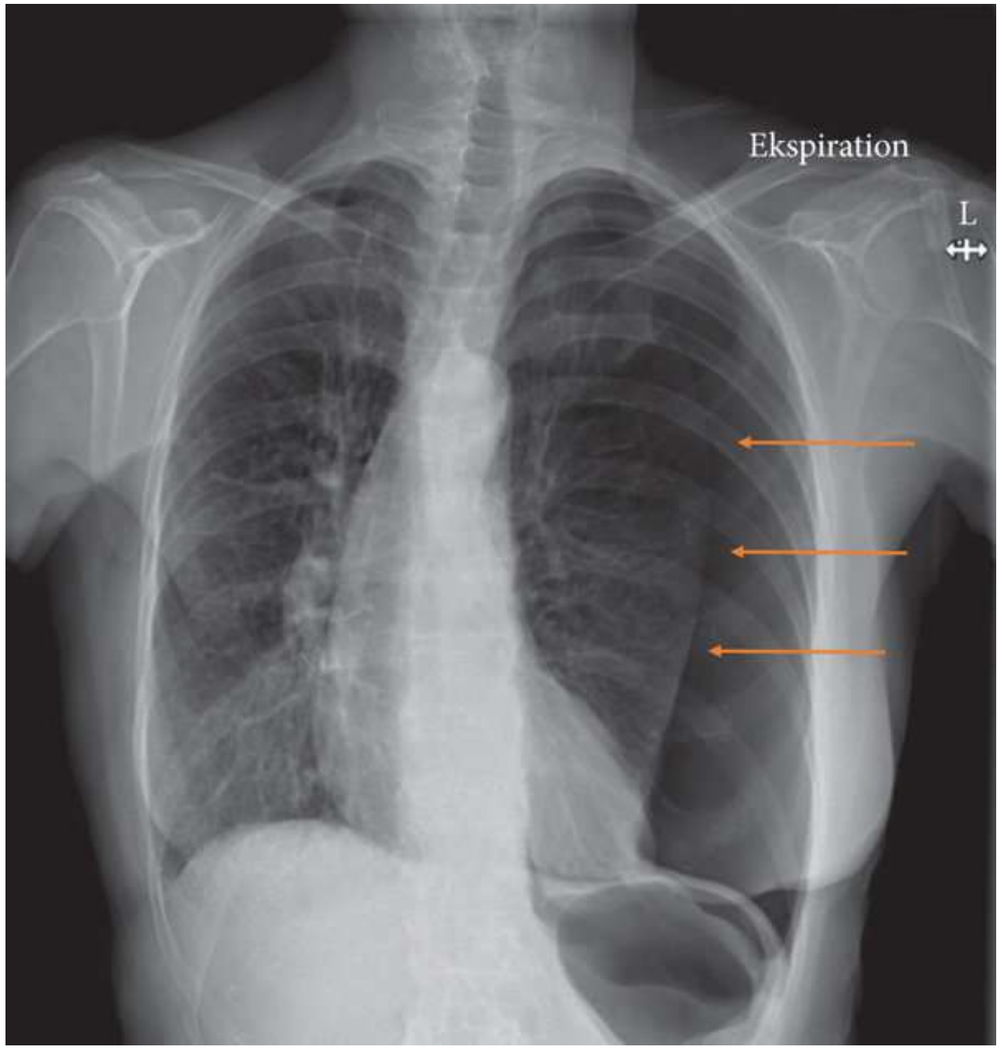


Image interpretation

- **Chest X-Ray:**

Hyperlucency noted on the left hemithorax. Mediastinal shift to the right side. No visible fractures or infiltrates

- **Point-of-Care Ultrasound** (POCUS):Absence of lung sliding on the left side, no evidence of pericardial effusion or tamponade

- **Electrocardiogram** (ECG):Sinus tachycardia at 120 bpm, no ST-segment changes or signs of ischemia.

Expert opinion

What are your differentials at this point

What is your management plan?

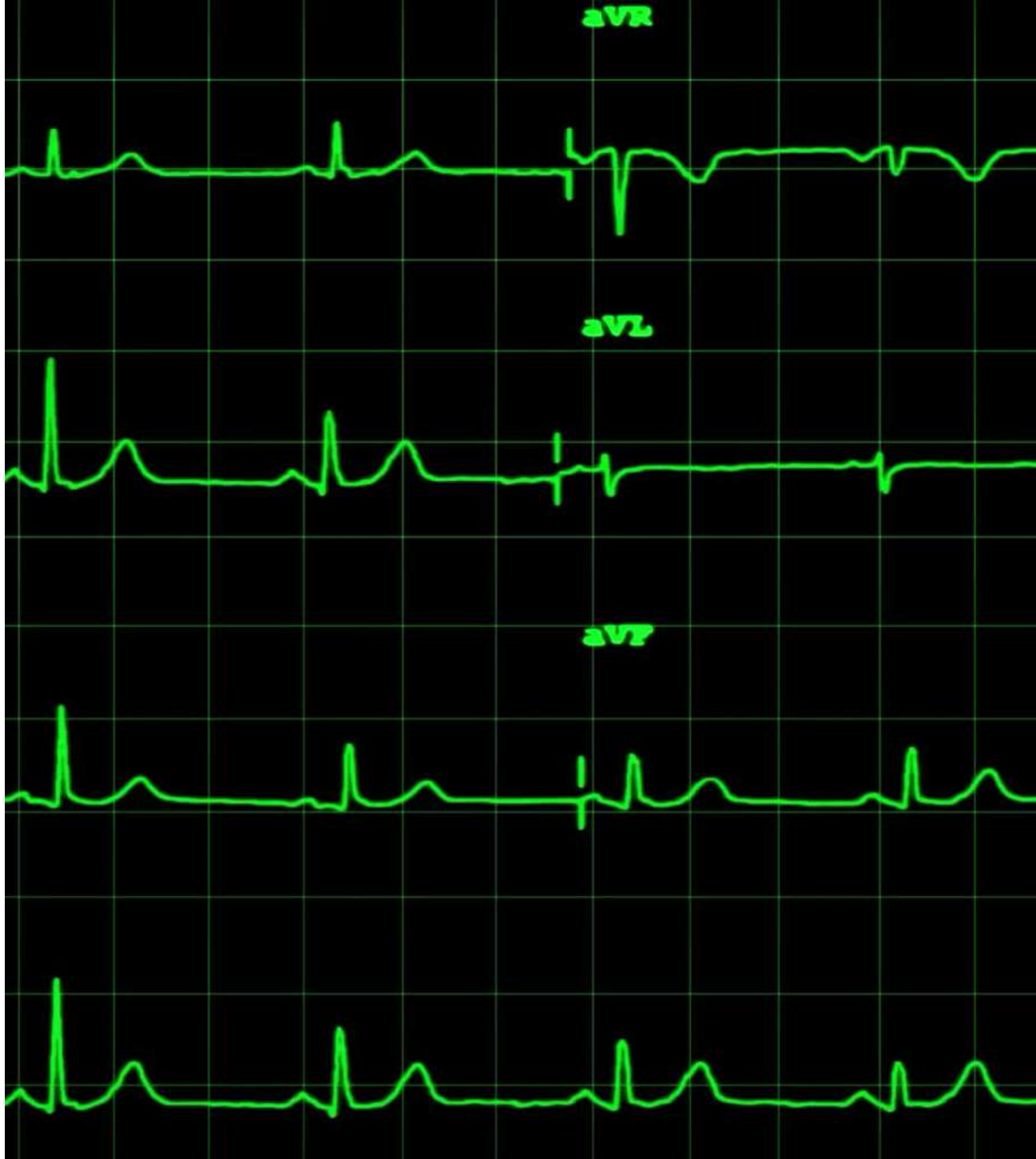
ED course

Cardiology Consultation: cardiology consultation

Recommendation: Continue monitoring cardiac biomarkers, and initiate aspirin and statin therapy

Changes During ED Course:

- **Initial Condition**: Initially had severe respiratory distress, hypotension, and chest pain, managed with O_2 therapy, fluid resuscitation, and analgesia.
- **Management;** Needle decompression in the 2nd ICS-MCL on clinical assessment and chest thoracotomy after imaging, with immediate improvement in Respiration and B.P
- **Post-Intervention**: Patient more stable, SPO_2 improved to 96% on 5L/min and B.P= 102/66 mmHg



Hospital course

- **Diabetes:** insulin therapy instituted as per the sliding scale (initial RBS= 320 mg/dL)
- **Admission: Intensive Care Unit (ICU)** for proper management (tension pneumothorax and DKA, CAD) and close monitoring of vitals (RR, SPO_2 , BP, CRT)
- **Plan**:
  - **Chest Tube**: Continue monitoring the chest tube for any signs of complications such as re-expansion pulmonary edema or infection.
  - **Diabetes Management**: Maintain tight blood glucose control with insulin and monitor for any complications related to hyperglycemia.
  - **Cardiac Monitoring**: Continue monitoring for any signs of ischemia or arrhythmias.
  - **Respiratory Support**: Wean off supplemental oxygen gradually if the patient remains stable
  - **Further Imaging**: A follow-up chest X-ray in 6-12 hours to assess lung re-expansion and confirm resolution of the pneumothorax.

Expert

Pearls and pitfalls

Highlights

- **MIST Summary (Field Trauma Summary)**
- **M**: Mechanism of injury – The patient farming when he experienced sudden onset of chest pain and difficulty breathing.
- **I**: Injuries sustained – Suspected tension pneumothorax due to respiratory distress, hypotension, and decreased breath sounds.
- **S**: Signs and symptoms – Tachycardia, hypotension, chest pain, fatigue, cough, dizziness, and hypoxia.
- **T**: Treatment provided – Oxygen, IV fluids, pain control, and chest tube insertion for pneumothorax

ATLS (Advanced Trauma Life Support) Approach:

- **Primary Survey:**
  - **Airway**: Ensure airway is clear and patent.
  - **Breathing**: Assess for adequate ventilation and signs of pneumothorax and O_2 therapy as needed **Circulation**: Monitor for signs of shock (hypotension, tachycardia) and administer fluid resuscitation and control any bleeding.
  - **Disability**: Check neurological status (Glasgow Coma Scale, pupil reaction).
  - **Exposure**: Remove clothing to assess for additional injuries or trauma.

- **Secondary Survey:**
  - Detailed head-to-toe examination to identify all injuries, including the lungs and chest.
  - Focus on diagnosing pneumothorax, monitoring for signs of re-expansion pulmonary edema post chest tube insertion.
  - Perform necessary imaging (X-ray, ultrasound) to confirm diagnosis.
- **See It, Fix It:**

- **See it**: Identify the signs and symptoms of tension pneumothorax early (tachycardia, hypotension, respiratory distress, tracheal deviation, and hyperresonance on percussion).
- **Fix it**: Perform immediate needle decompression (if tension pneumothorax is suspected) followed by definitive chest tube insertion. Monitor for complications such as re-expansion pulmonary edema.

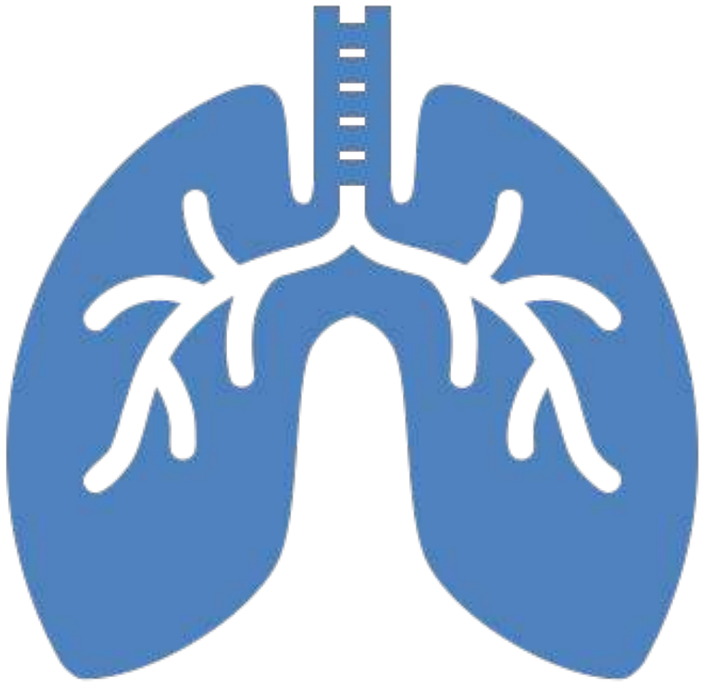
Pneumothorax

Etiology

Spontaneous

- Endometriosis (catamenial)
- Blebs (COPD, connective tissue disorders)

- Traumatic
  - Blunt chest trauma (Rib fractures)
  - Penetrating chest trauma
  - Iatrogenic (Medical procedures eg central lines, bronchoscopy)



RECOGNITION

- Hx and exam

  Symptoms: Chest Pain, Shortness of breath

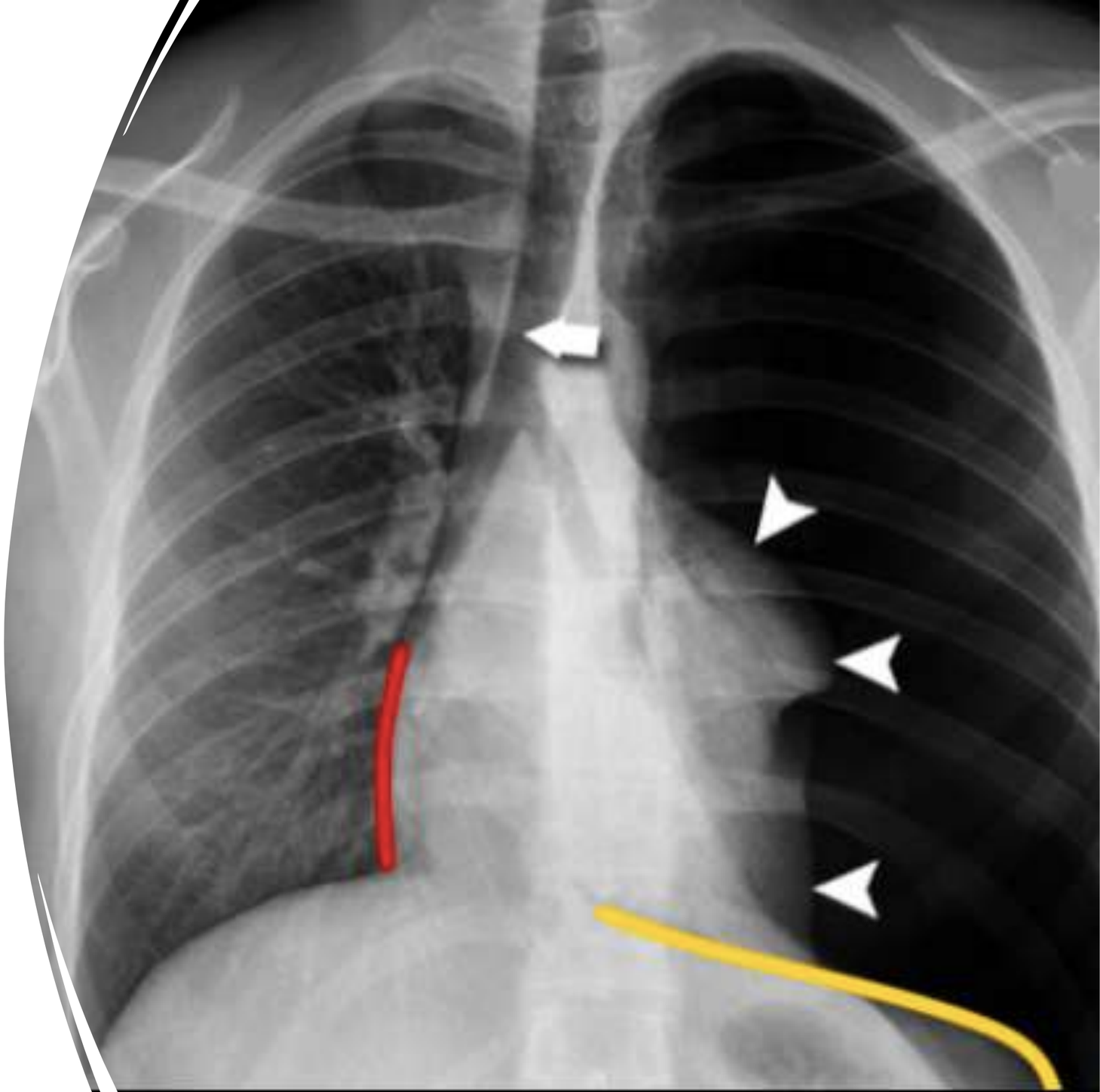
  Vitals : HR, RR, BP

  Chest: Asymmetric percussion / auscultation

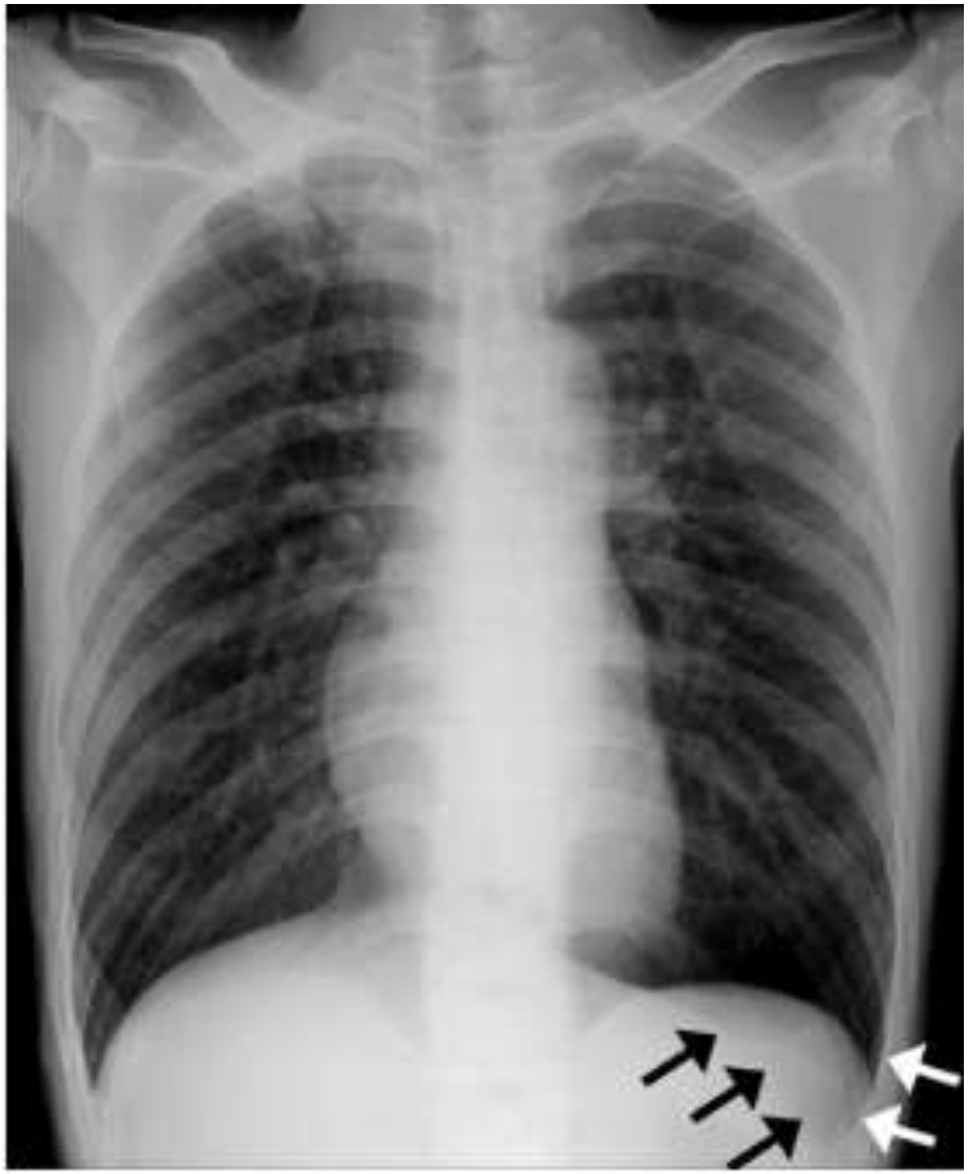
  Imaging
  - Ultra Sound
  - Supine XRAY: Deep sulcus sign
  - Erect XRAY: Free air
  - CT

Erect chest XR: Small Pneumothorax

Erect Xray: Tension Pneumothorax



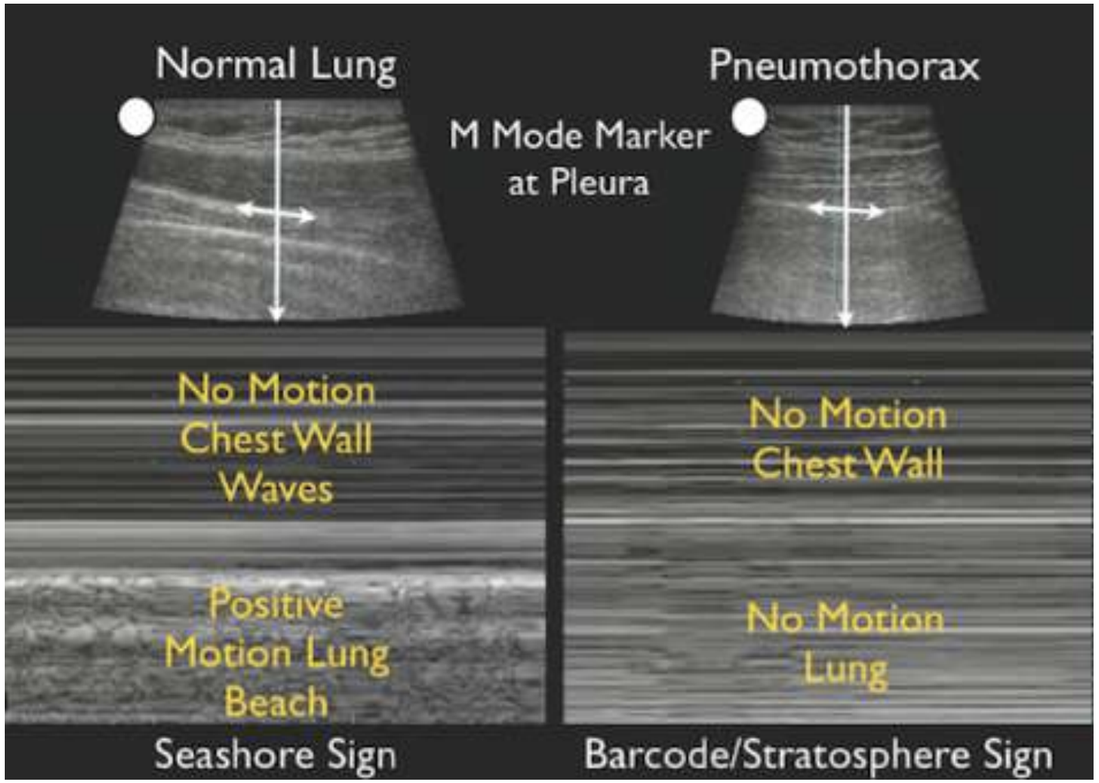
Supine Xray: Deep Sulcus Sign



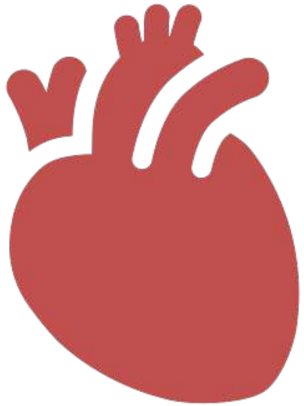
CT Scan

ULTRASOUND

- No lung sliding
- Lung point
- Barcode sign



MANAGEMENT



Clinically unstable (Tension physiology) : Thoracotomy

Emergent: Needle decompression => Thoracotomy

Stable: Observe +/- Oxygen therapy

Questions?