

It's Challenge Time



**TAKE THE
CHALLENGE**





US

challenge



**TAKE THE
CHALLENGE**



Presentation

42 year old diabetic woman with left sided pleuritic chest pain. Mild fever and cough.

ft lower lobe



Left lower lobe Doppler

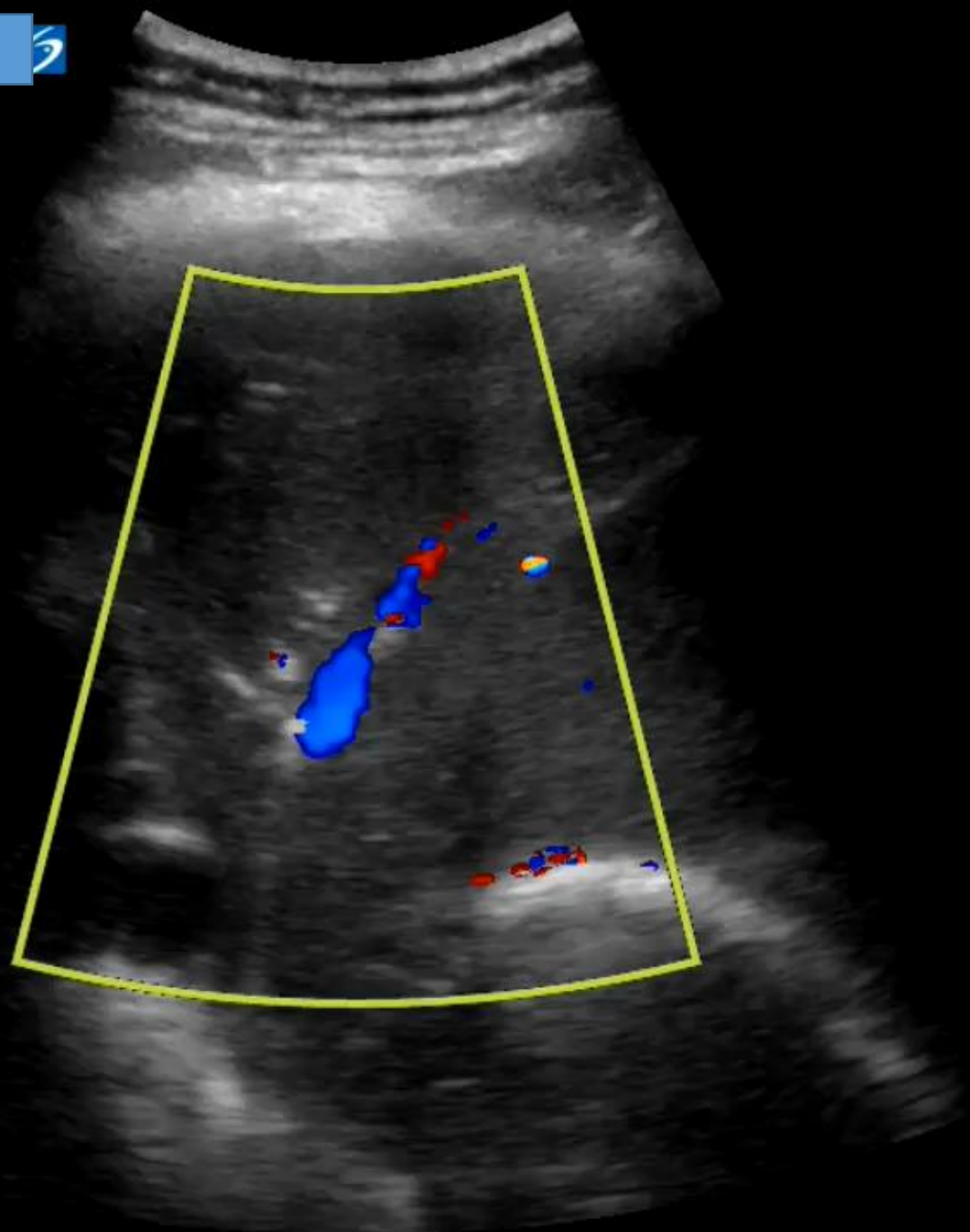


IMAGE INTERPRETATION

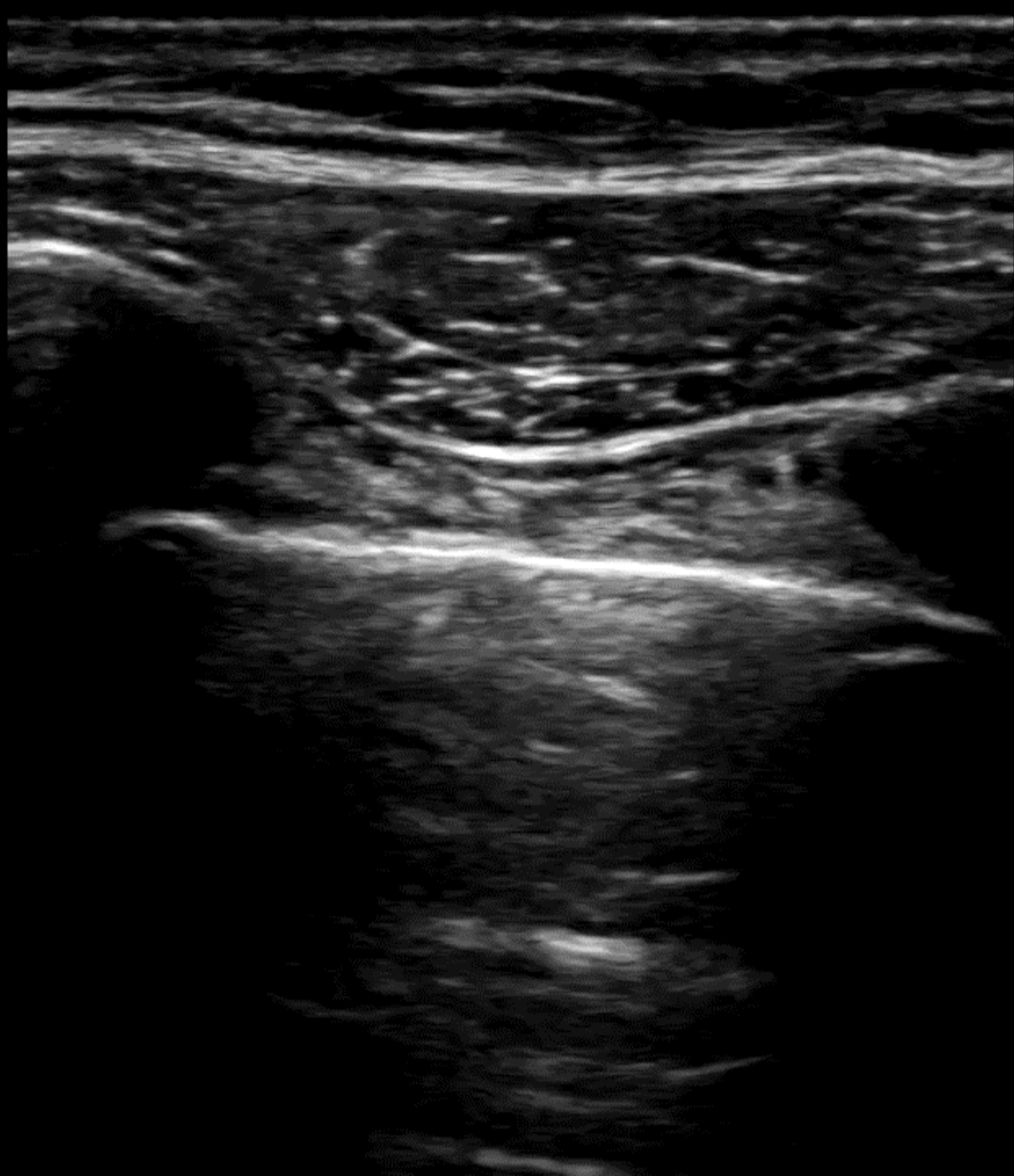
Image 1: Left lower lobe consolidation with prominent air bronchograms and a parapneumonic pleural effusion.

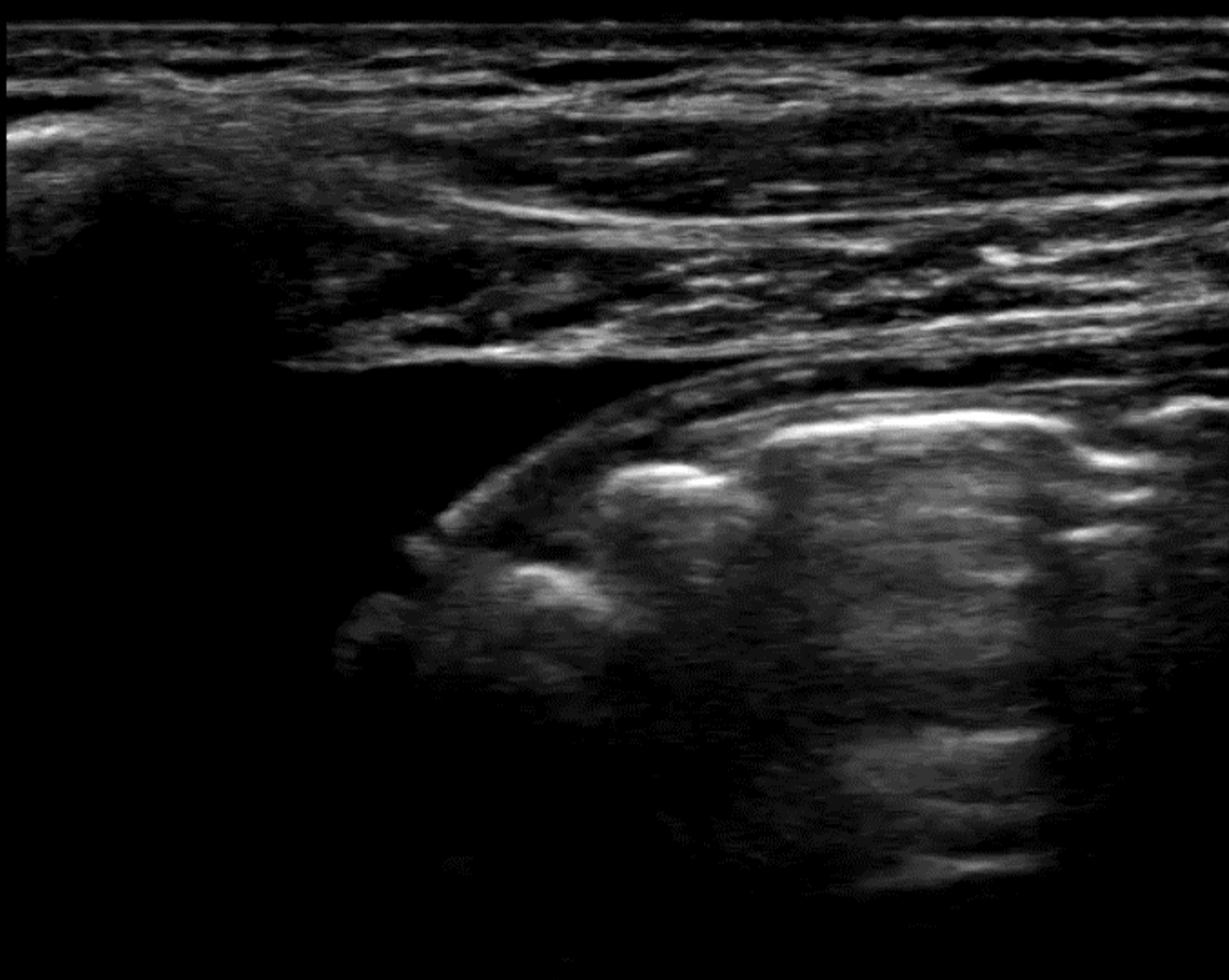
Image 2: Colour Doppler interrogation confirms the pulmonary arterial flow and venous flow.

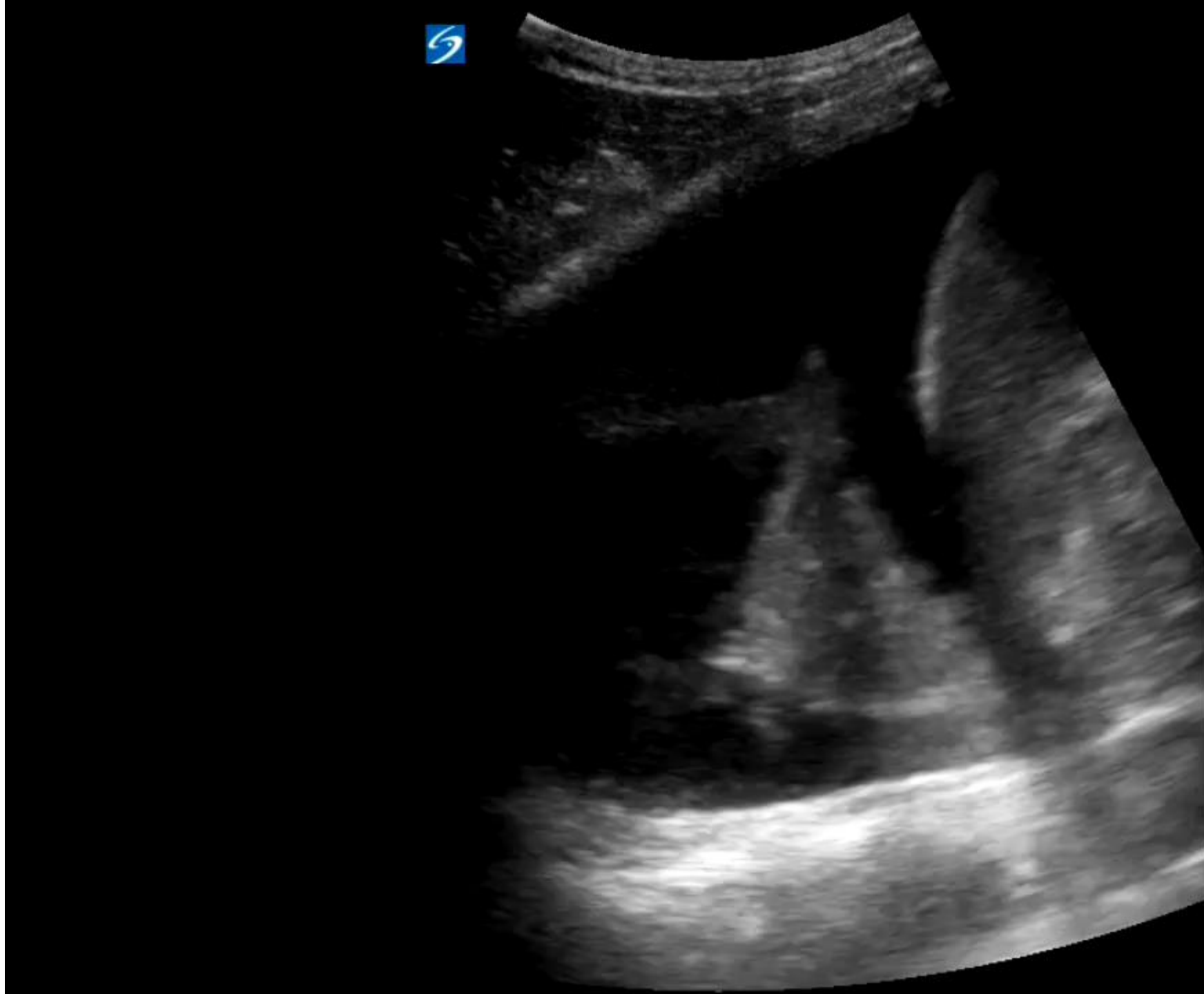
Left lower lobe pneumonia and parapneumonic effusion.



35 year old male represents with shortness of breath 5 days after falling of his bicycle. His initial chest x-ray on day one had shown a tiny pneumothorax and several rib fractures.







- **Image 1:** Pneumothorax with loss of lung sliding and loss of short path reverberation artefacts ([comet tail](#) and [B-lines](#))
- **Image 2:** Normal lung sliding and [comet tail artefact](#) on the asymptomatic side.
- **Image 3:** Pleural effusion with underlying collapsed lung
- HEMOPNEUMOTHORAX



Presentation

72 year old man with a history of mesothelioma presents with increasing shortness of breath.





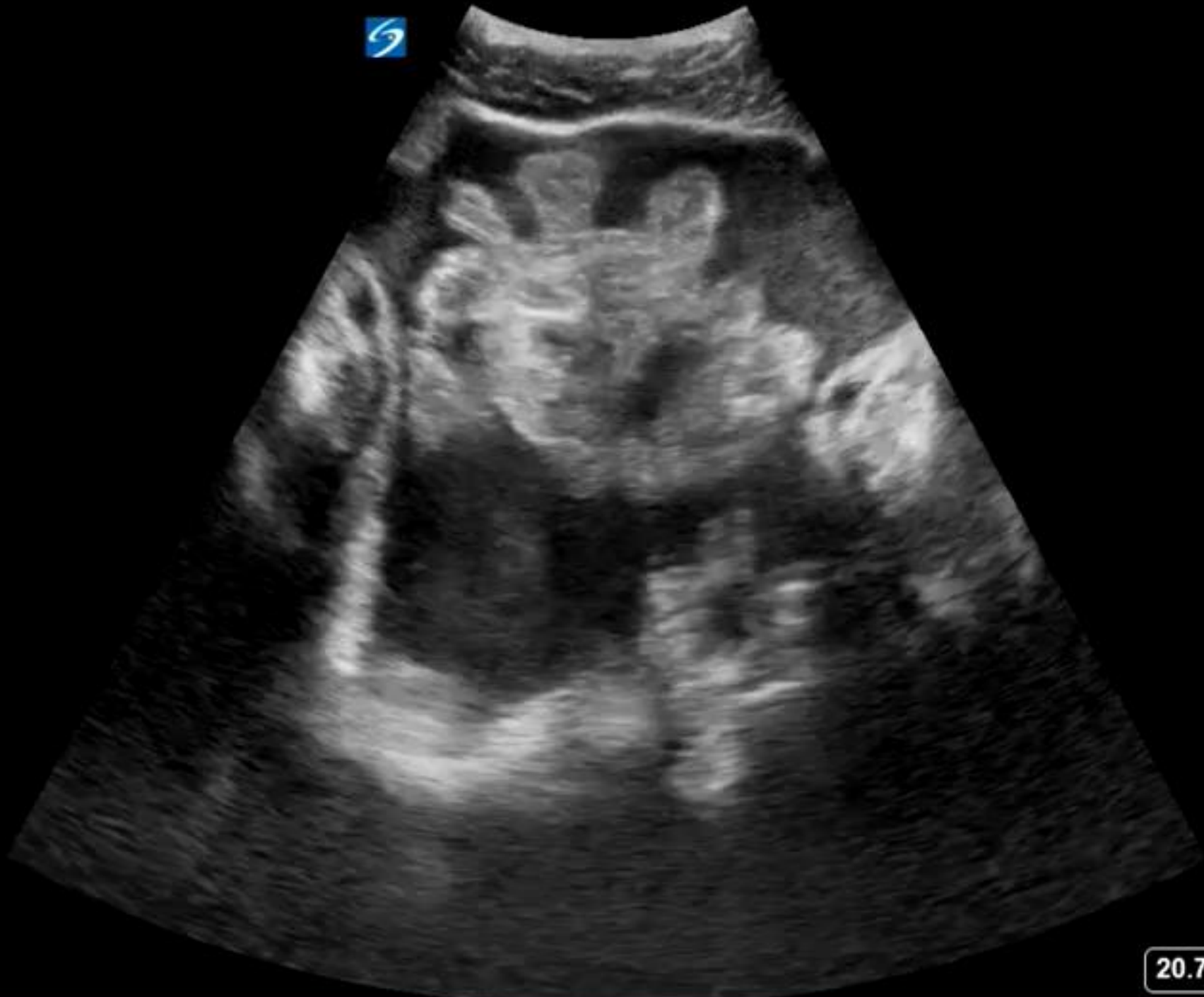
- **Image 1:** A moderate sized pleural effusion is present. Fanning through the effusion the descending aorta is seen, then the heart – which is surrounded by a large pericardial effusion.
- **Image 2:** Using the echo probe the pericardial effusion is again seen through the pleural effusion.



- 35 year old male represents with shortness of breath 5 days after falling of his bicycle. His initial chest x-ray on day one had shown a tiny pneumothorax and several rib fractures.



16.2 cm



20.7 cm

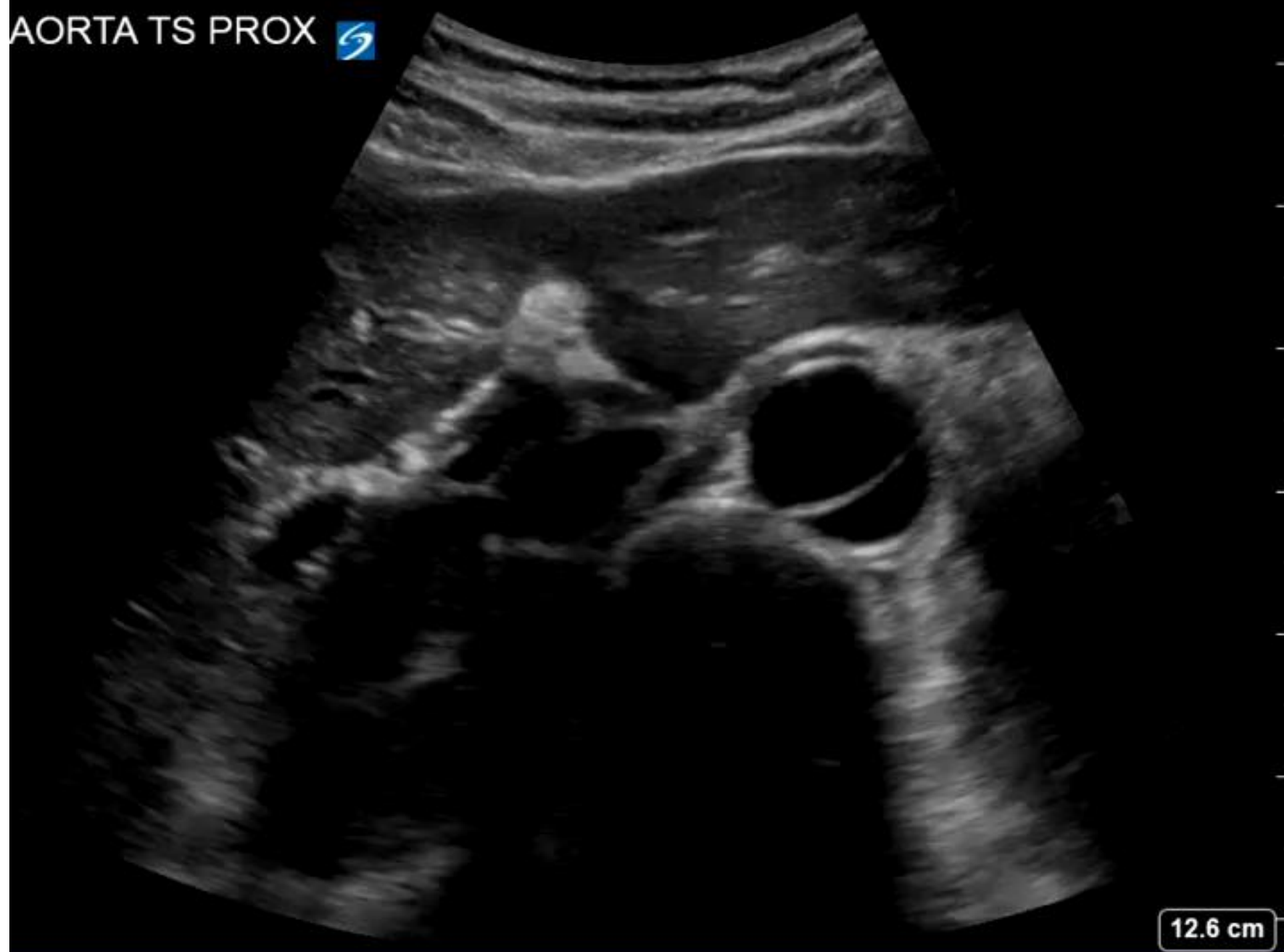
Haemoperitoneum.

- **Image 1:** *RUQ*: There is a large amount of free fluid in the right upper quadrant.
- **Image 2:** *Pelvis*: Views of the pelvis show free fluid. The fine echogenic particulate appearance is typical of blood that has not yet formed clot nor layered. Imagine an ESR tube with red cells slowly settling with gravity.



A thin and tall young man presents with back pain.

AORTA TS PROX 



12.6 cm



AORTA LS PROX 



12.6 cm



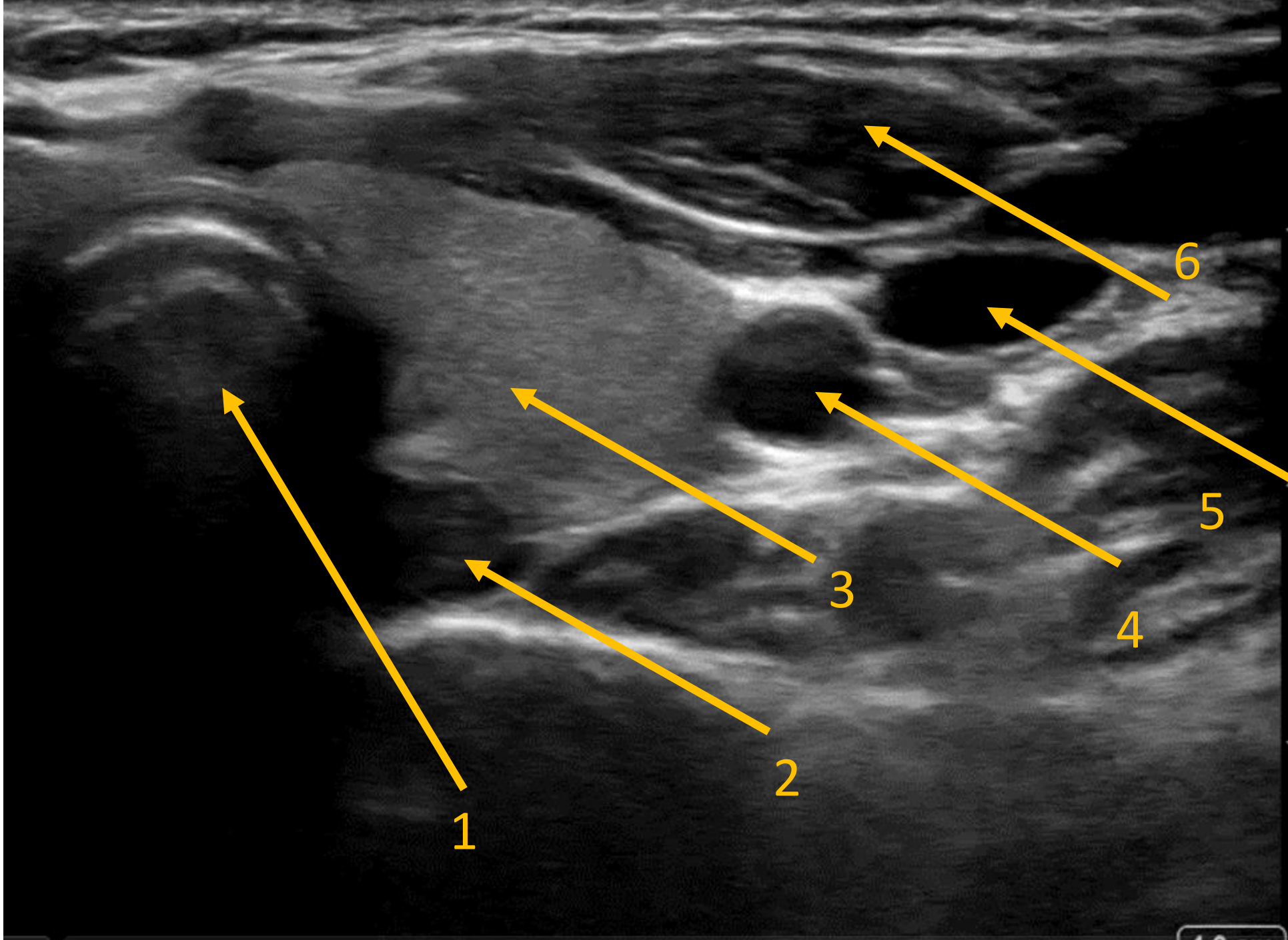
- **Image 1:** *Transverse mid abdominal aorta.*
- **Image 2:** *Longitudinal view abdominal aorta.*

- A dissection flap is seen in the abdominal aorta.



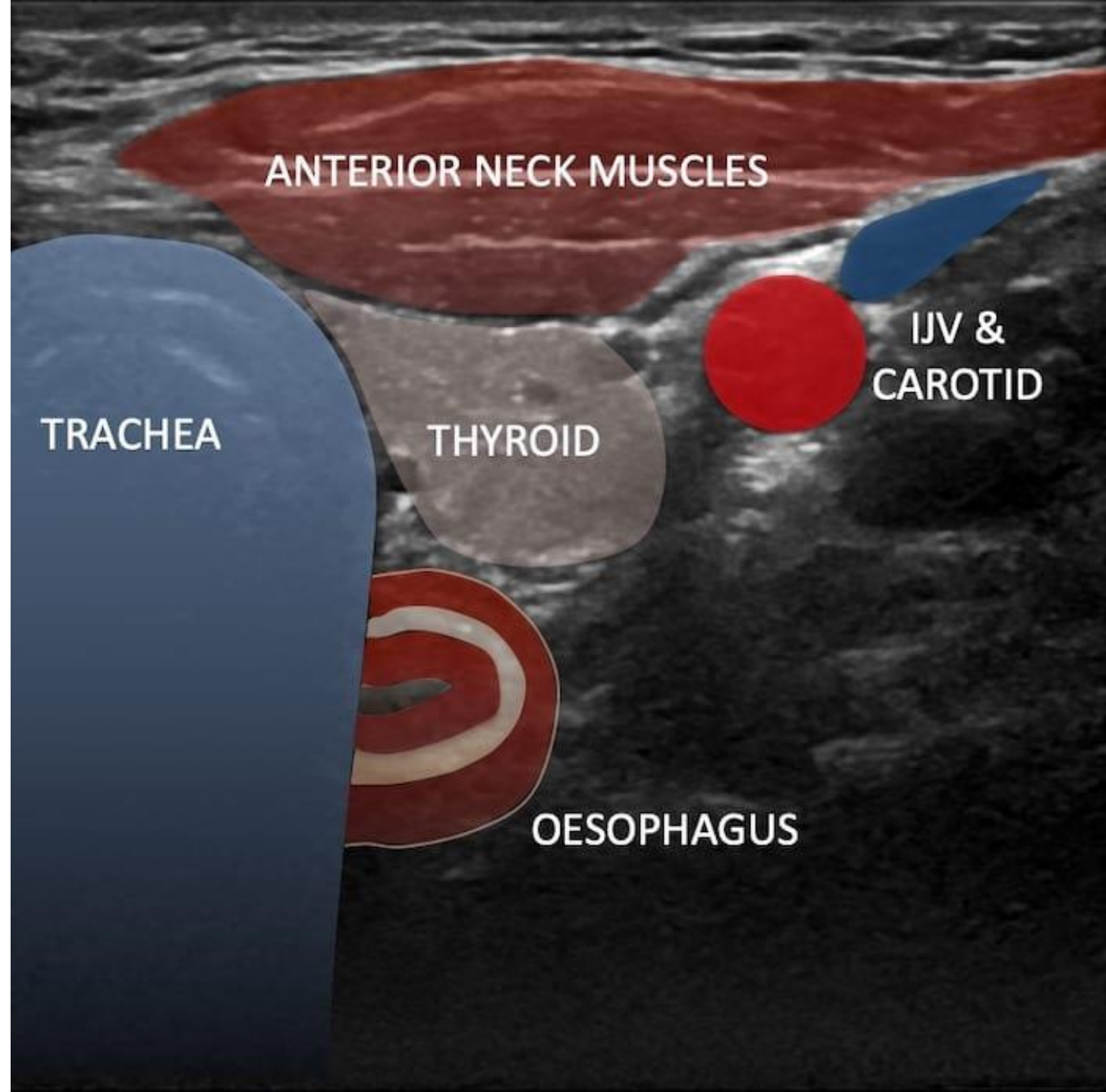
Oesophageal intubation

- There are several ways of ensuring endotracheal intubation but in competent hands ultrasound visualisation has several advantages.
- Feedback is given in real time so there is no need to ventilate or to wait for end tidal CO₂.
- The operator can press gently with the probe creating cricoid pressure if desired or can use it to guide the larynx – if laryngeal manipulation (like “BURP”) if required.
- It is easy to visualise oesophageal intubation whilst it is more difficult to see tracheal intubation – however success can be inferred if the tube is passed and the oesophagus not intubated.
- Lung sliding can also be used to confirm ventilation of both lungs once the tube has passed.



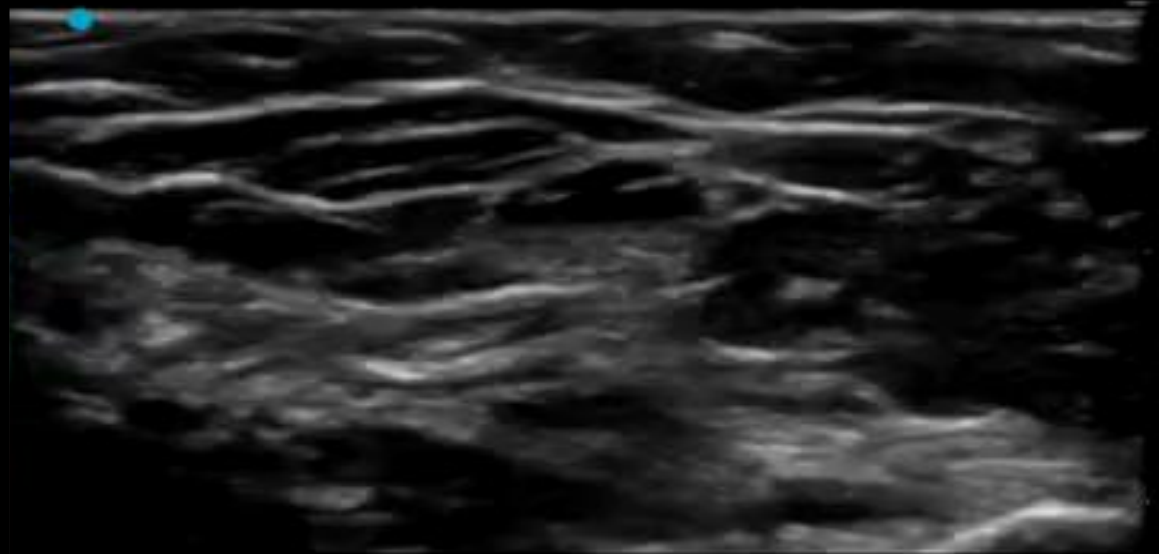
4.0 cm





Presentation

Ultrasound guided peripheral intravenous cannula placement



2.2

IN or OUT of Plane ?

Presentation

Ultrasound guided peripheral intravenous cannula placement



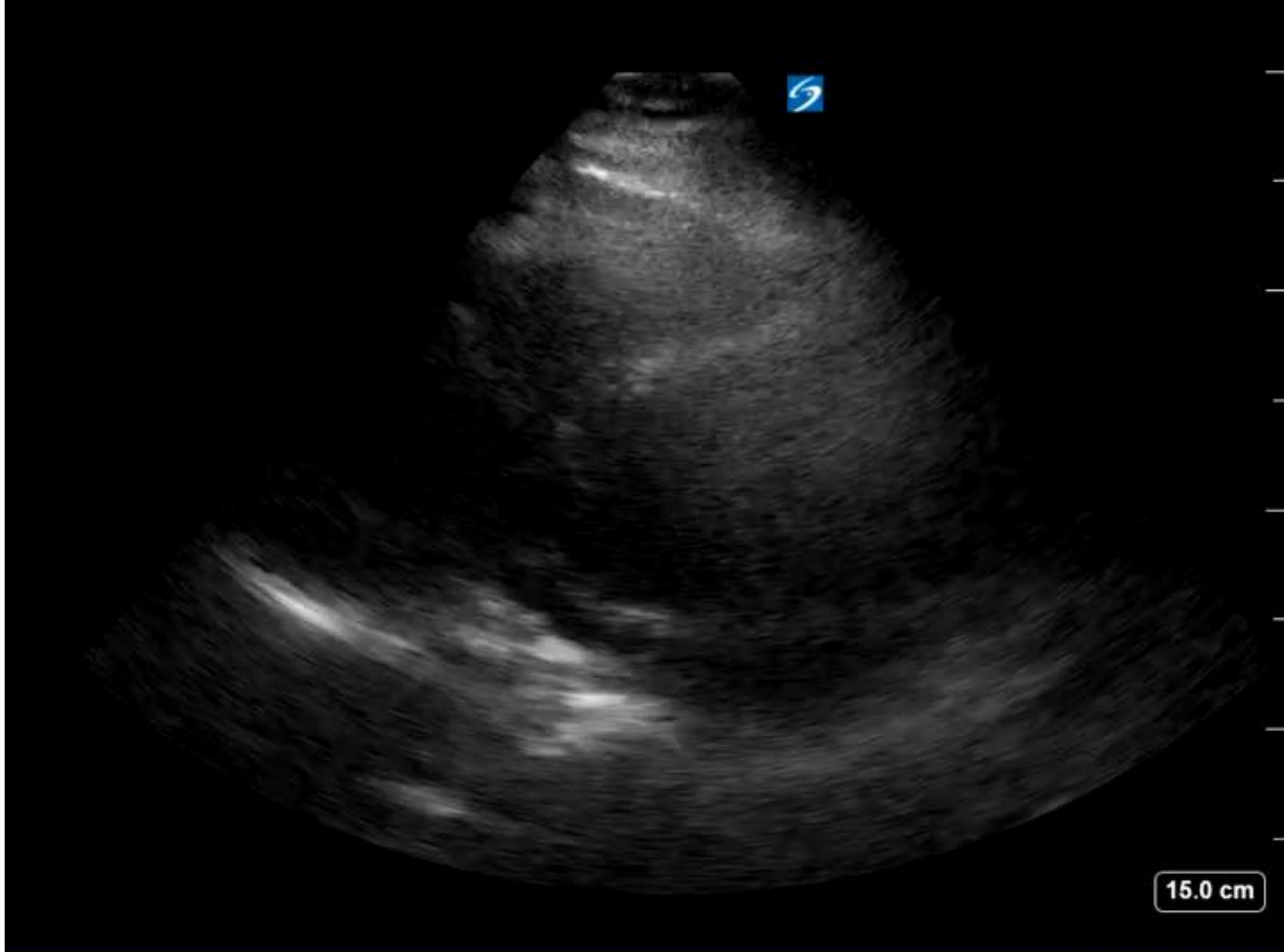


A 50 year old male has an out of hospital cardiac arrest. ROSC is achieved rapidly on scene and he is brought in by ambulance hypotensive, agitated and confused.

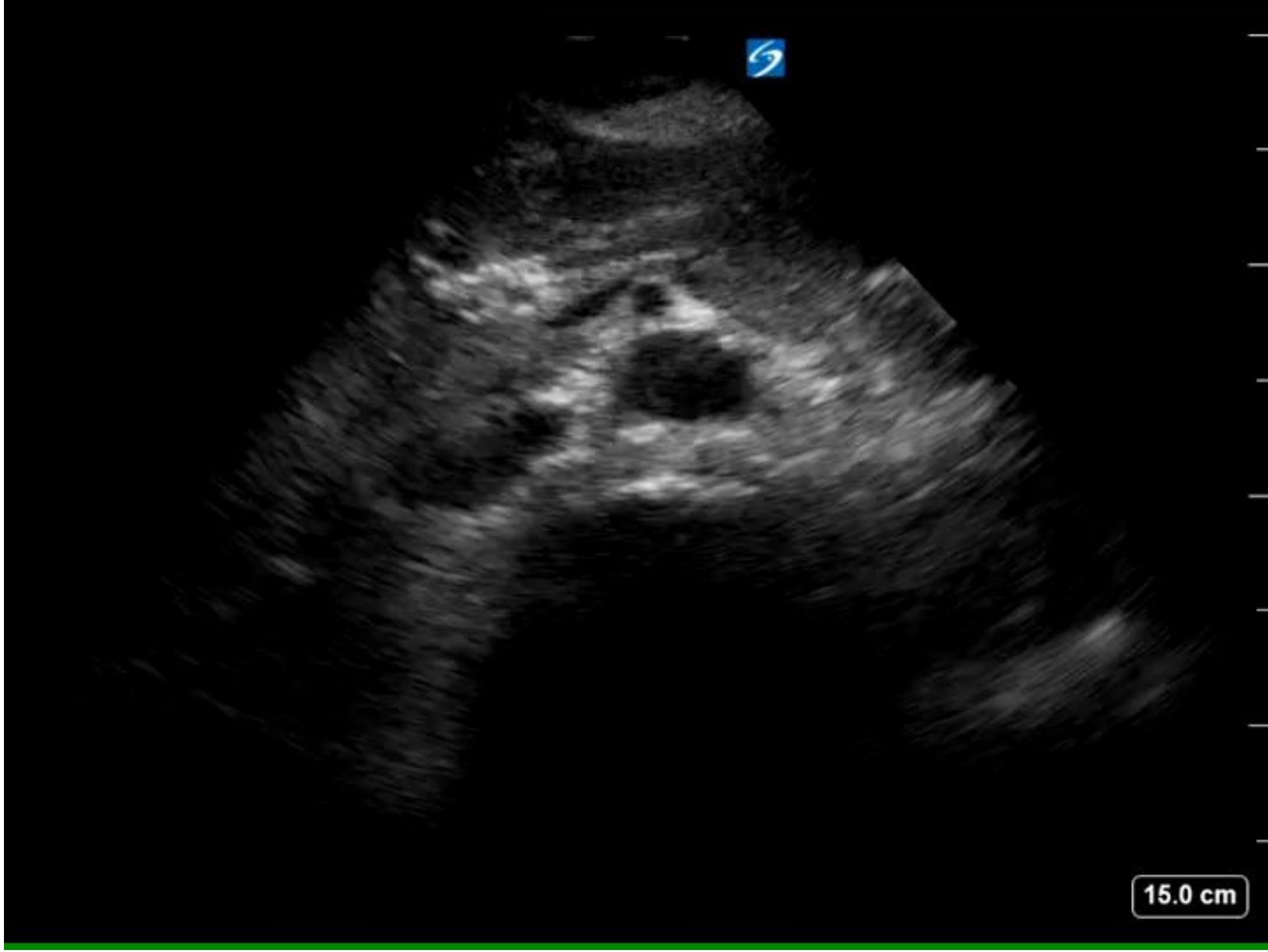
You perform an abbreviated echo in ED to direct further investigations and management.



23.0 cm



15.0 cm

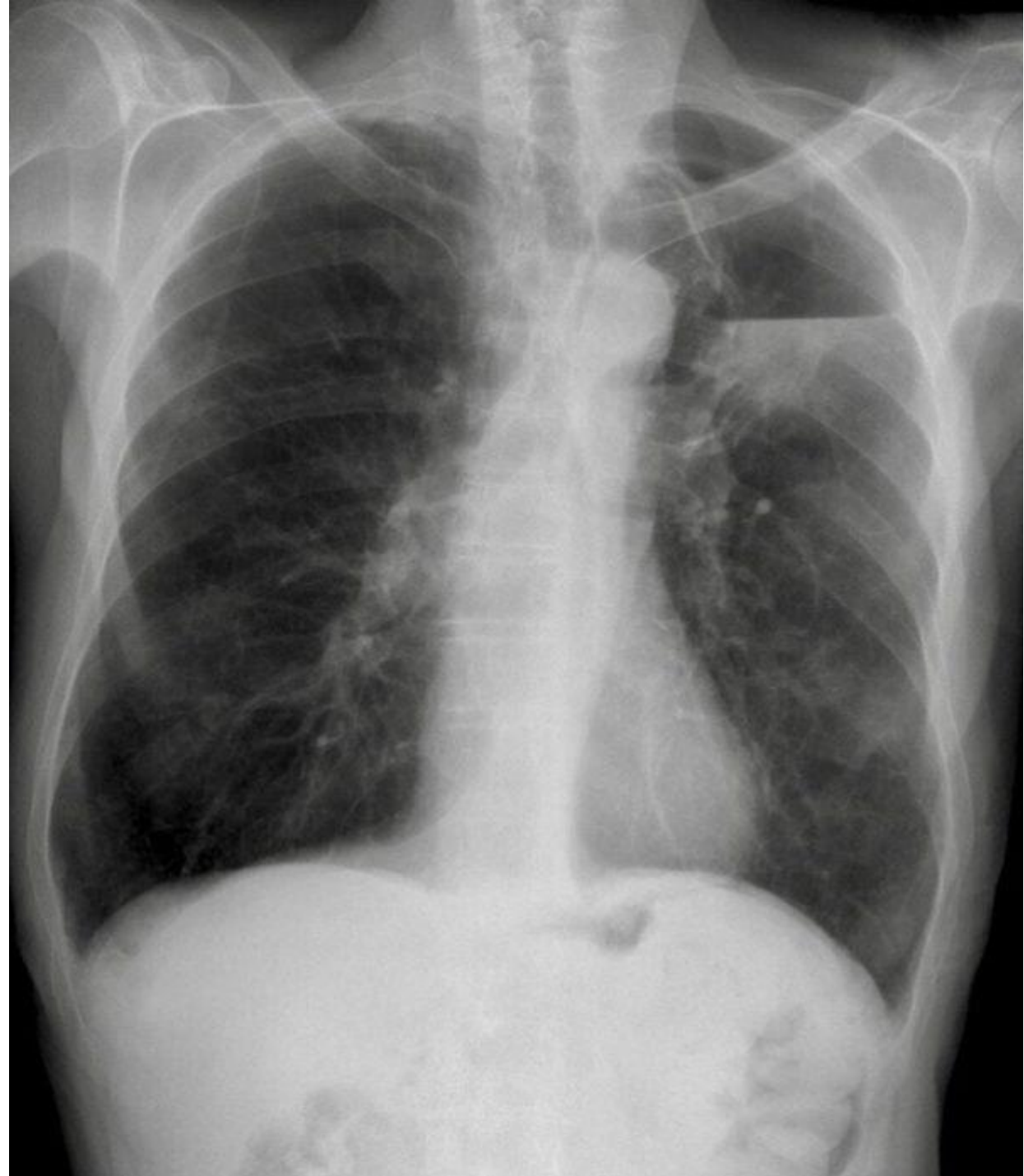


15.0 cm

- **Image 1:** Poor quality subcostal cardiac view. Despite the poor view you can see a small pericardial effusion, you see the right heart is not dilated and is functioning well. The left heart looks to be contracting well but it is very difficult to be certain. You move to a parasternal long axis view.
- **Image 2:** The parasternal long axis view. The most obvious feature is the markedly dilated proximal aorta which measures just over 6cm. It compresses the left atrium.
- **Image 3:** Transverse view of the proximal abdominal aorta. This view shows a dissection flap in the non-aneurysmal abdominal aorta.

Describe and interpret this CXR

- A 64 year old male smoker presents to his GP with weight loss and a cough and is sent to ED.
- The patient was put on 25mg of prednisolone for presumed polymyalgia rheumatica 6 weeks ago. He has type II diabetes.



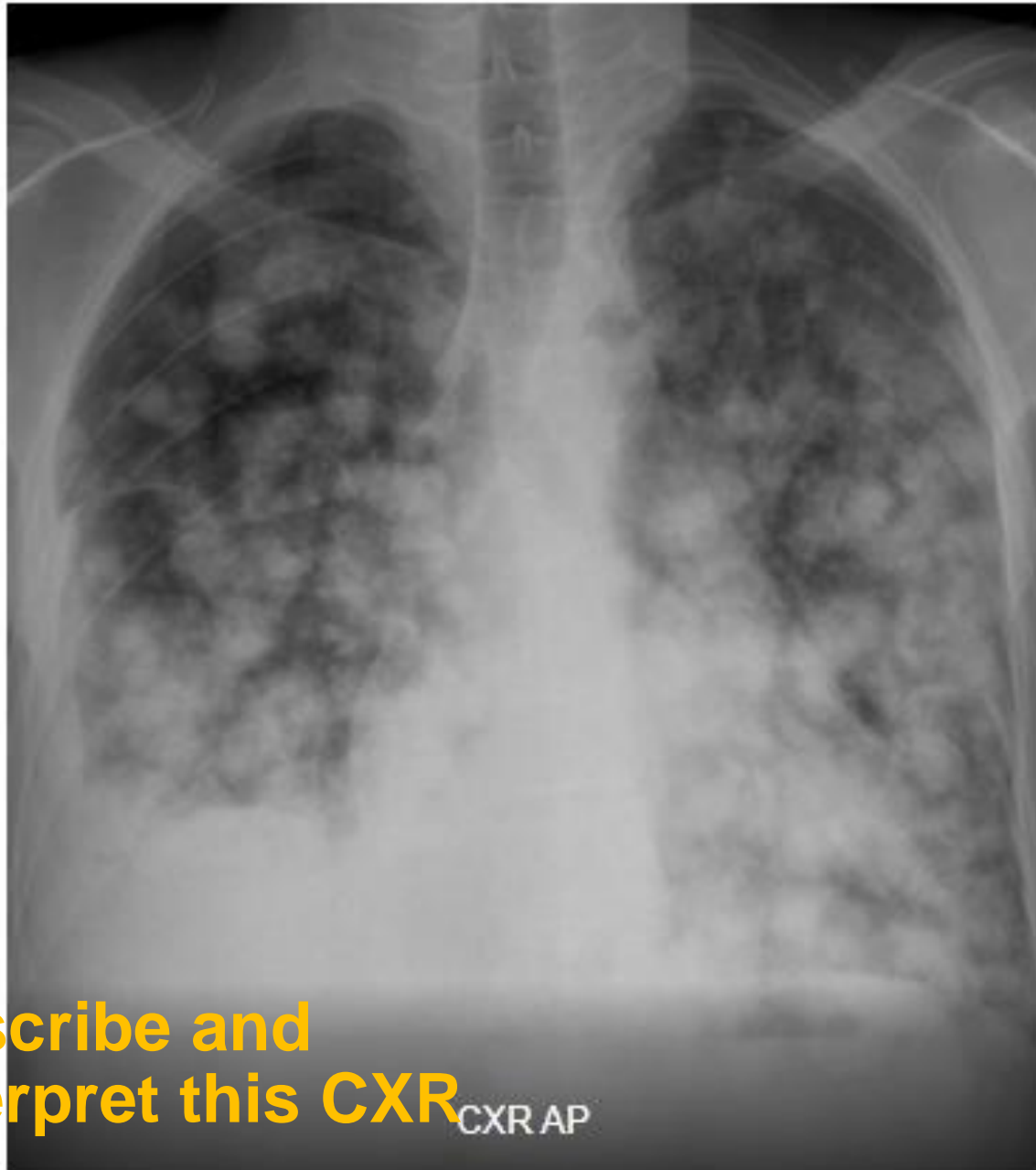


CHEST X-RAY INTERPRETATION

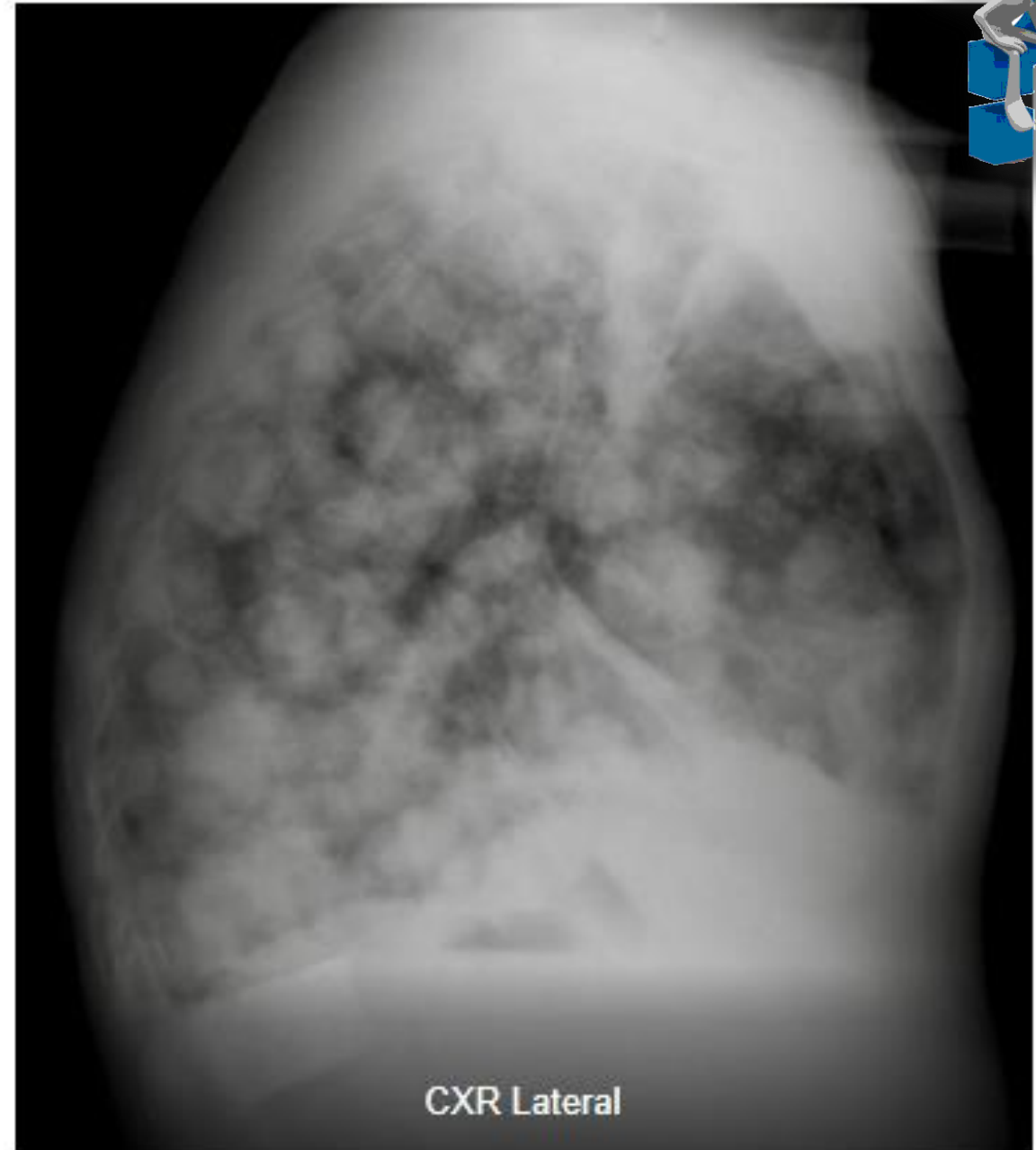
- There is an air fluid level in a large cavity in the left upper zone with associated increased airspace shadowing and left hilar adenopathy. There is increased lucency above the air fluid level with scanty lung markings suggesting this is either a large cavity or involving the pleural space. The rest of the lung parenchyma and pleural spaces are normal.

Malignancy and TB would be the most important diagnoses to consider.

A 40 year old male presents with septic shock and reduced consciousness



CXR AP



CXR Lateral

Describe and interpret this CXR

CXR Interpretation:

There are multiple large areas of airspace opacification projecting over both lung fields.

** Areas of opacification project primarily over the lower and mid-zones, and completely obscure the heart border.*

** The right base is more dense, suggesting possible pleural effusion, with fluid laterally and in the horizontal fissure.*

Lateral CXR Interpretation:

T12 has diffusely and homogeneously increased density – an [‘ivory vertebra’](#) (this is actually visible on the PA – but we are easily distracted...)

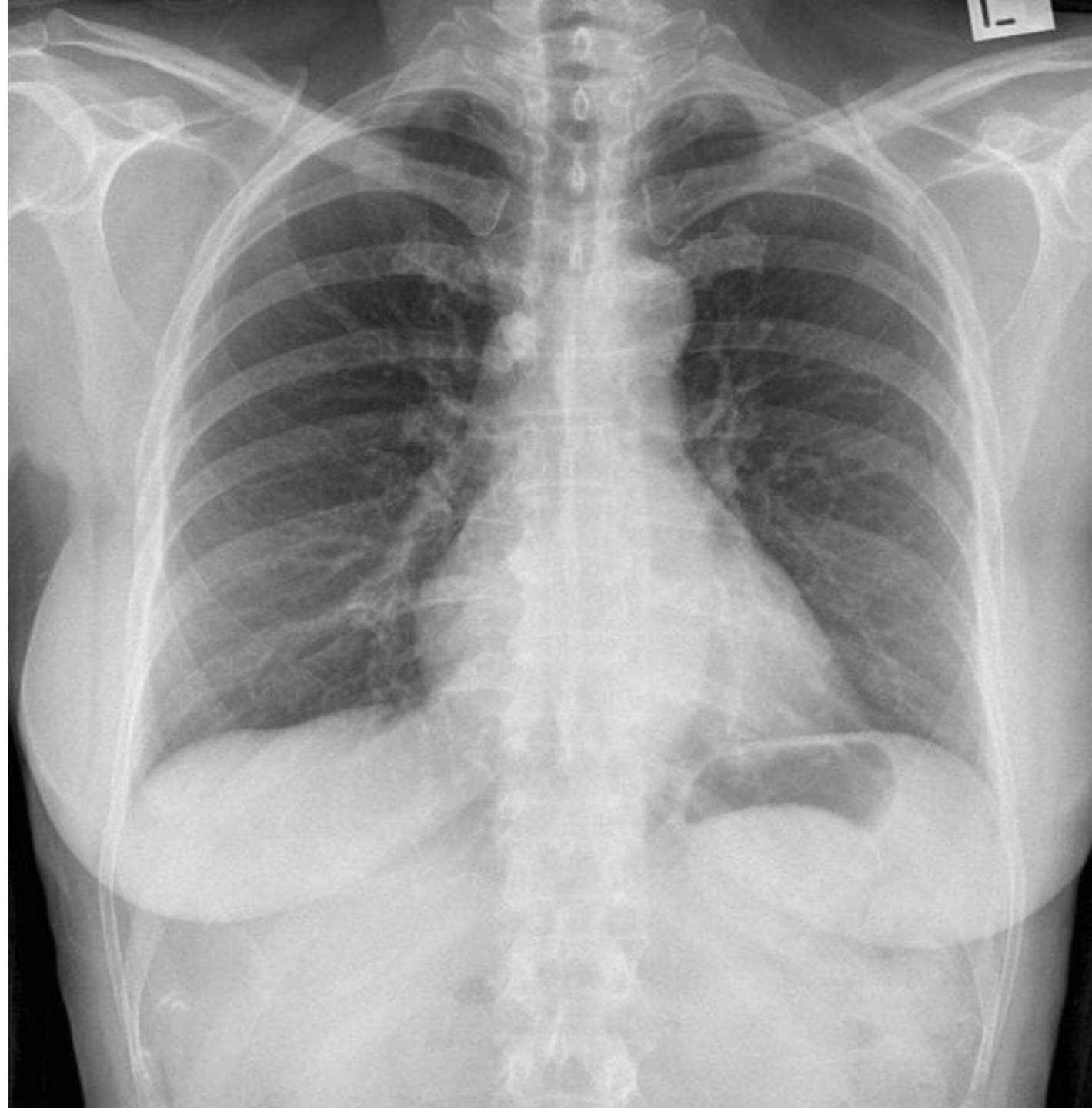
Methicillin-resistant *Staphylococcus aureus* was isolated from blood cultures 24 hours later.

The patient had lymphoma.



- *'Routine'* CXR on a 64 year old female attending the emergency department after an hour of central chest pain

Describe and interpret this CXR



CXR Interpretation:

There is a calcified suprahilar lymph node on the right (station 4R). Remaining mediastinum, lung parenchyma and pleural are normal.

This is **old tuberculosis (TB)**.

Any history of active disease (cough, fevers, weight loss) should be sought – although this is likely decades old



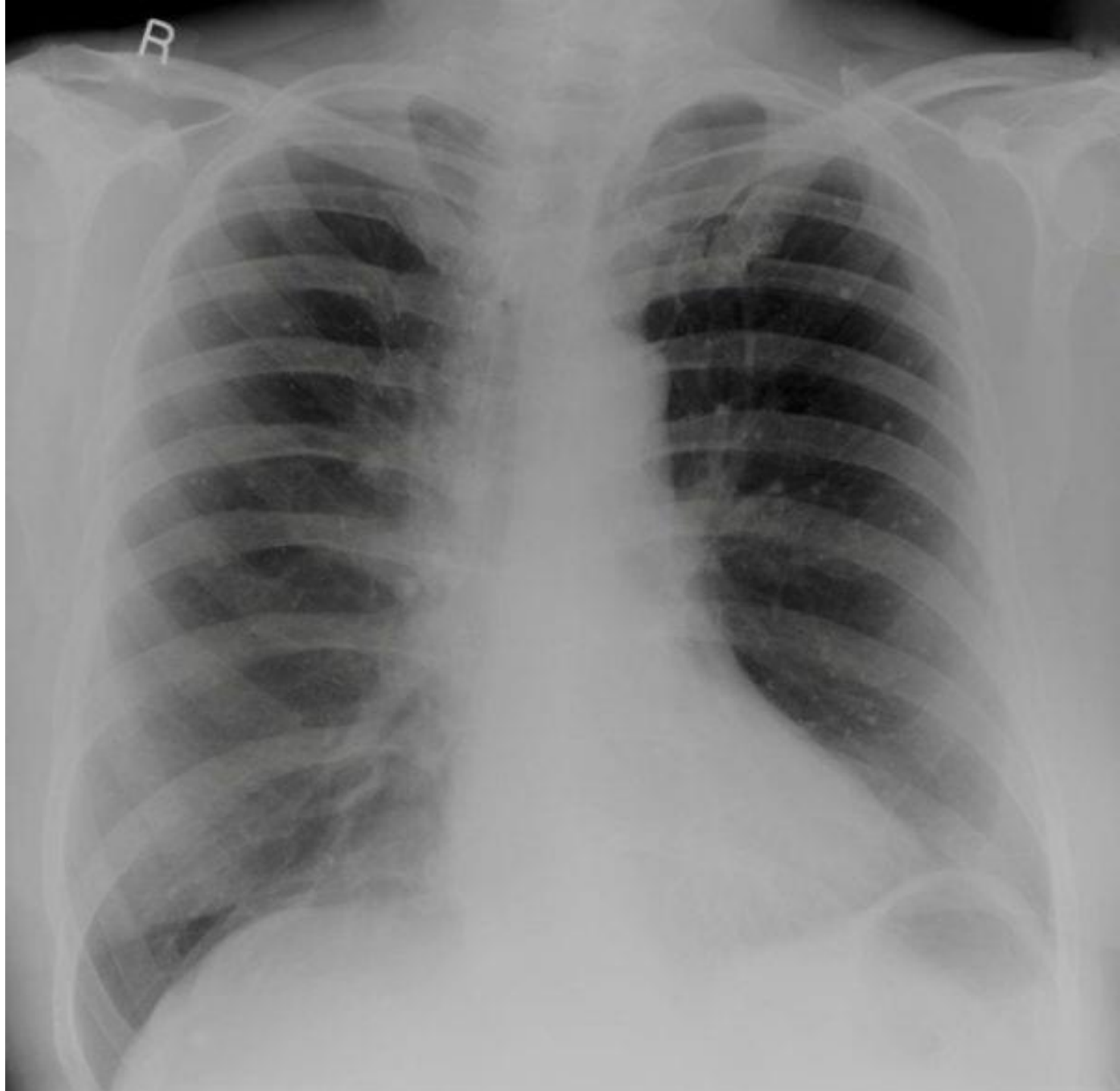
- A 52 year old lady presents with worsening weight loss and fatigue over several months



- There are multiple rounded well defined opacities of varying sizes throughout both fields
 - * *A left mastectomy is noted*
 - * *No obvious bony lesions*
- This lady has metastatic breast cancer.



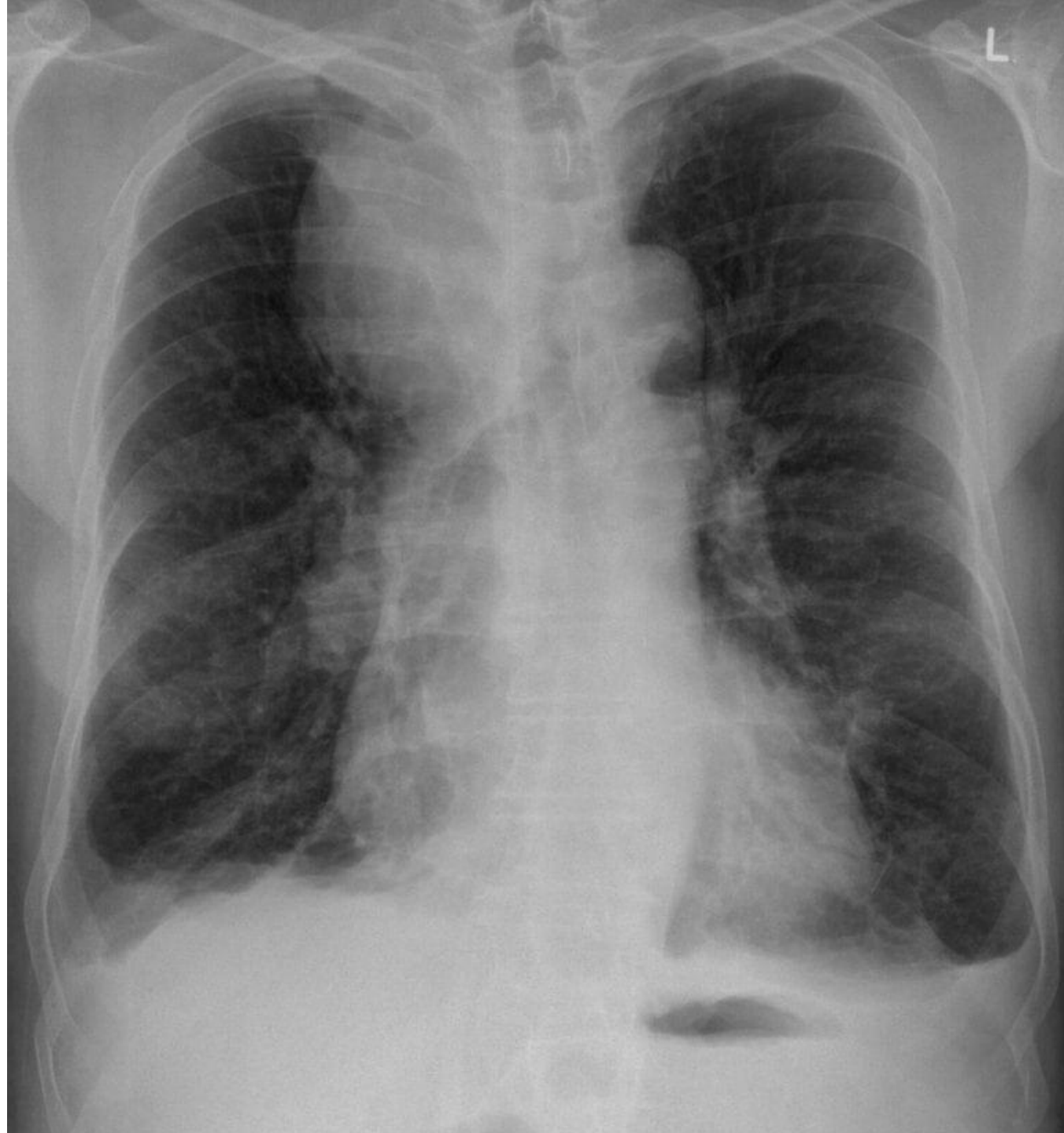
- A 46 year old man presents with transient central chest discomfort. Routine CXR.



- There are multiple small calcified parenchymal densities projecting over both lung fields.
** The lungs are otherwise clear.*
- A common cause for small calcified lung opacities is healed **varicella pneumonia**.
These lesions are usually 2-3mm in size, and are randomly scattered throughout the lungs.
- A differential for small nodules in the lungs includes chronic exposures in occupation-specific conditions such as **silicosis and coal worker's pneumoconiosis**.



- A 81 year old male presents with progressive cough and occasional wheeze.



- **CXR Interpretation:**

There is a large soft tissue mass arising from the right superior mediastinum.

The right hilum appears bulky. Both lung fields are over-inflated consistent with COPD.

Causes of mediastinal cysts include bronchogenic, thymic, pericardial, enteric and from teratoma.



- A 65 year old male presents with progressive cough,



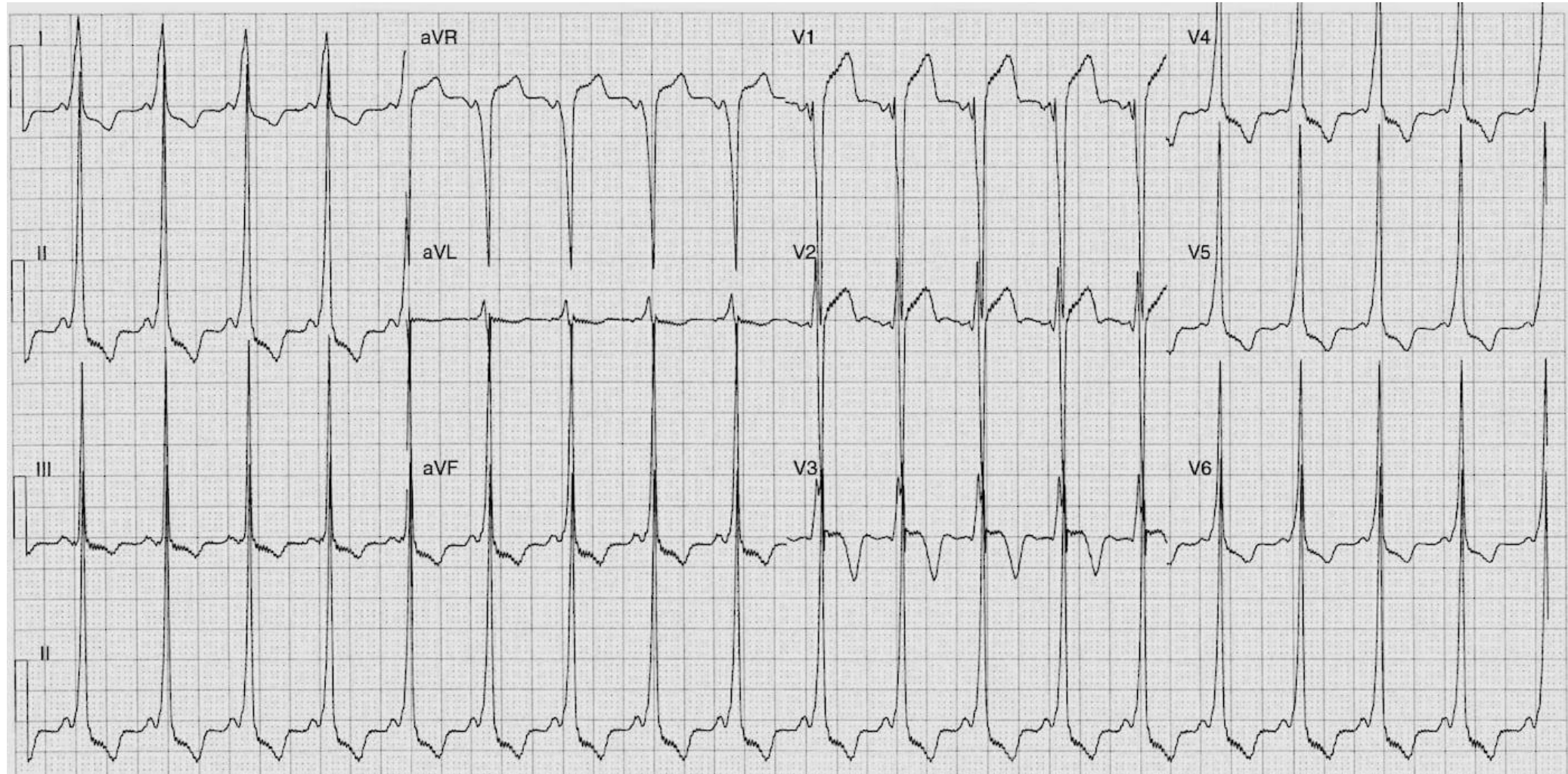
- There is a large mass in the medial right lung adjacent to the mediastinum.
The airway and right inferior pulmonary artery are clearly visualized, suggesting this is posterior to the hilum.
Lung fields, pleura and bones otherwise normal.
- This is very likely to be a **primary lung cancer**.
Smoking history, occupational exposures (particularly asbestos) and additional clinical features such as dyspnea and weight loss should be gained.



ECG

challenge

29 year old male with a syncope



Interpretation:

Wolff-Parkinson-White syndrome

- Rate: 110-115 bpm
- Rhythm: Regular
- Sinus rhythm
- Segments:
 - ✓ ST Elevation leads aVR, V1-2
 - ✓ ST Depression leads I, II, III, aVF, V4-6

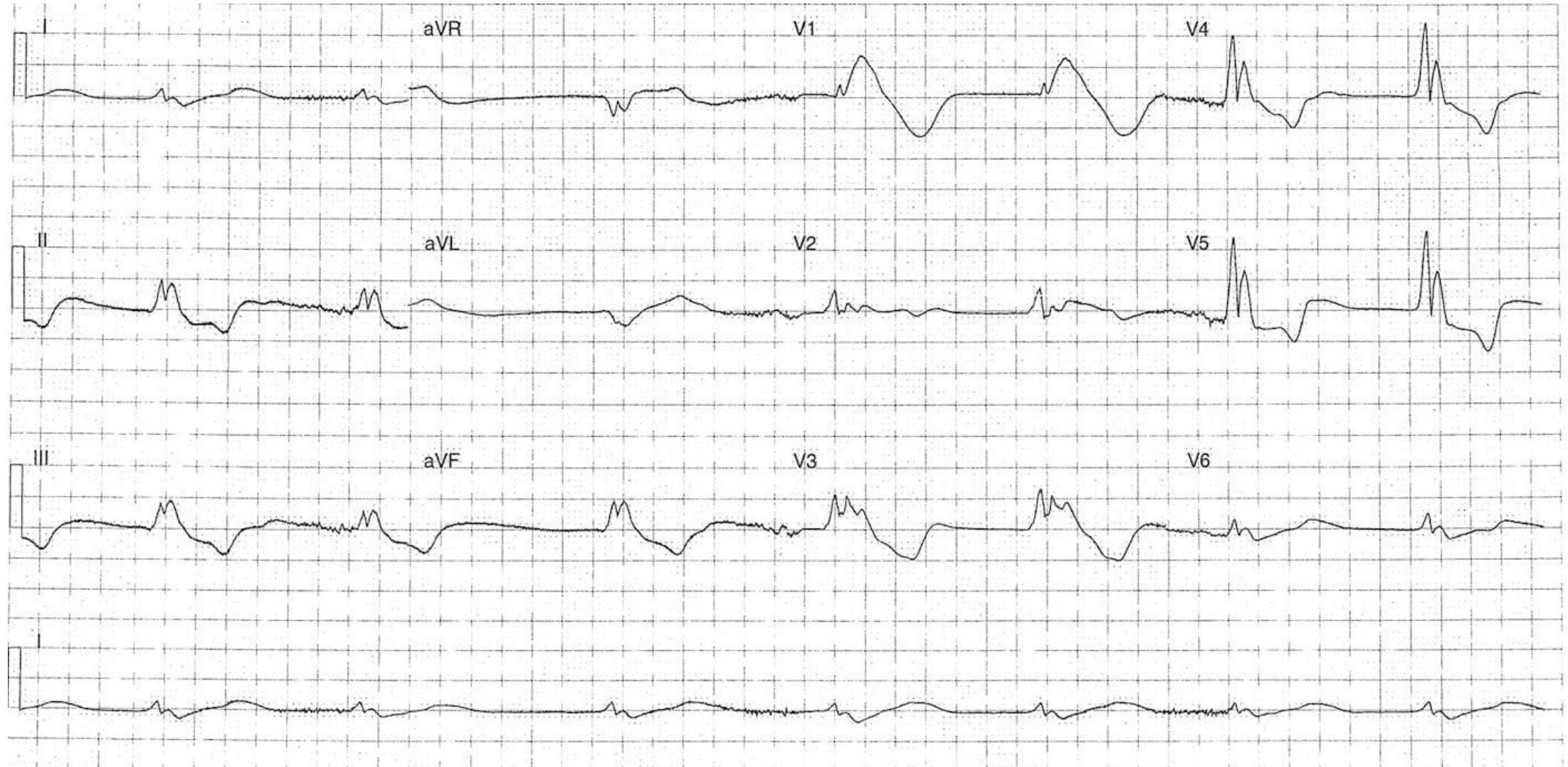
Additional:

Delta waves best seen inferolaterally

T wave inversion leads I, II, III, aVF, V3-6

'Pseudo' left ventricular hypertrophy

44 year old male with a history of non-compliant Type 1 diabetes. He has been found at home in a semi-conscious state.



Rate: 42 bpm

Rhythm: Irregular

Nil visible p waves

Intervals:

QRS – Prolonged (200ms), QT – 760ms (QTc Bazett 640 ms)

Segments: ST Elevation lead aVR + ST Depression leads II, III, aVF, V2-6

Deep T wave inversion leads II, III, aVF, V1, V3-5

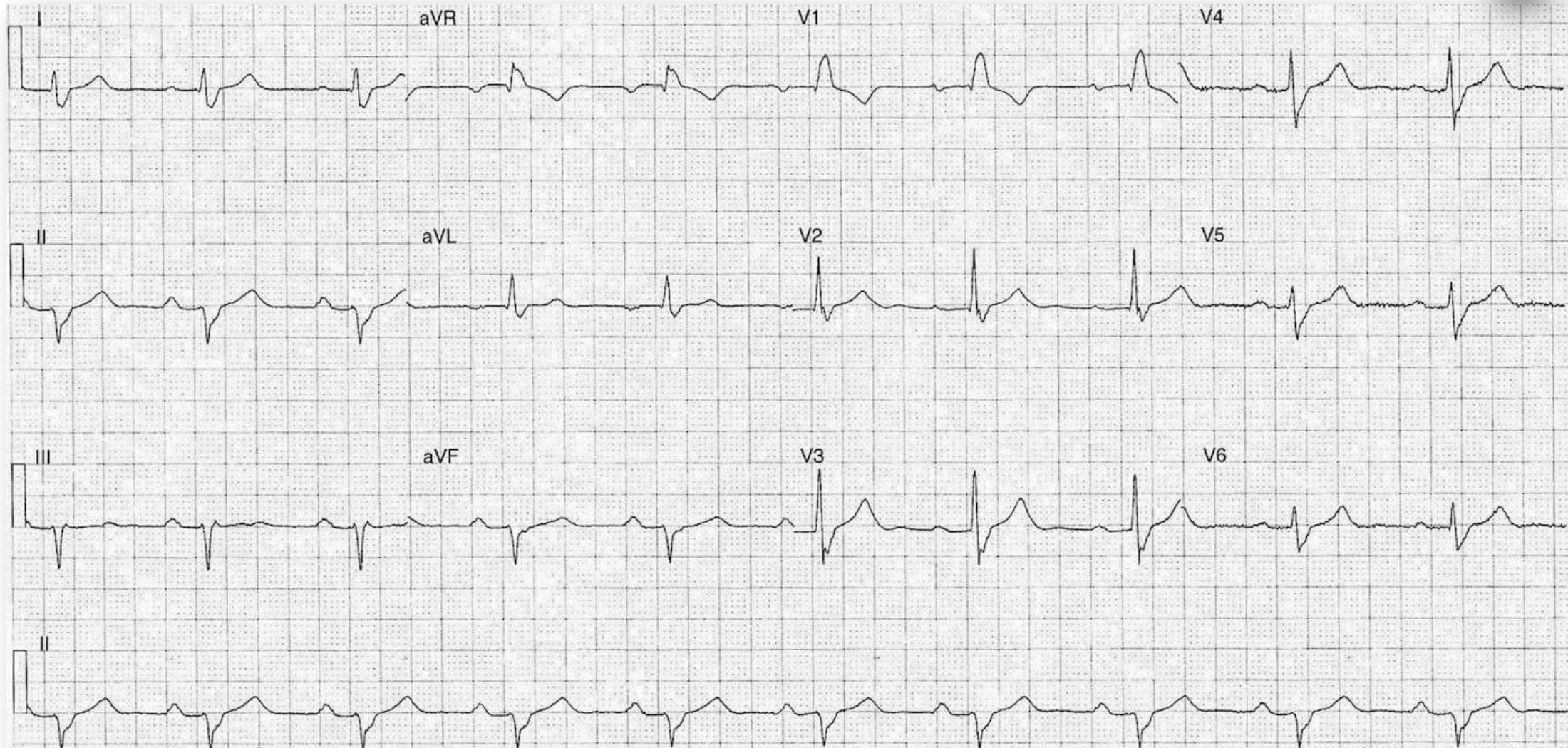
Interpretation:

Main differentials for these ECG features include
Hyperkalaemia

A 73yr old female presents following an episode of syncope.
She is on no medication and has the following vitals



BP 114/65
RR 18
Sats 97% (RA)
Temp 36.3



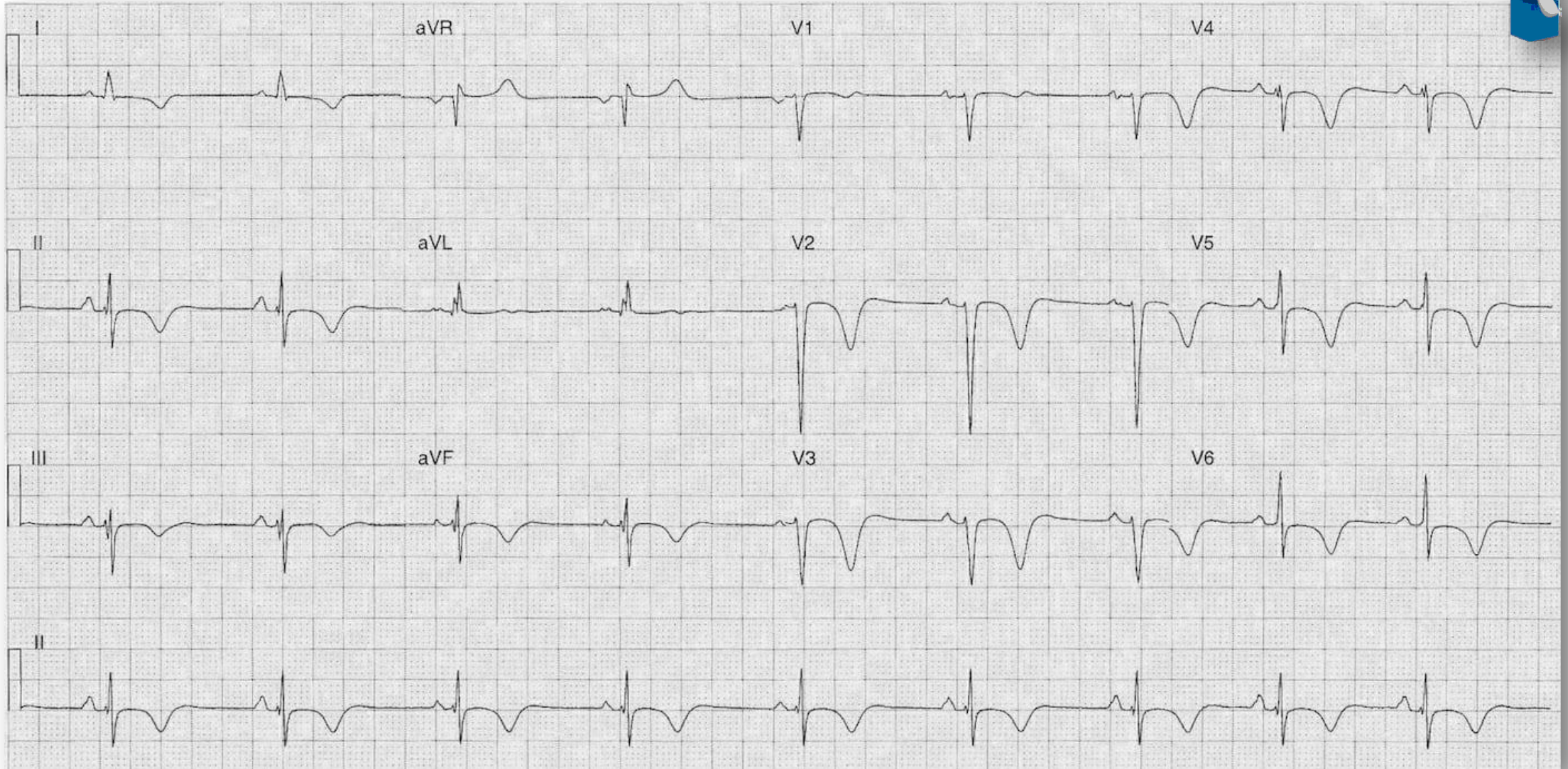
- Rate:60
 - Rhythm:Regular + Sinus rhythm
 - Intervals:
 - PR – Prolonged (~260ms)
 - QRS – Prolonged (140ms)
- RBBB Morphology

Interpretation:

- Bifascicular Block: RBBB + LAFB
- 1st Degree AV Block

So it's a trifascicular block ?
Well yes and no.

22 year old female presents with sudden onset of severe occipital headache



- ✓ Rate: 54
- ✓ Rhythm: Regular
- ✓ Sinus Rhythm
- ✓ Intervals:
 - PR – Normal (~160ms)
 - QRS – Normal (80ms)

Additional: Deep T wave inversion V2-6, I, II, III, aVF

Positive T wave aVR, Positive deflection terminal portion T waves

In clinical setting of severe headache and widespread T wave changes this is concerning for raised intracranial pressure (ICP) – in this case ?subarachnoid haemorrhage ?intracranial bleed

The patient had a normal CT scan

