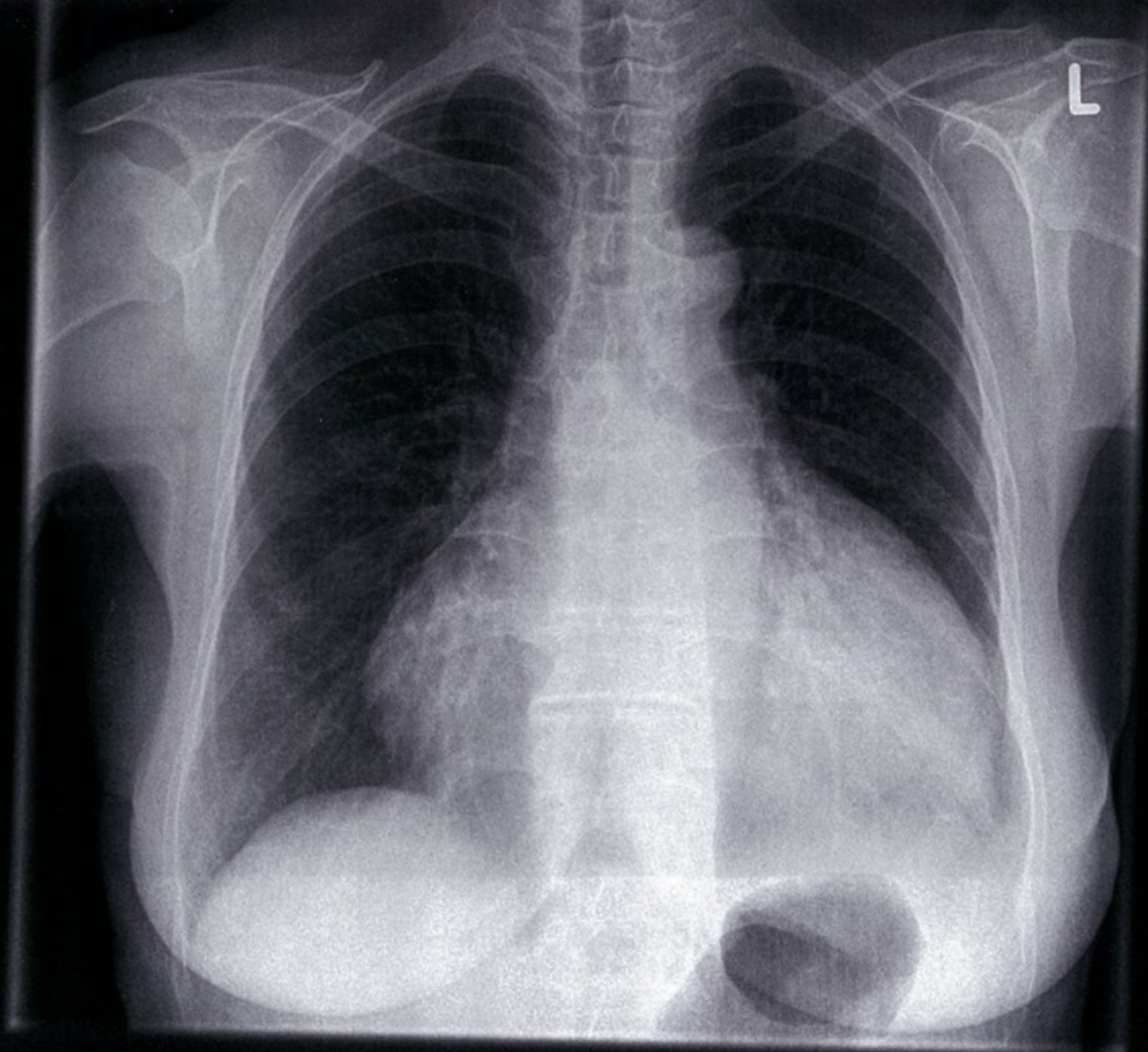


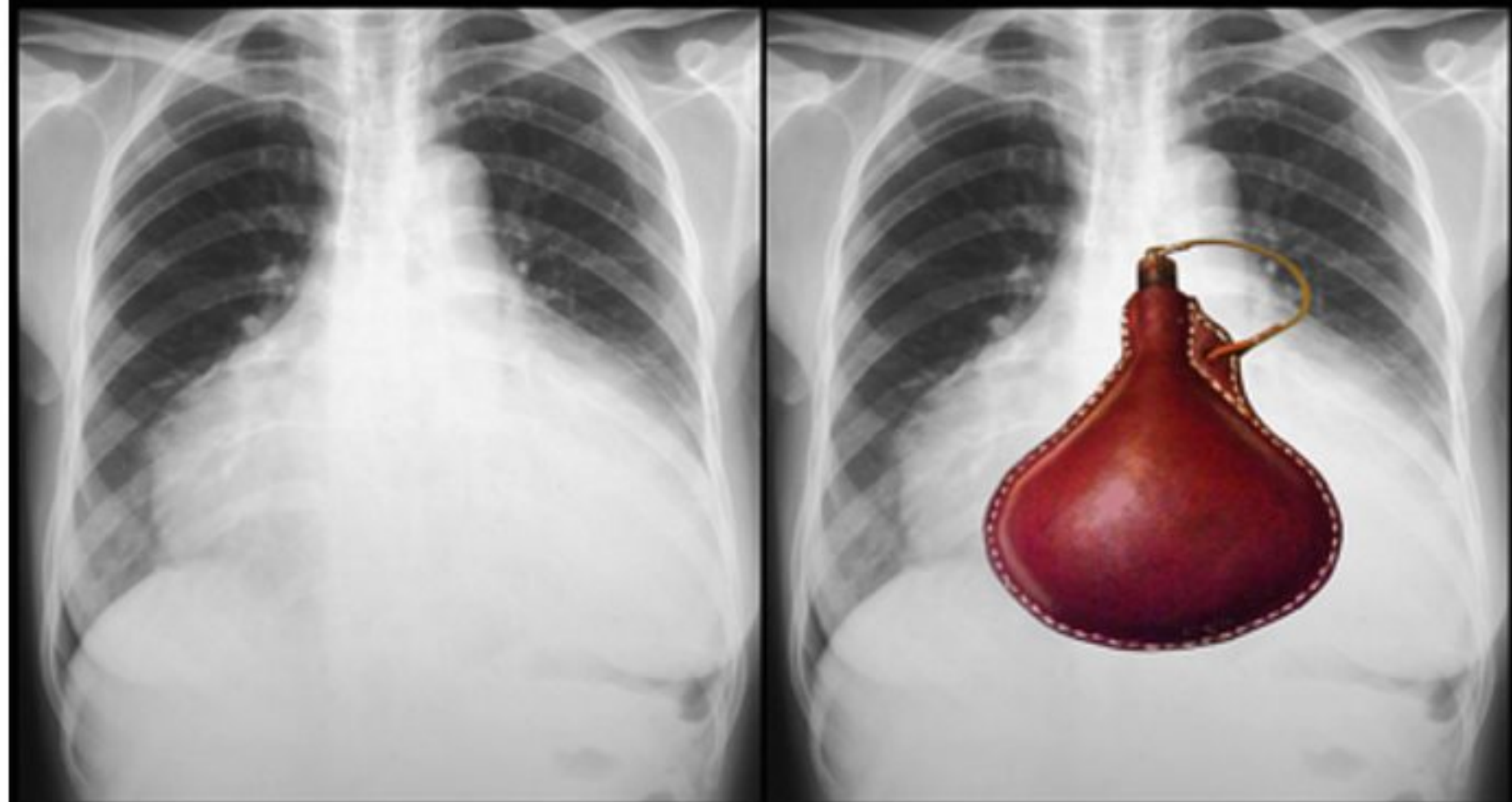
Trigger :

You are an intern in ED. Mrs X, a 63F presents with progressively worsening shortness of breath since an MI 1 week prior. She has been using 3 pillows to sleep and has experienced mild, retrosternal chest pain. Mrs X has a history of hypertension. A PA CXR was performed on admission.

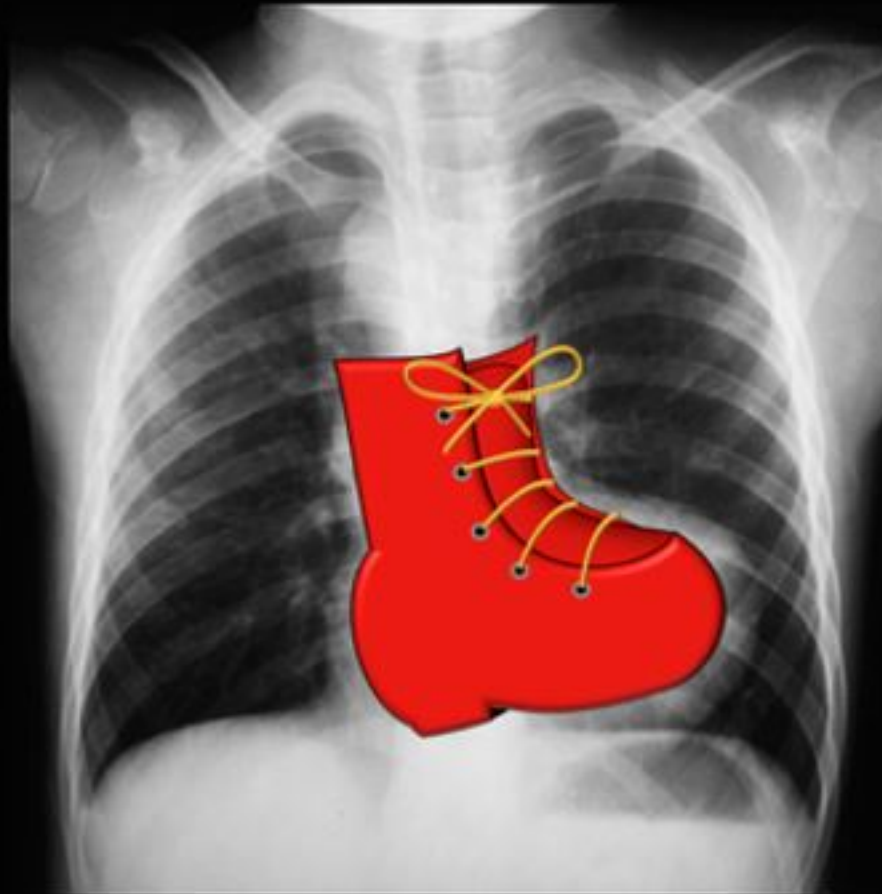
Task 1: Interpret the CXR and provide a differential



Details and demographic	PA CXR of a 63F 1 week post MI
RIPE/Quality	Rotation : No rotational artifact
	Inspiration: Adequate inspiratory effort with 6 anterior ribs showing.
	Projection: AP
	Exposure: Adequate exposure
Airways and lung fields	Trachea is equidistant between two clavicles, not indicative of any tracheal deviation. Clear lung fields
Bones and soft tissue	<ul style="list-style-type: none"> No obvious fractures
Cardo-mediastinum	<ul style="list-style-type: none"> Mediastinum appears to be midline Cardiothoracic ratio of 0.75 (a normal measurement is 0.42 to 0.50) Enlarged cardiac silhouette (water bottle sign). This indicates a large pericardial effusion.
Diaphragm	Left costophrenic angle is not visible due to enlarged cardiac silhouette
Everything else	No free gas under the diaphragm, no subcutaneous emphysema is noted.
Interpretation	<p>In summary, this is a PA CXR of a 63F 1 week post MI. An enlarged cardiac silhouette, water bottle sign is present which indicates a large pericardial effusion. My working differential is pericardial effusion as a result of cardiac wall rupture (secondary to MI).</p> <p>A common cause of an enlarged cardiac silhouette is cardiomegaly, which is an appropriate differential. In particular, a 'boot shaped heart' is classically associated with Tetralogy of Fallot (cardiomegaly with an upturned cardiac apex). Pericardial effusion is the more likely differential given the clinical picture presented.</p>



<https://radiopaedia.org/articles/water-bottle-sign-heart>



<https://radiopaedia.org/articles/boot-shaped-heart-2>

Follow-up questions:

Question 1: What 2 factors determine whether a pericardial effusion progresses to cardiac tamponade?

Question 2: Outline the clinical presentation of cardiac tamponade

Question 3: After pericardiocentesis, the fluid was analysed, and the fluid type was identified to be 'blood'. What are other aetiologies of pericardial effusion that would have this fluid type?

Answers:

Q1:

- Volume of fluid (the larger the effusion improves likelihood of cardiac tamponade)
- Acute vs Chronic onset (a rapid but small effusion can lead to cardiac tamponade)

Answers:

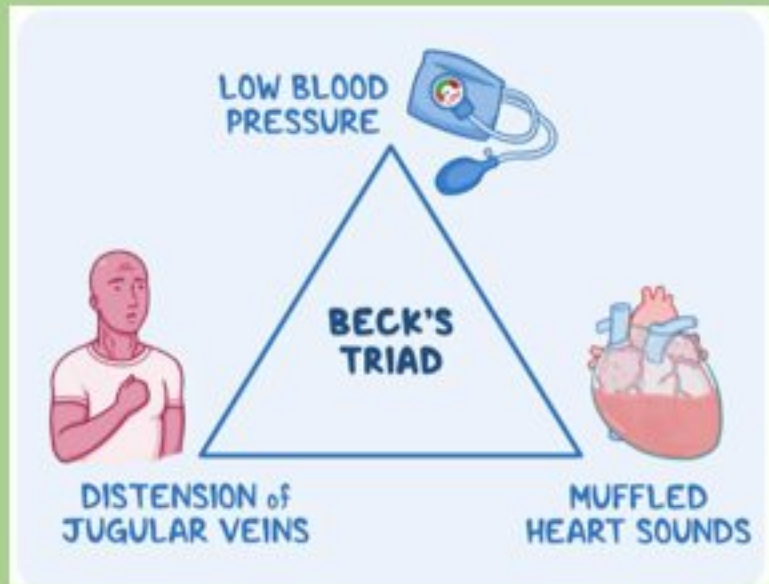
Q1:

- For chronic pericardial effusion, ~1500 mL can cause cardiac tamponade, but with acute pericardial effusion, only ~150 mL is needed.
- Acutely, the pericardium is stiff/non-compliant, so rapid developing pericardial effusions will rapidly increase intrapericardial pressure
- Over time the pericardium can stretch and increase compliance to accommodate a larger volume of fluid. Once maximum distension is reached, additional fluid will rapidly increase intrapericardial pressure
- <https://pubs.rsna.org/doi/full/10.1148/rg.276065002>

Answers:

Q2:

- Classic Triad of symptoms: Beck Triad
 - Hypotension
 - Muffled heart sounds
 - Elevated JVP
- Other Signs/Symptoms
 - Tachycardia
 - Pulsus paradoxus
 - Pallor
 - Signs of Heart Failure
 - Signs of Obstructive Shock



Answers:

Q3:

- Cardiac rupture (post MI)
- Postcardiac surgery
- Trauma
- Aortic Dissection
- Malignancy
(usually metastatic disease)

<https://www.osmosis.org/answers/pericardial-tamponade>

ACUTE PERICARDIAL TAMPONADE

- SUDDEN FLUID ACCUMULATION
- PERICARDIUM CANNOT ADJUST
↳ DRAMATIC INCREASE in PRESSURE
INSIDE PERICARDIAL SAC



CHEST TRAUMA



RUPTURED AORTA



RUPTURED of
VENTRICLE AFTER
a HEART ATTACK

Answers:

Q3 (continued):

Other fluid types include transudate, exudate, and purulent fluid.

Fluid Type	Appearance	Aetiology
Transudate	Clear	<ul style="list-style-type: none">• Heart Failure• Renal Failure• Hypoalbuminaemia e.g. Cirrhosis, Nephrotic Syndrome
Exudate	Cloudy + Chylous	<ul style="list-style-type: none">• Viral Infection• Inflammation• Malignancy• Autoimmune Disease
Blood	Haemorrhagic	see previous slide
Purulent	Thick, yellowish-white, cloudy	<ul style="list-style-type: none">• Bacterial Infection• Tuberculosis