



# IMAGING INTERPRETATION



Milena Nossen – Year 5  
2024



# Objectives

- To have an approach to interpretate x-rays and CTs for chest and abdomen.
- To recognise common pathologies on imaging and to know their management.

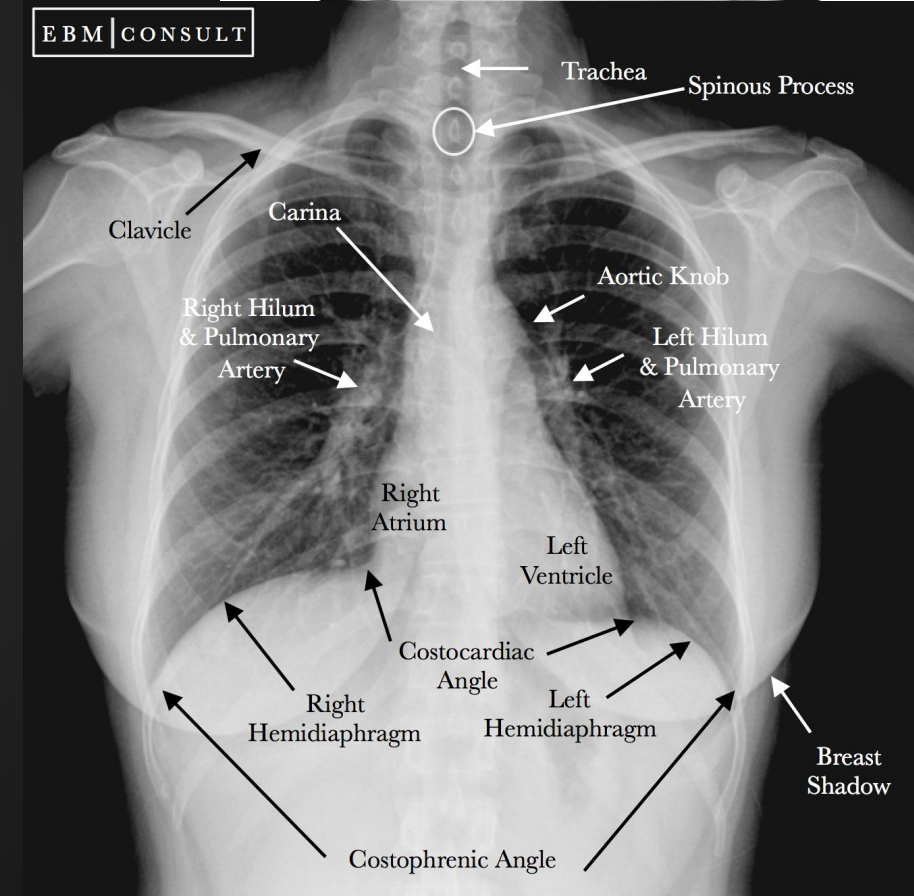
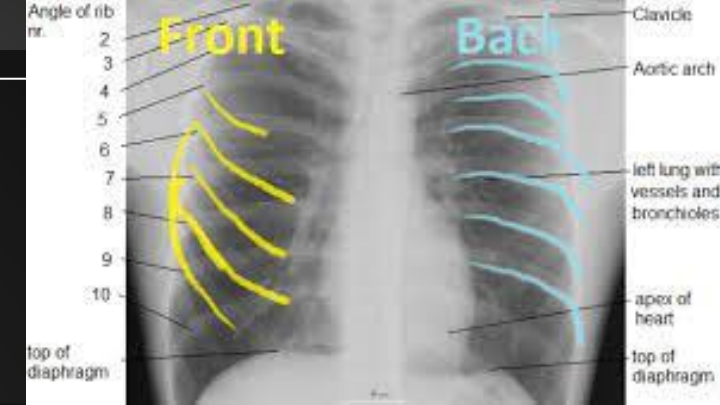


# Content

- Chest X-ray interpretation
- Abdominal X-ray interpretation
- CT scans for supplementation

# Chest X-ray Approach

- Dr. Details – ID, date of film, prv images (or mention you would compare)
- R Rotation - distance medial clavicle to spinous process
- I Inspiration – 5-6 anterior ribs
- P Projection – PA or AP? AP can see scapula border, also CRAP for heart
- E Exposure – see vertebrae behind heart
  - > If major abnormality can mention here, e.g. massive effusion
- A Airway – trachea, carina, bronchi, hilar structures
- B Breathing – lung fields
- C Cardiac – heart size (<50%), borders (if unclear suggests lung pathology)
- D Diaphragm – costophrenic angles, pneumoperitoneum, position
- E Everything else – bones, soft tissue, artefacts



# Case 1

50-year-old male, presents to ED with fevers, cough, hypoxia.

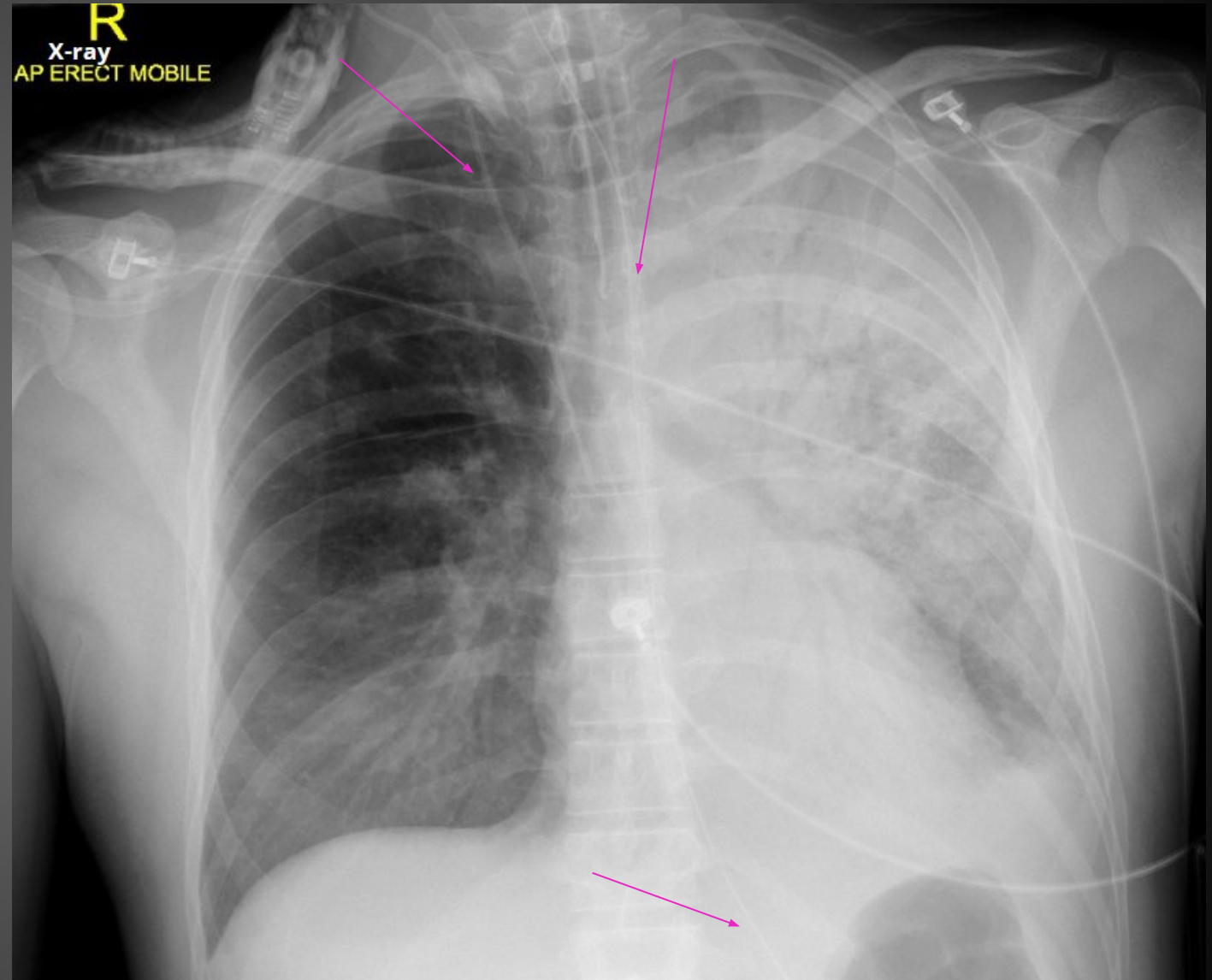
Findings?

Almost complete white-out of the left hemithorax with extensive air bronchograms indicating this is consolidation. Patchy airspace opacity on the right.

ETT, right internal jugular CVC and NGT appropriately positioned.

□ Severe case of community-acquired pneumonia

Next steps: IV Abx, O2



# Case 2

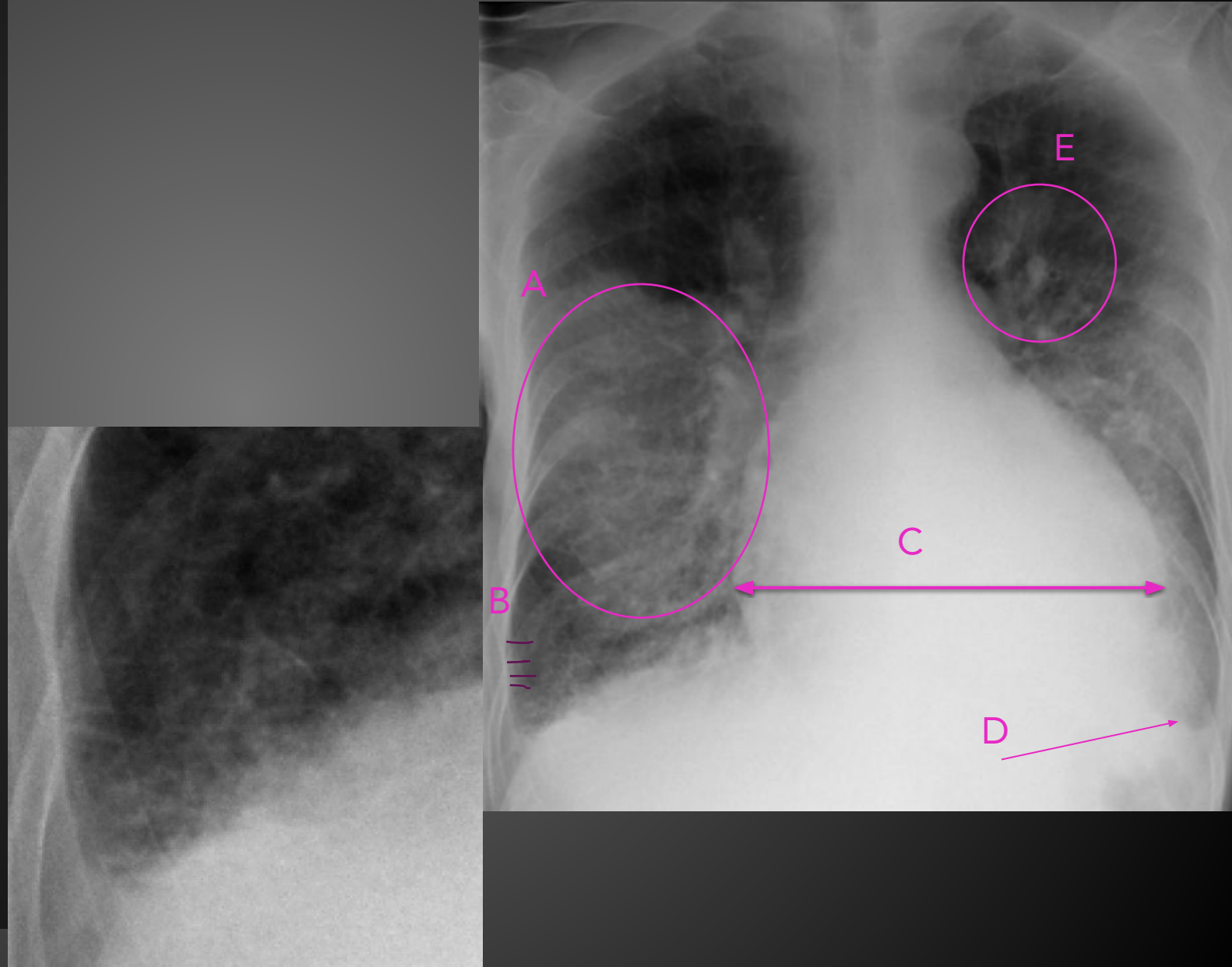
55-year-old male, progressive dyspnoea and leg swelling

Findings?

-> acute heart failure

- A. **Airspace** shadowing (bat's wing) (alveolar oedema)
- B. Kerley **B** lines
- C. **Cardiomegaly**
- D. Blunt costophrenic angles (**diaphragm**)
- E. Upper zone vessel **enlargement**

Next steps: IV diuretics, consider ventilation, inotropes, vasopressors



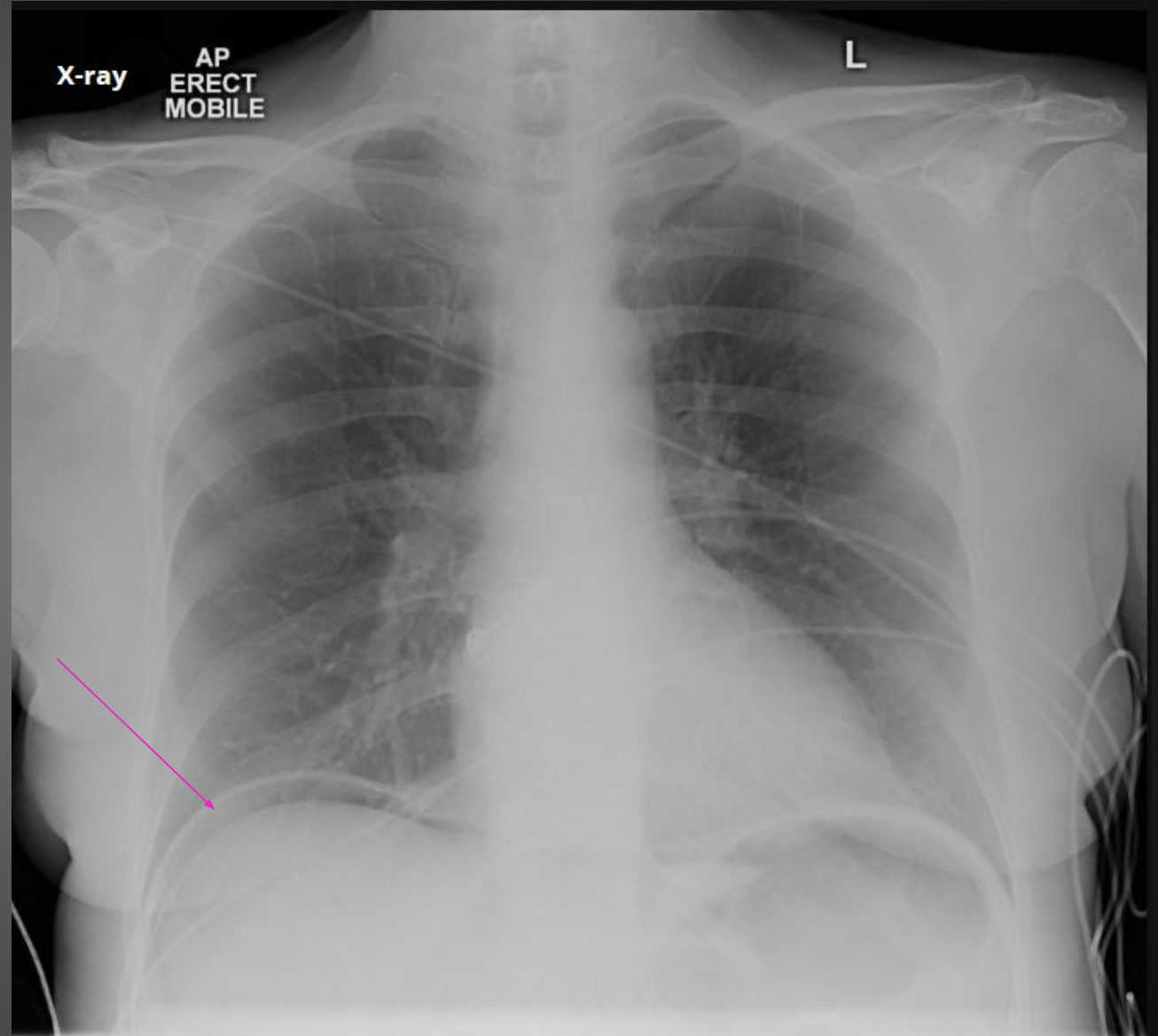
# Case 3

Findings?

Free subdiaphragmatic gas  
(due to recent bowel surgery).

Note: wires seen (likely ECG  
leads).

Next steps: further imaging  
(often CT abdomen & thorax to  
detect free air in abdomen),  
emergency laparotomy OR  
conservative treatment



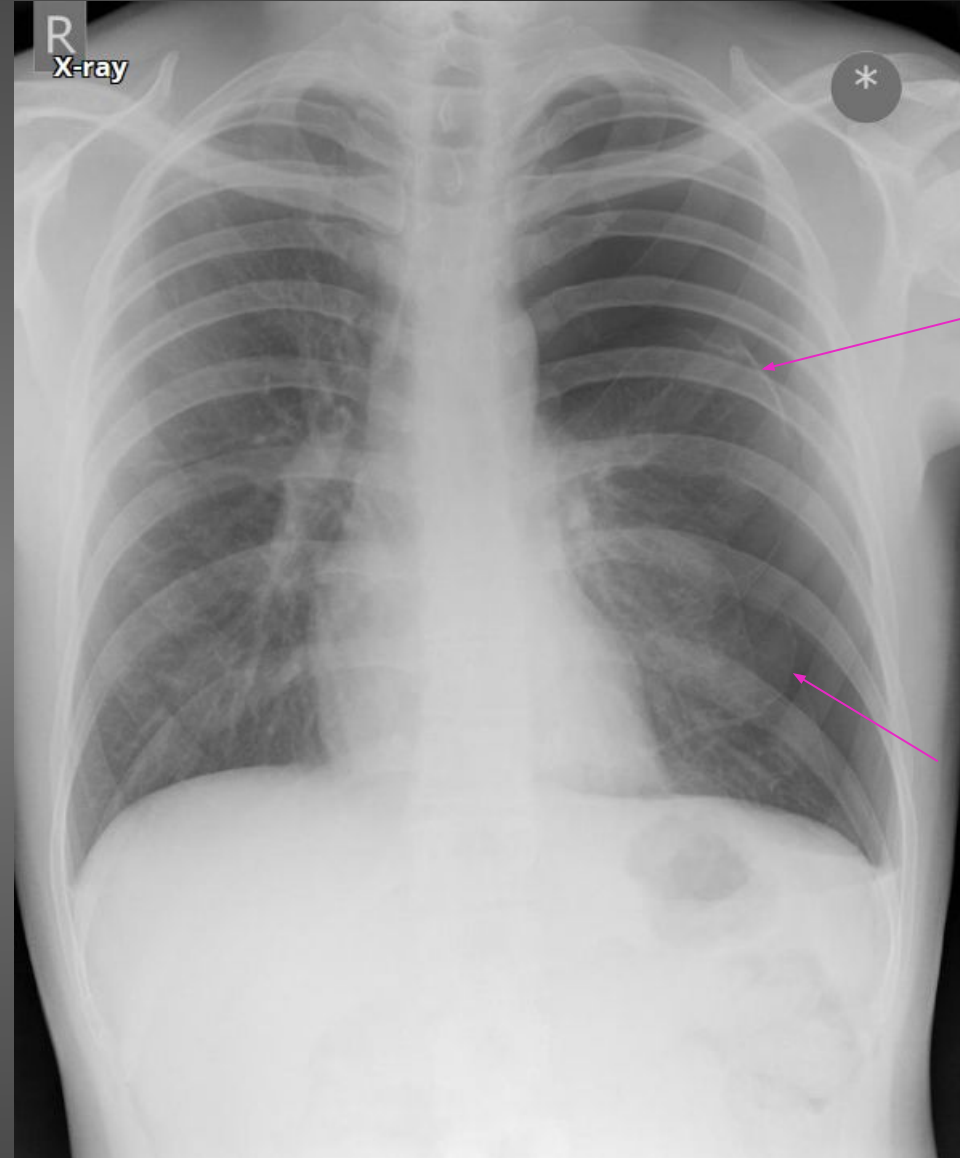
# Case 4

Findings?

Missing lung markings on the left, collapsed lung can be seen in the centre.

- Large left pneumothorax with the whole lung collapsed towards the hilum.

Next steps: needle aspiration OR chest drain OR conservative





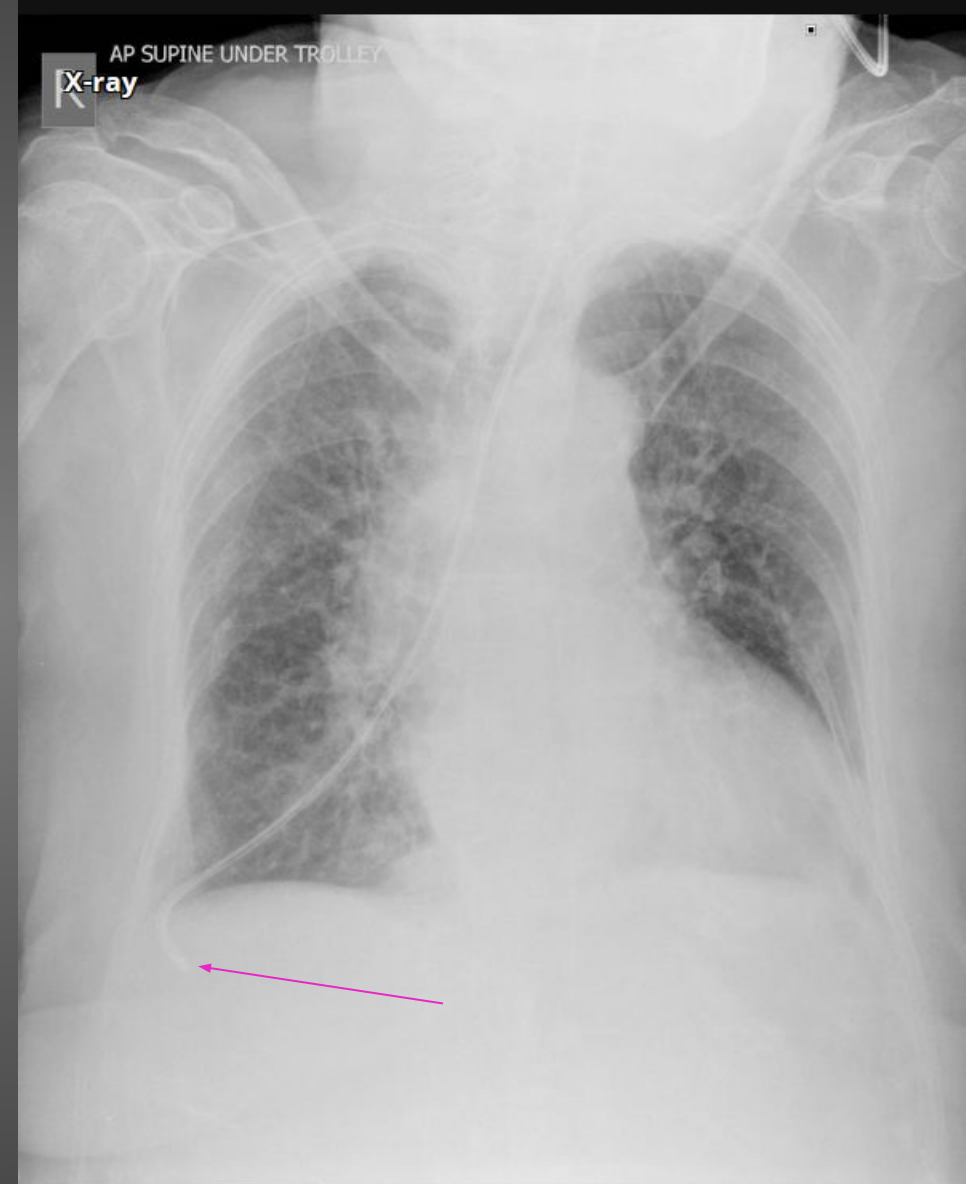
# Case 5

Diagnosis?

Malposition of the NG tube. Given the bronchial anatomy, if an NG tube enters the trachea, it is most likely to end up in the right lower lobe because its bronchus is most vertical and in line with the trachea.

The tip of the tube appears to be below the diaphragm, but this is just because the tube has entered the posterior segment and is projected below the level of the anterior diaphragm.

Certainly an enthusiastic attempt at NG insertion.



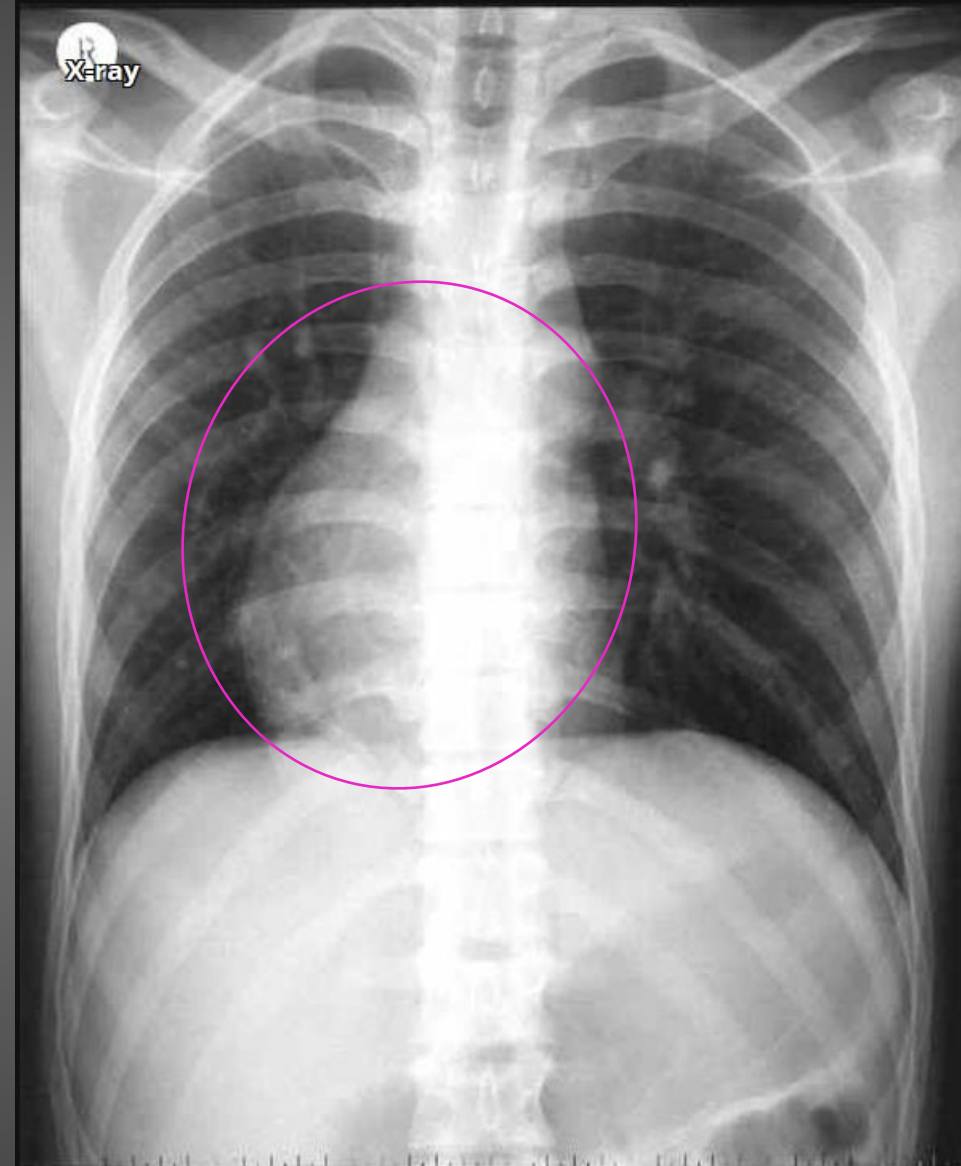
# Case 6

Findings?

The heart is positioned inversely.  
The upper abdominal organs (and probably the lungs, too) are in their normal positions.

-> Double check sides of x-ray!

Dextrocardia



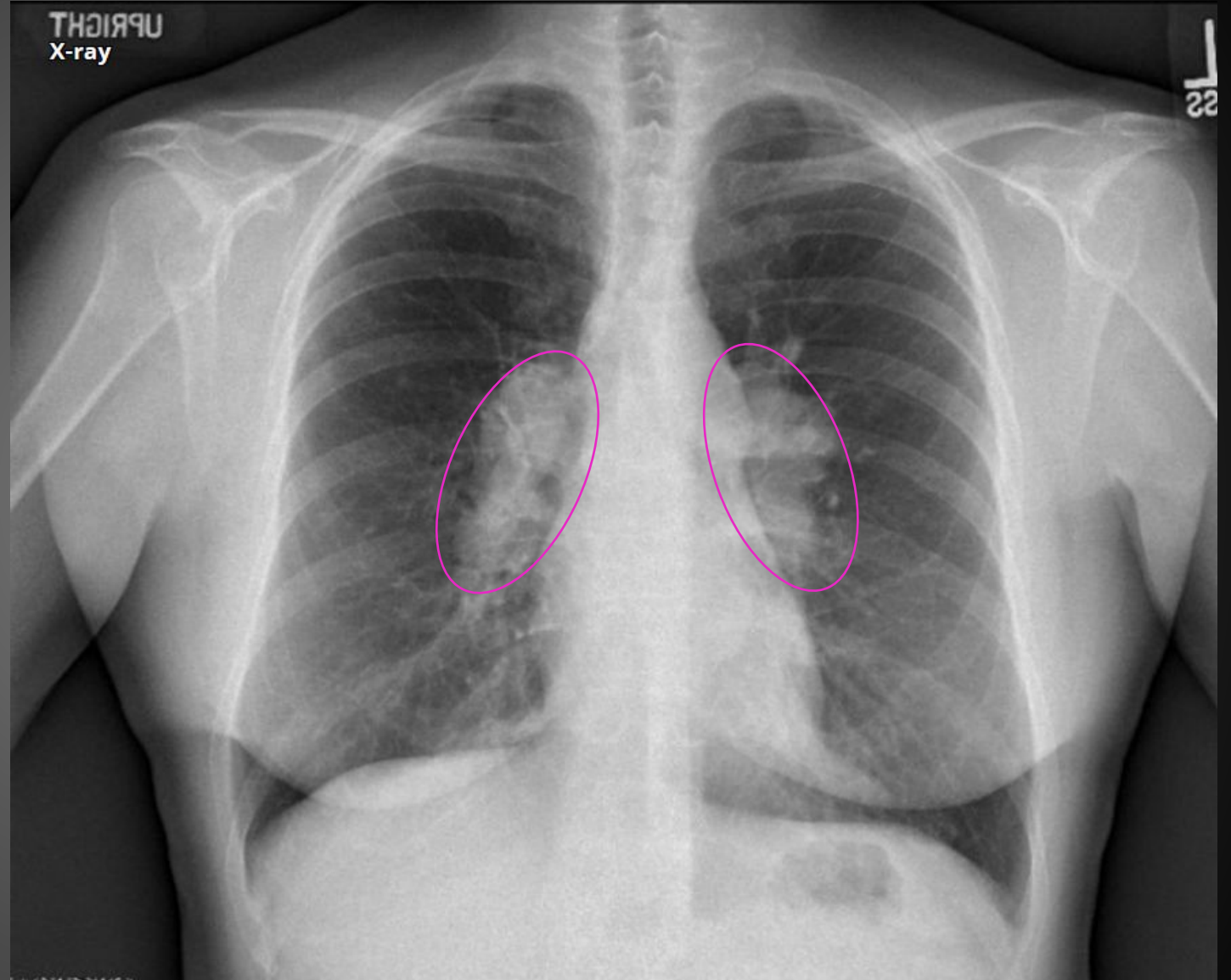
# Case 7

Findings?

Bilateral hilar lymphadenopathy.  
No evidence of interstitial lung disease.

Causes include sarcoidosis,  
infection, malignancy

Next steps: CT, biopsy

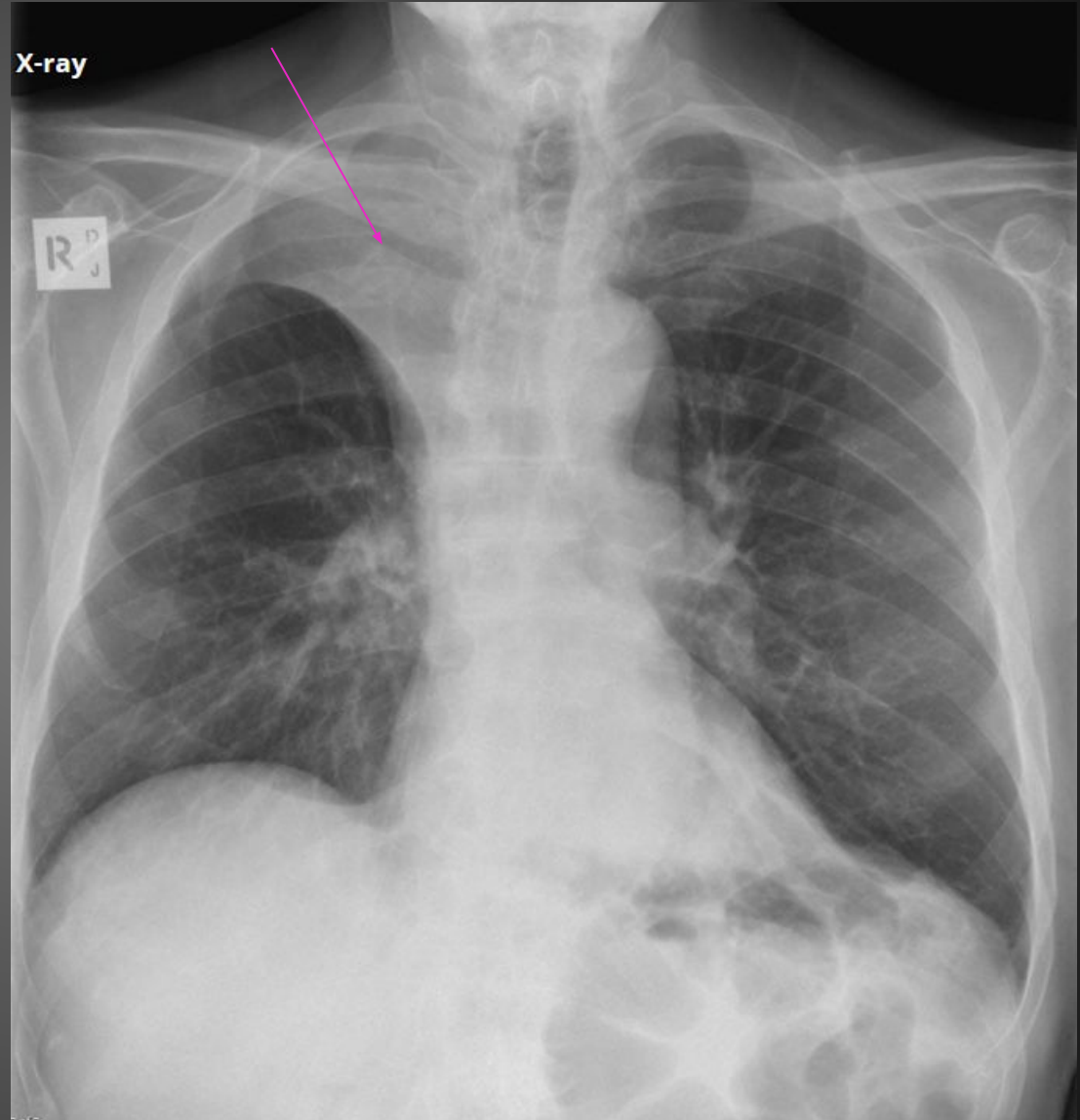


# Case 8

Findings?

Almost complete collapse of the right upper lobe.

Next steps: determine cause (bronchoscopy/ CT), remove obstruction / physiotherapy if mucus plug



# Case 8

Findings?

Almost complete collapse of the right upper lobe.

CT scan: right upper lobe  
bronchus mucus plug

Bronchial washing: Eosinophilia  
with fungal elements identified

*Aspergillus fumigatus* ISOLATED



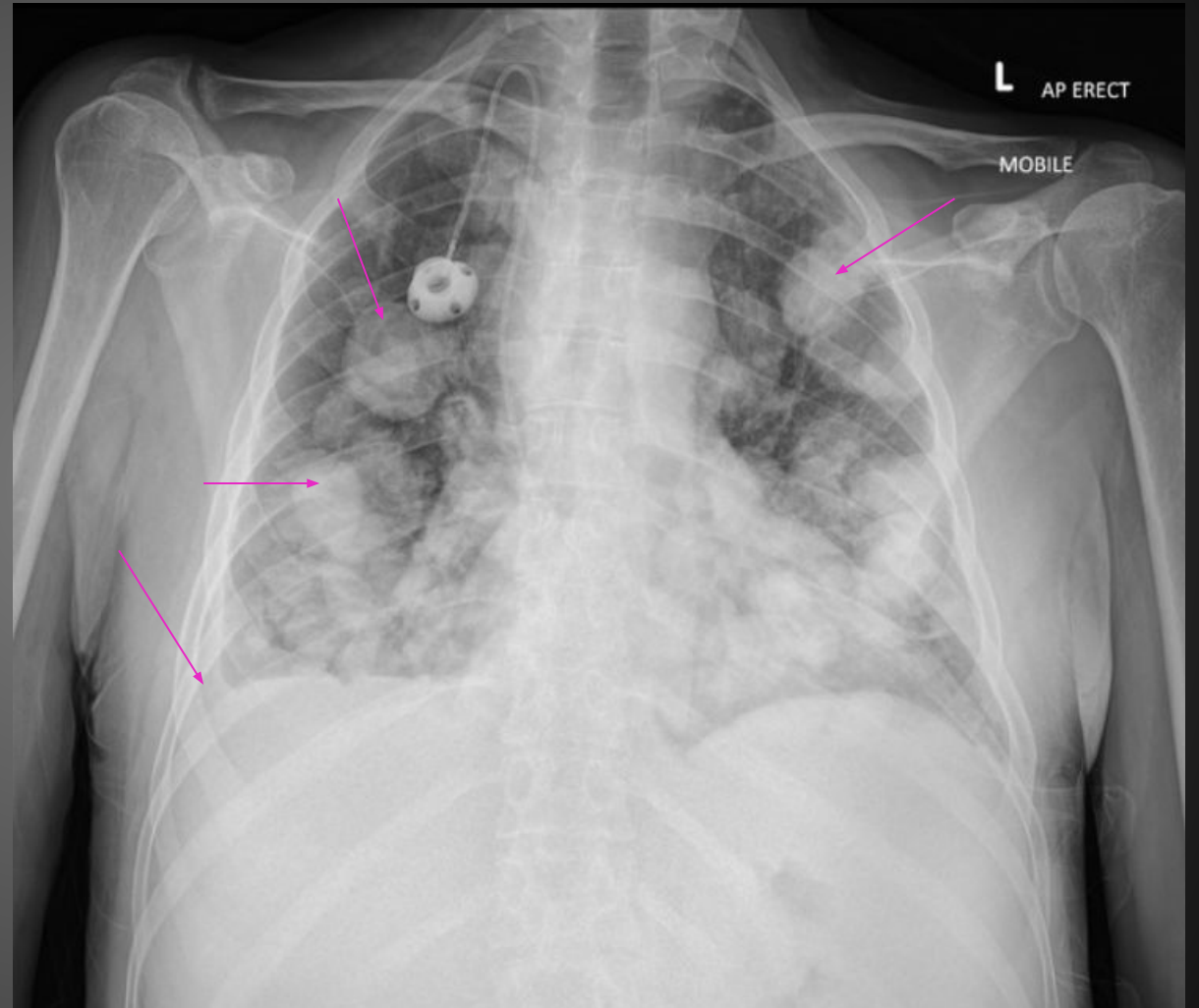
# Case 9

Findings?

Numerable masses and nodules in both lungs. Small right sided pleural effusion.

□ Cannonball metastases

Next steps: refer to oncology for staging, if no source known whole body CT

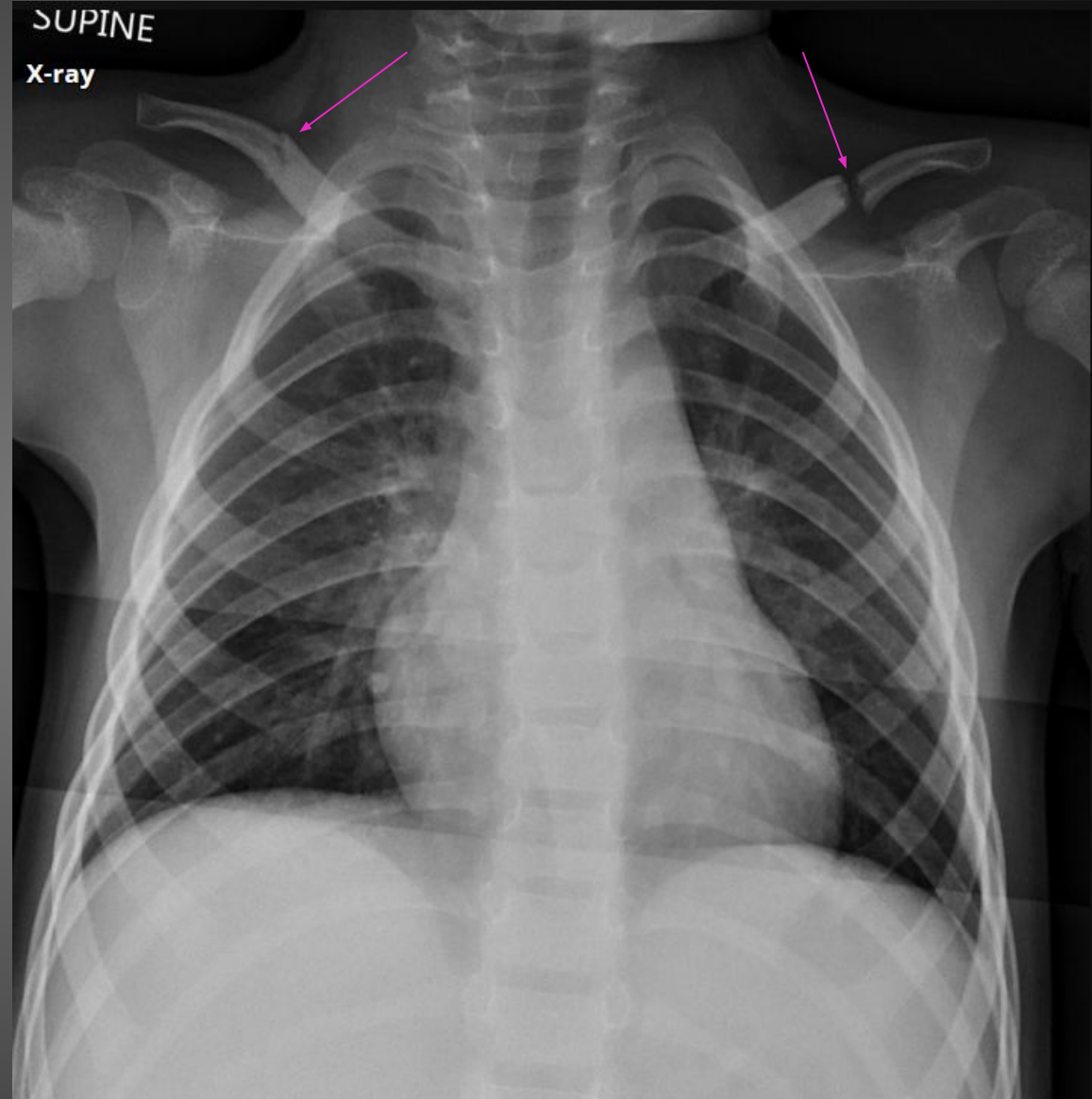


# Case 10

3-year-old after high speed  
RTC

Findings?

Bilateral clavicle fractures. No  
other abnormalities.

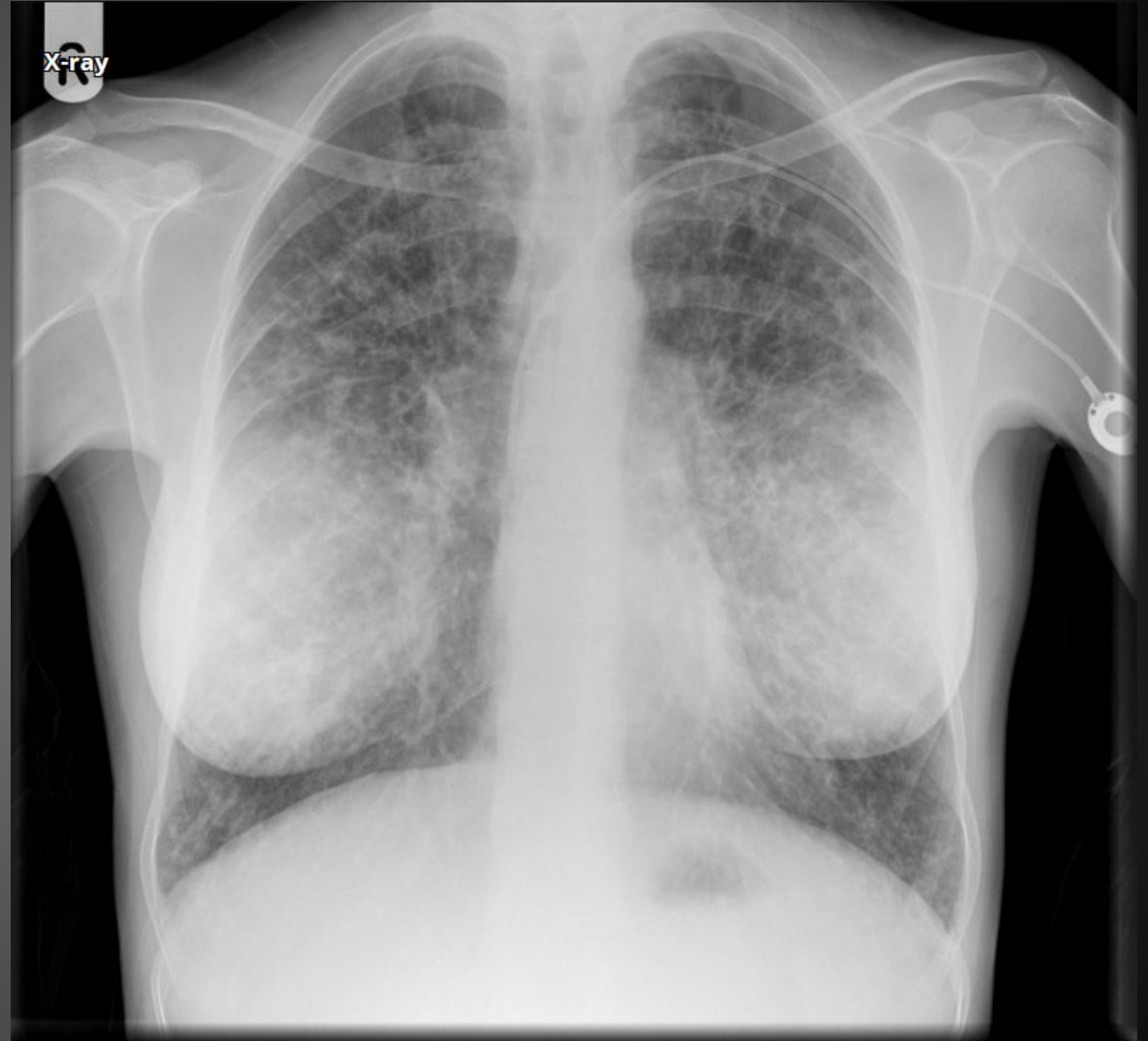


# Case 11

Known cystic fibrosis.  
Worsening breathlessness.

Findings: coarse reticular shadowing -> indicative of interstitial lung disease

Next step: CT

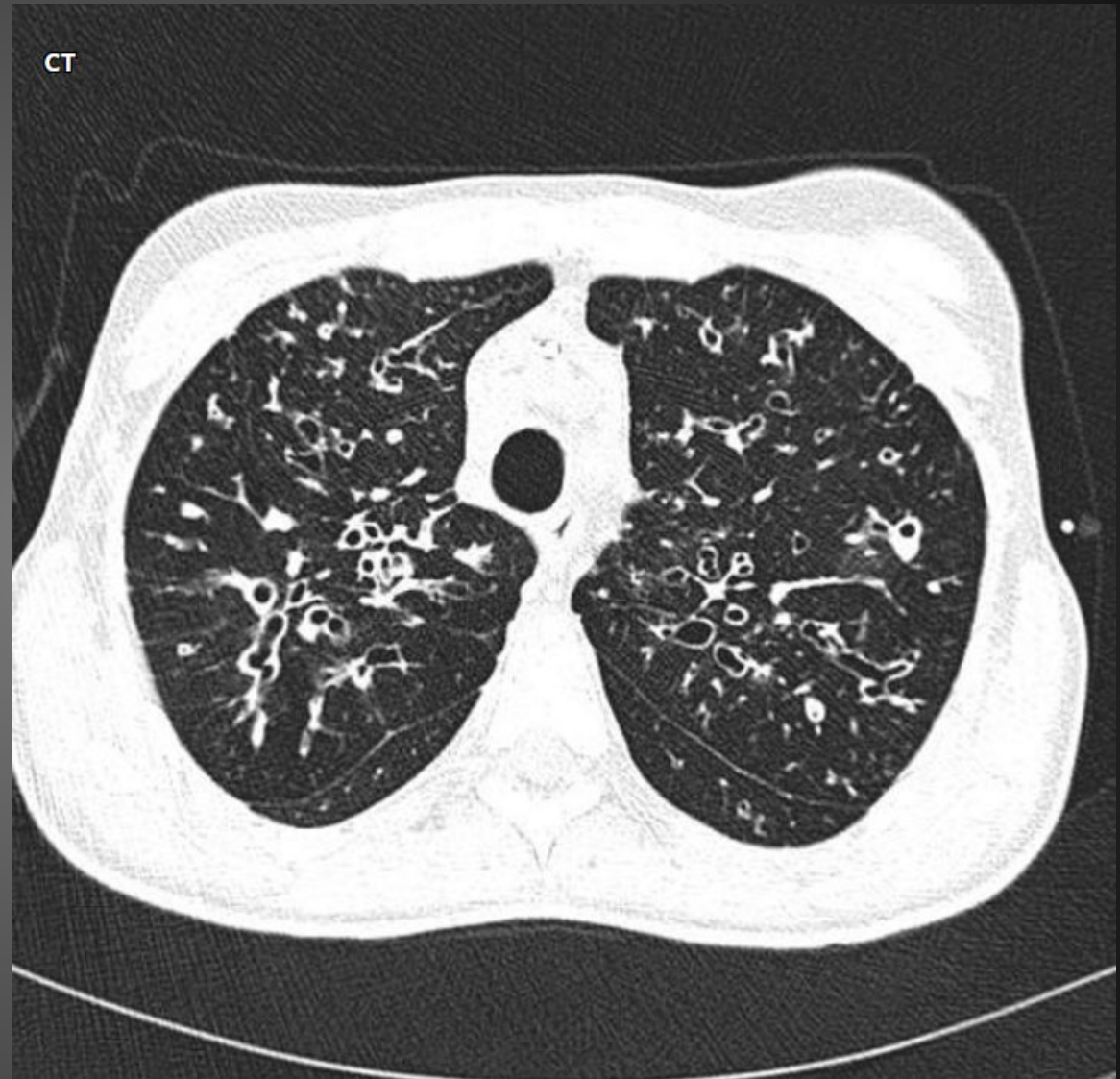




# Case 11

CT scan:

Bronchiectasis with bronchial wall thickening



# Case 12

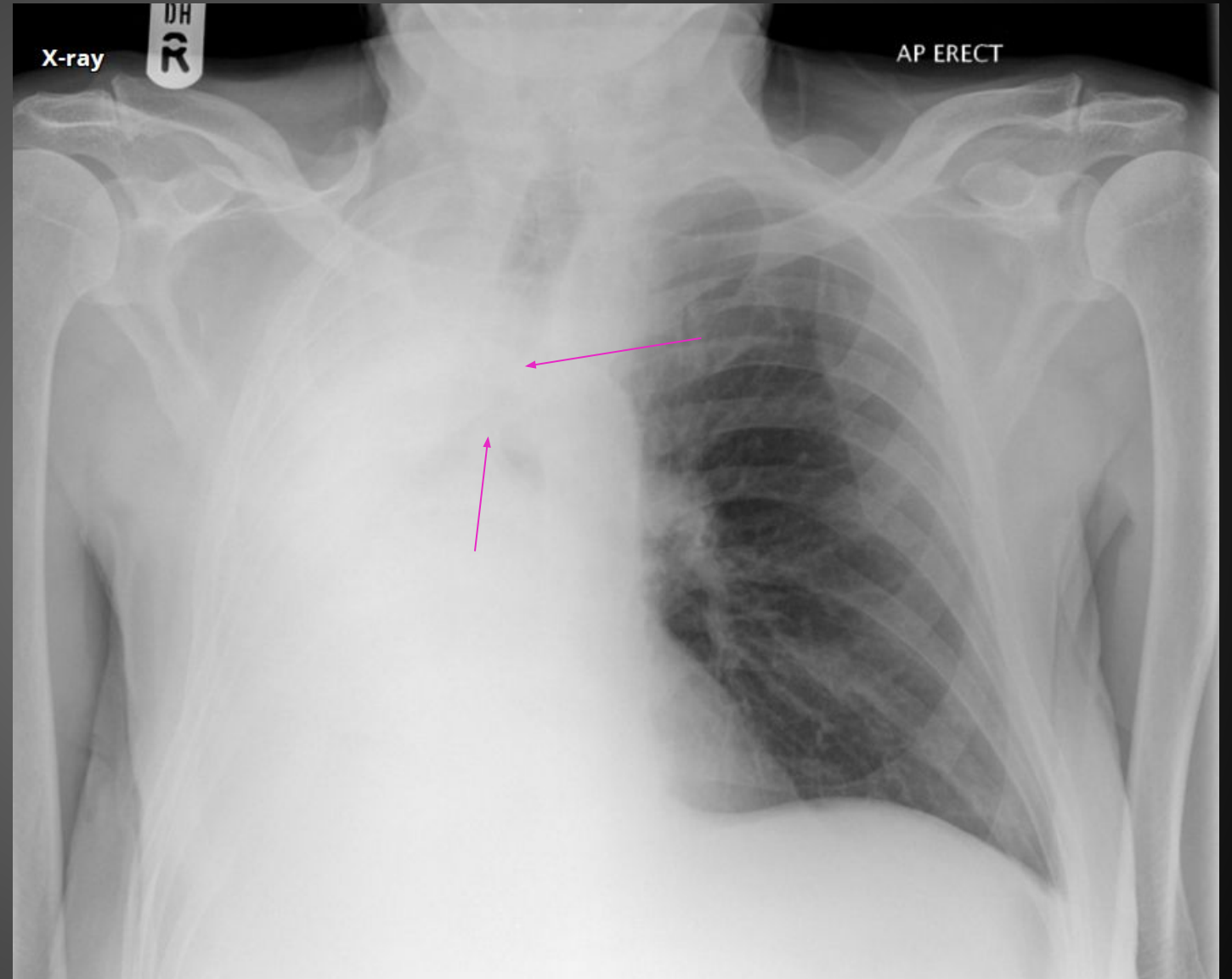
Findings?

Total white-out of the right hemithorax with tracheal deviation to the right.

Cause? Look at trachea

- Pulled towards: pneumonectomy, total lung collapse, pulmonary agenesis
- central: consolidation, mesothelioma, pulmonary oedema
- Pushed away: pleural effusion, diaphragmatic hernia, large pulmonary mass

CT confirmed total lung collapse, secondary to a T4N3M1 lung tumour



# Case 12

## Findings?

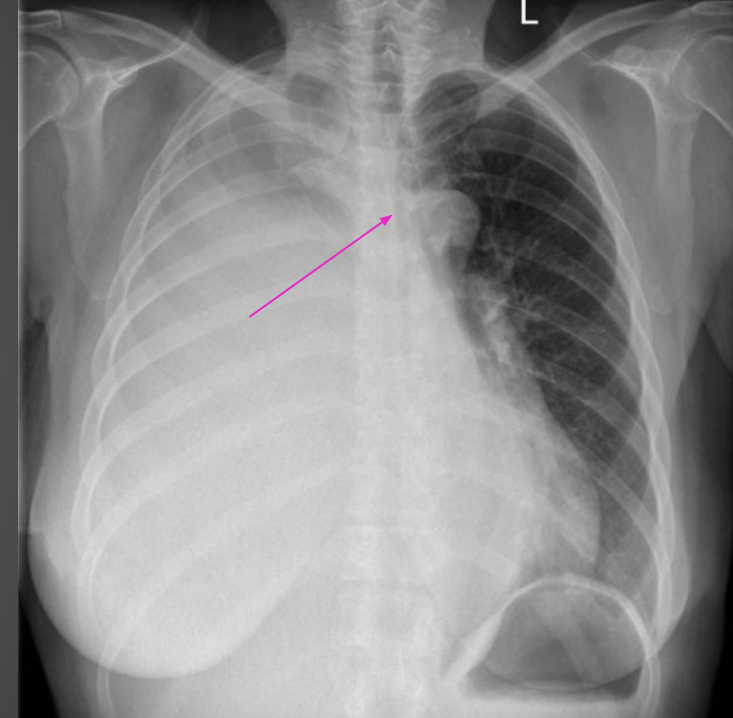
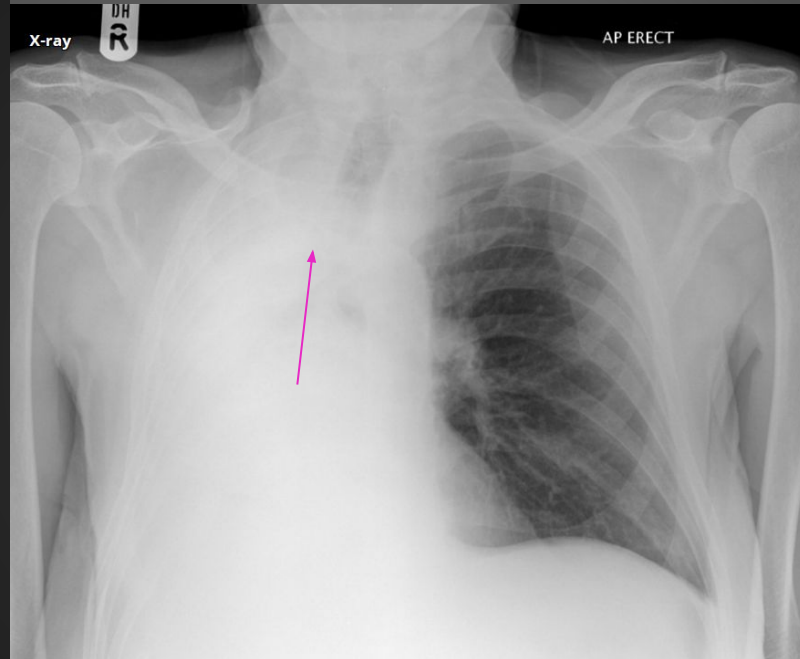
Total white-out of the right hemithorax with tracheal deviation to the right.

## Cause? Look at trachea

- Pulled towards: pneumonectomy, total lung collapse, pulmonary agenesis
- central: consolidation, mesothelioma, pulmonary oedema
- Pushed away: pleural effusion, diaphragmatic hernia, large pulmonary mass

CT confirmed total lung collapse, secondary to a T4N3M1 lung tumour

On the right: large pleural effusion



# Case 13

20-year old with SOB and cough

Findings?

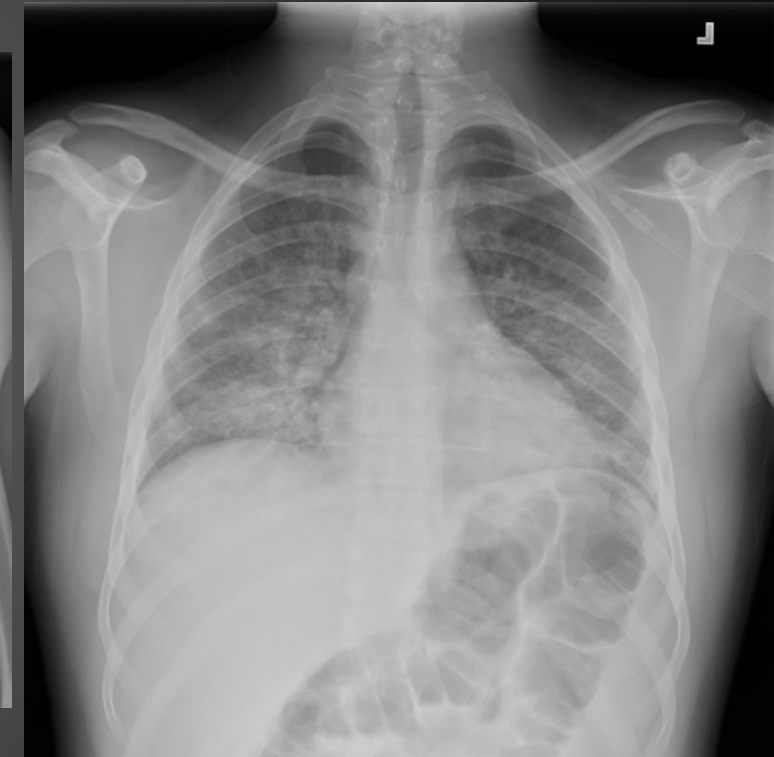
1. Subtle patchy reticular thickening in both lungs
2. New bilateral lower lobe predominant patchy opacities, right greater than left

Next steps: CT, broad infection screen, autoimmune screen, FBC, ESR, CRP, cultures

Day 1



Day 2



# Case 13

20-year-old with SOB and cough

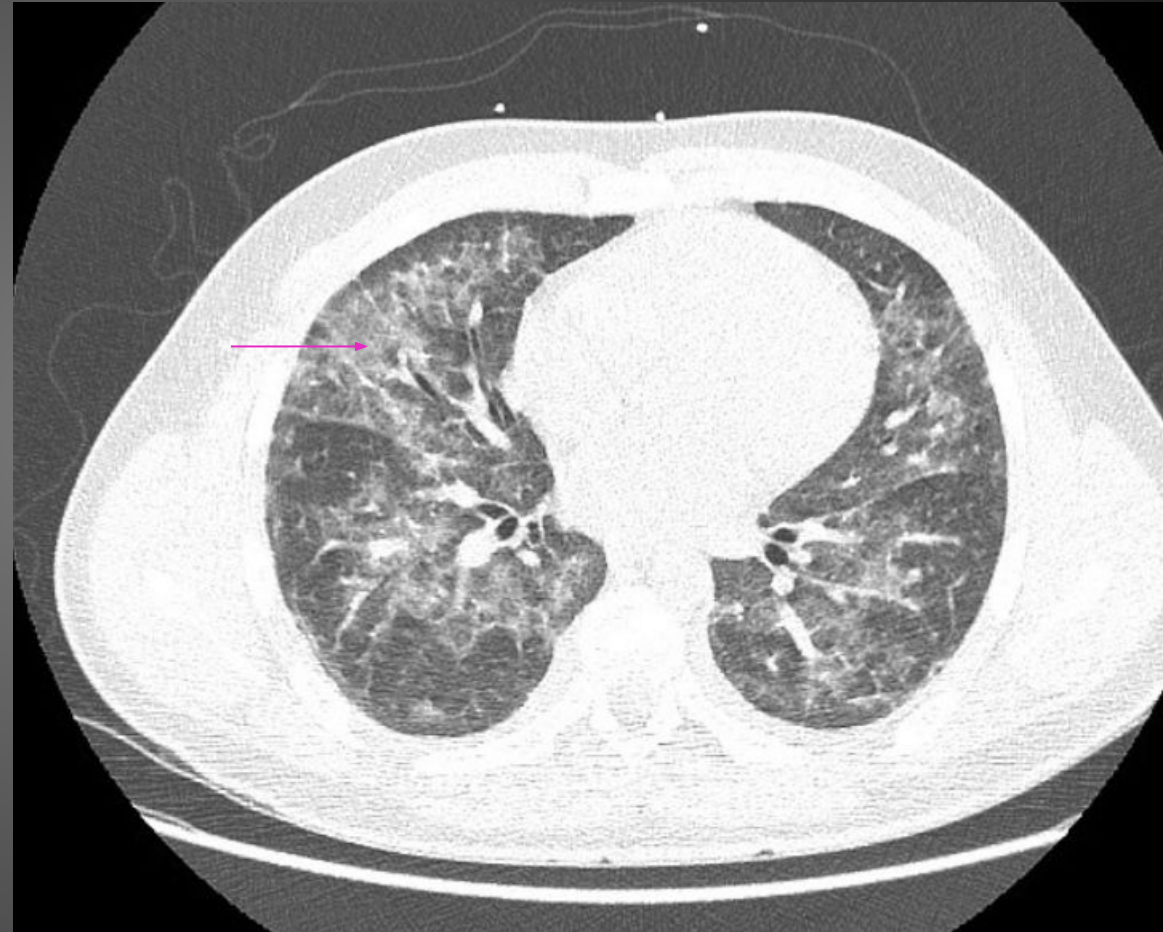
Findings?

Extensive symmetric bilateral groundglass and reticular opacities in a bronchovascular distribution with subpleural sparing affecting all lobes.

-> electronic cigarette or vaping product use-associated lung injury (EVALI)

EVALI: recent hx of vaping & CT changes without other cause (infections or others)

Next steps: oxygen, steroids



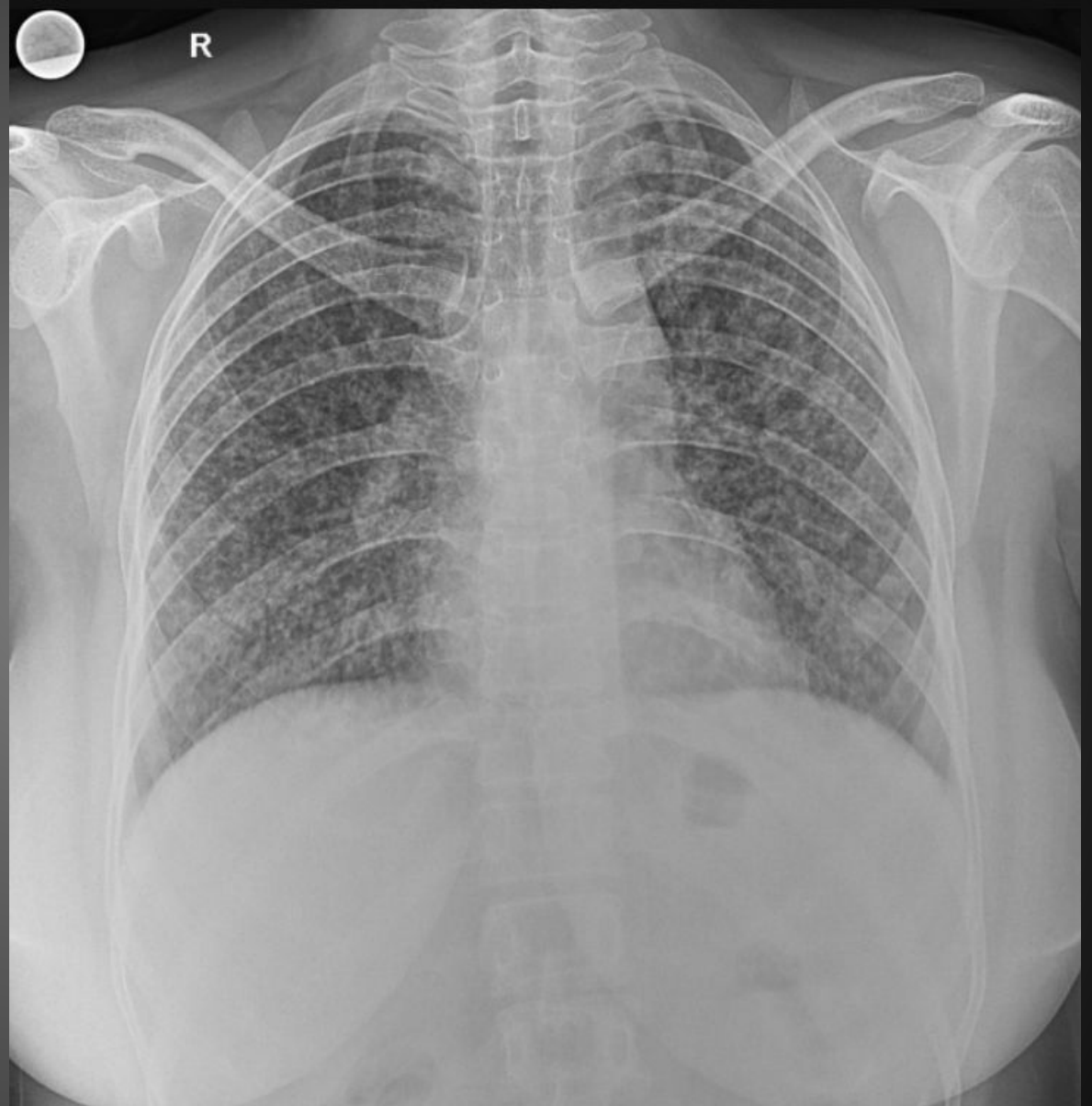
# Case 14

5-month history of productive cough, fever, weight loss

Findings?

Multiple tiny nodular opacities of average size 1-3 mm noted diffusely in bilateral lung fields suggestive of miliary tuberculosis.

Next steps: infection control, sputum smear (Ziehl-Neelsen stain)/ culture or NAAT



# Case 14

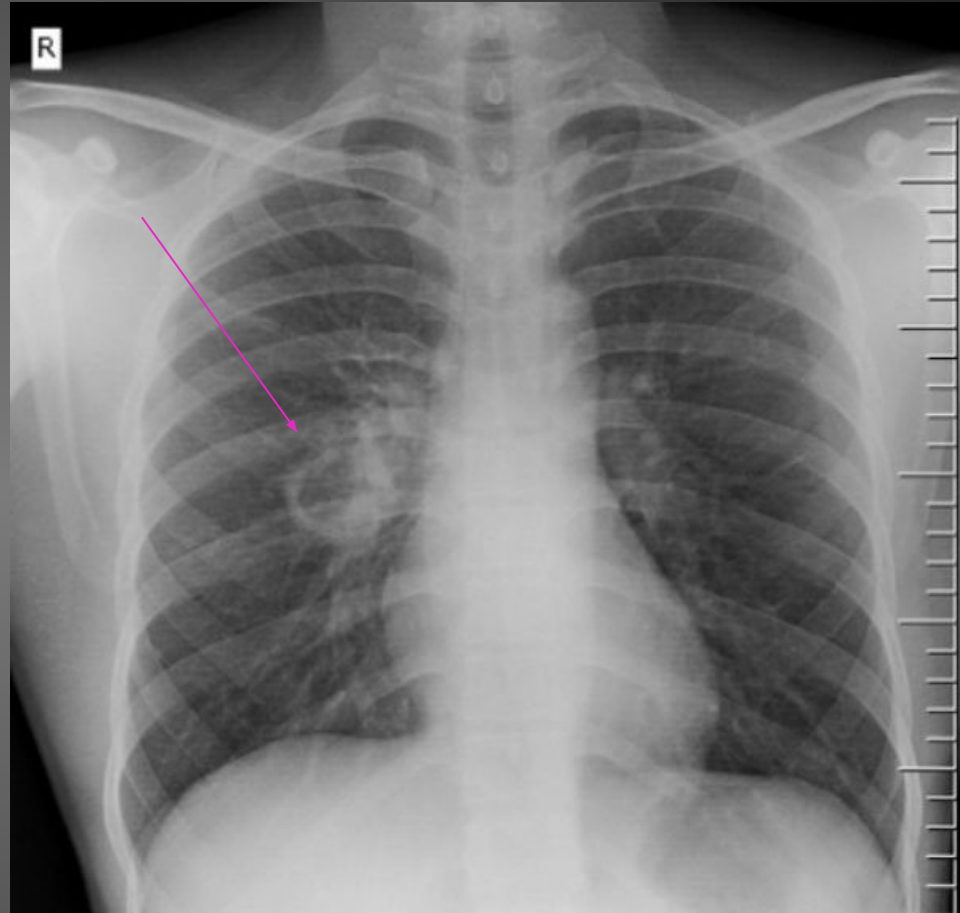
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Multiple tiny nodular opacities of  
average size 1-3 mm noted diffusely  
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miliary tuberculosis.

Next steps: infection control, sputum  
smear (Ziehl-Neelsen stain)/ culture or  
NAAT

This x-ray shows a cavitory lesion in  
the right para-hilar area in the  
midzone of right lung -> pulmonary  
TB



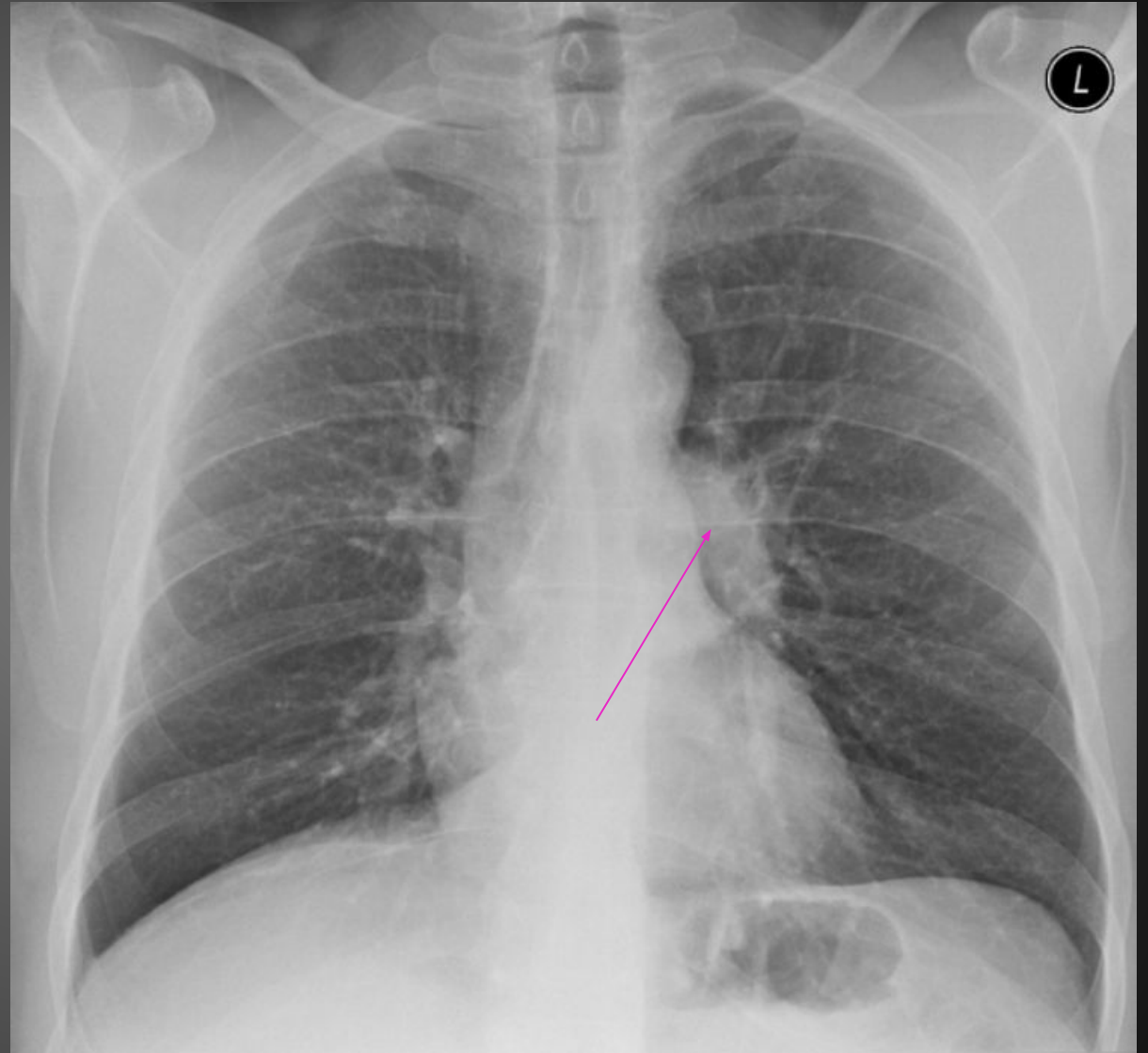
# Case 15

Findings?

The dense hilum sign and a lobulated soft tissue mass lesion is noted posterior to the left hilum.

Highly suggestive of lung carcinoma

Next steps: CT, biopsy





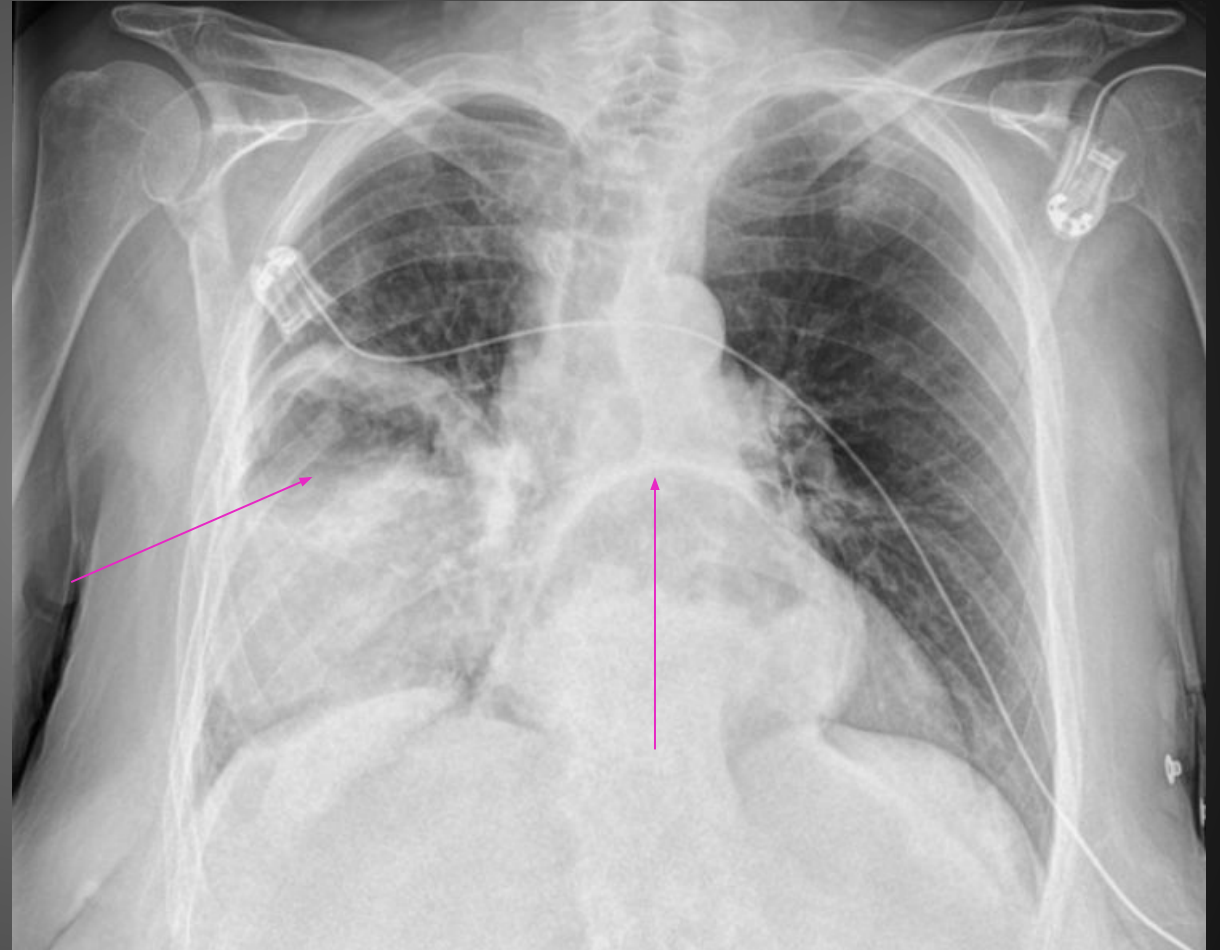
# Case 16

Patient feeling 'under the weather'.

Findings?

Cavitating mass in the right lower lobe with an air-fluid level. Left lung normal. Large hiatus hernia.

Next steps: CT, drainage, Abx



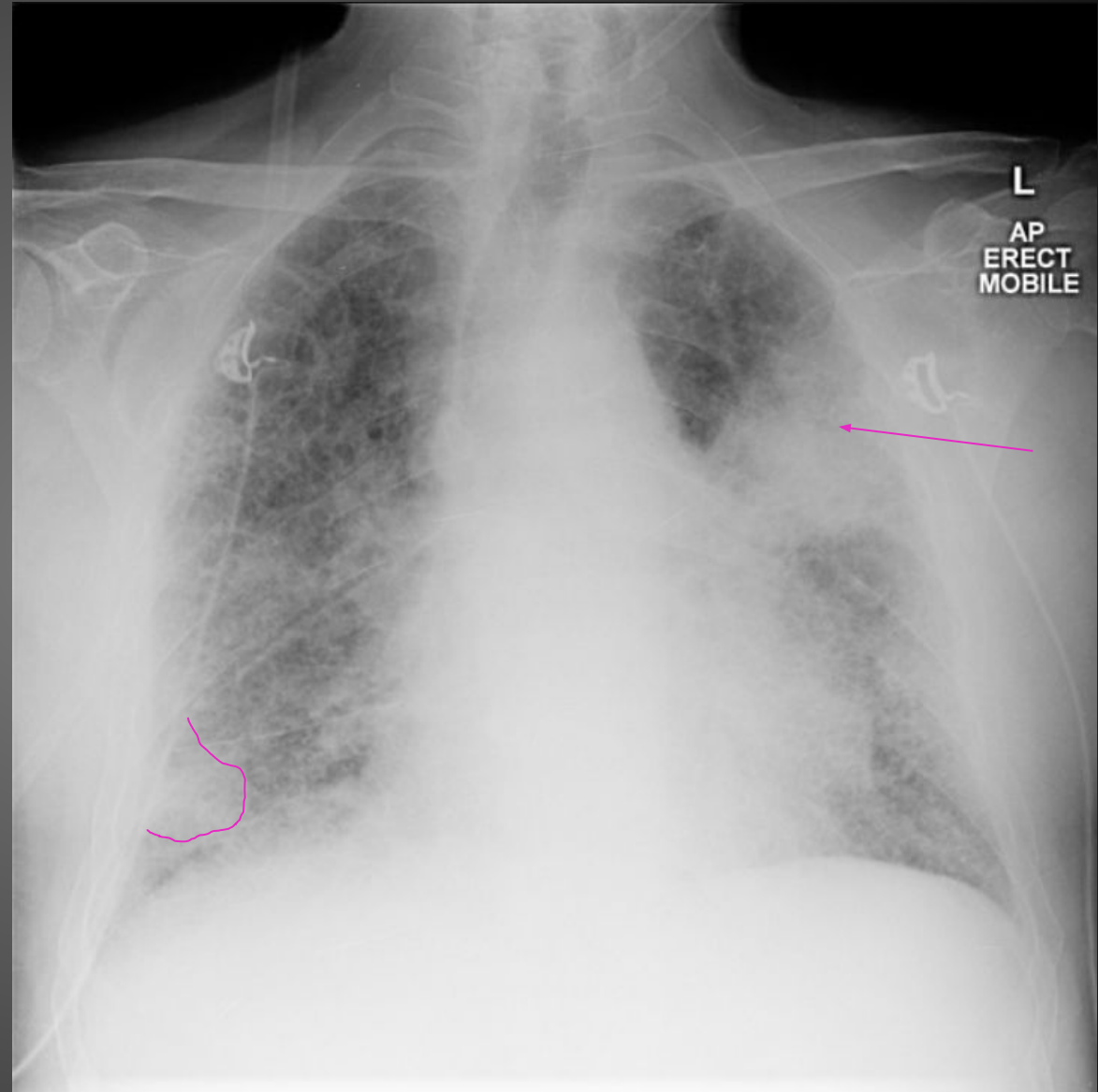
# Case 17

Known pulmonary fibrosis for 3 years.  
Recent deterioration with raised  
inflammatory markers.

Findings?

There are changes of diffuse and  
extensive fibrosis in both lungs (lung  
volume reduction & reticulation).  
Segmental area of consolidation is  
present in the left upper lobe. An ill  
defined possible mass lesion is seen  
at the right base.

Next steps: CT, biopsy, ABx



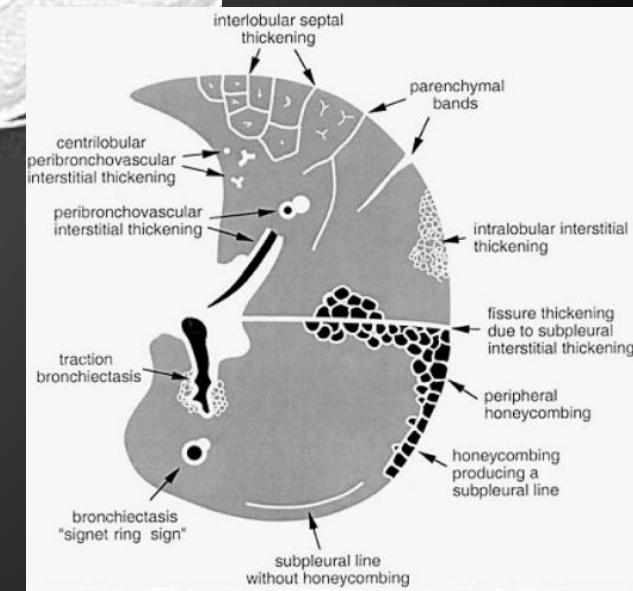
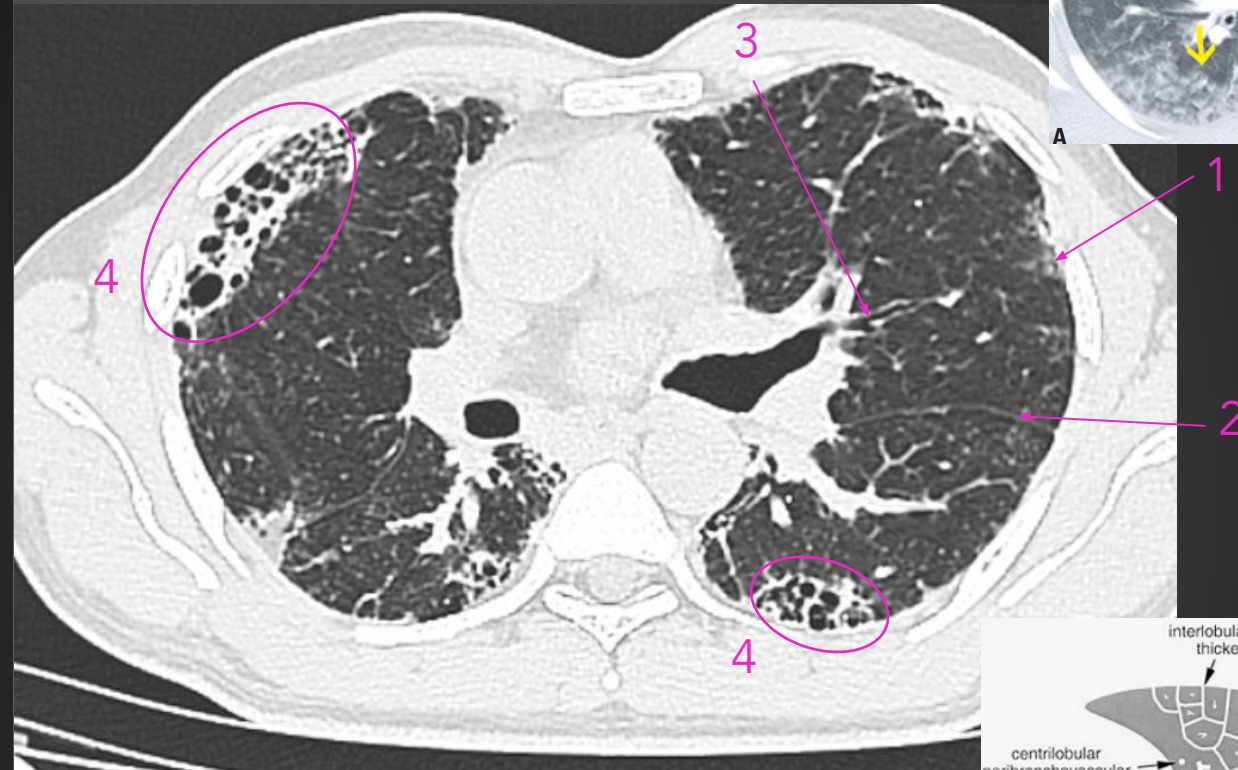
# Case 17

CT scan (not this patient)

Findings?

Features consistent with usual interstitial pneumonia (UIP), IPF most common cause.

There are ground glass opacities (1) as well as interlobular and subpleural interstitial septal thickening (2) with a predominate peripheral and basal distribution. Traction bronchiolectasis (3) is present in the region of affected lung. Layers of honeycombing cysts (4) are present in the basal segments of the right lower lobe and lesser degree in the left lower lobe. Overall the lung volume is reduced. Reactive mediastinal lymph nodes noted.



# Abdominal X-ray Approach

- Dr. Details – ID, date of film, prv images (or mention you would compare)
- P Projection – AP /PA
- E Exposure – diaphragm to pelvis, adequate exposure
  - > If major abnormality can mention here
- A Air – only within lumen of the bowel. If intraperitoneal air suspected, erect chest x-ray best
- B Bowels - position, size, wall thickness: SB (central, folds across, small volume air) vs LB (peripheral, folds alongside, air & faecal matter). 3-6-9 rule for SB, LB, caecum diameter
- D Dense structures, calcification, bones – ribs, vertebrae, pelvis, femurs, renal/gallstones
- O Organs and soft tissue – inspect for abnormalities but not precise
- X eXternal objects / artifacts



# Case 18

Distended abdomen. Absolute constipation for 24 hours.

Findings?

The large bowel is gas filled and distended down to the level of the distal descending colon-sigmoid. Small bowel collapsed. No free gas.

-> Large bowel obstruction

Next steps? NBM, IV fluids, NG tube. CT to identify cause, laparotomy



# Case 19

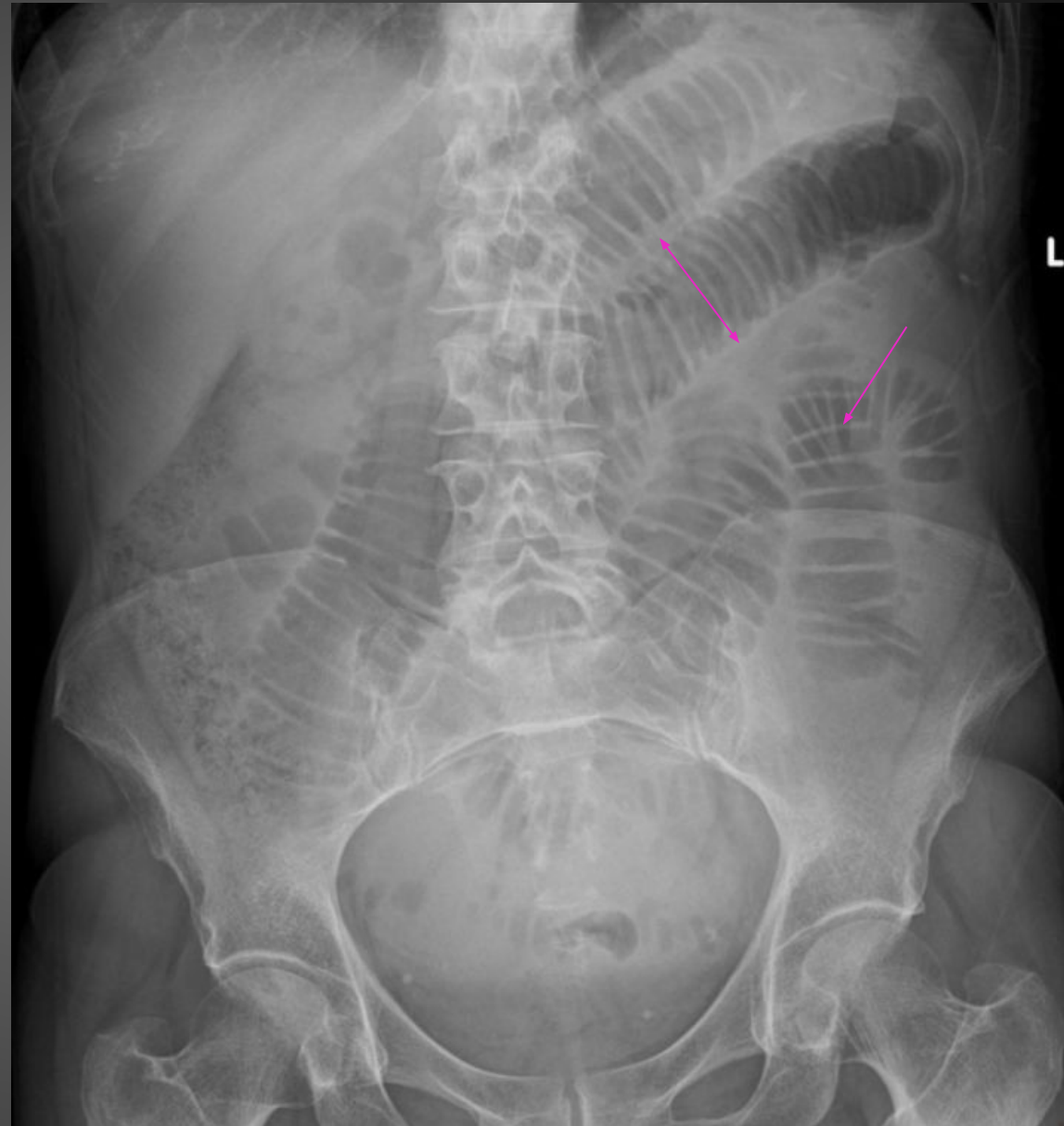
Distended abdomen and vomiting.

Findings?

Multiple loops of dilated gas filled small bowel in the central abdomen. The large bowel is collapsed. No pneumoperitoneum.

-> Small bowel obstruction

Next steps? NBM, IV fluids, NG tube, CT and laparotomy to find and treat obstruction



# Case 20

## Findings?

Dilatation of the sigmoid ( coffee bean shape). It extends superior to the transverse colon, (northern exposure sign). Absent of gas in the rectum.

□ Sigmoid volvulus

Next steps: rigid sigmoidoscopy with rectal tube insertion



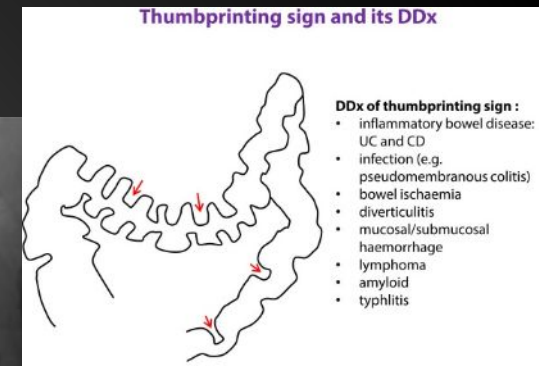
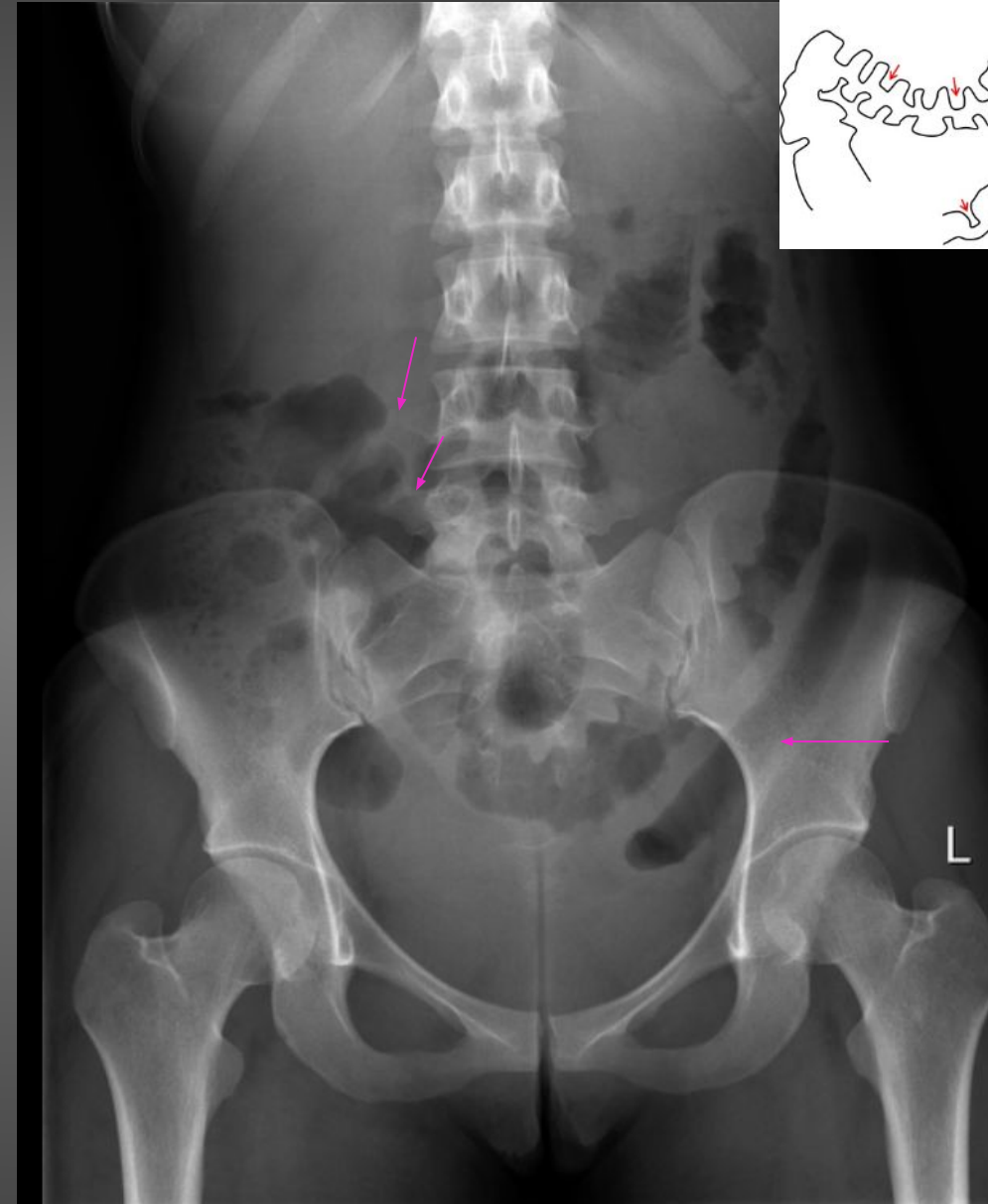
# Case 21

## Findings?

Thumbprinting of the transverse colon and lead pipe appearance of the descending colon. No dilated large or small bowel loops to suggest toxic megacolon or bowel obstruction. No features of pneumoperitoneum.

□ Inflammatory bowel disease

Next steps: treat flare up as per guidelines



- DDx of thumbprinting sign :**
- inflammatory bowel disease: UC and CD
  - infection (e.g. pseudomembranous colitis)
  - bowel ischaemia
  - diverticulitis
  - mucosal/submucosal haemorrhage
  - lymphoma
  - amyloid
  - typhlitis

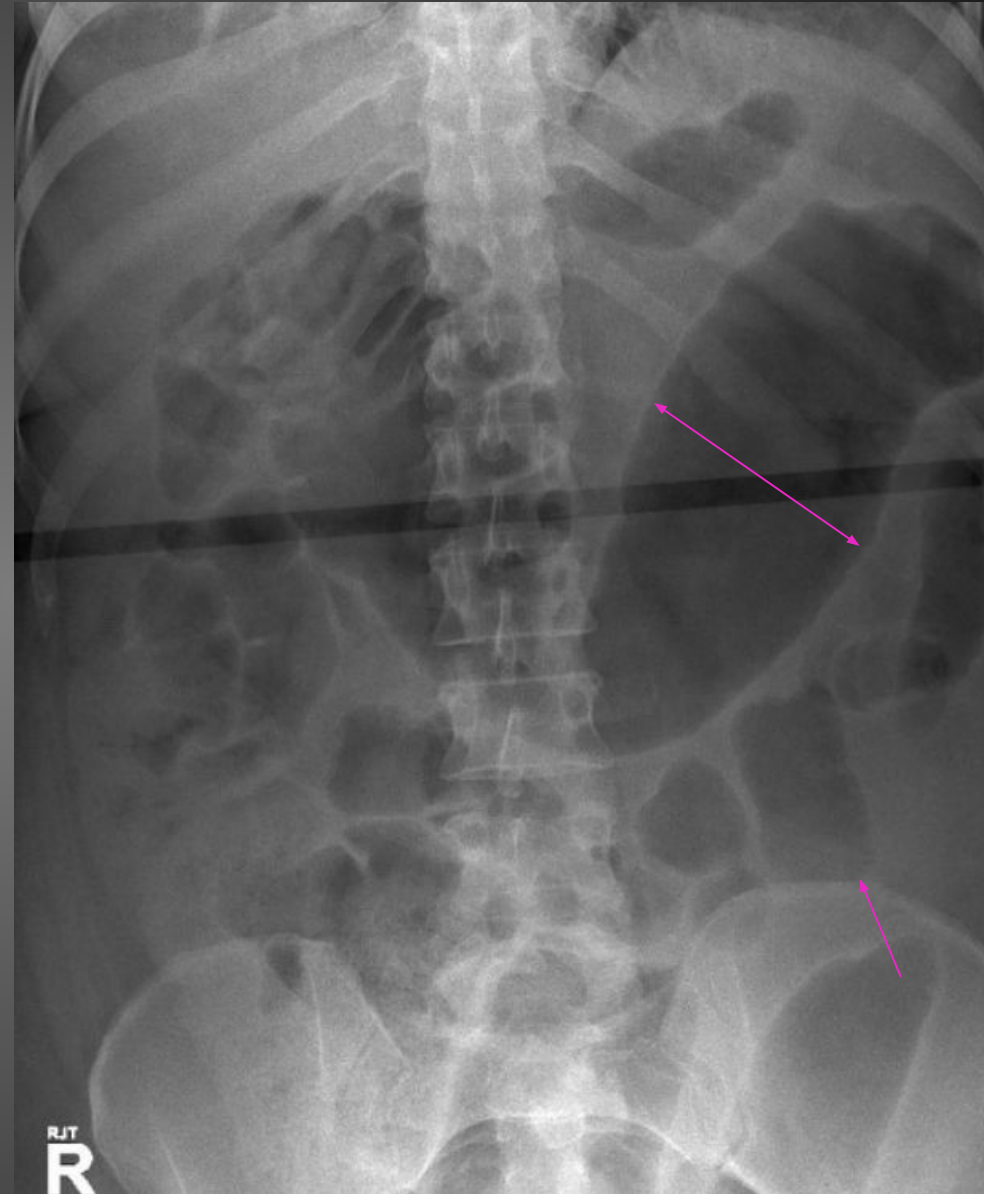


# Case 22

## Findings?

Increase in gaseous distension of the distal transverse colon. The transverse colon and sigmoid colon are both featureless consistent with severe colitis. There is faecal loading in the right side of colon. No evidence of free gas or pneumatosis intestinalis. The appearance is concerning for toxic megacolon.

Next steps: CT, supportive management incl. IV fluids, NG tube, bowel rest.

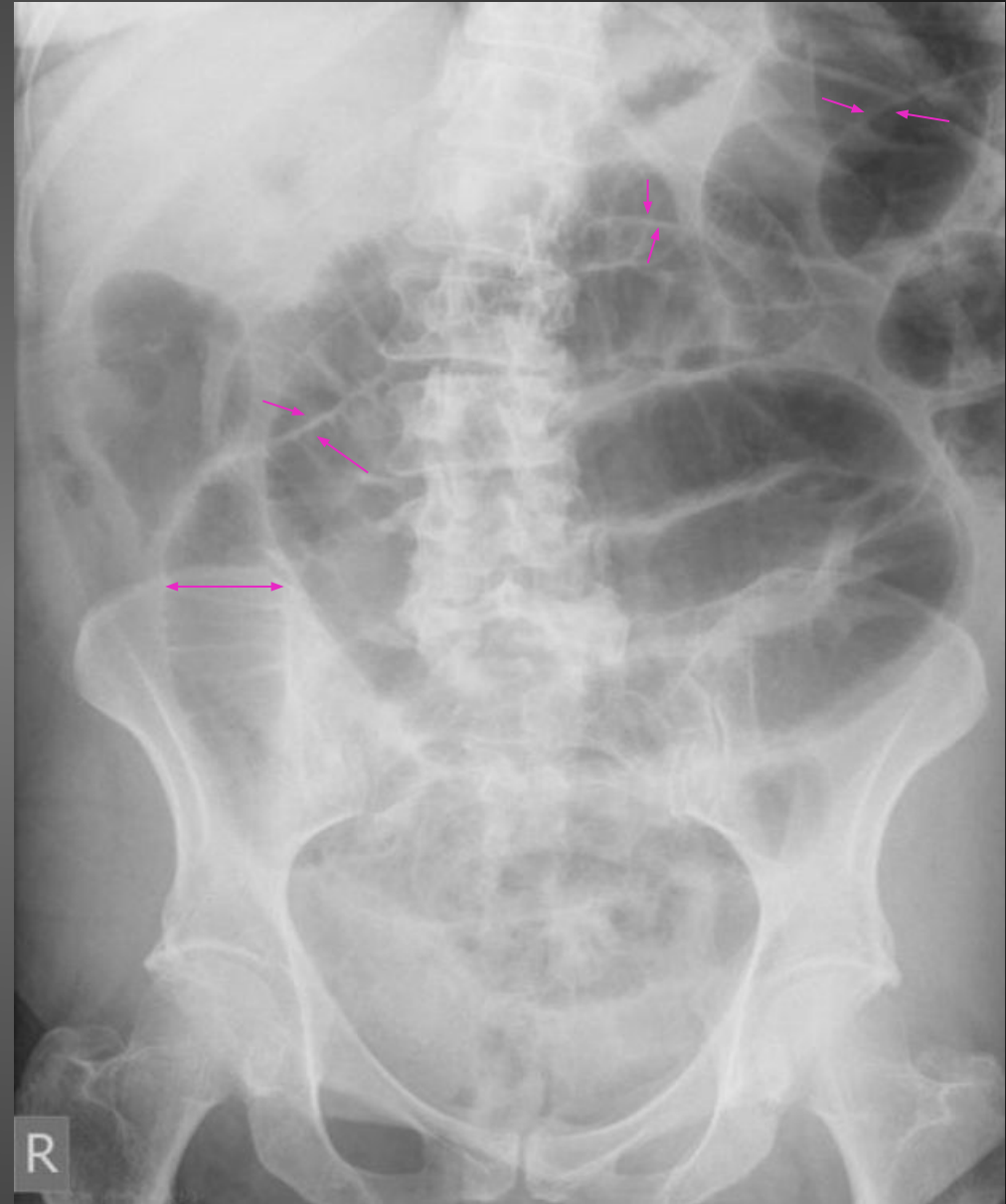


# Case 23

Findings?

Distended, gas-filled loops of small bowel.  
Extensive intramural gas and free gas (Rigler sign).

Next steps: CT,  
observation OR surgery,  
Abx



# Questions?

- Sources: all cases from radiopaedia, except:
  - HF case from radiology masterclass

# Feedback

Thank you for attending today's session!

Please fill in the feedback form:

[https://docs.google.com/forms/d/1wm2UdSB7m8DXGCImp2DQdpGmocdo8OUE-nPmgerVkO8/viewform?edit\\_requested=true](https://docs.google.com/forms/d/1wm2UdSB7m8DXGCImp2DQdpGmocdo8OUE-nPmgerVkO8/viewform?edit_requested=true)



Contact us:

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# Content covered

- Chest X-ray interpretation
  - Approach
  - Lung: pneumothorax, pneumoperitoneum, pneumonia, TB, lesions (ca), pleural effusion, lobar collapse
  - Bronchiectasis, fibrosis, ILD
  - NG tube placement, EVALI
  - Cardio: heart failure, dextocardia
- Abdominal X-ray interpretation
  - Approach
  - Toxic megacolon, volvulus, IBD, perforation, obstruction
- (CT scans for supplementation)