

Department of Radiology – Case of the Month #2

Part 1 – Identifying Abnormalities

A 77-year-old male presents with chronic shortness of breath. Posteroanterior (PA) and lateral chest radiographs are requested (Figures 1 and 2).

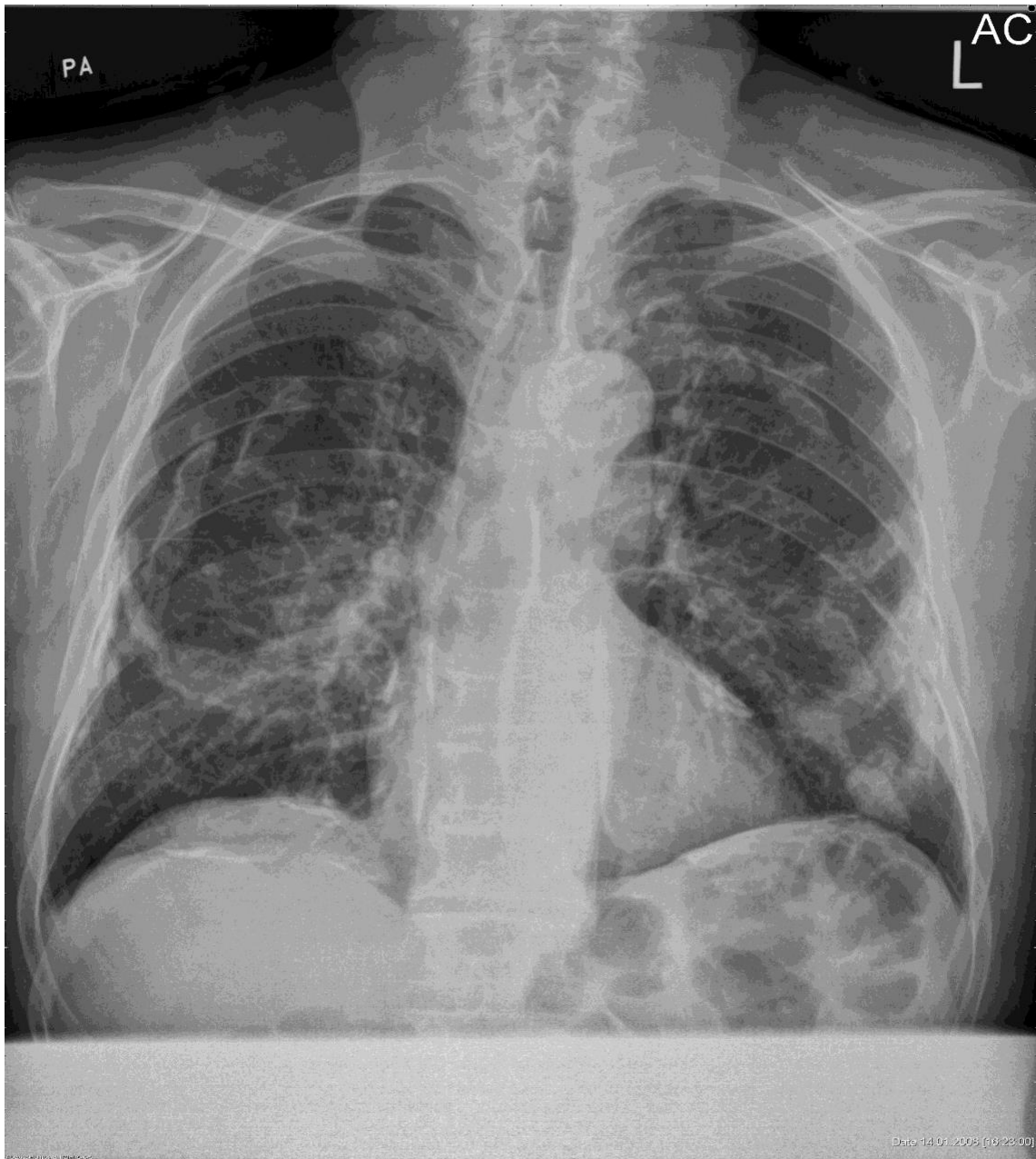


Figure 1: PA View



Figure 2: Lateral View

Prompting Questions:

- 1) Do you notice any abnormalities in the above scans?
- 3) How would you characterize the abnormality/abnormalities?
-too white or too black? Shape? Borders?

Part 2 – Characterization and Localization

Examination reveals several findings; outlined below:

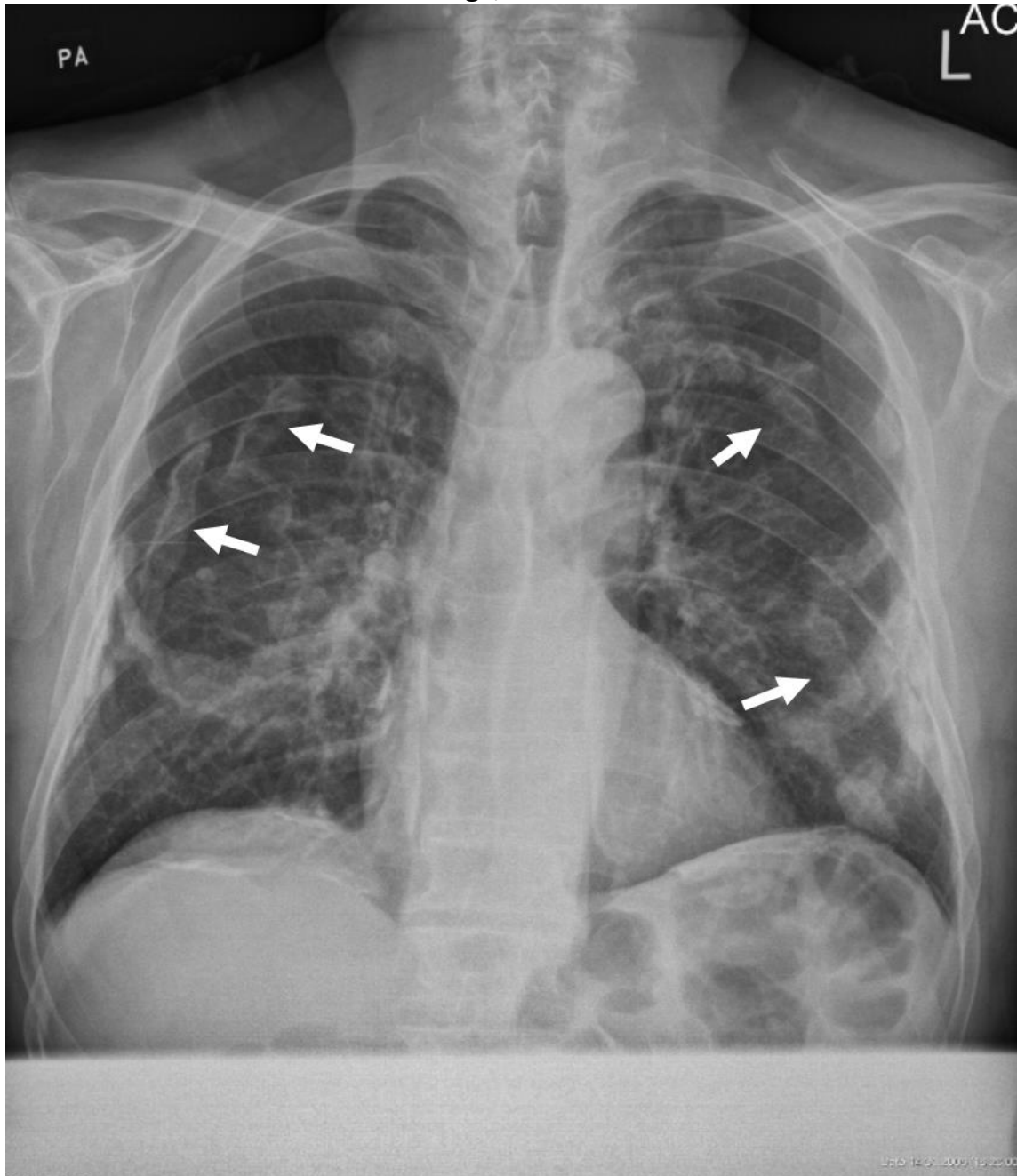


Figure 3: Irregularly shaped opacities overlying both lung fields

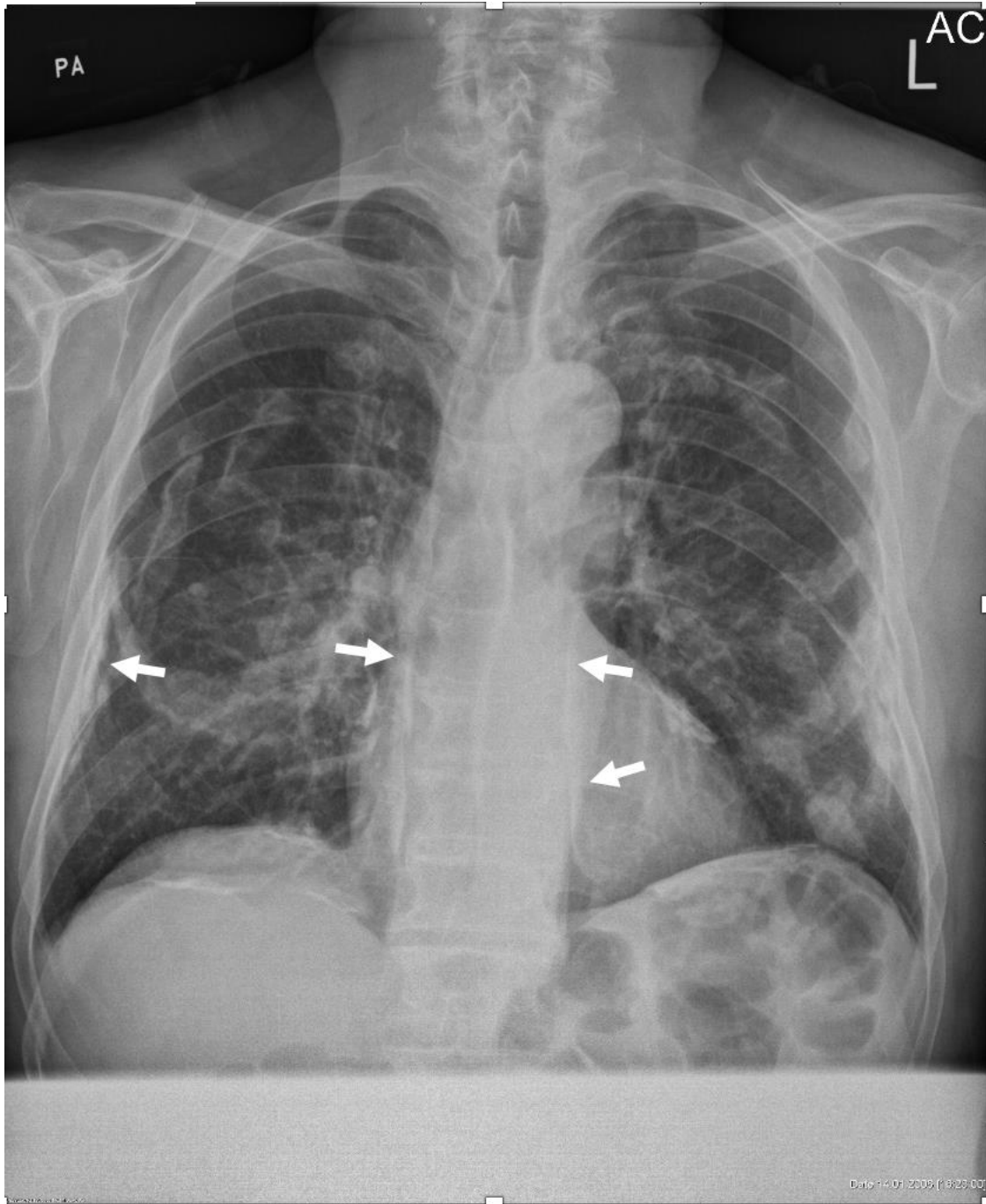


Figure 4: Linear opacities can be observed along the medial and lateral borders of the lungs



Figure 5: Linear opacities can be seen at the level of the diaphragm bilaterally

Try to localize the opacities utilizing the concept of radiologic zones:

To simplify radiologic anatomy, we can use the concept of radiologic zones. These include:

- Zone 1: Hilar
- Zone 2: Mediastinal
- Zone 3: Cardiac
- Zone 4: Pleural
- Zone 5: Lung
- Zone 6: Peripheral (chest wall)

Each of these zones can be divided into right and left, and anterior and posterior.

Prompting Questions:

- 1)** Did you identify all or some of the abnormalities shown? How effective / systematic was your approach?
- 2)** Was your characterization of what you identified accurate? Did you use similar terminology to that used in the captions for Figures 3-5?
- 3)** Based on a process of elimination, what are the possible locations for the abnormalities?
- 4)** Is it possible to definitively localize the abnormalities utilizing only the PA scan?

Part 3 – Lateral Perspective

To determine definitive localization, we require the lateral X-ray:



Figure 6: Lateral with abnormalities identified

Prompting Questions:

- 1) Where are the abnormalities located?
- 2) Was your initial localization correct?
- 3) What would be the implications in diagnosis and management if localization was not precise?
- 4) Based on the nature and location of the lesion, what is on your differential? What are the next steps for investigation / management?

Commentary:

Based on the PA image alone, it is not possible to localize the lesions with any degree of certainty. An X-ray displays all overlapping structures viewed from a single perspective. The PA scan limits our ability to determine how anterior or posterior the lesions are positioned. When using the PA X-ray alone, we are unable to determine if the lesions are present in the chest wall, pleura, or the lungs.

Examining the lateral scan (Figure 6), we see that the lesions are located posterior to the anterior chest wall and anterior to the lungs. The inferior lesions are located below the lungs. Based on these findings we can conclude that the lesions are not located within the lungs or the chest wall: the only remaining possibility is the pleural space.

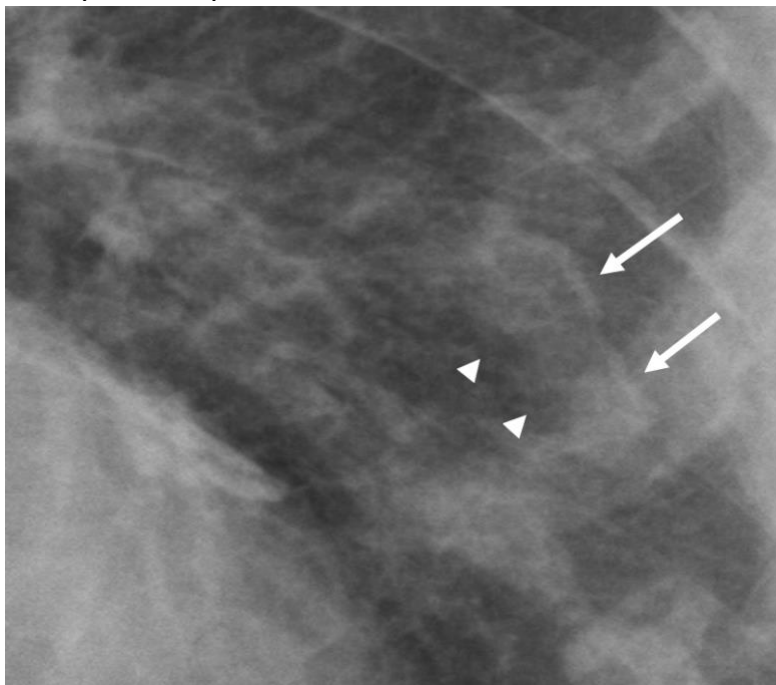


Figure 7: Magnified view of one of the opacities demonstrates well-circumscribed, denser lateral margins and poorly defined medial margins in keeping with the incomplete border sign which is characteristic of an extra-pulmonary lesion (pleural or chest wall).

Part 4 – Computed Tomography

The patient subsequently received a CT scan. Relevant slices from the axial, coronal, and sagittal views are included below:

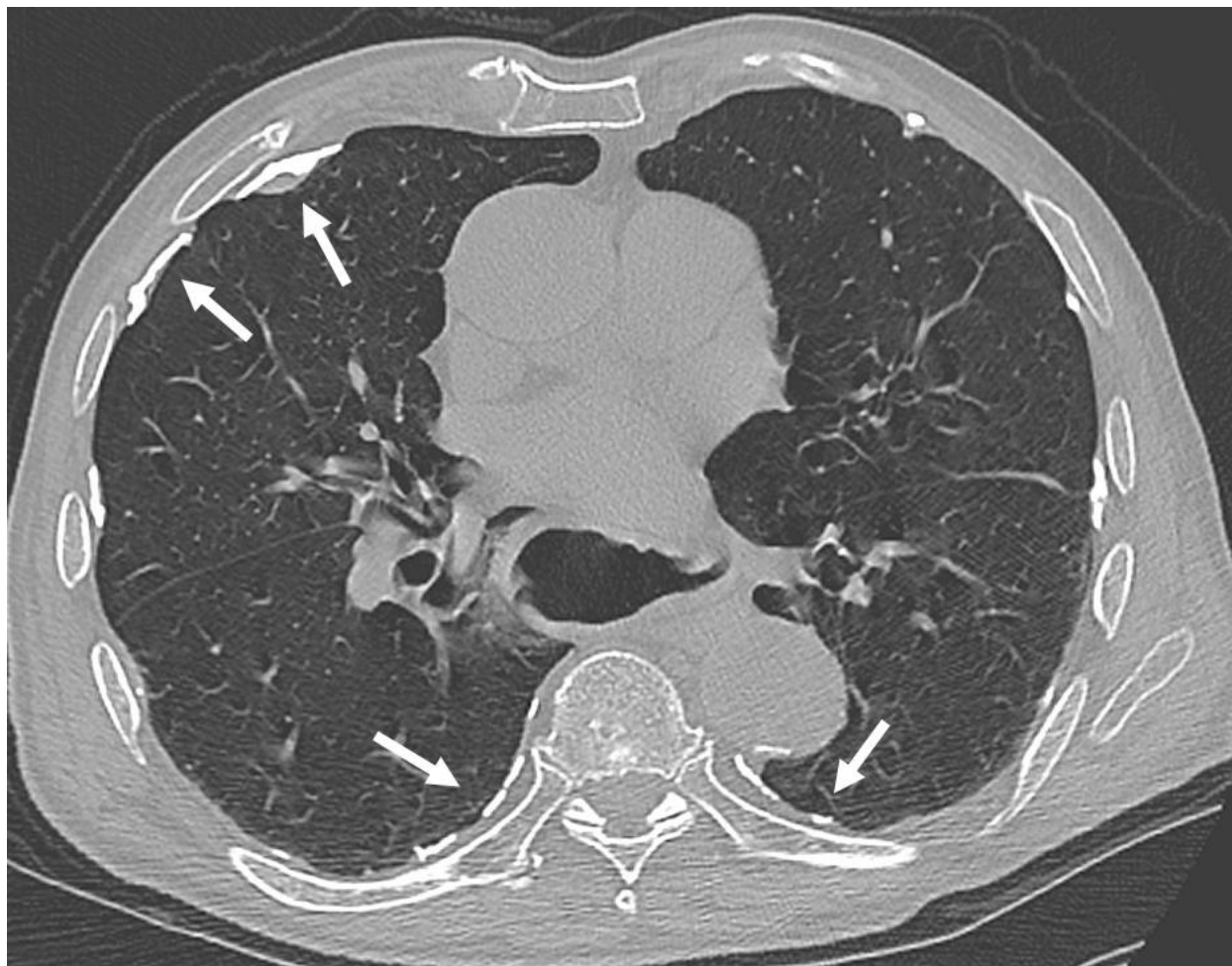


Figure 8: Axial view. Arrows indicating areas of irregular linear opacity.



Figure 9: Coronal view.

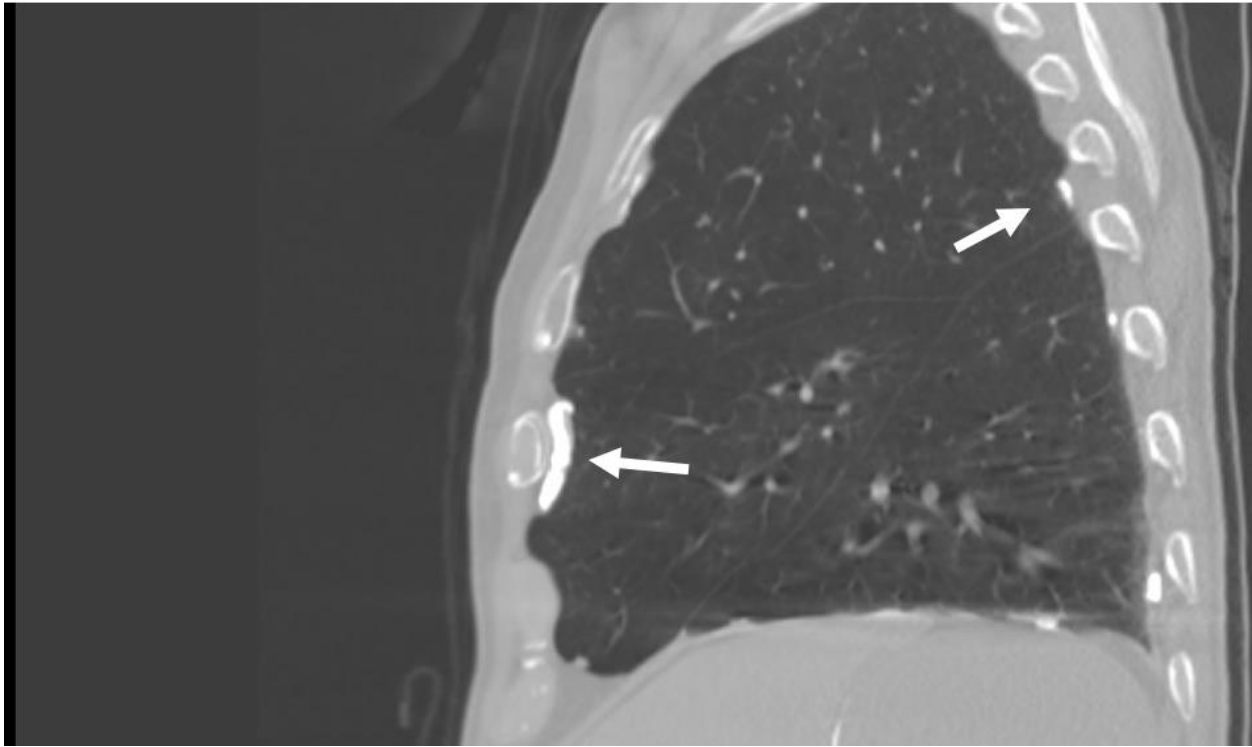


Figure 10: Sagittal view.

Prompting Questions:

- 1) How would you characterize these abnormalities?
- 2) Does having the CT change your localization?
- 3) What additional information does the CT provide us with? Why was it ordered?
- 4) Did the CT help narrow our differential? Do we have enough information to formally diagnose the patient? What other components of the history would be useful for us to know?

Summary:

The PA and Lateral chest X-rays show irregular pleural calcifications. Pleural calcification can occur following a hemothorax, infection involving the pleura, inflammation, trauma, surgery, radiation therapy, or as a result of exposure to asbestos. In cases which involve exposure to asbestos, plaques typically become visible 20 or more years following initial exposure, and calcified plaques of the diaphragmatic pleura are particularly common. Because diaphragmatic pleural plaques are present in this case, a clinical history to determine past asbestos exposure would help confirm the likely diagnosis of calcified pleural plaques resulting from asbestosis.

Teaching points:

- 1) Opacities that are as dense as the ribs and other osseous structures are likely calcified.
- 2) Pleural-based opacities that have irregular margins when seen in profile and sharp borders when seen face on and may demonstrate the incomplete border sign.
- 3) Asbestos related pleural plaques are usually bilateral and covering the dome of the diaphragm.
- 4) Unilateral pleural calcifications could be secondary to prior infection and trauma.

Diagnosis:

Calcified pleural plaques due to Asbestos-related pleural disease.