

February 2012 Imaging Case of the Month

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Clinical History

A 70-year-old woman with no significant past medical history presented with progressive shortness of breath. A chest radiograph (Figure 1A) was obtained. Figure 1B is a frontal chest radiograph obtained 2 years earlier, presented for comparison.

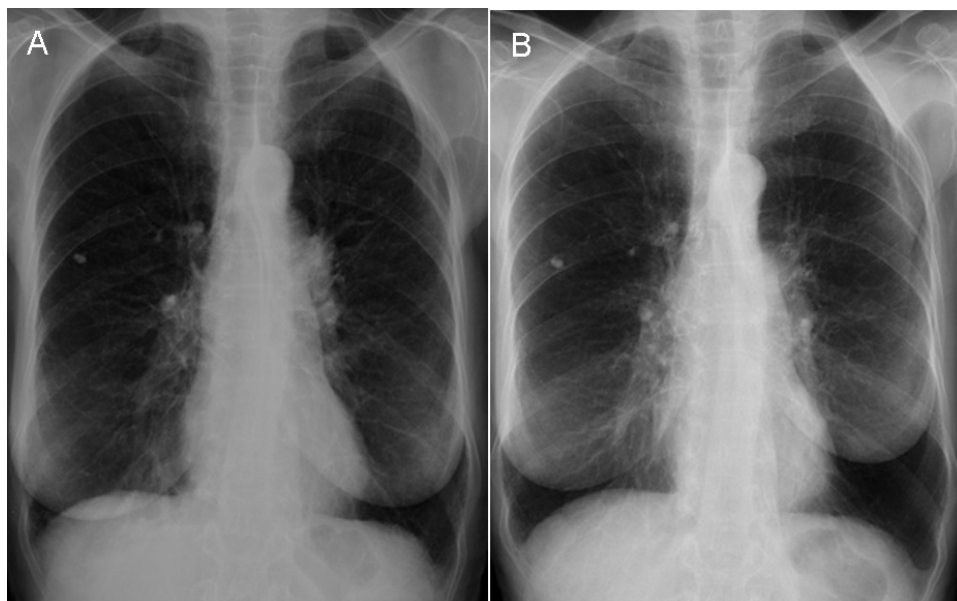


Figure 1A: Frontal chest radiograph. Figure 1B: Frontal chest radiograph obtained 2 years prior to Figure 1A.

What radiological sign is present?

1. The “silhouette sign”
2. “Golden’s S” sign
3. The “dense hilum” sign
4. The “cervicothoracic” sign
5. The “scimitar” sign

Answer: 3. The “dense hilum” sign

Figure 1 shows the “dense hilum” sign. The “dense hilum” sign is present when one hilum appears clearly denser than the contralateral hilum on a frontal chest radiograph, and implies the presence of a lesion within or projected over the abnormal hilum. Compare the density of the left hilum in Figure 1A, obtained at the time of presentation, with that of Figure 1B, which is a chest radiograph obtained 2 years earlier. Normally the left hilum is somewhat cephalic to the right, and both hila are roughly of equal density. In Figure 1, the left hilum is noticeably denser than the right. Importantly, this observation represents a change compared to the chest radiograph obtained 2 years earlier- compare the left hilum in Figure 1A and Figure 1B.

The “silhouette sign” represents the lack of visualization of a border on a chest radiograph that is normally rendered visible because the juxtaposing structures creating the border are of different density. Recall that the visibility of a border on a chest radiograph requires the juxtaposition of structures of *different* density. When the silhouette sign is present, the juxtaposing structures are of similar density, and the border between two structures of equal density cannot be visualized. “Golden’s S” sign occurs when a central mass produces right upper lobe atelectasis, resulting in superior displacement of the right minor fissure, creating an “S” shape. The medial portion of the “S” faces laterally and inferiorly, and is created by the mass causing hilar enlargement and right upper lobe bronchial obstruction, with cephalic displacement of the lateral portion of the right minor fissure, forming the lateral portion of the “S”. The “cervicothoracic” sign refers to the notion that a mass on chest radiography that has a lateral border visible superior to the clavicle must be located within the posterior mediastinum, and not the anterior mediastinum, owing to the anteriorly downward sloping orientation of the cervicothoracic junction. In other words, an anterior mediastinal lesion near the thoracic inlet will no longer contact lung and create a visible border because such a lesion will enter the neck at this point and lose contact with lung, whereas a posterior mediastinal lesion may still contact the lung at a level cephalic to the clavicle, creating a visible border on chest radiography. Finally, the “scimitar sign” refers to a curvilinear density, representing partial anomalous pulmonary venous return, typically found along the right heart border coursing inferiorly and medially, so named for its resemblance to a Turkish sword of the same name.)

Follow up thoracic CT (Figure 2) was performed.

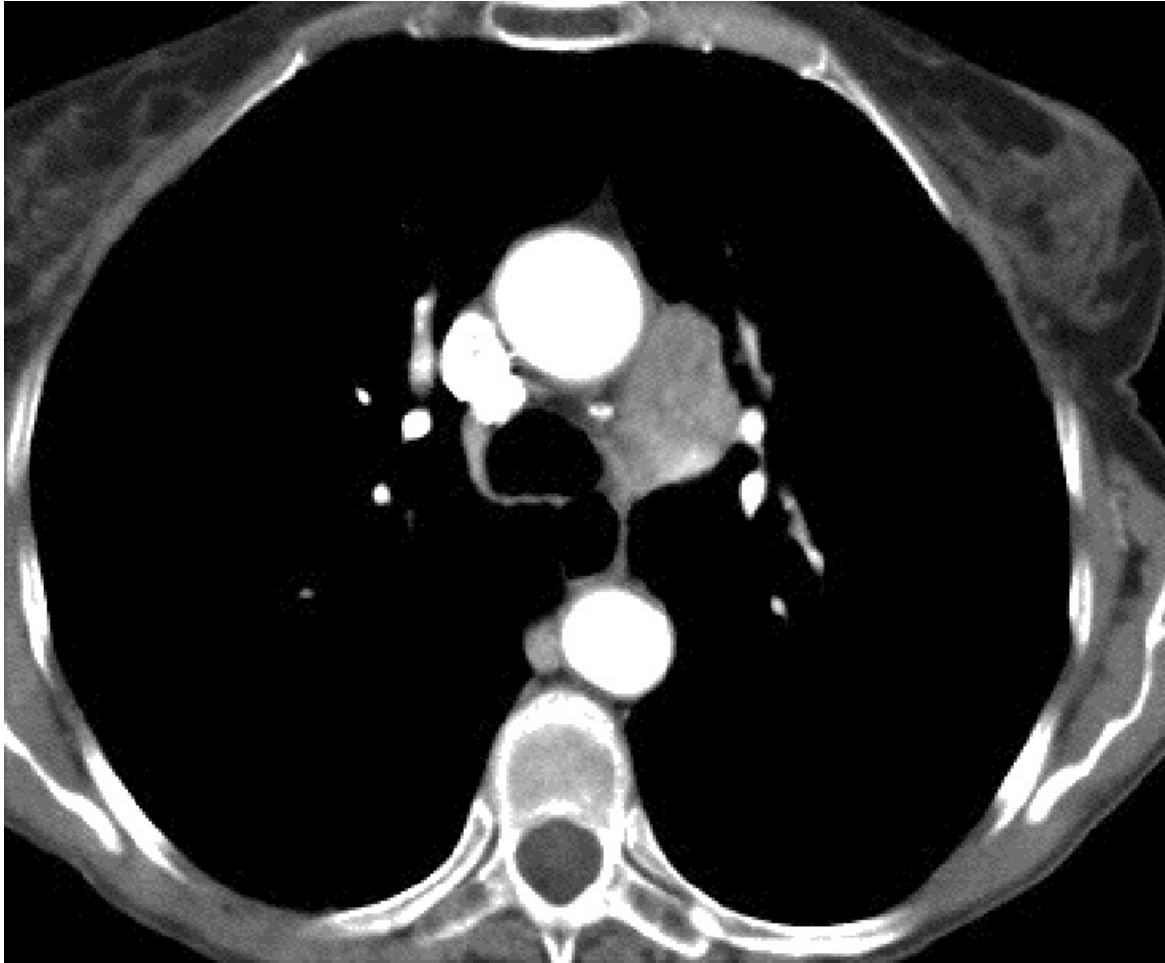


Figure 2.

Characterize the thoracic CT findings. Which of the following is correct?

1. Thoracic CT shows left upper lobe collapse
2. Thoracic CT shows an intraluminal filling defect expanding the left pulmonary artery
3. Thoracic CT shows a mass arising from the pericardium
4. Thoracic CT shows a mass in the para-aortic and subaortic space
5. Thoracic CT shows a mass arising from the heart

Answer: 4. Thoracic CT shows a mass in the para-aortic and subaortic space

A soft tissue mass is present lateral to the aortic arch, within the para-aortic space (lateral to the aortic arch), extending inferiorly to the space anterior to the main pulmonary artery and lateral to the left pulmonary artery, and medial to the origin of the first branch of the left pulmonary artery- the subaortic space.

No other aggressive appearing abnormalities were seen on this study. Which procedures would be potentially useful for establishing a diagnosis for this lesion?

- 1.Percutaneous fine needle aspiration biopsy
- 2.Endobronchial ultrasound with fine needle aspiration biopsy
- 3.Endoscopic ultrasound with fine needle aspiration biopsy
- 4.Left anterior mediastinotomy (Chamberlain procedure)
- 5.Standard cervical mediastinoscopy
- 6.More than one of the above

Answer: 6. More than one of the above

Endobronchial ultrasound with fine needle aspiration biopsy, endoscopic ultrasound with fine needle aspiration biopsy, left anterior mediastinotomy (Chamberlain procedure), and potentially extended cervical mediastinoscopy could access this lesion to establish a histopathological diagnosis. Because this lesion resides lateral to the ligamentum arteriosum, standard cervical mediastinoscopy cannot access this lesion.)

Two months after the thoracic CT, the patient subsequently underwent left anterior mediastinotomy to establish the etiology of the subaortic lesion. The diagnosis: was a large cell neuroendocrine tumor

One month following the thoracotomy, the patient underwent 2-[18F]-Fluoro-2-Deoxy-D-Glucose positron emission computed tomography-CT (FDG-PET CT) for staging purposes.

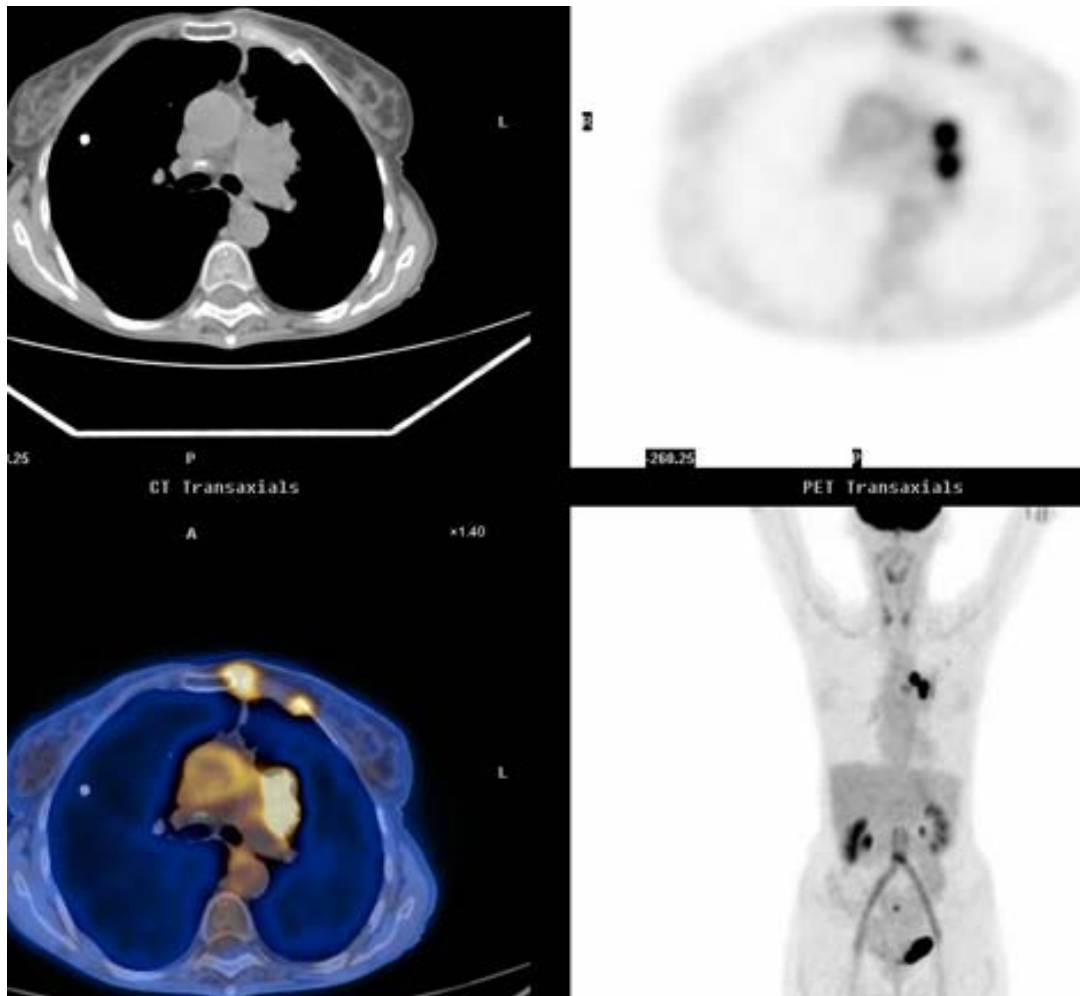


Figure 3: FDG-PET CT.

Which of the following statements is correct?

1. FDG-PET CT shows increased metabolic activity in the subaortic space and anterior chest wall and left internal mammary region, suggesting metastatic malignancy
2. FDG-PET CT shows only increased metabolic activity in the subaortic space, corresponding to the large cell neuroendocrine tumor in this region
3. FDG-PET CT shows only normal myocardial tracer utilization
4. FDG-PET CT shows increased metabolic activity in the subaortic space and activity in the left chest wall, most likely related to the recent thoracotomy
5. FDG-PET CT shows elevated tracer utilization that localizes to the lumen of the left pulmonary artery, suggesting pulmonary embolism

Answer: 4. FDG-PET CT shows increased metabolic activity in the subaortic space and activity in the left chest wall, most likely related to the recent thoracotomy

FDG-PET CT shows foci of marked tracer utilization corresponding to the abnormal soft tissue seen on the thoracic CT, found to represent neuroendocrine tumor, as well as additional foci of elevated glucose utilization localizable to the left chest wall. Note that the abnormal region of the left chest wall on FDG-PET CT shows no abnormal soft tissue or destructive change on the recent thoracic CT (Figure 2); rather, rib irregularity is visible on the top image to the left in Figure 3, correlating with the lateral area of chest wall tracer accumulation. The left chest wall findings are related to the recent left anterior mediastinotomy and resolved on follow up re-staging FDG-PET CT.

References

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3. <http://www.learningradiology>.