

December 2012 Imaging Case of the Month

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Clinical History: A 40-year-old man presented with persistent left chest and flank pain one year following emergent spine surgery for a traumatic burst fracture of L2 associated with left diaphragmatic injury. Frontal chest radiography (Figure 1) was performed.

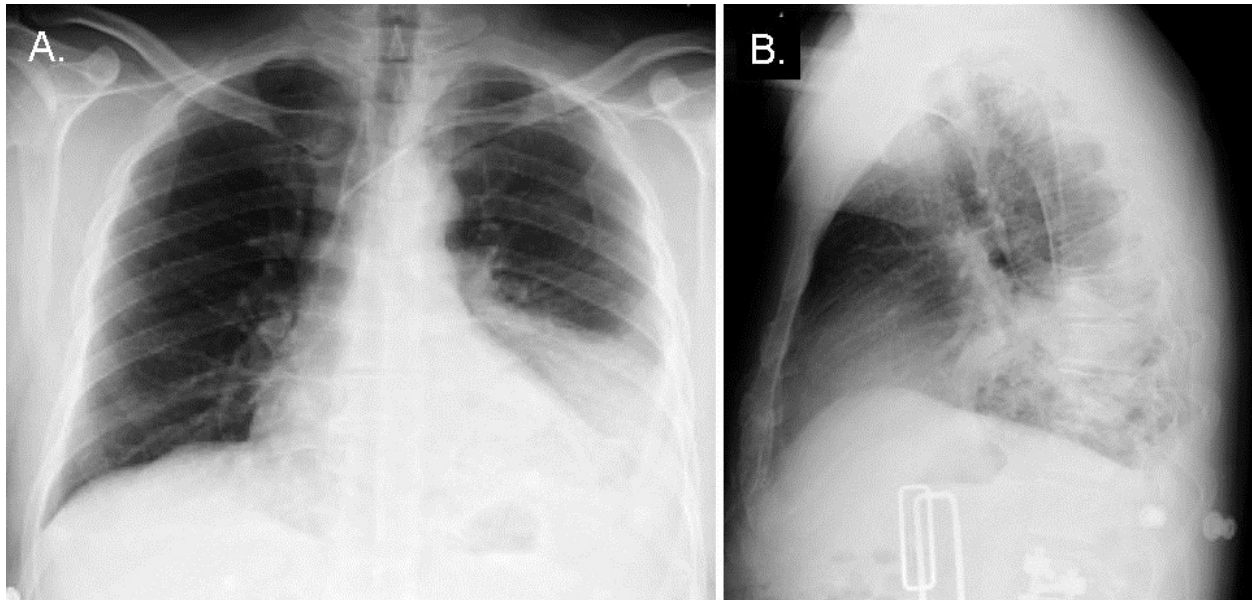


Figure 1. Frontal (A) and lateral (B) chest radiography.

Which of the following statements regarding the chest radiograph is **most accurate**?

1. The chest radiograph shows left lower lobe mass-like consolidation
2. The chest radiograph shows diffuse interstitial thickening
3. The chest radiograph shows a large left pleural effusion
4. The chest radiograph shows a left-sided mediastinal mass
5. The chest radiograph shows a left hydropneumothorax

Correct!

1. The chest radiograph shows left lower lobe mass-like consolidation

The frontal chest radiograph shows increased opacity in the left lower thorax, obscuring the left diaphragmatic contour, creating a somewhat mass-like appearance. A few air bronchograms are present along the cranial portion of the opacity, indicating the presence of consolidation. A left pleural effusion may be present (although not large), but no gas or air-fluid level is seen within the left pleural space to indicate hydropneumothorax. Interstitial thickening is not present. The left thoracic lesion does not significantly contact the mediastinum and therefore is not suggestive of a mediastinal mass. Furthermore, the lesion triangulates to the left lateral lower thorax using the two views of the thorax presented in Figure 1, rendering a mediastinal origin unlikely.

The cause of the left thoracic lesion was unclear. Clinical assessment of the patient did not indicate infection. Therefore, the patient subsequently underwent thoracic CT (Figure 2).

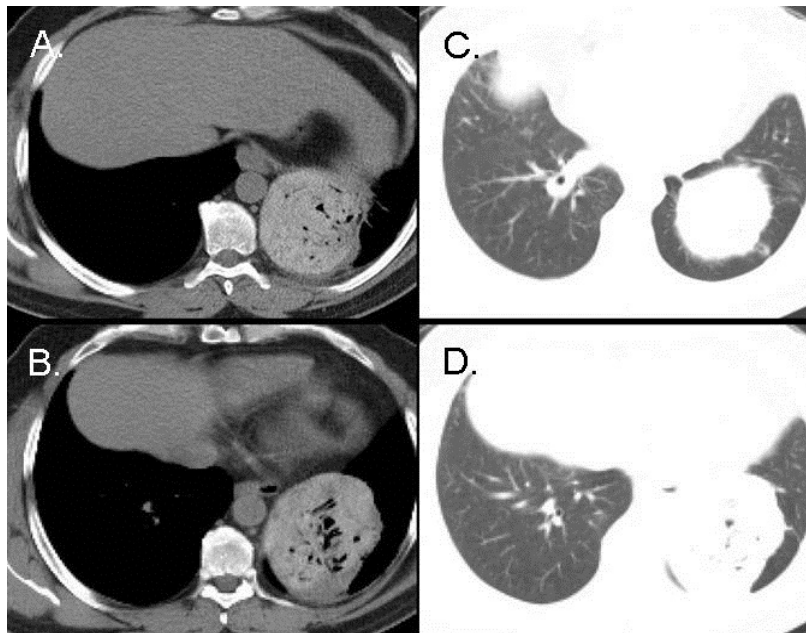


Figure 2. Representative still thoracic soft tissue (Panels A and B) and lung (Panels C and D) CT images.

Regarding the thoracic CT, which of the following statements is ***most accurate?***

1. The thoracic CT shows a fat containing left thoracic mass
2. The thoracic CT shows parenchymal accompanied by hila and mediastinal lymphadenopathy
3. The thoracic CT shows a mixed attenuation, hyper- and hypoattenuating left thoracic mass
4. The thoracic CT shows a highly vascular left lower thoracic mass
5. The thoracic CT shows a mass arising from the left lower lobe bronchi

Correct!

3. The thoracic CT shows a mixed attenuation, hyper- and hypoattenuating left thoracic mass

The lesion in the left lower thorax shows a combination of increased attenuation with linear-shaped, very regular-appearing, decreased attenuation (hyper- and hypoattenuating, respectively) centrally, but the areas of decreased attenuation do not show fat density; rather, they appear to show air or gas density. No hilar or mediastinal lymph node enlargement is evident. Whether or not the lesion is vascular cannot be ascertained on this unenhanced study, although a clear relationship to intrathoracic vessels is not evident. The left lower thoracic mass does not show a clear relationship to left lower lobe airways. Furthermore, other features that suggest an endobronchial origin for the lesion, such as post-obstructive atelectasis, air-trapping, or pneumonitis, or mucus impacted bronchi, are not present.

What is the **appropriate** next step for the evaluation / management of this patient?

1. Bronchoscopy with transbronchial biopsy
2. Serial thoracic CT to assess for growth
3. ¹⁸F-FDG-PET scanning
4. Percutaneous transthoracic fine needle aspiration biopsy
5. Open surgical lung biopsy

Correct!

4. Percutaneous transthoracic fine needle aspiration biopsy

Bronchoscopy with transbronchial biopsy is unlikely to provide a tissue sample adequate for diagnosis for a lesion located as peripherally as this lesion, particularly when no connection to the airways is evident. Serial thoracic CT for growth is often an appropriate strategy for the evaluation of small indeterminate nodules or when opacities of undetermined significance for which biopsy would be difficult are present. However, for this patient, a large, mass readily accessible to percutaneous fine needle aspiration biopsy is present and the patient has symptoms referable to this lesion; therefore, an observational strategy is not appropriate in this circumstance. ^{18}F FDG-PET scanning is unlikely to provide management-altering information in this circumstance. If ^{18}F FDG-PET shows hypermetabolism within the mass, a tissue diagnosis would be warranted. However, the lack of tracer utilization within the lesion would not allow a non-invasive approach given the large size of the lesion and the fact that symptoms are referable to the lesion's location. Finally, surgical lung biopsy could be considered, preferably using a thoracoscopic approach rather than an open one, but a surgical procedure is needlessly invasive when the lesion is so clearly amenable to a percutaneous approach.)

The patient subsequently underwent percutaneous transthoracic needle biopsy (Figure 3).



Figure 3. Prone thoracic CT image shows percutaneous needle biopsy of the left lower thoracic mass.

Based on the appearance of the lesion, which of the choices that follow is the ***most likely*** finding from the percutaneous biopsy procedure?

1. *Aspergillus* organisms
2. *Staphylococcus aureus* bacteria
3. Spindle cells
4. Paraffin wax
5. Cotton fibers

Correct!
5. Cotton fibers

Aspergillus infection, owing to the organism's ability to fix calcium, may appear hyperattenuating at thoracic CT, and cavitation may be present simultaneously with this infection. However, *Aspergillus* infections often occur in typical clinical contexts that are lacking in this case, and usually thoracic infection with *Aspergillus* species typically shows an imaging appearance significantly different than the appearance of the lesion in this patient.

Staphylococcus aureus pneumonia often appears as an area of lobar consolidation, although a bronchopneumonia pattern may be encountered as well. Cavitation within the area of pneumonia may occur with certain pneumococcus serotypes, and cavitory lung nodules may be seen with this infection when the source of the infection is intravascular, as with endocarditis or infection of indwelling central venous catheters. However, the hyper- and hypoattenuating appearance of the lesion would be distinctly unusual for *Staphylococcus aureus* infection.

Spindle cells may be seen on percutaneous transthoracic needle biopsies of patients with sarcomas, vascular, or fibrous tumors. Solitary fibrous tumor of the pleura would be one consideration for a mass in contact with the chest wall when percutaneous transthoracic biopsy results show spindle cells. However, solitary fibrous tumor of the pleura, as well as sarcomas and thoracic vascular tumors, would not present with the unusual appearance of the lesion in this case.

Paraffin wax could be obtained on a transthoracic percutaneous needle biopsy if the patient had previously undergone thoracoplasty for tuberculosis infection, but wax shows fatty attenuation on thoracic CT, and thoracoplasty using paraffin wax has not been performed for a number of years, and therefore it is unlikely to encounter this procedure in a patient of only 40 years age.

The **most likely** diagnosis for the lesion in this patient is which of the following?

1. Gossypiboma
2. Foreign body within the thorax
3. Textiloma
4. All of the above
5. None of the above

Correct!
4. All of the above

Gossypiboma, or textiloma, is the term applied to cotton-containing foreign bodies, such as sponges, swabs, and towels. Gossypibomas are the result of retained foreign bodies following surgery and may be encountered in many organ systems besides the respiratory system, including the gastrointestinal system or neurological system. Gossypibomas may be encountered asymptotically shortly after surgery or years after the surgical procedure, although they may be associated with significant symptoms, such as debilitating pain or infection. When encountered in the thorax, gossypibomas are often encountered in the pleural space or mediastinum. The chest radiographic appearance of gossypiboma depends on the nature of the foreign body. Surgical sponges often have a characteristic shape which allows recognition. However, surgical towels, as in this case, may have a non-specific radiographic appearance. Thoracic CT may show hyperattenuation, as in this case, although cotton-containing foreign bodies may show air density internally, usually very regular appearing, but often closely resembling abscess. A “whirl-like,” spongiform appearance is often encountered, and a lamellar hyperattenuating pattern is a clue to the nature of the abnormality. Gossypibomas may have variable appearances on imaging studies depending on the chronicity of the process, owing to the possible resorption of gas trapped within the foreign body, and the reaction they elicit in the patient. Furthermore, not all surgical textiles contain radio-opaque markers, which may make recognition on imaging difficult).

The lesion was surgically resected and proved to represent a surgical towel within the left pleural space.

Diagnosis: Gossypiboma- retained surgical towel in the left pleural space

References

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