December 2011 Case of the Month

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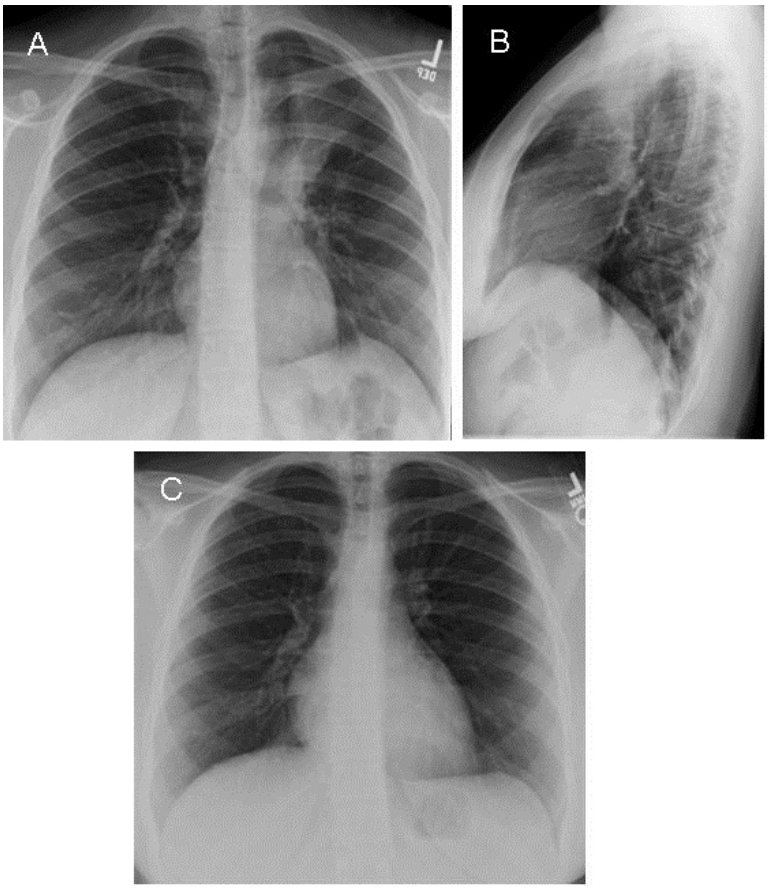
Clinical History: A 19-year-old woman presents with complaints of cough, with a history of recurrent left pneumonias and abnormalities noted in the left lung on outside facility prior imaging. A frontal and lateral chest radiographic examination (Figures 1A and B) was performed. A chest radiograph (Figure 1C) obtained over one year previously is shown for comparison.

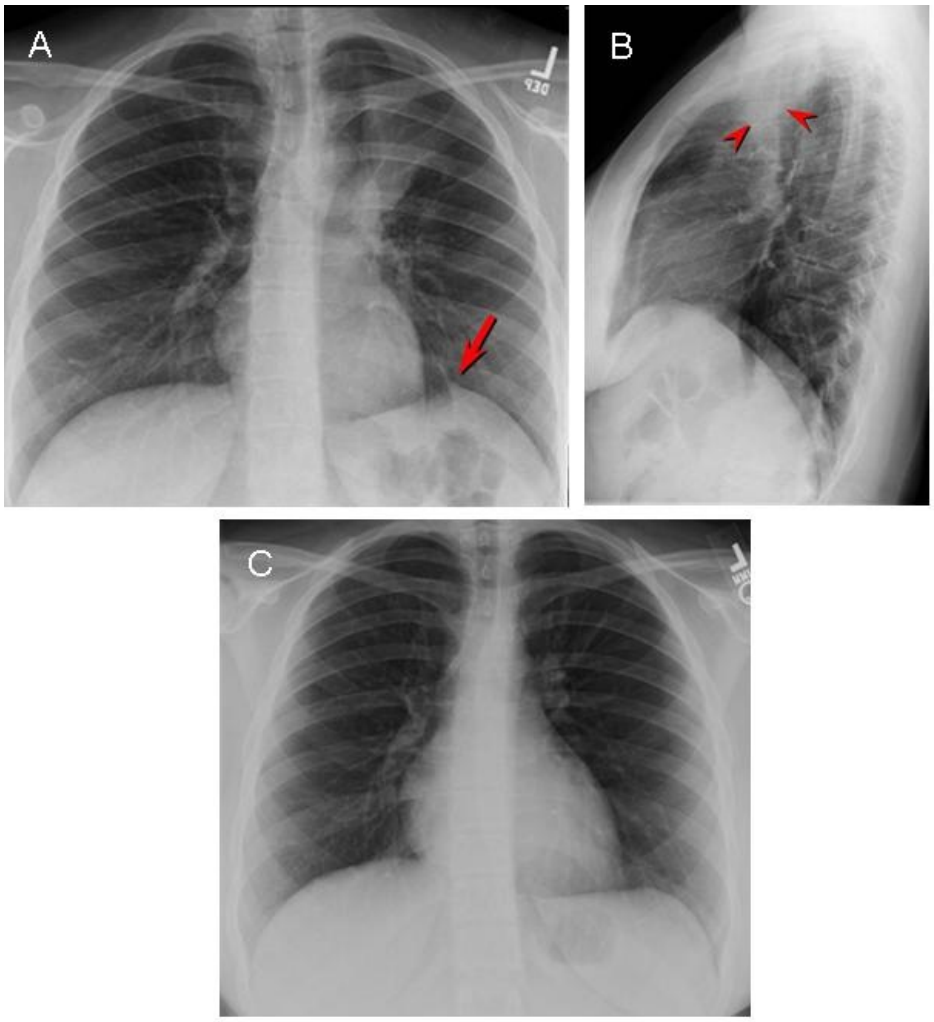


What is the main finding on the current chest radiograph (Figures 1A and B)? How would you describe the finding?

1. A left upper lobe mass is present
2. A wide mediastinum is present
3. Partial collapse of the left upper lobe is present
4. An extrapulmonary lesion is projected over the left upper thorax
5. A left pleural effusion is present

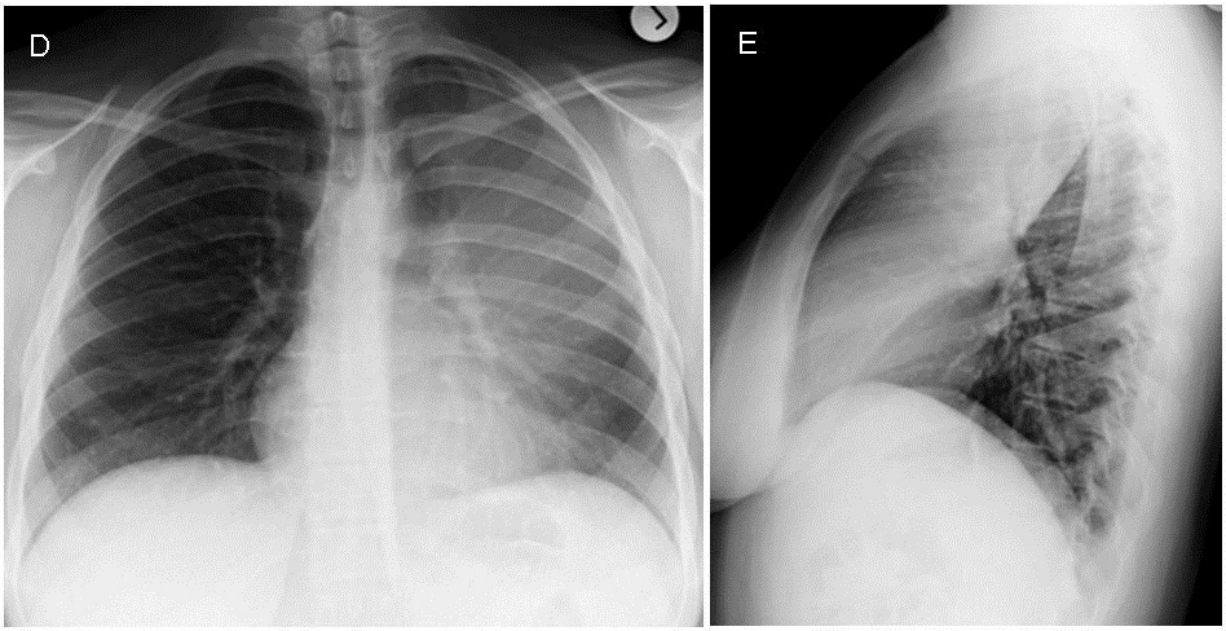
Correct!

3. Partial collapse of the left upper lobe is present



Figures 1A and B: Frontal and lateral chest radiography shows hazy opacity projected over the left upper thorax on the frontal examination (A), residing anteriorly within the lung on the lateral projection (arrowheads, B). Slight left lung volume loss is present, with a juxtaphrenic peak (arrow, A) present at the mid-portion of the left diaphragm (the "*juxtaphrenic peak*" sign represents a triangular-shaped opacity projecting superiorly at the medial half of the diaphragm, usually due to the presence of an inferior accessory fissure). The left hilum and prevascular region appears prominent and somewhat dense. The findings suggest partial collapse of the left upper lobe. Figure 1C: Frontal chest radiography obtained over 1 year before Figures A1 and B appears normal. In particular, note that the left hilar and prevascular area shows normal density; compare with Figure 1A.

Follow up frontal and lateral chest radiography (Figures 1D and E) was performed 6 months after the first set of images (Figures 1A and B) when the patient developed hemoptysis.

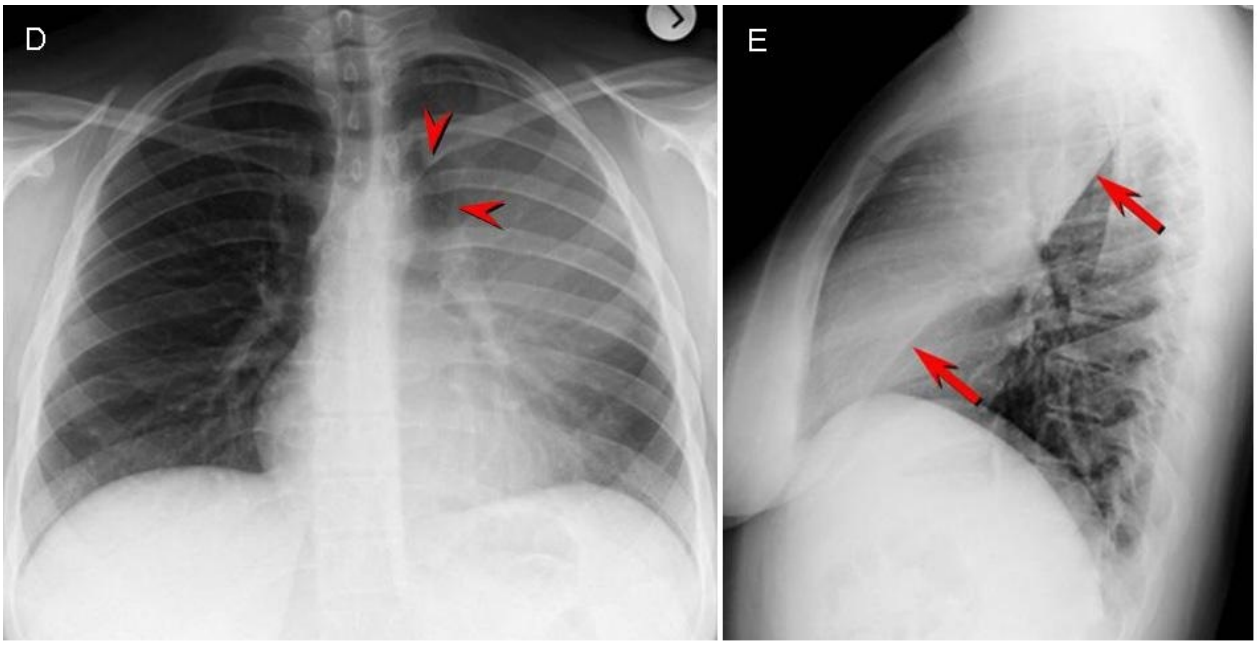


The lucency seen along the periphery of the aortic arch is known as:

1. The “incomplete border” sign
2. The “air-crescent” sign
3. The “reversed ground-glass halo” sign
4. The “Luftsichel” sign
5. The “dense hilum” sign

Correct!

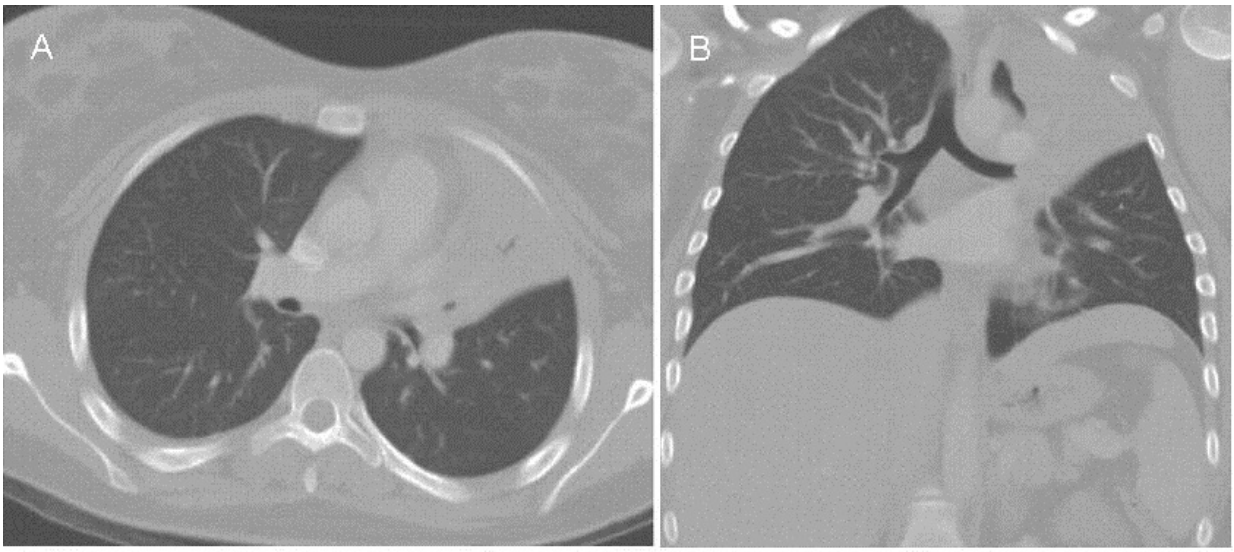
4. The “Luftsichel” sign



Figures 1D and E: Frontal and lateral chest radiography shows progression of the hazy opacity projected over the left upper thorax, now with a rim of lucency projected over the aortic arch (arrowheads, D). The lateral study (E) shows increased attenuation anteriorly, marginated posteriorly by the left major fissure (arrows, E). While there is little evidence of shift or other features of volume loss, the appearance is typical of left upper lobe collapse.

The “Luftsichel” sign represents extension of the aerated superior segment of the left lower lobe extending superiorly, between the aortic arch and collapsed left upper lobe. This results in aerated lung contacting the aortic arch posteriorly, rendering the contour of the latter visible).

The patient also underwent thoracic CT (Figures 2A and 2B).



What is the main finding on the thoracic CT? Among the following choices, which is the **most useful** next step for the management of this patient's hemoptysis?

1. Surgical resection of the left lung
2. Bronchoscopy
3. 18FDG-PET-CT scanning
4. Bronchial artery arteriography and embolization
5. Transthoracic percutaneous CT-guided biopsy of the prevascular lymphadenopathy

Correct!

2. Bronchoscopy

The patient underwent bronchoscopy and a lesion was found occluding the orifice of the left upper lobe bronchus (Figure 3).

Figure 3: Bronchoscopic image showing a lesion occluding the left upper lobe bronchus.

This lesion was biopsied and a diagnosis was established. The patient subsequently underwent surgical resection of the left upper lobe. She recovered uneventfully.

Diagnosis: Left upper lobe collapse resulting from mucoepidermoid carcinoma

Differential Diagnosis: The differential diagnosis of an endobronchial lesion is large, and includes mucous, primary and secondary malignant neoplasms, benign tumors, aspirated foreign bodies, post-inflammatory, infectious, or traumatic strictures, and inflammatory polyps. Proliferative lesions, such as amyloidosis, are a rare cause of endobronchial lesions. Among adult patients, primary malignancies, including bronchogenic carcinoma (particularly squamous cell malignancies) and carcinoid tumors are the most common etiologies for endobronchial obstruction. Less common primary airway malignancies include lymphoma and tumors of salivary origin, such as adenoid cystic carcinoma and mucoepidermoid carcinoma. Numerous benign tumors may present as endobronchial lesions, including papillomas, lipomas, hamartoma,

leiomyoma, neurogenic tumors, and granular cell or glomus tumors (both of which may be malignant also).

Among children, tumors are a far less common cause of endobronchial obstruction and aspirated foreign bodies are typically the cause of endobronchial obstruction in the pediatric age group.

Numerous causes of long-segment airway strictures, such as Wegener's granulomatosis, amyloidosis, and relapsing polychondritis, among other considerations, merit less consideration in this circumstance because such processes tend to be multifocal or diffuse, rather than focal and polypoid in morphology.

Given the patient's young age, bronchogenic carcinoma would be unlikely, and some benign airway tumors, inflammatory myofibroblastic tumor, mucoepidermoid carcinoma, and carcinoid tumor would be the leading considerations.

References

1. Ko JM, Jung JI, Park SH, Lee KY, Chung MH, Ahn MI, Kim KJ, Choi YW, Hahn ST. Benign tumors of the tracheobronchial tree: CT-pathologic correlation. AJR Am J Roentgenol 2006; 186:1304-1313.
2. Kim TS, Lee KS, Han J, Im JG, Seo JB, Kim JS, Kim HY, Han SW. Mucoepidermoid carcinoma of the tracheobronchial tree: radiographic and CT findings in 12 patients. Radiology 1999; 212:643-648.
3. Algın O, Gökalp G, Topal U. Signs in chest imaging. Diagn Interv Radiol 2011; 17:18-29.
4. Davis SE. Juxtaphrenic peak in upper and middle lobe volume loss: assessment with CT. Radiology 1996; 198:143-149.