

## November Case of the Month

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### **Clinical History**

A 47-year-old woman presents with complaints of hemoptysis. The hemoptysis was witnessed and was massive, resulting in anemia. A frontal and lateral chest radiograph (Figures 1A and B) was performed.

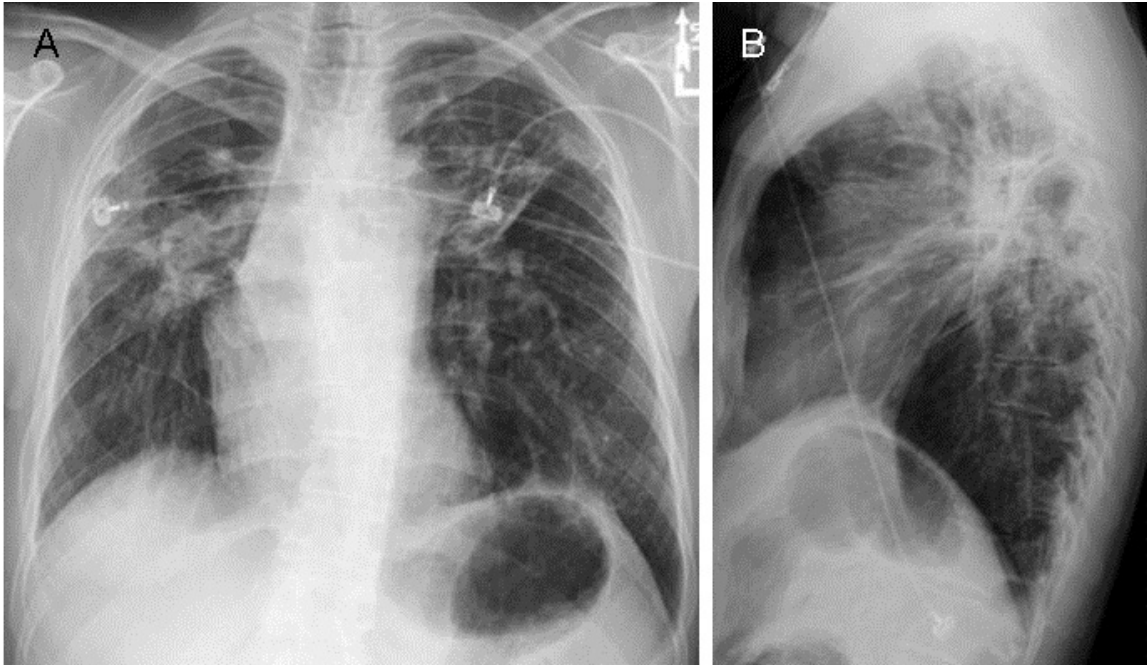


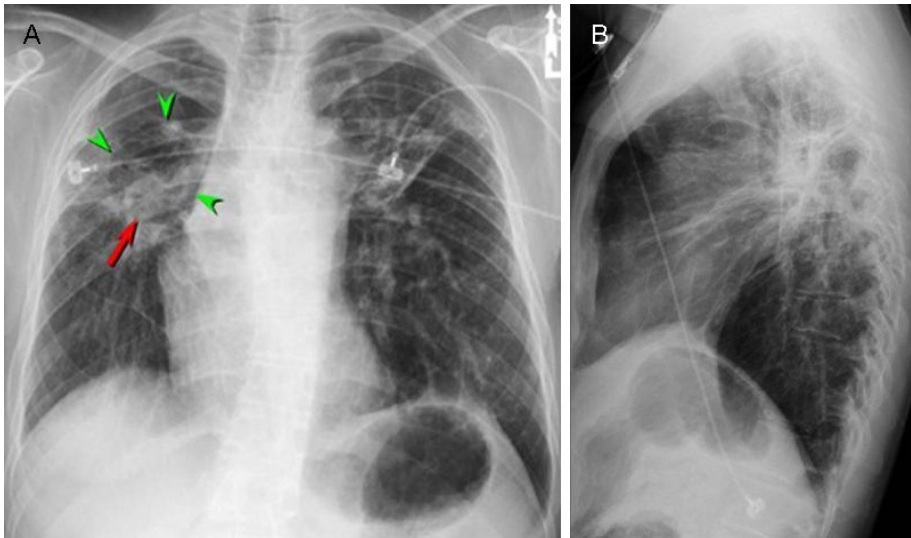
Figure 1: Frontal and lateral chest radiograph

What is the main finding on the chest radiograph? How would you describe the finding?

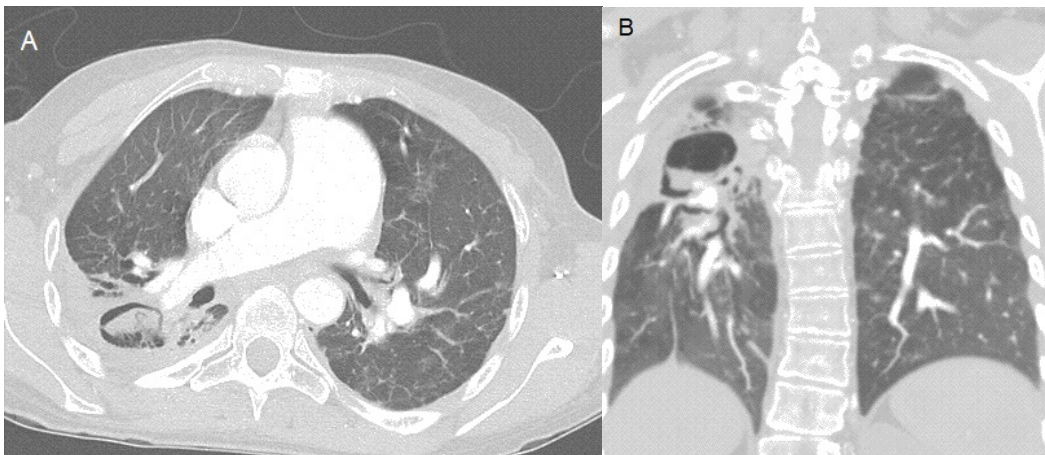
1. A solitary pulmonary nodule
2. An anterior mediastinal mass
3. Basal predominant linear and reticular abnormalities suggesting fibrotic lung disease
4. An intracavitary mass superimposed on a background of interstitial abnormality
5. Bilateral pleural effusions and thickening

4. An intracavitary mass superimposed on a background of interstitial abnormality

Frontal and lateral chest radiograph shows a mid- and upper lung predominant linear and reticular abnormalities with architectural distortion. A nodule (arrow) is seen projected over the right upper lung, and appears to reside within a thin-walled cavity (arrowheads).



Clinical Course: The patient underwent thoracic CT (Figures 2A and 2B).



Figures 2A and B: Axial (A) and coronal (B) thoracic CT.

What is the main finding on the thoracic CT?

1. Upper lobe predominant bullae
2. Traction bronchiectasis
3. Calcified hilar and mediastinal lymph nodes are present
4. A cavity containing a nodular opacity
5. All of the above

## 5. All of the above

Figures 2A and B: Axial (A) and coronal (B) thoracic CT shows upper lobe predominant bullae and traction bronchiectasis with linear interstitial-appearing opacities associated with architectural distortion; calcified hilar and mediastinal lymph nodes are present. A cavity containing a nodular opacity is present within the superior segment of the right lower lobe, accounting for the appearance on the chest radiograph. The upper lobe predominance of the fibrotic abnormalities is shown to advantage on the coronal images (2B).

Among the following choices, which is NOT a potentially appropriate next step for management of this patient's hemoptysis?

1. Surgical resection of the cavitory lesion
2. Bronchial artery arteriography and embolization
3. Percutaneous instillation of antifungal medication into the cavity
4. Bronchoscopy
5. Transthoracic percutaneous CT-guided biopsy of the intracavitary lesion

## 5. Transthoracic percutaneous CT-guided biopsy of the intracavitary lesion

The patient underwent surgical resection of the right lower lobe superior segment cavity and intracavitary mass, which required right pneumonectomy. The patient did well, with resolution of the hemoptysis. Several years later, the patient returned with hemoptysis, and the background lung disease appeared to have worsened. A follow up thoracic CT was performed (Figure 3).

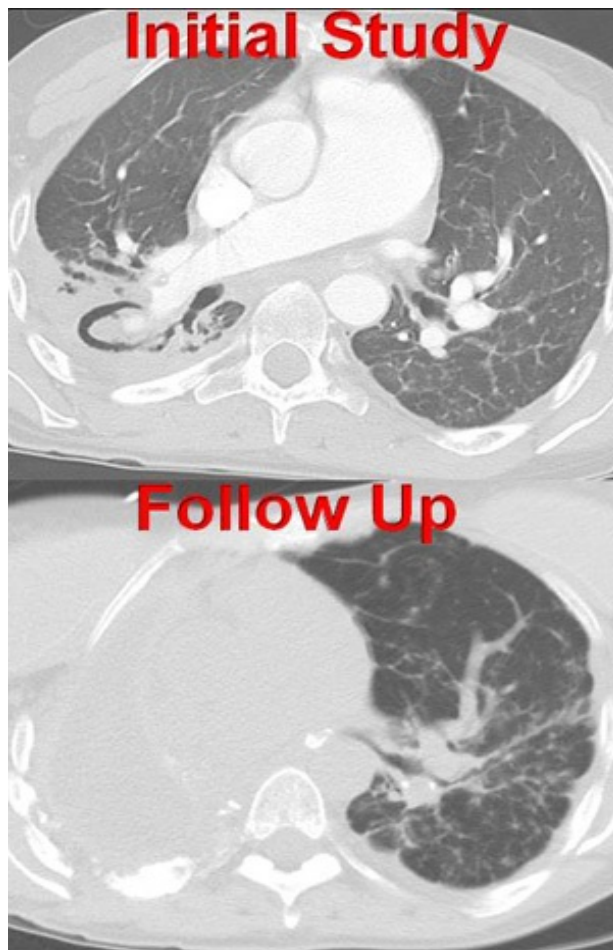


Figure 3. Axial thoracic CT at presentation (top image, part of the study shown in 2A) and later following right pneumonectomy when hemoptysis recurred (bottom image).

What is the most likely etiology of the background fibrotic lung disease?

1. Emphysema with pulmonary fibrosis
2. Sarcoidosis
3. Tuberculosis
4. Neurofibromatosis
5. Langerhans cell histiocytosis

## 2. Sarcoidosis

Note the increase in nodular interstitial thickening in the left lung in the bottom image in Figure 3. These nodules are primarily distributed along the bronchovascular bundles and fissures, and are upper lobe predominant, and are associated with fibrosis- these findings are typical of sarcoidosis.

Diagnosis: Aspergilloma (mycetoma) occurring in a patient with fibrotic lung disease due to sarcoidosis

Differential Diagnosis: The differential diagnosis of a nodule or mass within a cavity, often referred to as the “crescent” sign on imaging, is fairly limited. Thoracic mycoses, particularly *Aspergillus*, often presents in such a fashion. *Aspergillus* manifesting as a nodule or mass within a cavity may occur in three main forms: as an *aspergilloma* (*mycetoma*, *fungus ball*), which represents *Aspergillus* colonization of a pre-existing cavity; *angio-invasive aspergillosis*, which represents fungal tissue invasion resulting in pulmonary infarction, typically occurring in profoundly immunosuppressed patients, often without pre-existing lung disease; and *chronic necrotizing aspergillosis* (aka *semi-invasive aspergillosis*), which occurs as a result of fungal tissue invasion with resulting pulmonary infarction, but over a longer time course and in somewhat less immunosuppressed patients than those affected by angio-invasive aspergillosis. Other fungal organisms, particularly invasive fungi, such as those in the class Zygomycetes, may produce tissue invasion resulting in the radiographic appearance of the “crescent” sign. Coccidioidomycosis may rarely manifest in this fashion as well. Necrotic pulmonary carcinomas may present on chest radiography as a “crescent” sign. A blood clot within a pre-existing cavity may present on thoracic imaging studies with the “crescent” sign appearance also, as may a hydatid cyst or pulmonary abscess, particularly when gangrene is present. Carcinoma complicating papillomatosis can manifest in this manner as well. More recently, a nodule-in-cyst appearance has been recognized on thoracic CT in patients with pulmonary amyloidosis and benign metastasizing leiomyomas.

### References

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2. Dutkiewicz R and Hage CA. *Aspergillus* infections in the critically ill patient *Proc Am Thorac Soc* 2010; 7:204-209.
3. Segal BH. Aspergillosis. *N Engl J Med* 2009; 160:180-1884.