

## Severe Hemoptysis in a Young Man

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### Clinical Image

A 34 year old man comes to the respiratory outpatient department with complaints of large amounts of blood in the sputum since one day. He is a non-smoker and works as a clerk in an accounting office. There is no history of chest pain or breathlessness. He gives history of pulmonary tuberculosis 10 years ago for which he was given a 6 month course of anti-tuberculosis treatment to which he responded well. On examination, the patient's vital parameters are normal. The trachea appears shifted to the right side. There is a hyper resonant note on percussion in the right supraclavicular and right infraclavicular regions anteriorly and bronchial breath sounds with increased vocal resonance are heard in the same area. The left lung examination is normal. A chest radiograph is urgently undertaken (Figure 1).



Figure 1: A chest radiograph.

### Interpret the chest radiograph

The chest radiograph shows a tracheal shift to the right side. There is a large, thick-walled cavity measuring 6 cm x 5 cm in the right upper zone with a somewhat rounded opacity within it. In addition, multiple

areas of small cavitation are also seen in the right and left upper and mid-zones of the lungs. A few calcific spots are seen in the right and left mid-zones of the lungs. There is also pleural thickening on the right side as evidenced by obliteration of the right cost phrenic angle and on the left side at the apical region.

### In view of the history and chest radiographic findings, what is the most likely clinical diagnosis?

Aspergilloma within a chronic tuberculous cavity with bilateral bronchiectatic lesions (To rule out active pulmonary tuberculosis)

### How would you further investigate this patient?

- Sputum examination for: Acid-fast bacilli (AFB), fungal culture, bacterial culture and sensitivity and cytology
- Full blood count, erythrocyte sedimentation rate (ESR)
- High-resolution computed tomographic (HRCT) chest scan
- Fiberoptic bronchoscopy with bronchoalveolar lavage (BAL)

### What is the pathophysiology of this condition?

Aspergillomas typically occur in chronic cavities. Twenty-five percent of affected patients have had previous tuberculosis.

Normal clearance mechanisms are impaired within tuberculous cavities which facilitates germination of the fungal conidia leading to an aspergilloma.

The hyphae of *Aspergillus fumigatus* are characteristic, with frequently branching septae. They gradually advance by secreting toxins and trypsin-like proteolytic enzymes and penetrate the walls of the tuberculous cavity.

This leads to angioinvasion that produces the characteristic clinical feature of recurrent massive haemoptysis, which occurs in 45%-50% of patients with aspergillomas. The fungal ball consists of living and dead fungal elements, inflammatory cells, epithelial cell debris and fibrin.

### How would you manage this condition?

- Prompt hospital admission and treatment are vitally important. Patients may require resuscitation and airway management. Endotracheal intubation using a double-lumen tube (Broncho-Cath) is important in order to prevent aspiration of secretions into the normal contra-lateral lung, while simultaneously maintaining ventilation of the normal lung.
- Fiberoptic/rigid bronchoscopy through the endotracheal tube is essential. Laser therapy, cauterisation or intrabronchial infusion of epinephrine, tranexamic acid and iced-saline lavage may be required to control the bleeding. To reduce the risk of rebleeding,

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the patient may also be administered desmopressin and tranexamic acid systemically.

- Supportive management includes blood transfusion and fluid replacement. In severe cases, infusion of fresh frozen plasma and factor-specific transfusions or platelet transfusions may also be required.
- Definitive treatment options include oral itraconazole (effective in approximately 60% of patients). Treatment may need to be longer

than 6 months. Intracavitary instillation of amphotericin B using bronchoscopy or CT-guided percutaneously placed catheters has been reported as a safe and successful form of treatment.

- For massive haemoptysis ( $\geq 240$  ml per day): Emergency bronchial artery embolization may first be attempted. However, emergency lobectomy may be required in case of unrelenting bleeding, where there is a real danger of exsanguination.