



Rumi Khajotia

Nalini Somaweera

Recurrent haemoptysis

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Case study

A man, 56 years of age, presents to his general practitioner after coughing up half a cupful of fresh, bright red blood every day for 1 week. He has no other medical complaints. He reports previous pulmonary tuberculosis 12 years ago treated with 6 months of standard therapy. Routine follow up was discontinued after 5 years after no evidence of reactivation. He is a nonsmoker, does office clerical duties and is not known to have diabetes or hypertension.

On examination, he is pale with a pulse rate of 126 beats per minute. His blood pressure is 90/62 mmHg and his respiratory rate 24 breaths per minute. His chest moves symmetrically and the percussion note is resonant bilaterally. Auscultation reveals normal vesicular breath sounds bilaterally except for the presence of a few rales at the right infraclavicular region anteriorly. An urgent chest radiograph is taken (*Figure 1*) and the patient is immediately hospitalised.

Question 1

What do you see on the chest radiograph?

Question 2

What other investigations would you perform in this patient?

Question 3

What would your initial differential diagnoses be?

Question 4

What is the final diagnosis?

Question 5

What is the pathophysiology of this condition?



Figure 1. Chest radiograph showing scarring in the right upper zone with areas of cavitation

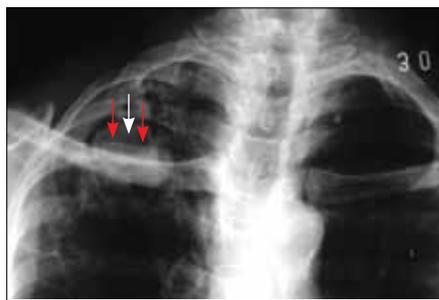


Figure 2. Chest radiograph showing fairly large cavity with a rounded nodular opacity (red arrows)

Question 6

What is the management of this condition?

Answer 1

The chest radiograph shows scarring in the right upper zone with areas of cavitation (*Figure 1*). There is one fairly large cavity measuring 3.5x3 cm, within which is a rounded nodular opacity (*Figure 2* – marked by red arrows).

There is an area with the appearance of ground glass that is surrounding the nodular opacity (Figure 2 – marked by a white arrow), which gives it a characteristic 'halo appearance'.

Answer 2

Investigation would occur in parallel with resuscitation and immediate management. Sputum examination for acid fast bacilli smear and culture for cytology and fungal culture would be performed as well as full blood examination looking particularly for anaemia and at eosinophil counts. Test also for human immunodeficiency virus serology and aspergillus precipitin antibody (IgG, IgE, IgA levels). A computed tomography (CT) scan of the chest would provide more detail and fiberoptic bronchoscopy and bronchoalveolar lavage of the right upper lobe may provide a definitive diagnosis.

Answer 3

Differential diagnoses include active pulmonary tuberculosis (reinfection or reactivation), malignant change in scar tissue (adenocarcinoma), lung abscess, bronchiectasis, aspergilloma in a chronic tuberculous cavity, pneumonia (bacterial or fungal) with cavitation, Wegener granulomatosis and sarcoidosis.

Answer 4

The recurrent haemoptysis and radiographic features (cavity with a nodular opacity surrounded by a halo appearance) are typical of an aspergilloma in a chronic tuberculous cavity.

Answer 5

Aspergillomas typically occur in chronic cavities. Twenty-five percent of affected patients have had previous tuberculosis¹ as normal clearance mechanisms are impaired within tuberculous cavities. This facilitates germination of the fungal conidia leading to an aspergilloma. The hyphae of *aspergillus fumigatus*² 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 haemoptysis that occurs in over 50% of cases.^{1,3} The fungal ball

consists of living and dead fungal elements, inflammatory cells, epithelial cell debris and fibrin.⁴

Answer 6

Prompt referral and treatment is important and patients may require resuscitation and airway management. Definitive treatment options include oral itraconazole (effective in approximately 60% of patients⁵) although treatment may need to be longer than 6 months.⁶ Intracavitary instillation of amphotericin B using bronchoscopy or CT guided percutaneously placed catheters, has been reported as a safe and successful treatment.^{7–9} For massive haemoptysis (>300 mL per day) emergency bronchial artery embolisation¹⁰ or emergency lobectomy may be required. This is technically difficult because of the combination of fibrotic and vascular tissue.^{11,12}

Authors

Rumi Khajotia MBBS, MD, DM, FAMA, FAMS, is Associate Professor, Department of Internal Medicine, International Medical University Clinical School, and consultant pulmonologist, Department of Internal Medicine, Hospital Tuanku Ja'afar, Seremban, Negeri Sembilan, Malaysia. xeruker@yahoo.com

Nalini Somaweera MBBS, MD, is Senior Lecturer, Department of Radiology, International Medical University Clinical School, Seremban, Negeri Sembilan, Malaysia.

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correspondence afp@racgp.org.au