CASE REPORT

Pulmonary aspergillosis presenting with recurrent haemoptysis

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SUMMARY

Pulmonary aspergillosis presents with a variety of clinical forms including invasive pulmonary aspergillosis, chronic necrotising aspergillosis, aspergilloma, chronic cavitary pulmonary aspergillosis and allergic bronchopulmonary aspergillosis. Haemoptysis is a devastating complication of pulmonary aspergillosis and a common indication for surgery. We report a case of a 54-year-old man with a history of pulmonary tuberculosis and diabetes mellitus, who presented with productive cough and haemoptysis for 2 months. Chest CT revealed a 30 mm diameter soft tissue mass in the upper lobe of the right lung. Haemoptysis subsided with conservative measures, but 2 weeks later the patient developed a new episode of persistent haemoptysis, which was only partially controlled with bronchial arterial embolisation. He underwent right upper and middle lobectomy. Histology examination confirmed the presence of a fungal cavitary lesion. The patient was started on voriconazole, and recovered with no recurrence at 18 months follow-up.

BACKGROUND

Pulmonary aspergillosis refers to the clinical spectrum of lung diseases caused by several species of the genus *Aspergillus*. These fungal infections have recently shown increased incidence and are associated with significant morbidity and mortality.¹ In spite of the known clinical impact and improvement in diagnostics, aspergillosis remains a diagnostic challenge in clinical practice. In this report, we present a case of pulmonary aspergillosis complicated by haemoptysis in a patient with history of pulmonary tuberculosis (TB).

CASE PRESENTATION

A 54-year-old man presented with productive cough and haemoptysis for 2 months. He denied fever, chills, night sweats, shortness of breath, chest pain and any other symptom. He had a history of pulmonary TB at age 50 and diabetes mellitus. He was an ex-smoker who quit 30 years prior, in his mid-20s and denied alcohol and illicit drug use. On physical examination, vital signs were within normal values and chest examination revealed scattered right upper lung field crackles. The rest of the physical examination was unremarkable.

INVESTIGATIONS

Laboratory results showed blood glucose (random) 242 mg/dL, but were otherwise normal. Acid-fast bacillus (AFB) smear and culture were negative on three sputum samples. HIV test was also negative.

Figure 1 Chest CT showing a right upper lobe mass of approximately 30 mm diameter surrounded by an infiltrate.

CT of the chest revealed a 30 mm diameter soft tissue mass in the upper lobe of the right lung surrounded by extensive infiltrates (figure 1). Video bronchoscopy showed no abnormalities in the tracheobronchial tree, and further tests of the bronchoalveolar lavage were negative, including AFB smear and culture, Grocott's methenamine silver stain (GMS) and cytology for malignant cells. Bronchial tissue biopsy showed only inflammatory signs.

OUTCOME AND FOLLOW-UP

During the 7-day hospital stay the patient improved clinically, and maintained stable vital signs and normal haemoglobin/haematocrit. He was discharged to the pulmonary clinic for close follow-up and further work up.

Two weeks after discharge, the patient presented with persistent haemoptysis and bronchial arterial embolisation was performed. However, the bleeding was only partially controlled with embolisation. Since initial presentation, the patient's haemoglobin had dropped over 3 g/dL. The decision was taken to proceed with surgical intervention for recurrent haemoptysis. Pulmonary function tests (PFTs) were not performed given the emergency situation. A preoperative flexible bronchoscopy revealed bleeding from the right middle lobe but showed no endobronchial lesions. The patient underwent right upper and middle lobectomy. Estimated intraoperative blood loss was approximately 200 mL. The patient received 3 units of packed red blood cells. After the procedure, he was transferred to the surgical intensive care unit with stable haemodynamic

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Figure 2 Histopathological examination (400×) showing fungal hyphae on Grocott-Gomori methenamine silver (GMS) stain.

and respiratory status. His postoperative course was complicated by fever, which resolved with empiric broad-spectrum antibiotics. He was also started on voriconazole immediately after surgery and was discharged on the 22nd postoperative day.

Histological examination confirmed the presence of a cavitary pulmonary lesion containing a fungus ball comprised of a mass of fungal hyphae morphologically consistent with *Aspergillus* spp. on GMS and periodic acid-Schiff (PAS) stains (figure 2). This was further confirmed with fungus culture. No evidence of tissue invasion was seen and AFB smear was negative.

The patient was followed up weekly for 2 months, then every 2 months, to complete 6 months, and finally returned to regular visits. Voriconazole was discontinued after 2 months of treatment. He recovered without recurrence at 18 months follow-up. PFTs at this time showed a moderate ventilatory limitation on a mixed obstructive and restrictive basis: forced expiratory volume in 1 s (FEV₁) 1.46 L (43%), forced vital capacity (FVC) 2.52 L (57%), FEV₁/FVC 58% and total lung capacity (TLC) 3.42 L (57%). Diffusing capacity (DLco) was also reduced (12.3 mL/mm Hg/min; 44% of predicted) with a corrected DLco for alveolar volume (DLco/VA) of 38%. No significant changes were observed post-bronchodilator.

DISCUSSION

This case highlights the challenge of establishing a diagnosis of pulmonary aspergillosis. On admission, the main differential diagnoses were TB, aspergillosis and malignancy. The fact that the patient had a history of TB made the diagnosis more challenging because both disorders, TB and aspergillosis, have very similar presentations and can even coexist. Chest CT did not show the classic sign of a cavity colonised by *Aspergillus*, nor did the bronchoscopy contribute to a positive diagnosis. The final diagnosis and confirmation of the clinical form was only possible after appropriate histological samples were obtained through an invasive surgical procedure. This case illustrates that the diagnosis of aspergillosis must be suspected early on and prompt treatment initiated to prevent further complications.

Pulmonary aspergillosis presents with a variety of clinical forms including invasive pulmonary aspergillosis, chronic necrotising aspergillosis (subacute invasive pulmonary aspergillosis), aspergilloma, chronic cavitary pulmonary aspergillosis (CCPA) and allergic bronchopulmonary aspergillosis.² Differential diagnosis among these forms is sometimes difficult due to overlapping presentations. The case presented here was an aspergilloma, and met the definition of simple aspergilloma instead of CCPA as defined elsewhere,³ since the patient had

only one pulmonary cavity, few symptoms and no radiological demonstration of progression.

The clinical forms of pulmonary aspergillosis are largely determined by two factors, the presence of underlying lung disease and the immune status. Aspergilloma usually presents in non-immunocompromised patients with a history of pulmonary TB or other pre-existing cavitary lung disease.¹ Pulmonary TB accounts for a significant number of patients with aspergillosis with an estimated 1.2 million cases of chronic pulmonary aspergillosis following TB.⁴

Haemoptysis is one of the most devastating complications of pulmonary aspergillosis and is reported in 64%–83% of cases with aspergilloma.⁵ Bronchial artery embolisation has been used to control significant bleeding but the results are often limited. The recommendation is to use it as a temporary measure to stabilise a patient with severe bleeding who might be a candidate for a definitive therapy such as a surgical procedure.² Surgical resection, on the other hand, provides definitive treatment for aspergilloma but is a difficult procedure, associated with several complications, including haemorrhage, bronchopleural fistulae, empyema, prolonged air leak, respiratory failure requiring tracheostomy/reintubation and acute respiratory distress syndrome.^{2–6} It can also compromise the pulmonary function in poor surgical candidates. Controversy remains regarding surgery indications. In a recent report of 30 patients (40% with simple aspergillosis and 60% with chronic cavitary pulmonary aspergillosis), Farid *et al*⁶ recommended that surgery should be reserved for patients with unilateral localised disease, failure of medical treatment and to treat complications such as haemoptysis. Antifungal therapy is not excluded by surgical intervention in most cases since it can serve as an adjuvant treatment to prevent both *Aspergillus* empyema and recurrence of aspergillosis post-surgery.⁶ In our case, the attempt to control bleeding with artery embolisation yielded only partial results. Definitive treatment was successfully achieved only by surgical intervention.

Learning points

- ▶ Pulmonary aspergillosis should be suspected in all patients with a history of tuberculosis and a new lung mass.
- ▶ Haemoptysis is the most common symptom of pulmonary aspergillosis and a potentially life-threatening complication requiring emergent intervention.
- ▶ Artery embolisation is used in an attempt to stabilise a patient with severe bleeding but often is ineffective or serves only as a temporal therapy, bridging to a more definite procedure such as surgery.

Competing interests None declared.

Patient consent Obtained.

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