



## Case report

## A unique case report of endobronchial cryptococcosis and review of the literature

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## ABSTRACT

Cryptococcosis is an infection caused by the yeast-like fungus *Cryptococcus neoformans*. Pulmonary cryptococcosis is typically identified as a single mass or as multiple nodules, while endobronchial lesions are quite rare. Here we report an uncommon case of pulmonary cryptococcosis presenting as endobronchial lesion in an immunocompetent patient. A 49-year-old male patient complained of intermittent cough with hemoptysis for two years. Computerized tomography of the chest showed a filling defect in the basal segment of the right lower lobe bronchus. A flexible bronchoscopic examination revealed a white smooth-surfaced polypoid lesion completely occluding the medial basal segment of the right lower lobe bronchus. The diagnosis was confirmed by bronchial biopsy under bronchoscopy, and the histopathologic findings showed the organisms were *Cryptococcal neoformans*. The patient was treated with fluconazole at a dose of 400 mg daily. The endobronchial lesion was found rapidly diminished after 18 days of therapy, and disappeared after 6.5 months of therapy by repeated fiberoptic bronchoscopy. Then the patient continued fluconazole for another 2.5 months. During the total 16 months' follow-up visits, the patient repeated CT scanning for five times, the results of which were all normal. The patient's symptoms disappeared as well, and now he is still under follow-up. This case highlights the fact that pulmonary cryptococcosis can present as endobronchial lesions even in immunocompetent subjects, mimicking lung tumor. Pathological confirmation is important to establish the definite diagnosis.

## 1. Introduction

Cryptococcosis is an infection caused by the yeast-like fungus *Cryptococcus neoformans*. The infection is thought to be acquired by inhalation of spores into the airway, and is mostly common in immunocompromised patients. The clinical manifestations of cryptococcosis are protean, and the radiological findings are also nonspecific, so the diagnosis is often a challenge. Pulmonary cryptococcosis is typically identified as a single mass or as multiple nodules infiltrates, while endobronchial lesions are quite rare. There are only a few case reports of pulmonary cryptococcosis presenting as endobronchial lesions. Here, we report such a rare case, and a systematic literature review was performed for similar published cases of endobronchial cryptococcal infection in immunocompetent and immunocompromised patients.

## 2. Case report

A 49-year-old Chinese man complained of intermittent cough with hemoptysis for two years, sometimes with a slight fever. He denied having any chest pain, dyspnea, night sweats, weakness, headache, or weight loss. The patient had been intermittently treated by his local physician with antibiotics, but his symptoms persisted, and also developed gradually productive cough with green or black sputum. There was no history of allergies, smoking or using illicit drugs. He took no medications and did not own any pets. A chest CT scan showed a lesion in the basal segment of the right lower lobe bronchus, which was initially considered as secretion or space occupying lesion by radiologist (Fig. 1). So he was admitted to our hospital for further evaluation.

On physical examination, he appeared anxious. His temperature was 36.6 °C and pulse rate was 103 bpm. Systemic examination was normal.

Abbreviations: H&E, Hematoxylin and Eosin; HIV, human immunodeficiency virus

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**Fig. 1.** Thoracic computed tomography showed a neoplasm in the basal segment bronchi of right lower lobe. A: Parenchymal window. B: Mediastinal window. C: Coronal section.

The blood assay showed white cell count  $4640/\text{mm}^3$  (3500–9500; neutrophils, 55.10%, lymphocytes, 32.80%), hemoglobin 14.5 g/dl (13.0–17.5) and platelet  $242,000/\text{mm}^3$  (125,000–350,000). Tests of renal function, liver function, blood sugar, coagulation function and tumor markers were all normal. Sputum smear for fungi or acid-fast bacillus was negative. Sputum and blood samples grew no pathogens. *Cryptococcus neoformans* capsular polysaccharide antigen was absent in the serum.

The patient underwent a fiberoptic bronchoscopic examination. It showed a white polypoid lesion completely occluding the medial basal segment of the right lower lobe bronchus. (Fig. 2A). Then biopsies of the endobronchial lesion under bronchoscopy were performed. Histological examination of the samples revealed dense accumulation of the histiocytes and yeast-form fungi that did not uptake the Hematoxylin and Eosin (H&E) staining. Notably, these organisms were positive for Periodic Acid-Schiff staining, that was consistent with cryptococcosis (Fig. 3). Fungal culture of the sample was not performed for this patient.

The patient was then evaluated for his immune status. Test for human immunodeficiency virus (HIV) was negative. Total lymphocyte count, CD4 and CD8 count, and immunoglobulin levels were normal. The patient had no evidence of disseminated cryptococcal infection and his neurological examination through MRI was normal. On the basis of these findings, the diagnosis of primary endobronchial cryptococcosis was established.

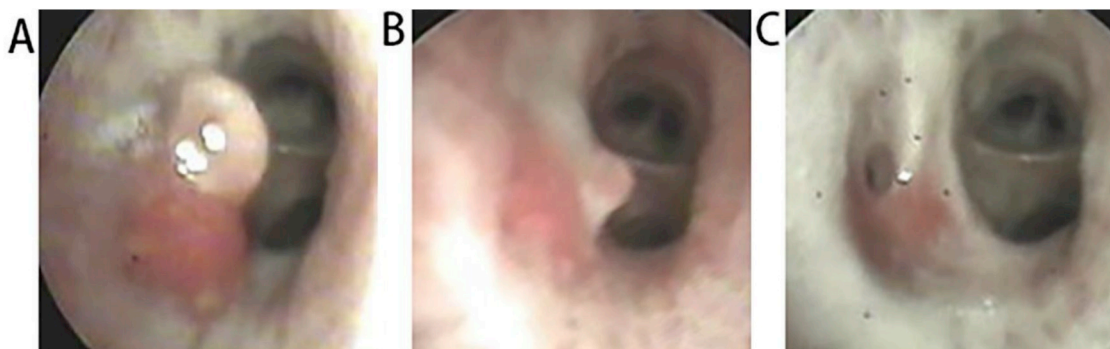
The patient was initiated on intravenous fluconazole at a dose of 400 mg per day. After 18 days, a repeated fiberoptic bronchoscopy demonstrated that the endobronchial lesion in the basal segment of right lower lobe bronchus had diminished significantly (Fig. 2B). Meanwhile, another biopsy was performed and the histological examination revealed chronic inflammation with necrosis of the superficial epithelium, but negative outcome of PAS staining. The patient was then discharged home on oral fluconazole 400 mg per day, continued fluconazole for another 6.5 months and underwent bronchoscopy examination once again. The endobronchial lesion was found disappeared completely remaining a narrow medial basal segment

bronchus (Fig. 2C). Afterwards, the patient was treated with fluconazole for another 2.5 months. So the duration of treatment for fluconazole was 9 months totally. During the 16 months' follow-up visits, the patient underwent repeated CT scanning for five times, respectively after 3, 6, 9, 12 and 14 months of therapy, and all the results were normal without any lesion in the previous lesion site (Fig. 4). The patient's symptoms disappeared as well. Now the patient is still under follow-up.

### 3. Discussion

Cryptococcosis is caused by *Cryptococcus neoformans*, a ubiquitous budding yeast-like basidiomycete that is endemic in many countries. Cryptococcosis is most often associated with human immunodeficiency virus (HIV) infection. Patients with other immunodeficiency states including organ transplantation, and the use of corticosteroid and other immunosuppressive therapies, are also at increased risk of infection. However, cryptococcosis is also well described in apparently healthy hosts. The clinical manifestations of cryptococcosis are protean. Cryptococcal meningoencephalitis is the most frequent and most severe form in both immunocompromised and immunocompetent patients. Pulmonary disease is the next most common presentation. Besides, skin/subcutaneous, ophthalmic, bone, and prostatic disease also occur [1].

Generally, pulmonary cryptococcosis is difficult to diagnose because the symptoms and radiological findings are nonspecific, and are variable depending on the immune status of the patient [2]. The most common radiologic manifestations of cryptococcal lung lesions include a single well-defined mass (often based in the pleura), multiple nodules or a well-defined consolidation [3,4]. Some unusual features such as cavitations, pleural effusion, and lymphadenopathy may be present in immunocompromised patients [3]. Development of an endobronchial lesion is a rare manifestation of pulmonary fungal infection. Review of the literature done by Karnak et al. [5] found that the majority of these cases were related to infections with *Aspergillus* species. Endobronchial infections with *Cryptococcus neoformans* were found to be less



**Fig. 2.** Bronchoscopic examination. A: Bronchoscopic examination revealed a white smooth-surfaced polypoid lesion completely occluding the medial basal segment of the right lower lobe bronchus. B: The endobronchial lesion diminished after 18 days of treatment with oral fluconazole. C: The endobronchial lesion disappeared after 6.5 months of treatment with oral fluconazole.

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