Case Report

Large Solitary Pulmonary Cryptococcoma Mimicking Lung Carcinoma in an Immunocompetent Patient

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Abstract

Cryptococcosis is a life-threatening mycosis typically seen in immunocompromised patients. Pulmonary cryptococcosis generally presents as multiple or solitary nodular opacities. Cryptococcal infection presenting as a destructing cavernoma (cryptococcoma) without diffuse infiltration of the lung is an extremely rare presentation, even in immunocompromised patients. This report presents a healthy, HIV negative, immunocompetent patient who presented with a large solitary lung mass provisionally diagnosed as a lung malignancy on radiological imaging that proved to be a large cryptococcoma after biopsy. The patient was treated with liposomal Amphotericin B and fluconazole, and the lesion showed regression on serial imaging. This case report thus highlights an unconventional presentation of pulmonary cryptococcosis in an immunocompetent individual.

Keywords: *cryptococcosis, immunocompetent, pulmonary, radiology*

Introduction

Cryptococcosis, also known as torulosis or European blastomycosis, is a pulmonary, meningitic, or systemic infection generally seen in immunocompromised patients, especially those with acquired immunodeficiency syndrome (AIDS). The estimated annual incidence of pulmonary cryptococcosis in non-AIDS patients over a 9-year period ranges from 0.5–7.5 per 10,000, with < 3 per 10,000 in 7 years (1). This case report highlights a varied spectrum of pulmonary cryptococcosis manifesting as a large cryptococcoma. With the increasing rise of cryptococcal infection even in HIV-negative patients, a differential diagnosis of cryptococcal infection should thus be considered for any patient presenting with a solitary mass in the lung, irrespective of his or her immune status; however, confirmation can be made only via histopathological examination.

Case Report

A 32-year-old male chronic smoker (16 cigarettes per day; 8 pack years) presented with long standing non-productive cough with streaky hemoptysis and low grade fever for the preceding 4 months, associated with significant weight loss (17 kg over a 4-month period) and loss of appetite. The patient received symptomatic management for the cough and fever before presenting to the clinic. Routine blood investigations showed elevated total leucocyte count to 14,000 per cubic millimeters (70% neutrophils, 25% lymphocytes, 5% monocytes) and an elevated ESR value (45 mm/hour). A routine sputum examination for acid fast bacilli (AFB) and a smear and culture for Mycobacterium tuberculosis was done in light of the patient's long-standing cough in an endemic area. However, the smear/culture was negative for AFB. The chest radiograph of the patient showed left parasternal opacity suggestive of

a lung mass, for which he was referred. On examination, the patient was thin and febrile (38.5 °C) with a heart rate of 94 beats/minute.

Computed tomography (CT) of the chest revealed a heterogeneously enhancing mass in the left upper lobe of dimensions 4.1 × 7.3 × 8.2 cm, infiltrating the mediastinum and encasing the left main pulmonary artery and upper lobe segmental bronchi, with loss of fat planes within the arch of the aorta (Figure 1). Enlarged, necrotic lymph nodes with peripheral enhancement and hypodense centers, ranging in size from 1–2.5 cm in the short axis, were noted in the para-aortic, prevascular, left supraclavicular, and left hilar spaces. Subsequently, a positron emission tomography CT (PET-CT) was performed, which confirmed the hypermetabolic nature of the mass lesion (max SUV 8.7). A large necrotic FDG avid left para-aortic nodes abutting the lesion was also identified (max SUV 9.3) (Figure 2).

Based on the clinical and imaging findings, a provisional diagnosis of lung carcinoma was made. However, a biopsy of the mass lesion highlighted cryptococcal organisms (Figure 3).

The patient was screened for HIV I and II, hepatitis, diabetes, chronic renal disease, hematological malignancies, hematological immunodeficiency syndromes, autoimmune

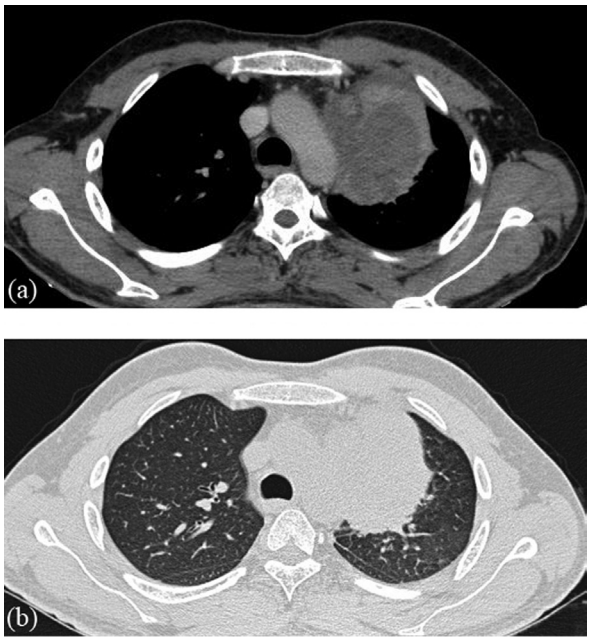

Figure 1. Axial CT scan; soft tissue (a) and lung window (b); demonstrates a heterogeneously enhancing mass in the left upper lobe of lung infiltrating the mediastinum with loss of fat planes with the arch of aorta

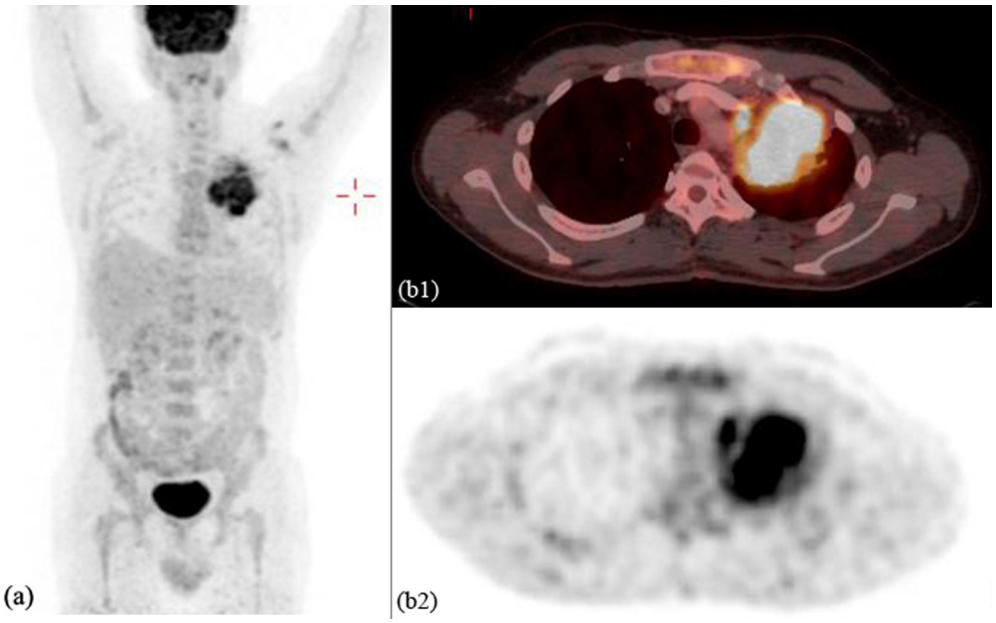

Figure 2. (a) Maximum intensity projection coronal image showing F-18 fluoro-deoxy-glucose (FDG) uptake by the left lung mass lesion (max SUV–8.7).
(b) The transaxial integrated CT/PET (b1) and maximum intensity projection (b2) image at the same level showing the hypermetabolic mass lesion and necrotic FDG avid left pre-vascular lymph node adjacent to it (max SUV–9.3)

disorders, diabetes mellitus, and collagen vascular disorders; however, to the authors' surprise, the patient tested negative for any such immunocompromised states. Moreover, the patient was not on corticosteroids or on any other immunosuppressive drugs. This was an extremely rare presentation of pulmonary cryptococcosis.

To treat the cryptococcosis, the patient was put on liposomal Amphotericin B (5 mg/kg/day for a 21-day period) and Fluconazole (500 mg/day) for a total treatment duration of 6 months.

Serial chest radiographs taken at the start of treatment (Figure 4a) and at 3 weeks (Figure 4b) post-Amphotericin B treatment revealed a reduction in the size of the lesion. At 6 months post full completion of treatment, the serial chest radiograph (Figure 5) showed a significant decrease in the size of the lesion.

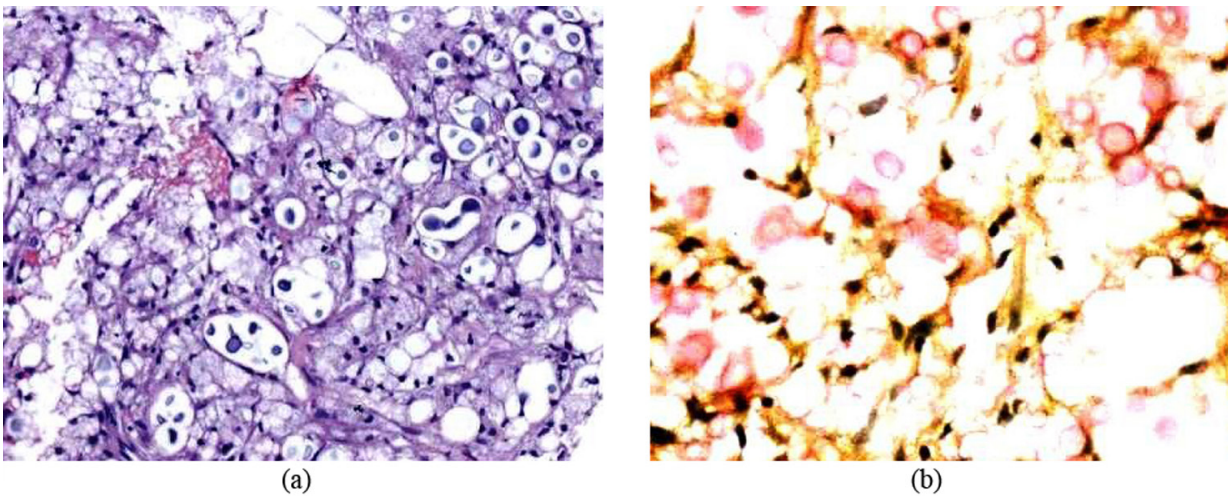

Figure 3. The fungal cells are lightly basophilic and fill the alveolar space (a) and are surrounded by a clear space which represents the capsular material. The mucicarmine stain (b) well demonstrates these fungal cells

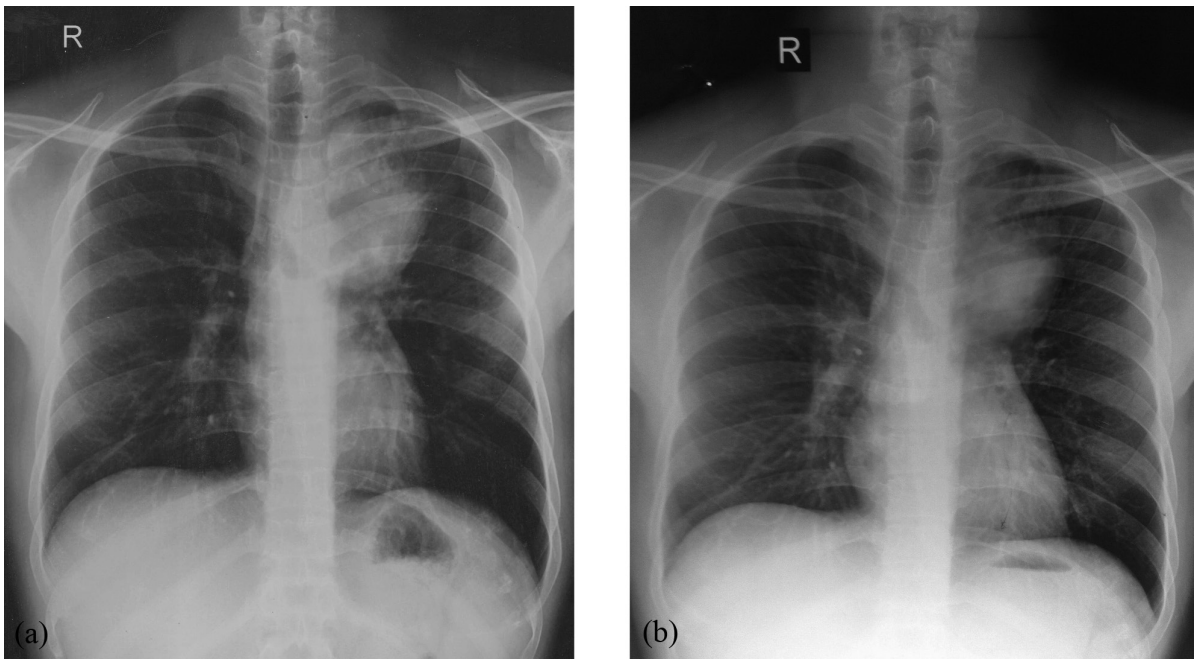

Figure 4. The chest radiograph at the start of treatment (a) showing a left apical opacity. Reduction in the size of the lesion (b) after 3 weeks treatment with liposomal Amphotericin B

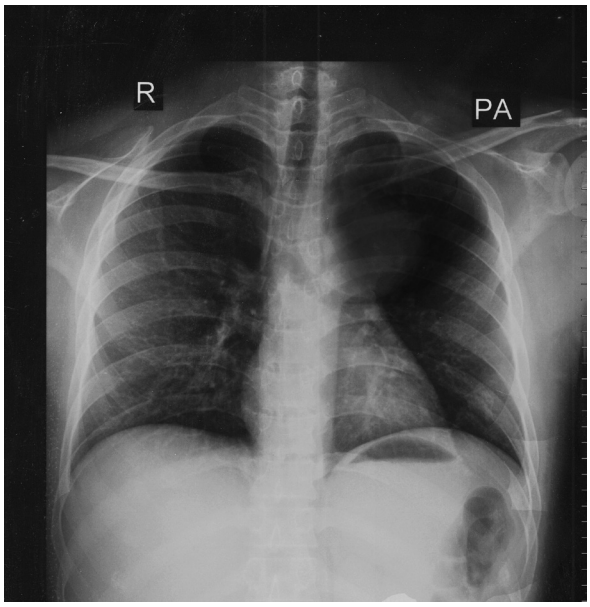

Figure 5. At 6 months post completion of treatment, the serial chest radiograph showed significant decrease in the size of the lesion

Discussion

Cryptococcus is an encapsulated heterobasidiomycetous fungus that can infect virtually any organ of the body (2). *C. neoformans* lives in environments throughout the world. The fungus is typically found in soil, on decaying wood, in tree hollows, and in bird droppings. Humans and animals can get the infection after inhaling the microscopic fungus from the environment. In a normal individual, the intact cell-mediated defenses rip the fungus off. However, Cryptococcus infection can be fatal when cell-mediated immunity is faltering. Hence, the designation "opportunistic pathogen" describes Cryptococcus aptly (2). Although it is usually seen in HIV afflicted individuals, other conditions—such as recovery from organ transplantation, long-term steroid usage, lymphoma, and sarcoidosis—also make an individual vulnerable to cryptococcosis (1, 3). However, occurrence in an immunocompetent individual is rare.

The portal of entry for Cryptococcus is the respiratory tract; however, involvement of the central nervous system (CNS) is also common (2, 3). Pulmonary symptoms are non-specific and range from mild fever, cough, and chest pain to life threatening acute respiratory distress syndrome (ARDS) (2).

On CT, pulmonary cryptococcosis usually presents as a nodule in immunocompetent patients. The nodule may be solitary or multiple (1). When multiple, nodules are present bilaterally in an asymmetric or symmetric pattern. Although the nodules have an upper-mid lobe predominance, their distribution within the lobes is random (1). Their usual diameter is < 10 mm, and they lack a halo. Findings such as consolidation with or without cavitation, lymphadenopathy, pleural effusion, and cryptococcoma are seldom seen in immunocompetent patients but almost always seen in immunocompromised patients.

A cryptococcoma is a cavernous destruction of pulmonary or nervous tissue that manifests as granulomatous masses. *C. gatti* is the usual causative agent (2). Very rarely, a large solitary cryptococcoma may be the only imaging feature, and such a presentation is even rarer with intact cell-mediated immunity. Diagnosis is based on isolation of Cryptococcus from, or detection of cryptococcal antigen in, a pulmonary specimen, coupled with appropriate clinical, radiological, and histopathological findings. Cases of pulmonary cryptococcosis in immunocompetent individuals have been described in the literature (1, 2). However, a presentation mimicking lung carcinoma is distinctly rare (3, 4).

Although Huang CJ et al. (3) describe pulmonary cryptococcoma mimicking carcinoma lung in non-HIV patients, their patient was suffering from type 2 diabetes. The present case is thus specifically unique. The patient presented here was a chain smoker, smoked 16 cigarettes per day (8 pack years), and presented with a non-productive cough including infrequent streaks of hemoptysis. This typical presentation with imaging findings of a large left apical pulmonary mass with loss of fat planes within the arch of the aorta and enlarged necrotic lymph nodes renders carcinoma lung a likely differential diagnosis. The immunocompetent status of the patient further added to the diagnostic dilemma, and the correct diagnosis could be achieved only after biopsy.

Treatment of pulmonary cryptococcoma depends on the immunity of the patient and the clinical status. For mild infection confined to the respiratory tract, treatment should be with fluconazole 200 mg/daily for 6–12 months, for both immunocompetent and immunocompromised patients (5). Moderate infection confined to the respiratory tract may be treated with fluconazole from 200–400 mg/day

for 12 months. For severe cases, disseminated disease, and CNS involvement, Amphotericin B and/or Flucytosine should be added, followed by oral Fluconazole for up to 12 months for immunocompetent patients and indefinitely for immunocompromised patients. Currently, surgical treatment is recommended only in the case of failure of clinical treatment or for the treatment of pseudotumoral lesions and exudative pleural effusion (5).

Conclusion

Pulmonary fungal infection in an immunocompetent host is very rare. Nonetheless, cryptococcal infection should be included as a possible cause of an underlying mass or a non-resolving consolidation irrespective of the patient's HIV and/or immunocompromised status.

Authors' Contributions

Conception and design: KMA
Analysis and interpretation of the data: KMA
Drafting of the article: KMA
Critical revision of the article for important intellectual content: YA
Final approval of the article: PH
Provision of study materials: YA
Administrative, technical, or logistic support: PH
Collection and assembly of data: YA

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