

Incidental Cryptococcal lung mass in an immunocompetent patient

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ABSTRACT

Cryptococcus is an encapsulated fungal organism often implicated in central nervous system and pulmonary disease in patients with AIDS or other immunocompromising diseases. However, immunocompetent hosts can also be infected. In these cases, symptoms are generally mild and common radiographic findings include small, well-defined, smoothly marginated pulmonary nodules. We present a case of a 31-year-old man without any immunocompromising factors found to have pulmonary Cryptococcal infection presenting as a large lung mass.

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1. Introduction

Cryptococcus is an encapsulated fungal organism often implicated in central nervous system and pulmonary disease in patients with AIDS or other immunocompromising diseases. While relatively rare, pulmonary cryptococcosis can also infect immunocompetent patients as well. In these cases, clinical presentations are often asymptomatic or mild with radiographic imaging typically showing small pulmonary nodules. We present a rare case of cryptococcus presenting instead as a large lung mass in an immunocompetent patient.

2. Clinical description

A 31-year-old male with no previous medical history initially presented with abdominal pain and cough. He denied any fever, headaches, shortness of breath, weight loss, or night sweats. He lived with his fiancée and worked as a cook at a small restaurant. He denied any risky sexual behaviour. He also endorsed smoking 1 pack/day for the last 16 years with occasional marijuana use, but otherwise denied any recent animal exposure or travel. Physical examination revealed decreased breath sounds in the right lower lung fields. Vital signs were normal. Laboratory results were unremarkable. Computed Tomography scan of his abdomen showed bowel wall thickening of the entire sigmoid colon suggestive of colitis. This finding was confirmed on colonoscopy and the patient's abdominal pain significantly improved with conservative treatment during his hospital stay. However, chest radiography demonstrated an opacification in the right lower lobe (Figure 1(a)). Further evaluation with Computed Tomography scan revealed a 4.3 × 3.9 cm egg-shaped mass in the apical

segment of the right lower lobe with air bronchogram and calcified hilar lymph node (Figure 1(b)). There were otherwise no enlarged mediastinal lymph nodes or effusions seen. Due to concern for lung mass, the patient underwent endobronchial ultrasound demonstrating a right lower lobe mass, but no bronchial lesions or mediastinal adenopathy. Endobronchial biopsies of the lung mass returned significant for necrotic cellular debris with spherical and ovoid thin-walled structures consistent with Cryptococcus (Figure 2). No malignancy was identified. While the patient initially endorsed cough, it resolved during his stay. AFB testing was negative. Fungal cultures were sent; however, they were negative for growth. Pt was seronegative on HIV testing. Before a thorough discussion with the patient regarding possible treatment options could be conducted, the patient left against medical advice and was lost to follow up.

3. Discussion

Two species of Cryptococcus are the main culprits of disease in humans: *Cryptococcus neoformans*, which is more ubiquitous and often affects immunocompromised individuals, and *Cryptococcus gattii*, which more often affects healthy individuals and is associated with tropical and sub-tropical climates¹. It is currently unclear the exact mechanism of how seemingly immunocompetent hosts develop Cryptococcal infection. It may be a result of high levels of exposure to the organism, exposure to more aggressive strains, or subtle immune deficits in the hosts such as alcoholism, diabetes mellitus, cirrhosis, pregnancy, and autoimmune conditions that may predispose the patient to increased risk of infiltration². In our particular patient, he did not appear to have any obvious immunocompromising

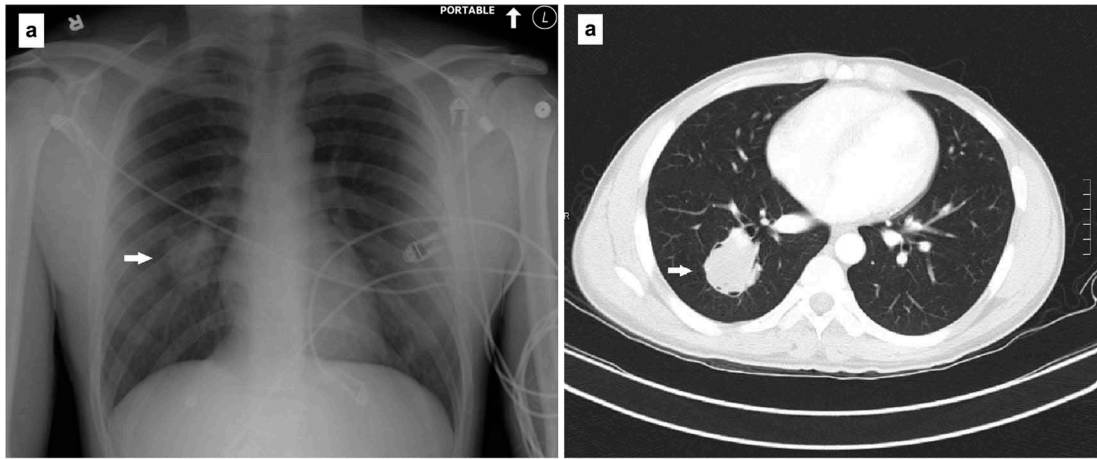


Figure 1. (a). Chest X-ray showing 4 cm right infrahilar pulmonary mass. (b). Axial CT Chest with contrast revealing 4.3 × 3.9 cm opacification in the apical segment of the right lower lobe with air bronchogram.

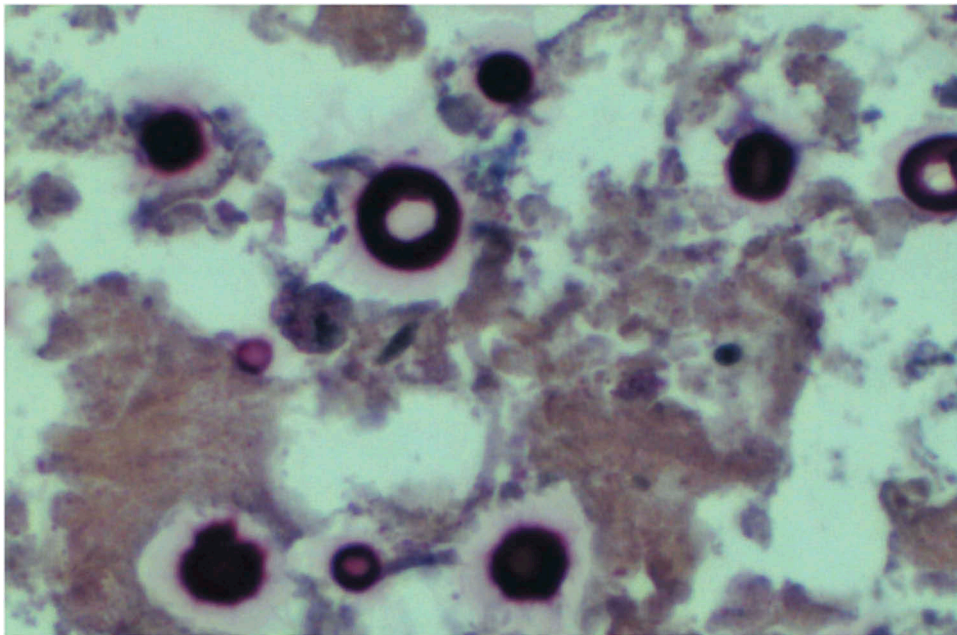


Figure 2. Histological examination of transbronchial biopsy of lung mass showed spherical and ovoid fungal organisms with mucicarmine-positive cell walls indicative of Cryptococcus.

conditions that we could identify. However, he did have a history of cigarette use and may have had exposures in the past that were not mentioned.

In immunocompetent hosts, pulmonary Cryptococcosis can be associated with a variety of radiographic findings. Fox et al. and Xie et al. found that the most common radiographic findings for these individuals are multiple, small, well-defined, and smoothly margined, non-calcified pulmonary nodules. Other findings included associated air bronchograms, cavitation, lymphadenopathy, and pleural effusion^{3,4}. However, our presented case demonstrated atypical findings such as the pulmonary mass with associated calcified hilar lymph node as well as a lack of lymphadenopathy and pleural effusion. Given the ability to form mass-like structures, pulmonary cryptococcosis is often mistaken for malignancy. In our case,

the mass's sharply circumscribed borders with associated air bronchogram, lack of symptoms, and unremarkable medical and social history pointed more towards an infectious etiology, but further diagnostic testing was required to rule out malignancy. Fungal cultures may also help identify Cryptococcus as an etiology, but cultures are often negative despite histopathologic evidence. This may be due to the ability for even deceased Cryptococcal organisms to elicit an inflammatory response in the lung, leading to infiltrating lymphocytes and fibrous tissue formation⁵. While it is atypical for pulmonary Cryptococcus to present in individuals without any identifiable immunocompromising condition or present as a large lung mass, it is important for clinicians to maintain Cryptococcus as a differential diagnosis for lung masses even in immunocompetent patients.

In our case, the patient was lost to follow up and did not participate in discussions regarding treatment options. Fisher et al. examined a variety of previous case reports in immunocompetent individuals with pulmonary *Cryptococcus*, and found that most asymptomatic, untreated individuals required a mean of 18.2 months for complete radiographic resolution, while asymptomatic, treated individuals only required a mean of 11.5 months⁵. While there is some evidence that antifungal treatment may accelerate radiographic resolution, there is little evidence to demonstrate the clinical utility for treatment. According to the Infectious Diseases Society of America (IDSA) 2016 guidelines, antifungal therapy is not recommended for patients with an asymptomatic pulmonary nodule from pulmonary coccidiomycosis and without overt immunocompromising conditions⁶. While there are no specific recommendations for pulmonary masses, given our patient's asymptomatic presentation, we would recommend observation only without antifungal therapy.

4. Teaching points

- (1) While differential diagnoses for a lung mass can be extensive, pulmonary *Cryptococcus* should be considered even in patients with an immunocompetent status.
- (2) Due to no clear benefit, asymptomatic immunocompetent patients with primary pulmonary *Cryptococcus* do not require treatment with antifungal therapy.

Disclosure statement

No potential conflict of interest was reported by the authors.

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References

- [1] Kwon-Chung, K. J., and J. E. Bennett. "Epidemiologic differences between the two varieties of *Cryptococcus neoformans*." *American Journal of Epidemiology* 120.1 (1984): 123–130.
- [2] Brouwer, Annemarie E., et al. "Immune dysfunction in HIV-seronegative, *Cryptococcus gattii* meningitis." *Journal of Infection* 54.3 (2007): e165–e168.
- [3] Fox, Danial L., and Nestor L. Müller. "Pulmonary cryptococcosis in immunocompetent patients: CT findings in 12 patients." *American Journal of Roentgenology* 185.3 (2005): 622–626.
- [4] Xie, Li-xuan, et al. "Pulmonary cryptococcosis: comparison of CT findings in immunocompetent and immunocompromised patients." *Acta Radiologica* 56.4 (2015): 447–453.
- [5] Fisher JF, Valencia-Rey PA, Davis WB. Pulmonary cryptococcosis in the immunocompetent patient—many questions, some answers. *Open Forum Infect Dis.* 2016;3(3):ofw167.
- [6] Galgiani, John N., Ampel, N M., Blair, J E., Catanzaro, A., Geertsma, F., Hoover, S E., Johnson, R H., Kusne, S., Lisse, J., MacDonald, J D., Meyerson, S L., Raksin, P B., Siever, J., Stevens, D A., Sunenshine, R., Theodore, N. "2016 Infectious Diseases Society of America (IDSA) clinical practice guideline for the treatment of coccidioidomycosis." *Clinical Infectious Diseases* 63.6 (2016): e112–46.