Cavitary Pulmonary Cryptococcosis with an Aspergillus Fungus Ball

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Abstract

We herein present the case of a 64-year-old immunocompetent man with a diagnosis of pulmonary cryptococcosis who presented with cavitary nodules, one of which contained a fungus ball, on chest CT. The coincidence of cavitary cryptococcosis and an Aspergillus fungus ball was histologically confirmed on a thoracoscopic lung biopsy. Encapsulated round-to-oval yeasts (Cryptococcus) were observed throughout the entire specimen, including the cavity, cavity wall and lung parenchyma. In contrast, filamentous fungi (Aspergillus) were noted within the cavity only. The probable mechanism of this rare manifestation is that the Cryptococcus formed cavities, after which an Aspergillus fungus ball developed within one cavity.

Key words: Aspergillus, cryptococcosis, fungus ball


Introduction

Pulmonary cryptococcosis, which is caused by Cryptococcus neoformans, occurs in immunocompromised patients, as well as normal hosts. The most common chest radiographic findings include single or multiple nodules, although cavities are occasionally observed (1).

We herein present a very rare case of cavitary cryptococcosis with Aspergillus fungus ball formation in one cavity.

Case Report

A 64-year-old man with a history of rheumatoid arthritis lasting for 18 years underwent chest computed tomography (CT) as a pre-therapy screening tool for treatment with an anti-Tumor Necrosis Factor α (TNFα) drug (adalimumab). The findings revealed two cavities, and the patient was subsequently referred to our department in September 2011. His medical history also included cerebral infarction and a 14 pack-year history of smoking. He denied having the symptoms of coughing, sputum production or dyspnea. A physical examination revealed no acute distress, with a blood pressure of 124/78 mmHg, heart rate of 68 bpm, body temperature of 36.6°C and respiratory rate of 18/min. A neurological examination showed no abnormalities, while laboratory tests showed a WBC count of 13,400/μL, C-reactive protein level of 5.25 mg/dL, erythrocyte sedimentation rate of 34 mm/hr and normal serum β-D glucan level. Tests for serum Cryptococcus neoformans and Aspergillus antigens were positive, although serum precipitating Aspergillus antibodies were negative. A sputum examination revealed no significant abnormalities. However, chest high-resolution CT demonstrated two cavities in the right lower lobe (Fig. 1): one measured 16 mm in size and exhibited internal fungus ball-like formation, while the other measured 9 mm in size, with no internal fungus balls.

Diagnostic bronchoscopy was then performed. The culture results were negative; however, both Hematoxylin and Eosin (HE), Periodic acid-schiff (PAS) and Grocott’s staining of the lung tissue showed encapsulated yeasts within a non-necrotizing granuloma (Fig. 2). Therefore, the patient was diagnosed with pulmonary cryptococcosis. Although lumbar puncture was performed due to the possibility of meningitis, the results showed clear cerebrospinal fluid with a normal cell count and protein and glucose levels. The cryptococcal antigen titer in the cerebrospinal fluid was negative.

Because the imaging findings were inconsistent with a di-

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Diagnosis of cryptococcosis alone, a thoracoscopic lung biopsy was performed to obtain a definitive diagnosis. A culture of the lung tissue resulted in the isolation of Cryptococcus neoformans, with no Aspergillus. A histopathological examination showed a cryptococcal granuloma exhibiting cavity formation with an internal fungus ball (Fig. 3). The fungus ball was composed of filamentous fungi, which was subsequently confirmed to be the Aspergillus species on polymerase chain reaction. The patient was diagnosed with both pulmonary cryptococcosis and an Aspergillus fungus ball. As to treatment, the patient received fluconazole orally for nine months. There has since been no episodes of disease recurrence, and the patient is currently under observation at our outpatient clinic.

Discussion

This case is the first reported case of cavitary cryptococcosis with Aspergillus fungus ball formation within a cavity, as documented on available CT images. In the present case, encapsulated round-shaped Cryptococcus neoformans were observed in the lung biopsy specimen, and the detection of positive serum Cryptococcus neoformans antigens and isolation of the fungus from the patient’s lung tissue led to a definitive diagnosis of cryptococcosis. Histopathology showed cryptococcosis in the cavity wall and lung parenchyma. On the other hand, filamentous Aspergillus with formation of a fungus ball was observed within the cavity only. In this very rare case, the cavitation and formation of an Aspergillus fungus ball progressed over two years, as a chest radiograph obtained in December 2010 showed only a small nodule in the right lower lung that was apparently distinct from shadows of tuberculosis sequelae and/or emphysematous cysts. There have been several reports of coincident cryptococcosis and Aspergillus infection. For example, Rosenheim et al. (2) reported a patient with multiple abscess cavities in the left lower lung in whom cryptococcosis was diagnosed based on sputum cytology and serological tests. In addition, an Aspergillus fungus ball was found within a cavity at the time of left lower lobe resection. However, chest CT was not performed in that case, and the characteristics of the radiologic images were not described. Meanwhile, Kitazaki et al. reported the case of a patient in whom chronic necrotizing pulmonary aspergillosis occurred around a site of former pulmonary cryptococcal infection (3), and Lin et al. described a case of simultaneous pulmonary cryptococcosis and invasive pulmonary aspergillosis in an immunocompromised patient (4). However, no concomitant Aspergillus fungus balls were observed in the latter two reports. Therefore, to our knowledge, this is the first reported case of cavitary pulmonary cryptococcosis with an Aspergillus fungus ball inside the cavity in a patient with available chest CT images.

Cavitation is occasionally detected on CT in patients with pulmonary cryptococcosis only (1, 5). In the present case, no filamentous fungi were pathologically observed in the cavity wall. Based on the patient’s clinical course and histopathological findings, we speculate that the Cryptococcus first formed cavities, after which an Aspergillus fungus ball formed within one cavity. Therefore, it is possible that the cryptococcal lesion on the cavity wall kept the Aspergillus fungus ball separate from the lung parenchyma. This may
Aspergillus. Fluconazole monotherapy targeting the cryptococcosis. Surgical resection is a definitive treatment for the cavity as a fungus ball and the lesion was completely resected. This case provides valuable advice regarding the histopathology in this case. Kinki University, Faculty of Medicine, Japan for providing the samples. Tsugu Miyazaki, Department of Chemotherapy and Mycoses, National Institute of Infectious Diseases, Japan for identifying the fungus. In conclusion, we herein reported a very rare case of the cavity as a fungus ball and the lesion was completely resected. Surgical resection is a definitive treatment for Aspergillus fungus balls (6). Therefore, it was reasonable to select fluconazole monotherapy targeting the cryptococcosis only (7).

In conclusion, we herein reported a very rare case of cavitary pulmonary cryptococcosis with Aspergillus fungus ball formation in the cavity that presented on a characteristic CT image.

The authors state that they have no Conflict of Interest (COI).

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