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Case Report

Diagnosis and Treatment of Bronchocentric Granulomatosis: A Rare Case Report

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ABSTRACT

Bronchocentric granulomatosis is a necrotizing granulomatous lesion of the bronchi and bronchioles and a rare disease, which is not associated with any clinical or radiological findings. It usually affects adults and is often incidentally diagnosed on chest X-ray. The diagnosis is confirmed by histopathological evaluations of the lung biopsy specimens. The present study reports the case of a 58-year-old male patient with pulmonary nodules observed on chest X-ray performed as part of general screening. Thoracic computed tomography confirmed the presence of multiple nodular lesions. Both invasive and non-invasive methods failed to remove the masses, and an open lung biopsy was performed. The histopathological diagnosis reported bronchocentric granulomatosis. This case has been presented to highlight the importance of multidisciplinary management of all conditions, which helps in the accurate detection of rare diseases, such as bronchocentric granulomatosis.

Keywords: Aspergillosis, granuloma, necrotizing, resection

INTRODUCTION

Bronchocentric granulomatosis (BG), which was first described by Liebow in 1973 (1), is a destructive granulomatous lesion, which forms in response to airway damage to the bronchi and bronchioles. It is a rare condition that is not associated with any specific clinical or radiological findings, and its diagnosis can be only confirmed histopathologically. Some general clinical manifestations include fever, cough, wheezing, and respiratory insufficiency. Laboratory findings primarily include eosinophilia. In radiological imaging, non-specific signs, such as nodular lesions, consolidations, and atelectasis can be observed (2, 3).

Katzenstein et al. (4) classified BG cases into two groups: those with asthma-like symptoms and those without asthmatic symptoms. Approximately half of the cases are associated with asthmatic findings and bronchopulmonary aspergillosis. These cases are usually observed in young men who present with clinical signs of fever, cough, and respiratory failure. Patients without asthmatic symptoms are usually older and present with non-specific findings, such as fatigue (2).

Herein, we report a case of BG in a 58-year-old male patient and its treatment in the light of the previously recorded scientific literature.

CASE PRESENTATION

A 58-year-old male patient underwent a screening X-ray of the chest and presented with nodular lesions that were incidentally discovered on the radiographic images (Figure 1). He complained about exertional dyspnea and intermittent chest pain. His medical history revealed a 40-pack-per-year smoking history without previous tuberculosis. Complete blood count and biochemical analysis results were normal. Thoracic computed tomography (CT) revealed bilateral, peripheral, mostly calcified, nodular lesions with smooth margins, the largest being 1.5 cm (Figure 2). Pulmonary function test results supported the diagnosis of asthma. Bronchoscopy revealed no endobronchial lesions. Acid-resistant bacilli were not detected in the bronchoalveolar lavage fluid, and the cytology was evaluated as benign. Positron emission tomography (PET/CT), which was performed to rule out secondary malignancies, did not reveal a metastatic disease in any part of the body.

Wedge resection was performed with mini-thoracotomy for diagnostic purposes. Pathological examination of the lung mass revealed necrotic granulomas separated by distinctive fibrous tissues. Positive-stained fungal hyphae on periodic acid-schiff (PAS) staining were observed in the field of necrosis. Mucus, neu-

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trophils, eosinophils, and lymphoplasmacytic cells infiltrating the bronchiolar wall were detected in the lumen (Figure 3). The reproduction of *Aspergillus niger* was detected in the sputum culture. As a result of these definitive findings, the patient was diagnosed with BG.

The treatment of the disease was initiated by administering oral itraconazole with inhaled corticosteroids and bronchodilators. However, the patient was unable to tolerate oral itraconazole and was switched to intravenous (IV) amphotericin B (50 mg daily). After 14 days of therapy, oral itraconazole was re-initiated but could not be used effectively because the patient was non-compliant with the treatment. Subsequently, IV caspofungin was initiated (50 mg daily) because the patient was clinically and radiologically unresponsive and his blood urea and creatinine levels had increased during the amphotericin B treatment. Clinical recovery was achieved after the 14-day therapy, and the patient was discharged with the maintenance treatment of oral itraconazole. The patient did not exhibit any radiological response during the follow-up, and his clinical symptoms had markedly regressed.

Figure 1. Chest X-ray for screening

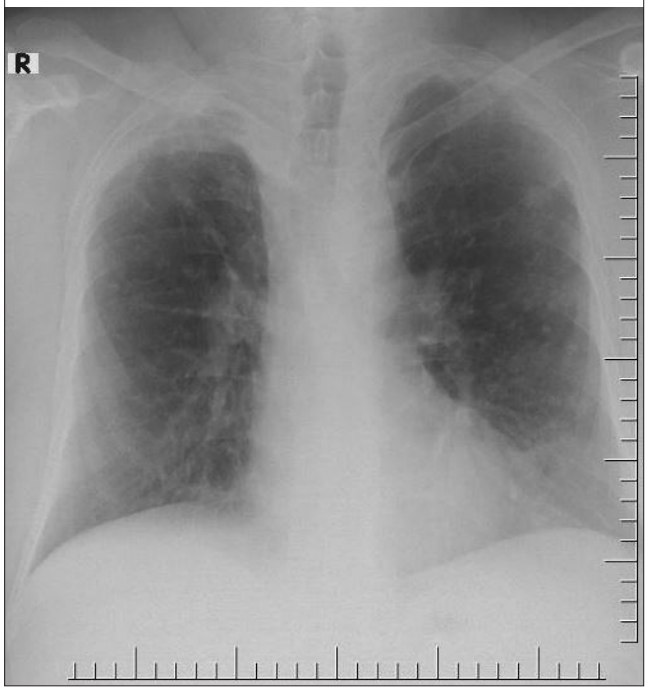
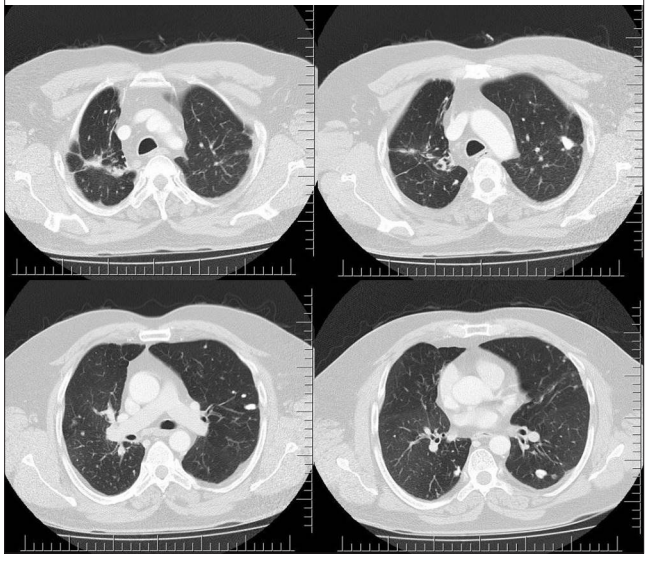


Figure 2. Bilateral, multiple pulmonary nodules on thoracic computed tomography



Written informed consent was obtained from the patient before the commencement of the procedure.

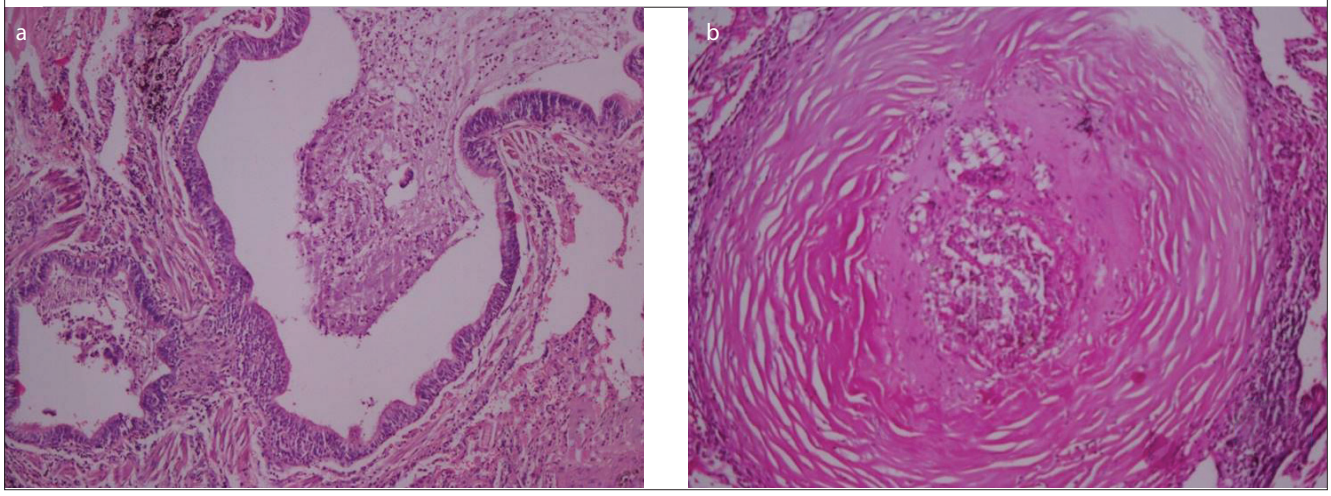
DISCUSSION

According to the BG classification system proposed by Katzenstein et al. (4), patients with asthmatic symptoms are often accompanied with bronchopulmonary aspergillosis; however, the underlying cause of non-asthmatic cases is often unknown. The non-asthmatic condition has been associated with chronic granulomatous diseases, glomerulonephritis, influenza virus, mycobacterial infections, and bronchogenic carcinoma. Patients with asthma-like symptoms are usually younger males aged 20-40 years, whereas those without asthmatic symptoms are relatively older (2, 5). In the present case, asthmatic symptoms such as cough, exertional dyspnea, and asthma were not detected, while the respiratory function test results were suggestive of asthma.

Radiological evaluations reveal no specific finding of BG; however, the findings are frequently observed unilaterally and located in the upper lobes. The disease usually presents with nodular lesions and may also manifest as atelectasis or pneumonic consolidation (2, 6). Thoracic CT of idiopathic BG were reported by Umezawa et al. (7) and Li et al. (3) in a 17-year-old male and a 43-year-old female patient, respectively. In these case reports, consolidation and segmental atelectasis were detected. However, in a report published by Kılıçgün et al. (2), multiple parenchymal nodules were observed at the forefront in the radiographs of both a 37-and 58-year-old male patients.

Seçik et al. (8) presented a case of a 40-year-old patient, in whom radiological examination revealed a 3-cm lesion in the right lung, although there were no significant clinical symptoms of the disease. The diagnosis of this patient was not confirmed by bronchoscopy or needle biopsy, instead BG was confirmed by wedge resection with thoracotomy. Because BG has no specific clinical, immunological, and radiological findings, the definite diagnosis can be made only by performing a histopathological examination of the biopsy specimens (9). Radiological imaging, biochemical and immunological tests, bronchoscopy, and sputum and bronchoalveolar lavage cultures have also been performed in previous studies in the literature; however, the final diagnosis was always established by histopathological examination of the open lung biopsy specimens (2, 3, 5, 7). In the previous studies, necrotizing granulomas and eosinophilia in the bronchial wall were detected histopathologically, and fungal elements were detected in some of them. In our case, we performed wedge resection with mini-thoracotomy, and the presence of necrotic

Figure 3. a, b. Histopathologic examination (Hematoxylin and eosin staining, 100×). (a) Lung biopsy specimen showing a small bronchus filled with mucinous material and inflammatory cells. (b) Respiratory epithelium is replaced by granulomatous inflammation and luminal debris containing fungal hyphal fragments



granulomas, eosinophilia, and fungal hyphae in the lumen observed in the histopathological examination confirmed the diagnosis of BG. The reproduction of *A. niger* was also detected in the sputum culture.

Although there is no established consensus for the treatment of BG, several studies have shown that corticosteroid therapy alone is sufficient to effectively treat this disease in non-asthmatic cases without fungal elements (3). However, antifungal therapy should be added to corticosteroids when fungal elements are detected in the histopathological evaluation or sputum culture (2, 3, 7). In the present case, we performed antifungal treatment combined with inhaled corticosteroid therapy because our patient was diagnosed with BG associated with aspergillosis. However, we were unable to obtain a radiological response, although the symptomatic response was achieved after treatment. There was no recurrence, progression, or additional pathology observed during follow-up.

CONCLUSION

Bronchocentric granulomatosis has no specific clinical, immunological, and radiological findings, and the definite diagnosis can be made only by performing a histopathological examination. Open lung biopsy should not be avoided in this disease because achieving the differential diagnosis is challenging, and it can be difficult to distinguish BG from many diseases radiologically. It is also crucial to diagnose the tissue and reveal the underlying cause to tailor the treatment effectively, particularly in symptomatic patients.

Informed Consent: Written informed consent was obtained from patient who participated in this study.

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Conflict of Interest: The authors have no conflicts of interest to declare.

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