Lung Carcinosarcoma Masked by Tracheobronchial Aspergillosis

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Abstract

Tracheobronchial aspergillosis is a form of invasive aspergillosis limited to the airways. Its presence usually indicates an immunocompromised status or local dysfunction of airway immunity. We herein report a case of lung carcinosarcoma masked by tracheobronchial aspergillosis and discuss the clinical manifestations, diagnostic procedures and treatment of such cases. Tracheobronchial aspergillosis may also mask endobronchial carcinoma, leading to difficulties in determining the diagnosis and selecting subsequent treatment. Bronchoscopy is crucial for obtaining a definitive diagnosis and confirming the treatment. In particular, the combination of intravenous antifungal drug administration, localized antifungal application and interventional bronchoscopy is effective. Nevertheless, clinicians should always investigate the underlying disease carefully, including the potential occurrence of lung malignancy.

Key words: aspergillosis, lung carcinoma, Aspergillus tracheobronchitis

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Introduction

Tracheobronchial aspergillosis is an unusual form of invasive aspergillosis that is primarily limited to the large airways. It usually occurs in individuals with local dysfunction of airway immunity or compromised immunity. One of the primary causes of tracheobronchial aspergillosis is lung cancer (1). Pulmonary carcinosarcoma, which accounts for only 0.1-0.4% of all lung cancers (2), begins in the central airways in two-thirds of patients and exhibits the morphology of polypoid airway lesions. Both tracheobronchial aspergillosis and pulmonary carcinosarcoma present with non-specific symptoms and are difficult to detect unambiguously on chest radiology, which may delay the diagnosis and thus worsen the patient’s prognosis.

We herein report a case of pulmonary carcinosarcoma associated with concurrent obstructive tracheobronchial aspergillosis. To the best of our knowledge, this is the first case of lung carcinosarcoma masked by tracheobronchial aspergillosis. This case highlights the importance of properly identifying tracheobronchial aspergillosis and ruling out the possibility of underlying lung malignancy.

Case Report

A 58-year-old man presented with a two-month history of a nonproductive cough and the recent onset of malaise, progressive exertional dyspnea and weight loss of 10 kg. The patient reported no prior history of lung disease or relevant occupational exposure, although he was a current smoker with a history of 30 pack-years. Upon admission, he was febrile, with a peak body temperature of 37.8°C. His breath sounds were reduced in the right lung, without signs of wheezing or rubbing, while a chest computed tomography (CT) scan revealed blockage of the right main bronchus and truncus intermedius (Figure A, B). A blood cell count was normal, and the results of an arterial blood gas analysis were as follows: partial pressure of arterial oxygen (PaO₂), 67.2 mmHg; partial pressure of carbon dioxide in arterial blood (PaCO₂), 46.2 mmHg and pH, 7.419. Bronchoscopy (1T260, Olympus, Tokyo, Japan) showed thick yellowish mucous plugs with termini in the right main bronchus dissociated from the wall of the bronchus, with no evidence of

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deeper tissue invasion (Figure F, G). The mucous plugs partly obstructed the truncus intermedius and completely obstructed the right lower lobe bronchus; the bronchi of the left lung were not involved. Hematoxylin and Eosin (HE) staining of bronchial biopsy specimens revealed septate and branching fungal hyphae, consistent with the features of Aspergillus (Figure H). Comprehensive tests disclosed the following results: IgE, 116.70 IU/mL (normal, 1.31-165.3); 1-3-β-D glucosan, <10 pg/fl; Aspergillus flavus skin prink test, positive. From day 10 onwards, the patient was given the antifungal voriconazole intravenously (400 mg every 12 hours for the first day, followed by 200 mg every 12 hours thereafter).

Bronchoscopy was performed on day 16 to remove the mass in the right main bronchus via electrocautery (VIO 200S, ERBE, Turbingen, Germany), cryotherapy (ERBOK- RYO CA, ERBE) and mechanical removal. The site of obstruction in the right main bronchus was clear, while the base of the residual mass was located in the truncus intermedius, closely connected to the lumen. A pathological examination of the mass showed structureless necrosis with inflammatory infiltration, and amphotericin B (5 mg twice a week, x1 week) via local intraluminal instillation was subsequently administered. We attempted sampling in search for evidence of underlying endobronchial disease in addition to tracheobronchial aspergillosis on bronchoscopy; however, no other pathological diagnosis was obtained.

On day 18, three days after the start of antifungal treatment, the patient was found to be afebrile, and chest CT showed a partial recovery of the occlusion of the truncus intermedius (Figure C, D). However, the solid mass in the lower lobe had become slightly enlarged, and chest CT performed on day 28 continued to show obvious airway occlusion. Meanwhile, the solid mass in the lower lobe had become obviously enlarged compared with that observed at baseline (Figure E). Due to our suspicion of malignancy and an attempt to obtain a definitive diagnosis, right lower lobectomy was performed on day 36. A solid mass measuring 5.0×5.0 cm rooted in the right lower lobe bronchus was observed to extend to the lumen of the truncus intermedius...
with enlarged hilar lymph nodes. The mass and surrounding lymph nodes were removed, and the final pathology confirmed a diagnosis of carcinosarcoma composed of poorly differentiated and undifferentiated epithelial cells with spindle cell foci and malignant mesenchymal elements (Figure I). No metastasis was observed in the bronchial stump or surrounding lymph nodes. In addition, the surrounding lung tissue showed no Aspergillus hyphae, and Aspergillus cultures were negative. At 18 months after discharge, the patient remained alive, and a CT chest scan showed no cancer metastasis or recurrence.

Discussion

Tracheobronchial aspergillosis has been documented in a few case reports (1, 3, 4). Some of these patients had isolated invasive Aspergillus tracheobronchitis, whereas the majority showed involvement of the lung parenchyma or other organs. Most patients with tracheobronchial aspergillosis have concurrent immune-related disease, such as solid organ or hematological malignancies, AIDS, a post-transplantation status or other forms of immunodeficiency (1, 3). In this report, we described a rare case of isolated tracheobronchial aspergillosis combined with underlying lung carcinosarcoma. According to the patient’s history, this case involved acute or subacute airway invasive aspergillosis.

Acute airway invasive aspergillosis accounts for less than one-third of cases of invasive aspergillosis (4). Different types of acute airway invasive aspergillosis may have different prognoses. Wu et al. proposed a four-type classification based on the bronchoscopic morphology of intraluminal lesions (3): superficial infiltration type, characterized by inflammatory infiltration, superficial ulcers and mild plaques involving pseudomembrane formation without obvious airway occlusion; full-layer involvement type, associated with deeper ulcerative tracheobronchitis; occlusion type, in which the caliber of the affected bronchi is ≥50% occluded, regardless of the cause; and mixed type, in which the patient presents with the characteristics of two or more of these disease types. Our patient was diagnosed with obstructive tracheobronchial aspergillosis, which caused no obvious systemic symptoms, but rather manifested as only non-specific local symptoms, such as coughing and dyspnea.

Mechanical removal combined with antifungal therapy is the main treatment for obstructive bronchial aspergillosis. However, we did not obtain a better clinical response in this case after managing the occlusion and providing antifungal treatment. We began to suspect an alternative underlying disease when both the bronchial cast mold and airway occlusion recurred and when the close connection between the bronchial cast and the distal bronchus was noted. For the reasons discussed above, surgery was necessary to obtain a definitive diagnosis.

The current case highlights the importance of differentiating tracheobronchial aspergillosis from endobronchial carcinomas, which can show similar clinical and radiological signs and symptoms (5). In one study, 87.5% of patients with pseudomembranous tracheobronchial aspergillosis had primary pulmonary and tracheobronchial tumors or pulmonary metastatic tumors. The prevalence of tracheobronchial aspergillosis in pulmonary cancer patients is higher than that of other types of immunodeficiency observed in the same hospital (1). These findings suggest that lung malignancy is a common risk factor for tracheobronchial aspergillosis. In addition, the existence of tracheobronchial aspergillosis may masked endobronchial carcinoma, leading to the difficulties in confirming the diagnosis and selecting subsequent therapy (4). The coexistence of tracheobronchial aspergillosis and underlying diseases, such as endobronchial carcinoma, should be assessed when the clinical response to antifungal therapy is limited, and bronchoscopy is crucial for obtaining a definitive diagnosis and determining the proper treatment.

Tracheobronchial aspergillosis is a rare form of invasive aspergillosis that primarily affects immunocompromised patients. Combination treatment with intravenous antifungal drugs, localized antifungal therapy and interventional bronchoscopy is effective in cases of tracheobronchial aspergillosis. However, clinicians should carefully investigate the underlying disease, including lung malignancy.

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

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