Case Report

Aspergillus pseudomembranous tracheobronchitis in an immunocompetent individual: A diagnostic conundrum with therapeutic challenge

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ABSTRACT

Aspergillus tracheobronchitis is an extremely uncommon manifestation of *Aspergillus* infection. Most of the cases described in the literature are in the immunosuppressed individuals and is almost uniformly fatal. Immunocompetent individuals do manifest the disease, but the disease if diagnosed early can be appropriately treated and thus can be life-saving. Here, we describe a similar case which was diagnosed only at autopsy.

KEY WORDS: *Aspergillus fumigates*, immunocompetent, pseudomembranous tracheobronchitis

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INTRODUCTION

Aspergillus is a ubiquitous fungus with no specific geographic distribution. *Aspergillus fumigatus* accounts for most of the invasive infections in humans and is the most commonly encountered species in pulmonary infections. The pathogenetic manifestations of *Aspergillus* infection depend upon its interaction with the host. The spectrum of lung manifestations ranges from hypersensitivity (asthma) to invasive aspergillosis. The diagnosis of common forms of invasive pulmonary aspergillosis (IPA) is relatively straight forward in the appropriate clinical setting (immunosuppression); whereas the diagnosis of uncommon forms of invasive aspergillosis especially pseudomembranous tracheobronchitis is difficult and the disease is uniformly fatal if not recognized early. We describe a rare case where this proved to be a diagnostic red herring in an immunocompetent individual that was resolved only at the time of autopsy.

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CASE REPORT

A 55-year-old gentleman who was a nondiabetic and nonhypertensive presented with fever with mucopurulent expectoration of 13 days and increasing dyspnea of 10 days duration. There was no associated chest pain, wheeze, hemoptysis or any other complaints. There was no history of diabetes, hypertension. He gave a history of receiving treatment for pulmonary tuberculosis 25 years ago. He was an occasional alcohol user and a bidi smoker for 25 years. Before his admission to our institute, he had received oral co-amoxiclav in view of community-acquired pneumonia. As his condition did not improve, he was referred to our institute where on examination was found to be conscious and oriented with normal blood pressure, tachycardia, tachypnea, and SpO_2 of 87% (FiO_2 0.21). There was no pallor, icterus, cyanosis, clubbing, significant lymphadenopathy, or pedal edema. Jugular venous pressure was normal. Examination of the respiratory system revealed bilateral wheeze and extensive crepitations involving all the lung

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fields. The other systemic examinations were within normal limits. The hemogram revealed neutrophilic leukocytosis with a total leukocyte count of 26.4 × 10^9/mL and an absolute neutrophil count of 23232/mL. His arterial blood gas analysis revealed partly compensated respiratory alkalosis. His blood cultures were sterile and serologically he was nonreactive to HIV, hepatitis B surface antigen, and hepatitis B virus. Chest X-ray revealed bilateral alveolar opacities progressing to extensive areas of consolidation [Figure 1a] and high-resolution computed tomography showed subcentimetric mediastinal lymphadenopathy, acinar as well as centrilobular nodules and areas of consolidation [Figure 1b]. Based on the presentation and past history of tuberculosis and the radiological findings, he was empirically stared on anti-tuberculous therapy and intravenous antibiotics for superadded bacterial pneumonia. Nevertheless, the patient had worsening hypoxemia requiring endotracheal intubation. Despite supportive management, the condition of the patient continued to deteriorate and he expired. Postmortem examination of the respiratory system revealed bilateral moderate pleural effusion. Both the lungs were heavy and together weighed 2680 g. Tracheobronchial tree mucosa was completely necrotic with the formation of dirty yellowish-brown pseudomembrane. The pseudomembrane extended into the hilar as well as the segmental bronchi [Figure 1c]. The subsegmental bronchi were plugged due to the sloughed-off pseudomembrane from the proximal airways. Both the pleural surfaces were dull with fibrinous tags. The cut surface of both the lungs showed dirty yellowish-brown bronchocentric consolidated areas which at places formed breaking down abscesses of 0.5–1 cm diameter. These lesions extended up to the periphery to involve the visceral pleura. The intervening lung parenchyma was subcrepitant. No tubercular focus or thrombi were seen within the pulmonary arteries and its branches. The microscopic sections from the tracheobronchial tree showed necrosis involving 50% of the thickness of the mucosa. The necrotic areas had hyphae of *Aspergillus* with a centrifugal spread from the luminal aspect both vertically as well as horizontally [Figure 1d] involving the entire length of the tracheobronchial tree up to the alveoli. In some of the areas, there was the destruction of the alveolar septa by neutrophil-rich inflammatory infiltrate along with nuclear debris and fungal profiles with the morphology of *Aspergillus*. The pulmonary artery (muscular type) invasion was noted. There were no eosinophils, giant cells, granulomas, bacterial colonies, or any evidence of malignancy. Stain for acid-fast bacillus was negative. The intervening pulmonary parenchyma showed alveolar spaces filled with homogenous pale eosinophilic material indicative of edema fluid. Hilar lymph nodes failed to reveal any granulomas. Rest of the secondary lymphoid organs was within normal limits.

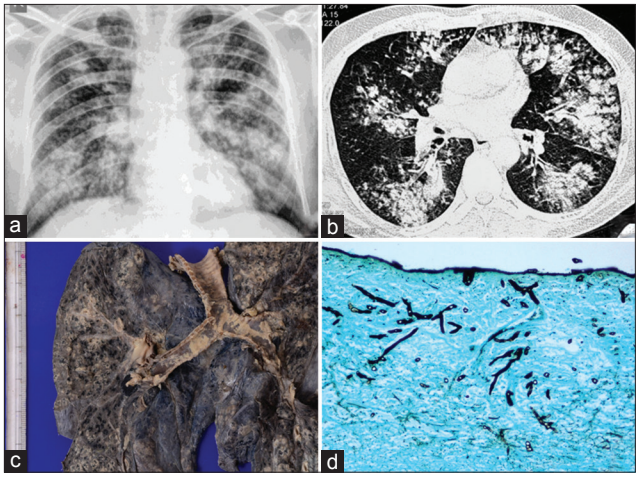

Figure 1: (a) X-ray chest revealing bilateral alveolar opacities progressing to extensive areas of consolidation. (b) High-resolution computed tomography chest depicting subcentimetric mediastinal lymphadenopathy, acinar and centrilobular nodules, areas of consolidation. (c) Postmortem lung showing pseudomembrane extending into the hilar as well as the segmental bronchi. (d) Grocott's methenamine silver stain demonstrates necrosis within the tracheobronchial tree involving 50% of the thickness of mucosa. The necrotic areas showed hyphae of *Aspergillus* sp. with centrifugal spread from the luminal aspect both vertically as well as horizontally (Grocott's methenamine silver ×200)

DNA sequencing was performed on the fresh tissue and paraffin blocks which confirmed the species to be *A. fumigatus* [Figure 2].

DISCUSSION

Aspergillus tracheobronchitis (AT) is an unusual manifestation of IPA, which accounts for <10% of cases.[1,2] The diagnosis of this condition is extremely difficult and hence is delayed in view of its relatively nonspecific presentation and the lack of specific radiographic findings, especially in the early stages.[3] The largest series available in the literature[4] states that solid organ transplantation (44.2%) is the most common underlying condition with most patients on long-term

Figure 2: DNA sequencing electrophoretogram confirming the species to be *Aspergillus fumigatus*

corticosteroid treatment (71.8%). Most patients present with fever and respiratory complaints. Acute respiratory distress syndrome at presentation is around one-third. The initial imaging studies were noninformative in 47.4%, and *A. fumigatus* was the predominant species (74.4%). The various forms described by bronchoscopy and/or autopsy are pseudomembranous, obstructive, ulcerative, obstructive and ulcerative, pseudomembranous and ulcerative, and pseudomembranous and obstructive. The pseudomembranous form is the most commonly observed (31.9%) and is more frequent in neutropenic patients. The most frequent antifungal monotherapy regimens were amphotericin B deoxycholate (23.1%) and itraconazole (18.6%). The overall in-hospital mortality was 39.1%, with neutropenia. The aforementioned case scenario, therefore, depicts the classical features described in the literature. However, the diagnostic difficulties were compounded by the history of receiving treatment for pulmonary tuberculosis and the absence of known underlying local or systemic conditions which predisposes to pseudomembranous AT. Nevertheless, a few cases of pseudomembranous AT are available in the literature[5,6] in patients with no known co-morbid illnesses.

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Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. Chang SM, Kuo HT, Lin FJ, Tzen CY, Sheu CY. Pseudomembranous tracheobronchitis caused by *Aspergillus* in immunocompromised patients. Scand J Infect Dis 2005;37:937-42.
2. Young RC, Bennett JE, Vogel CL, Carbone PP, DeVita VT. Aspergillosis. The spectrum of the disease in 98 patients. Medicine (Baltimore) 1970;49:147-73.
3. Tasci S, Glasmacher A, Lentini S, Tschubel K, Ewig S, Molitor E, *et al*. Pseudomembranous and obstructive *Aspergillus* tracheobronchitis – Optimal diagnostic strategy and outcome. Mycoses 2006;49:37-42.
4. Fernández-Ruiz M, Silva JT, San-Juan R, de Dios B, García-Luján R, López-Medrano F, *et al*. *Aspergillus* tracheobronchitis: Report of 8 cases and review of the literature. Medicine (Baltimore) 2012;91:261-73.
5. Oh HJ, Kim HR, Hwang KE, Kim SY, Ahn SH, Yang SH, *et al*. Case of pseudomembranous necrotizing tracheobronchial aspergillosis in an immunocompetent host. Korean J Intern Med 2006;21:279-82.
6. Wu N, Huang Y, Li Q, Bai C, Huang HD, Yao XP. Isolated invasive *Aspergillus* tracheobronchitis: A clinical study of 19 cases. Clin Microbiol Infect 2010;16:689-95.