Disseminated Pulmonary Mucormycosis with Concomitant Tuberculosis Infection in a Diabetic Patient

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Abstract

Patients with diabetes are often susceptible to various opportunistic infections such as tuberculosis and mucormycosis. However, the occurrence of both these infections simultaneously is rare. We present one such case of pulmonary tuberculosis with disseminated pulmonary mucormycosis in a patient with diabetes, which was successfully managed.

Keywords: Amphotericin B, diabetic ketoacidosis, posaconazole

INTRODUCTION

Mucormycosis is one of the most rapidly progressing and fulminant forms of fungal infection occurring in patients with predisposing factors such as uncontrolled diabetes, malignancies, renal failure, organ transplant, long-term corticosteroid, and immunosuppressive therapy. Diabetes mellitus remains the most common predisposing factor for mucormycosis globally.[1] There is also evidence suggesting an increased risk of tuberculosis among people with diabetes.[2] Pulmonary mucormycosis and tuberculosis coinfection are rare, and to the best of our knowledge, only four such cases have been reported till date.[3-6] This coinfection poses a challenge to the clinician in the diagnosis and management due to the similar presentations and need for long-duration treatment. Herein, we present one such rare case of pulmonary tuberculosis with concomitant disseminated pulmonary mucormycosis in a patient with diabetes.

CASE REPORT

A 54-year-old male presented with chief complaints of low-grade fever, cough with expectoration, and anorexia for a month. He was a known case of diabetes mellitus for the last 15 years, which was poorly controlled on oral medications. On examination, he was febrile and tachypneic. The respiratory system examination revealed crepitations in right infrascapular and intraaxillary regions. The rest of the systemic examination was essentially normal. On blood investigations, he had deranged blood glucose levels (random blood sugar – 300 mg/dl and HbA1c – 10.2%) with increased acute-phase reactants. Renal function tests, liver function tests, serum electrolytes, and urine examination were normal. Chest X-ray showed homogeneous opacity in the right middle and lower zone. Acid-fast bacilli were seen on sputum examination, and he was started on anti-tuberculous therapy (ATT). However, during the 2nd week of his hospital stay, he developed a pustule over his back which progressed to become an ulcer [Figure 1]. He was empirically started on broad-spectrum antibiotics, and debridement of the ulcer was done. His HIV status was negative, and tests for systemic vasculitis were also negative. Multiple pus samples sent from the ulcer site for Gram stain, culture, fungal elements, and acid-fast bacteria were negative. Finally, a biopsy from the ulcer edge was done which revealed periodic acid-Schiff positive asceptate hyphae, suggestive of mucormycosis.

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A contrast-enhanced computed tomography (CECT) of the chest done in view of persistent productive cough showed right lower lobe lateral segment consolidation with cavitation which was encroaching in intercostal muscles [Figure 2]. Bronchoalveolar lavage fluid for galactomannan, potassium hydroxide mount, Gram stain, and cultures were negative. Computed tomography-guided lung biopsy was done which showed aseptate hyphae, confirming the diagnosis of pulmonary mucormycosis [Figure 3]. A final diagnosis of pulmonary mucormycosis with skin dissemination and tuberculosis coinfection was made. His ATT was continued, and liposomal amphotericin B (5 mg/kg) daily was given for 3 weeks, followed by oral posaconazole. He was given insulin injections to maintain strict euglycemia. He showed clinical improvement without any serious adverse effects. A repeat CECT chest done after a month showed significant clearing in his lung lesions [Figure 4]. There was also healing of skin ulcer with healthy granulation tissue [Figure 5].

**DISCUSSION**

Immunocompromised patients with diabetes are at risk of acquiring various opportunistic infections such as tuberculosis and mucormycosis.[7] Uncontrolled hyperglycemia in patients with diabetes (particularly in patients having ketoacidosis) stimulates fungal proliferation and also decreases phagocytic efficiency which permits the otherwise innocuous organisms to thrive in acid-rich environment.[8] Similarly, patients with diabetes have three times the risk of developing tuberculosis due to dysfunctional innate and adaptive immunity.[9] Out of four reported cases of pulmonary tuberculosis with mucormycosis coinfection, three patients had uncontrolled diabetes.

Pulmonary mucormycosis is not uncommon in patients with diabetes and has a mortality rate of almost 75%. The clinical features are nonspecific such as fever, cough, dyspnea, chest pain, and hemoptysis. Radiological features include infiltrates, nodules, and cavitation similar to pulmonary tuberculosis.[10] Pulmonary mucormycosis can invade to adjacent structures; however, dissemination to the skin is very rare. In a review of 929 cases of mucormycosis, only 3% of patients had hematogenous spread of mucor from other organs to skin.[11] The diagnosis of mucormycosis is often delayed due to the lack of any biomarker and the need of tissue specimen from the involved site to demonstrate the presence of aseptate hyphae.[12]
The medical management of pulmonary mucormycosis includes anti-fungal therapy with or without lobectomy, whereas pulmonary tuberculosis is treated with ATT. The key to successful management, however, hinges on adequate glycemic control and discontinuation of immunosuppressive therapy. Our patient was successfully treated with antifungal therapy and ATT. Similarly, three out of four previously reported cases were managed medically, and only one patient succumbed to this coinfection.

**Conclusion**

Diabetes being rampant in today’s urbanized world poses a risk for serious bacterial and fungal infections. Fungal infections such as mucormycosis can mimic tuberculosis. Hence, it is imperative for the clinician to keep the possibility of fungal infections in nonresolving pneumonia as the early diagnosis and treatment can have a favorable outcome.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images, and other clinical information to be reported in the journal. The patient understands that name and initials will not be published and due efforts will be made to conceal the identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

**REFERENCES**