Prompt surgical debridement with adequate antifungal treatment as effective combination therapy for pulmonary mucormycosis

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Abstract

Pulmonary mucormycosis is an emerging life threatening fungal infection in the recent years. Immunocompromised patients and those with uncontrolled diabetes mellitus are exclusively affected by this infection. It carries a high mortality (40–76%) and morbidity. Here we present a patient, an elderly diabetic with fever and a cavity in the lung. He underwent lingulectomy and left lower lobectomy surgery. Histopathological examination of the specimen revealed numerous broad aseptate foldable fungal hyphae and sporangium suggesting pulmonary mucormycosis. He was treated with amphotericin B for six weeks. The patient was symptom free at his third month follow- up visit.

Keywords: Mucormycosis/Etiology, Lung diseases, Amphotericin B/Therapeutic use

Introduction

Mucormycosis is a rare fungal infection caused by organisms that belong to a group of fungi called Mucoromycotina in the order Mucorales of the class Zygomycetes.[1] These fungi are typically found in the soil and in association with decaying organic matter, such as leaves, compost piles, or rotten wood. It is classified as rhinocerbral, pulmonary, cutaneous, gastrointestinal, disseminated and uncommon presentations such as endocarditis, osteomyelitis, peritonitis, and renal infection.[2] In some series the incidence of pulmonary mucormycosis has been reported to be up to 24% among all cases of mucormycosis, but it may be underestimated due to the difficulties in diagnosis.[3]

Case Report

A 61 years old gentleman who was a farmer presented with shortness of breath, fever and dry cough for one month. Recently he was diagnosed with type II diabetes mellitus. His family physician started antituberculous treatment and empirical antibiotic therapy, but his symptoms did not resolve. On admission he had high blood sugars and he was treated with insulin. He had a thin built and was poorly nourished. Physical examination revealed a temperature of 101F, an oxygen saturation of 95%, and decreased breath sounds, dullness to percussion, and egophony at the left lower lung fields. Chest radiograph showed opacification of the left lower zone. (Fig. 1A) Contrast enhanced computed tomography of the thorax revealed a loculated hydropneumothorax with thick enhancing pleura of the lower lobe of the left lung. Areas of sub segmental atelectasis were seen in the left lower lobe. Linguar segment showed reverse halo sign. (Fig. 2A and 2B) Laboratory data revealed a hemoglobin of 9.2g/dL, and total leucocyte count of 9000cell/cu mm, Pleural fluid stain and culture for acid fast bacilli, and bacterial culture was negative. Bronchoscopy was normal.

He underwent left lower lobectomy and lingulectomy under single lung ventilation. Left lower lobe was collapsed and edematous. Abscess cavities extruding yellowish purulent material were in the lower lobe and lingula of the lung. Apical and basal pleural drain were placed and the thoracotomy was closed in layers.

Histopathological examination showed a cavity filled with necrosis and nuclear debris. Dispersed in the necrotic material are many broad aseptate foldable fungal hyphae and sporangium suggestive of mucormycosis as highlighted using lacto phenol cotton blue stain. (Fig. 3A, Fig. 3B)

Intravenous Amphotericin B 100mg/day was administered post operatively for six weeks. Strict glycemic control was maintained. Serum creatine was monitored weekly and good hydration was maintained. Pleural drain tubes were removed on the seventh post-operative day and the patient was discharged to home on the 14th day. Follow-up Chest X-ray (Fig. 1B) revealed good expansion of

the left lung and absence of residual disease.

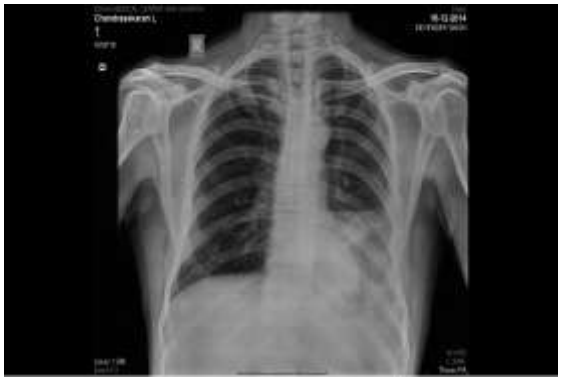

Fig. 1 a: Pre-operative chest X-ray left lower zone opacification

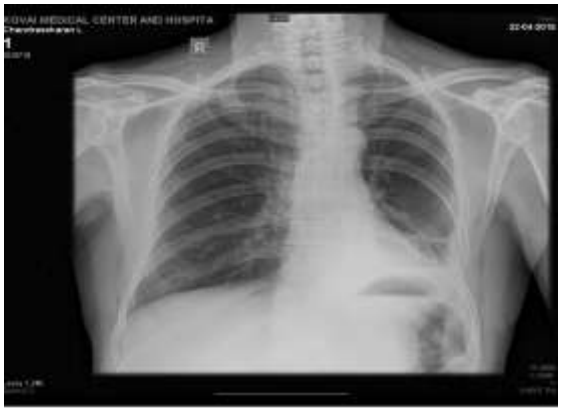

Fig. 1 b: Post-op chest X-ray shows good expansion of the left lung

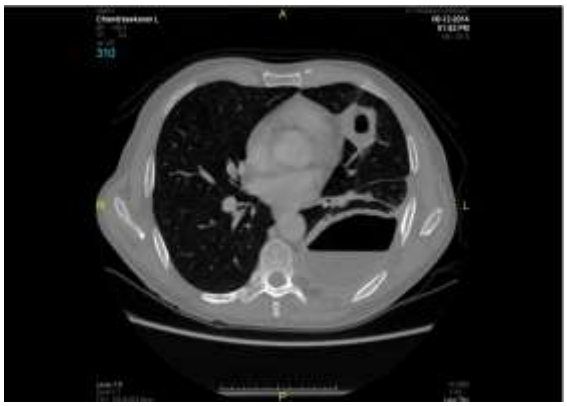

Fig. 2 a

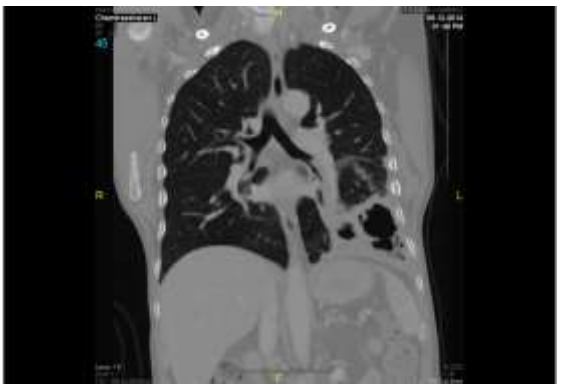

Fig. 2 b

Fig. 2 a & b: Shows loculated hydropneumothorax of left lower lobe and axial section shows reverse halo sign in the lingular segment

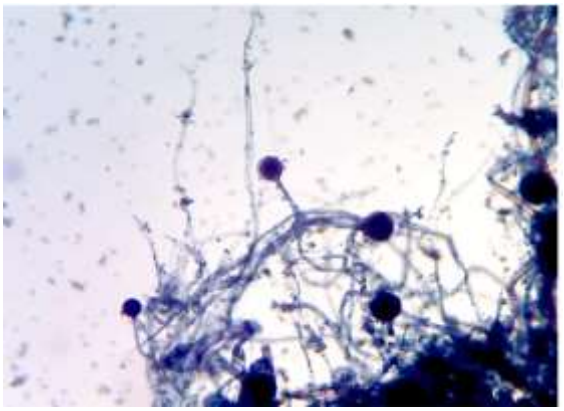

Fig. 3 a: Low power 10X microscopy shows the mucor hyphae

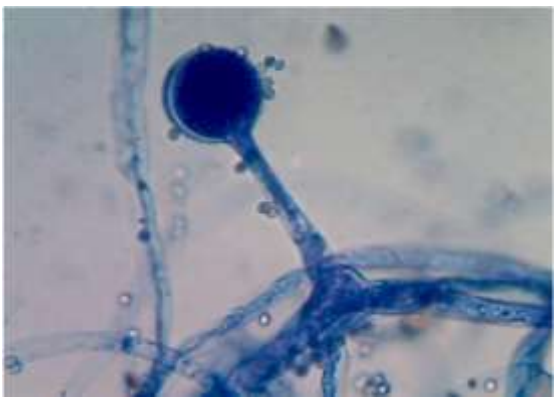

Fig. 3 b: High power 40X microscopy shows the sporangium

Discussion

Mucormycosis is caused by various species of mucorales like Rhizopus, Lichthemia and Mucor. Rhizopus commonly causes infection in humans. In the recent years this disease incidence is raising. The most common reported sites of invasive

mucormycosis have been the sinuses (39%), lungs (24%), and skin (19%).[4] The most important conditions predisposing to mucormycosis, according to various studies, include malignant hematological disease with or without stem cell transplantation, prolonged and severe neutropenia, poorly controlled diabetes mellitus with or without diabetic ketoacidosis, iron overload, major trauma, prolonged use of corticosteroids, illicit intravenous drug use, neonatal prematurity and malnourishment.[5]

Most human infections result from inhalation of fungal sporangiospores that have been released in the air or direct inoculation of organisms into disrupted skin or mucosa. The clinical features of pulmonary mucormycosis are prolonged high grade fever (>38C), pleurisy and dyspnea. Pulmonary mucormucosis spreads rapidly by local progression and angioinvasion thus causing tissue infarction and necrosis. It can invade the mediastinum, chest wall or the pericardium.

It should be a part of the differential diagnosis in patients who are immunosuppressed with non-resolving pneumonias. Computed tomography imaging features in pulmonary mucormycosis are nonspecific, it can present as consolidation, nodules, cavitations, atelectasis, effusion, posterior tracheal band thickening, hilar or mediastinal lymphadenopathy, air cresent sign, reverse halo sign and even normal findings.[6]

Histopathological examination of tissue and slide culture of the specimen for fungal growth obtained during surgery is a very important diagnostic tool. Mucorales genera produce non-pigmented, wide (5 to 20μm), thin-walled, foldable, ribbon-like hyphae with few septations (pauciseptate) and right-angle branching.

The recommended antifungal agent is liposomal Amphotericin B. Tissue penetration by his agent is poor so surgical dedridement is also advised. Renal failure is a known complication of this drug so careful monitoring of creatine levels and hydration is essential. We administered Amphotericin B 100mg/day for six weeks.

This case report shows that early diagnosis, surgical debridement in combination with adequate anti-fungal therapy results in a positive clinical outcome for the patient. Mucormycosis should be considered in the differential diagnosis of non-resolving pneumonias and cavitary lung lesions in patients with poorly controlled diabetes and other immunosuppressed states.

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Conflicts of interest: None declared

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