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Pulmonary Mucormycosis in a patient with Acute Myeloid Leukemia

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INTRODUCTION

Mucormycosis is a rare fungal infection that is common amongst uncontrolled diabetics and immunocompromised patients. The most common clinical presentation is rhino-orbital-cerebral infection, which typically affects diabetics with ketoacidosis.[1] Less commonly, pulmonary mucormycosis can occur in patients with hematologic malignancy, solid organ transplant and patients taking steroids or deferoxamine.[1] The following report describes a 25-year-old male with Acute Myeloid Leukemia (AML) who developed a pulmonary mucormycosis infection. With a mortality rate of about 87%, this case represents a favorable outcome for a rare and often lethal diagnosis.

CASE DESCRIPTION

A 25-year-old male with no past medical history presented to the hospital after two weeks of fatigue, shortness of breath and epistaxis. Lab work revealed leukocytosis with 43% blasts, anemia and thrombocytopenia. A bone marrow biopsy confirmed the diagnosis of AML. After admission, the patient developed persistent fevers and CT scan demonstrated ground-glass opacities in bilateral lung fields. Blood and sputum cultures, respiratory viral panel and acid fast studies were negative and the patient was started on antifungals and broad spectrum antibiotics. Bronchoscopy with bronchoalveolar lavage did not reveal an infectious source. The patient underwent induction chemotherapy with idarubicin and cytarabine, which was initially well tolerated. However, he soon developed neutropenic fever, hypoxia, and a non-productive cough. The treatment was broadened from vancomycin, zosyn and micafungin to meropenem and ambisome. Cultures remained negative during this time and subsequent imaging revealed right-middle and left-upper lobe consolidations with a central lucency.

OUTCOME AND FOLLOW UP

A CT-guided biopsy of the pulmonary consolidation was performed. Pathology revealed granulomatous inflammation with necrosis and silver stain showed sparsely septate hyphae consistent with mucormycosis. High-dose ambisome was initiated and the patient began to demonstrate signs of clinical improvement. He was discharged on a six-week course of intravenous ambisome. Follow-up imaging showed improvement of the consolidations and the patient was switched to oral posaconazle for six additional weeks.

DISCUSSION

Mucormycosis is a rare opportunistic fungal infection caused by fungi in the mucorales order, including mucor, rhizopus and absidia.[3] These fungi are ubiquitous in nature, commonly found in soil and decaying matter and released via airborne spores. Histologically, hyphae are seen in broad, irregular branches with few septations, as opposed to aspergilli, which have acute branching angles and many septations. Comprising a unique category of angioinvasive molds, tissue infarction is a hallmark of the disease process.[4] Risk factors include diabetes, hematologic malignancy, solid organ or stem cell transplant, immunocompromised state, iron overload and treatment with deferoxamine.[5] While incidence is difficult to estimate due to mucormycosis not being a reportable disease, it is estimated that approximately 500 cases occur in the US each year.[6] As rhino-orbital-cerebral infection is the most common clinical manifestation in diabetics, pulmonary mucormycosis is more commonly seen with hematologic malignancy, transplant patients and steroid or deferoxamine use. It is caused by direct inhalation of spores into bronchioles and alveoli, which presents as a rapidly progressing pneumonia with or without hemoptysis.[7] Clinical presentation is similar to that of other angioinvasive molds such as aspergillus or fusarium, and diagnosis is therefore obtained by culture and pathology. Imaging can show non-specific findings such as focal consolidation, nodules, masses, or pleural effusions. A halo sign on CT scan, which shows ground

glass attenuation surrounding a nodule, is characteristic of pulmonary aspergillus. A reverse halo-sign, on the other hand, shows focal ground glass attenuation within a ring of consolidation and is more commonly seen with mucormycosis. As cultures are typically negative, tissue diagnosis is often pursued. A biopsy with silver stain will typically reveal broad, irregular, branching hyphae.

In cases where pulmonary mucormycosis is localized to a single lobe, surgical excision can be performed. However, first line treatment for pulmonary mucormycosis remains high-dose, intravenous amphotericin B. Liposomal amphotericin is preferred due to improved efficacy and safety, although renal function and electrolytes must nonetheless be carefully monitored. Treatment should be initiated for several weeks until the patient clinically improves. At this time, amphotericin may be switched to oral posaconzale , which is often continued for several months until attainment of both clinical and radiographic resolution.

KEY POINTS

This case represents a rare and difficult diagnosis of pulmonary mucormycosis in a patient with hematologic malignancy. While a rapidly progressive disease with a high mortality rate, the patient in this case experienced a favorable outcome. Diagnosis was made only after invasive testing and successful treatment was achieved with an extended course of high dose intravenous ambisome.

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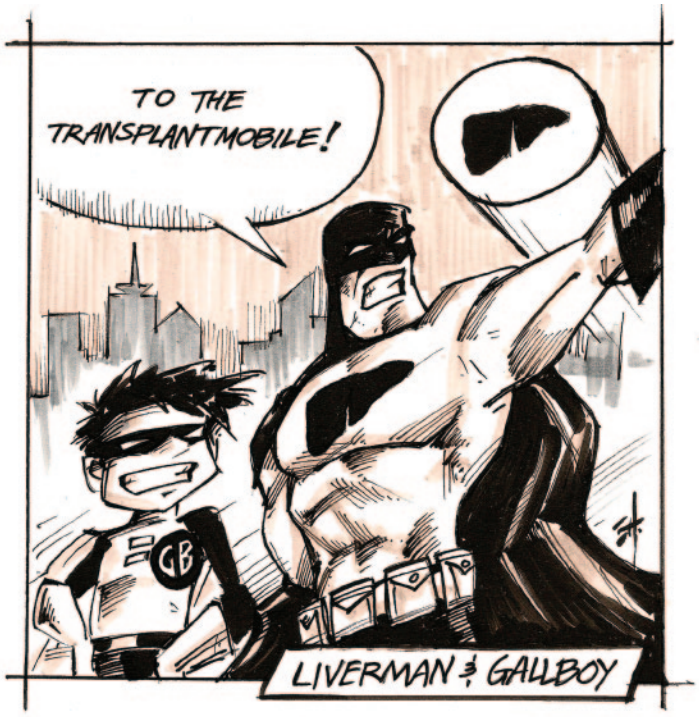

Cartoon by Eugene Han, MD

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