Case Report

Intestinal mucormycosis in an adult with H1N1 pneumonia on extracorporeal membrane oxygenation

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ABSTRACT

Gastrointestinal mucormycosis involving ileum is a very rare phenomenon. We present a case of 52-year-old male, known case of diabetes mellitus requiring extracorporeal membrane oxygenation (ECMO) for H1N1 pneumonia with severe acute respiratory distress syndrome (ARDS). The patient had small bowel obstruction with impending perforation requiring emergency bowel resection and ileostomy. The resected bowel segment histopathology showed mucormycosis. He was treated with conventional Amphotericin-B and later changed to Posaconazole. The patient responded very well and was gradually weaned from ventilator and successfully discharged home. This case report highlights rare site of mucormycosis. Early diagnosis and timely intervention can reduce mortality.

Keywords: Amphotericin, extracorporeal membrane oxygenation, gastrointestinal mucormycosis, posaconazole

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INTRODUCTION

Mucormycosis is a rare and devastating infection commonly seen in the immune-compromised. In 1885, Paultauf first reported mucormycosis in humans.[1] Gastrointestinal mucormycosis is rare and due to nonspecific presentation only 25% of the cases are diagnosed antemortem.[2] Early diagnosis and initiation of the treatment have shown improved survival.[3] We present a rare case of gastrointestinal mucormycosis in a patient on ECMO due to H1N1 pneumonia-associated severe ARDS who was managed successfully with surgical resection and antifungal treatment.

CASE REPORT

A 52-years-old male presented to our hospital with history of fever and breathing difficulty for 1 day. He was a known case of type-2 diabetes mellitus and hypertension. The patient was initially evaluated in emergency room (ER), he was conscious with pulse rate of 108bpm, blood pressure of 150/64 mmhg, Spo2: 52% (room air), and 82% on NIV with fio2 of 0.6, Glucometer random blood sugar (GRBS)- 330 mg/dl. Systemic examinations were normal except respiratory system showing diffuse bilateral crepitations. Routine blood investigations like complete blood count, serum electrolytes, liver function tests, renal function tests, and coagulation profile were normal. Arterial blood gas (ABG) analysis showed mild metabolic acidosis with type-1 respiratory failure (Ph-7.32, partial pressure of O2-65 mmhg, partial pressure of CO_2-46 mmhg, HCO3-26 mmol/l and lactate of 2.4 mmol/l). Chest X-ray [Figure 1] showing bilateral diffuse haziness and 2D transthoracic echocardiography was normal. At ER, the diagnosis of

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viral pneumonia with severe ARDS in the background of type-2 diabetes mellitus was made and he was shifted to intensive care unit (ICU) for further management.

Initially the patient was managed with non-invasive ventilation (NIV) but later intubated and ventilated due to worsening hypoxia. The patient was managed with inverse ratio pressure control ventilation with PEEP of 14 cm H_2O, Fio2 of 1, and plateau pressure less than 30 cm H_2O. Early prone ventilation was performed within 4 h of intubation. Due to refractory hypoxemia inspite of prone ventilation; he was initiated on veno-venous ECMO as rescue therapy. Right femoral vein was cannulated with 25 Fr cannula and placed up to the junction of inferior venacava and right atrium. Internal jugular vein was cannulated with 16 Fr cannula and passed up to the junction between superior venacava and right atrium. Pump flow kept at 4.5 L/min, sweep gas flow of 800 ml/min, Fio2 of 1, and activated clotting time of 180200 s. He was positive for H1N1 pneumonia. He was treated with antibiotics, antiviral, fluids, DVT and gastric ulcer prophylaxis, enteral nutrition, and other supportive measures. Tracheostomy was done on day 5 to assist weaning. Meanwhile on ECMO, his pneumonia resolved gradually with improvement in lung functions and he was weaned off from ECMO gradually and decannulated on day 10 of ECMO and simultaneously supporting him on ventilator. On 11th day the patient had fever, abdominal distension, and malena. Both upper GI endoscopy and colonoscopy were done (by medical gastroenterologist) which was inconclusive. Later we got the computed tomography abdomen (CT abdomen) which revealed ileal obstruction with impending perforation. He was immediately operated (general surgeon) where he had an ischemic small bowel segment [Figure 2], which was resected and ileostomy was done. The histopathology of the resected segment showed mucormycosis [Figure 3].

He was treated with conventional Amphotericin-B. His ileostomy was functioning well and thus initiated on enteral nutrition. He was gradually weaned off from ventilator and tracheostomy decannulation was done on day 24. The Amphotericin-B which was later stepped down (after 3 weeks) to oral Posaconazole once there was clinical improvement. Patient was shifted to ward on day 30th with complete recovery of ARDS and on day 40 of admission he was discharged from hosital with a functioning ileostomy.

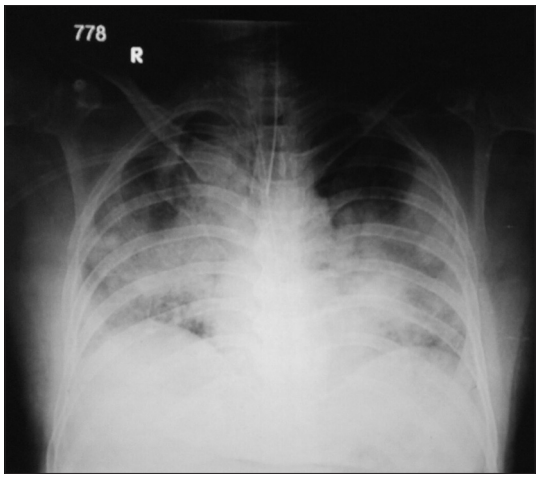

Figure 1: Initial chest X-ray of the patient having H1N1 pneumonia with severe acute respiratory distress syndrome

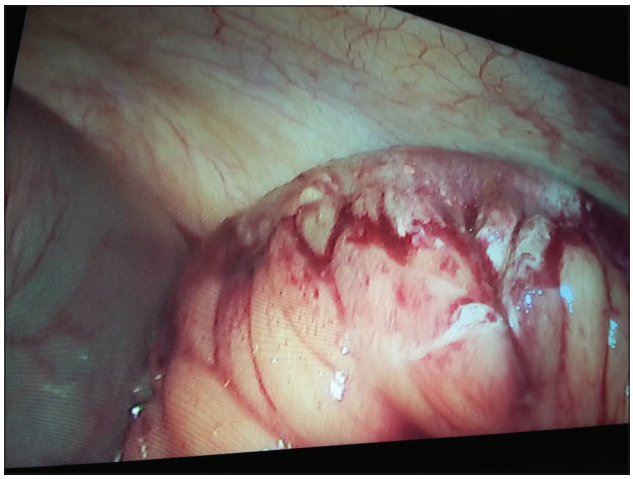

Figure 2: Showing ischemic bowel segment (Ileum)

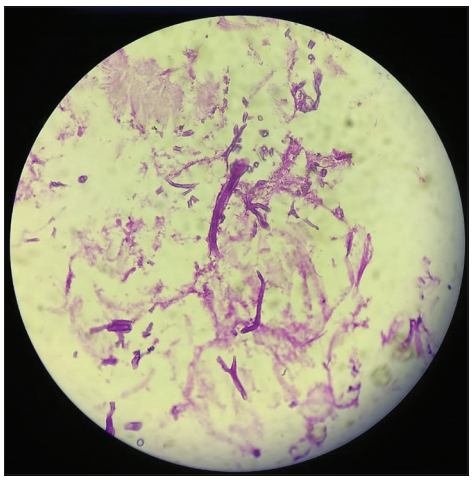

Figure 3: Histopathology of the resected segment showing hyphae of mucormycosis

DISCUSSION

Mucormycosis is an infection caused by the fungi of the subphylum mucormycotina, order mucorales.[4] These are ubiquitous organisms found on decaying organic matter and in soil. The genera commonly found in humans are Rhizopus, Mucor, Rhizomucor, Cunninghamella, Absidia, Saksenaea, and apophysomyces. They produce large spores

that become airborne and are exposed to humans during the day to day activities. Hyphae are broad, irregularly branched and rarely septate. Risk factors for mucormycosis infection include diabetes mellitus (common), steroids, deferoxamine, blood transfusion, iron supplements, hematological malignancies, solid and hematopoietic cell transplantation, trauma, and burns.[5] Rhizopus has enzyme ketone reductase[6] which helps them to thrive in acidic and high glucose conditions. Deferoxamine (iron chelator) acts as siderophore and enhances iron uptake by Rhizopus and stimulates growth. Our patient was diabetic and received 2 units of packed red blood cells for anemia due to malena.

Most common clinical manifestation is the rhinoorbitalcerebral mucormycosis by inhalation of spores into paranasal sinuses. Black eschar (necrosed tissue) seen in nasal mucosa and palate. Eye involvement causes periorbital edema, proptosis, and blindness. Lung involvement is due to inhalation of spores into bronchioles and alveoli. It causes pneumonia with infarction and on CT scan Halo or reverse halo sign[7] can be seen.

Gastrointestinal mucormycosis is unusual and comprises only 47% of reported cases.[1] It is mainly related to ingestion of pathogens[8] or due to ECMO cannulation. Blood culture from cannula were negative which excludes cannula related. Common sites are stomach and colon whereas ileum, duodenum and jejunum are rarely involved.[9] In our patient ileum was involvedwhich is very rare and mucormycosis in a patient on ECMO is barely reported. Patient usually present with abdominal pain, distension, vomiting hematemesis, or perforation.

Diagnosis is mainly histological. Fungal cultures are positive only in 50% of cases. Serum 1,3-Beta-D-glucan and galactomannan assay are usually negative. Endoscopic biopsy is required for gastrointestinal mucormycosis, in our patient we used excision biopsy. Polymerase chain reaction (PCR)[10] and matrix-assisted laser desorption ionization-time of flight (MALDI-TOF) mass spectrometry is also used. Treatment is surgical debridement of the necrosed tissue and antifungals. Amphotericin-B is the drug of choice (for several weeks). Step down treatment with posaconazole/isavuconazole (oral/IV) can be considered in patients who respond clinically to Amphotericin-B (usually takes several weeks). Other rare treatments include cytokines and hyperbaric oxygen. The prophylactic antifungal treatment is not recommended in a patient with ECMO.

Mortality is about 2562% with rhinoorbitalcerebral mucormycosis and 90100% in disseminated infection.[1] Clinicians need to maintain a high index of suspicion and perform timely and appropriate diagnostic evaluation to allow early initiation of antifungal and surgical therapy for improved patient outcome. In our patient the reason for mucormycosis may be multifactorial, such as diabetes mellitus, severe sepsis and multi-organ failure, and repeated blood transfusion. The route of entry may be ingestion. This case report highlights the rare site of mucormycosis (Ileum) and the first case report in a patient with ECMO.

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Conflicts of interest

There are no conflicts of interest.

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