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Case Report

A case report on gastrointestinal mucormycosis

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ABSTRACT

Mucormycosis is a rare but often fatal opportunistic fungal infection and gastrointestinal (GI) mucormycosis is an uncommon subtype associated with high mortality, particularly in immunocompromised individuals such as those with diabetes, malignancy or organ failure. A 57-year-old man reported with symptoms of fever, jaundice, altered mentation and generalised weakness. He was intubated and managed in ICU for sepsis, MODS and encephalopathy. Investigations revealed hyperglycaemia, renal dysfunction and leucocytosis and were managed with several intravenous antibiotics and other supportive care, sustained low-efficiency dialysis (SLED) was performed due to hyperkalemia and metabolic acidosis, along with acute kidney injury (AKI). After an endoscopy showed an ulcerated tumor in the stomach fundus, a sleeve gastrectomy and laparotomy were carried out. Histopathology confirmed gastric mucormycosis with angioinvasion. Initial treatment with liposomal Amphotericin B (300 mg, IV, once daily) was given and stopped due to acute kidney injury and replaced by Isavuconazole (200 mg, oral, once daily). Multidisciplinary care led to clinical improvement and the patient was discharged in stable condition. Prompt endoscopic evaluation, surgical intervention, and timely antifungal therapy, especially Isavuconazole when Amphotericin B is contraindicated, can significantly enhance survival and multidisciplinary approach is vital in managing such complex infections.

Keywords: Gastric mucormycosis, Isavuconazole, Liposomal amphotericin B, Laparotomy, Sleeve gastrectomy, Acute kidney injury, Fungal infection

INTRODUCTION

Mucormycosis also known as phycomycosis or zygomycosis, is a rare, fatal opportunistic fungal infection arises from fungi and initially reported by Paultauf in the year 1885.[1] It has often been noted in patients with diabetes mellitus, hematological cancers, organ transplants, corticosteroid therapy, a history of trauma and after experiencing burns.[2] Spores of mucormycosis can be found in soil, decomposing organic material and the entry of these spores into the human body may occur via ingestion, inhalation and inoculation.[3] The six recognized types of mucormycosis that have been commonly reported include rhino cerebral, pulmonary, cutaneous, gastrointestinal, disseminated and rare forms.[4] The prognosis and chances of survival are closely linked to early detection and prompt treatment. The mortality rate for mucormycosis ranges from 40% to 80%, even with improvements in treatment options and is influenced by the location of infection.[5]

Here, we present a case of male patient diagnosed with Gastrointestinal (GI) mucormycosis, treated with antifungal therapy and surgical procedures such as laparotomy and sleeve gastrectomy.

CASE REPORT

A 57-year-old male reported with fever, chills, jaundice, altered mentation and generalized weakness over the past

four days. He was treated at an outside hospital, intubated for seizure, encephalopathy and poor GCS and had a cardiac arrest (S/P CPR). On arrival, he was on ventilator support, receiving noradrenaline support and had a Glasgow coma scale (GCS) of E1VT M1. He was admitted to the ICU with a provisional diagnosis of sepsis, multiple organ dysfunction syndrome (MODS), encephalopathy and managed with IV antibiotics, Meropenem (1gm, IV, thrice daily), Doxycycline (100mg, IV, twice daily), Teicoplanin (400mg, IV, once daily) and antivirals Acyclovir (500mg, IV, once daily) and hepatoprotectives Ursodeoxy colic acid (300mg, oral, twice daily), N-Acetyl Cysteine (1.2gm, IV, twice daily), Glutathione (600mg, IV, once daily) and Ade Metionine (400mg, oral, twice daily).

Necessary investigations were done, PCT (procalcitonin) 5.52, HbA1c 10.80, potassium 7.5 mmol/l, creatinine 4 mg/dl, urea 248 mg/dl, RBS 433 mg/dl, total leukocyte count (TLC): 31170 /µl, platelet count 1.30 lakh/µl, C-reactive protein (CRP) 6.2 mg/l, Serum glutamic-oxaloacetic transaminase (SGOT) 251 U/l, serum glutamic-pyruvate transaminase (SGPT) 156.2 U/l and total bilirubin 7.3 mg/dl. NT-proBNP was 1847 pg/ml, serum calcium 8.6 mg/dl, phosphorus 9.8 mg/dl and magnesium 3.1 mg/dl. A 2D echo showed an ejection fraction of 60%, mild concentric left ventricular hypertrophy, grade I diastolic dysfunction and mild tricuspid regurgitation/pulmonary arterial hypertension (TR/PAH) with no evidence of pulmonary embolism. Electroencephalogram indicated bi-hemispheric electro-physiological dysfunction. Brain MRI showed no diffusion restriction but revealed hazy signals in bilateral cerebral sulci, suggestive of meningitis sequelae. Chest and abdominal CT scans indicated pulmonary congestion and aspiration pneumonia.

CSF analysis was done with neurologist advice and it was inconclusive. With nephrologist advice sustained low-efficiency dialysis (SLED) was performed due to hyperkalemia and metabolic acidosis, along with acute kidney injury (AKI) and recommendations were followed accordingly. The patient received treatment including IV antibiotics, actrapid, antiepileptics (Levetiracetam 500mg, IV, thrice daily) along regular monitoring of CBP, CRP, RFT and LFT.

During his hospital stay, gradually AKI subsided and he is off haemodialysis support, he experienced a persistent fever along with elevated total leukocyte count (TLC) and C-reactive protein (CRP). Consequently, an infectious disease consultation was requested, blood samples for bactifast were sent and the antibiotic regimen; Ceftazidime-Avibactam 1.25g (IV, thrice daily) Aztreonam 1g (IV, thrice daily) was modified. Due to persistent sepsis and impaired sensorium requiring prolonged ventilation, repeat imaging with chest CT, abdominal CT and brain MRI was performed. After an endoscopy revealed an ulcerated mass in the stomach fundus (Figure 1), a laparotomy and sleeve gastrectomy were performed under general anesthesia. Histopathological examination confirmed the diagnosis of GI mucormycosis with angioinvasion (Figure 2). Treatment was started with intravenous liposomal amphotericin B (IV, 300mg, once daily) and oral Posaconazole however, due to the onset of acute kidney injury (AKI), the therapy was stopped and replaced with Inj. Isavuconazole (IV, 200mg, for every 8 hrs loading dose followed 200mg, oral, once daily) to maintain antifungal coverage while ensuring a safer renal profile. The sensorium showed improvement to E4VTM6, patient improved symptomatically and discharged in stable condition. On follow up patient has improved with no recurrence and attending for routine checkups.

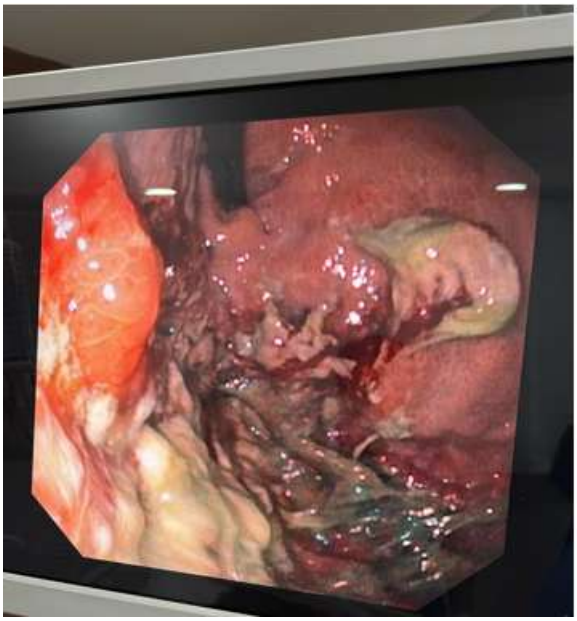

Figure 1: Ulcerated mass in the stomach fundus.

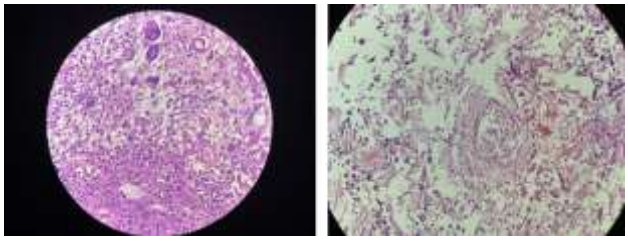

Figure 2: GI mucormycosis with angioinvasion.

DISCUSSION

GI mucormycosis is an uncommon manifestation characterized by a high mortality rate, primarily impacting patients with previously identified risk factors. Stomach is the most frequently infected organ, followed by the colon and ileum.[6]

In our case report patient experienced seizures, encephalopathy, sepsis etc. Seizures, encephalopathy in mucormycosis is a rare yet serious complication that arises

when the infection, mucormycosis extends to the brain resulting in inflammation and impairing brain function. This condition can trigger seizures and changes in mental status, particularly in those who have health issues such as diabetes or compromised immune systems.[7]

In our case, patient underwent endoscopy and histopathological examination (HPE) revealed stomach mucormycosis. Endoscopic evaluation and histopathological analysis are essential tools for diagnosing and managing gastrointestinal mucormycosis.[8] Endoscopy facilitates direct observation of the affected area, which may uncover distinctive lesions such as necrotic ulcers and other infected areas and these lesions might indicate GI mucormycosis, a rare yet potentially deadly fungal infection.[9] HPE remains the standard for diagnosing mucormycosis which includes the microscopic examination of tissue samples to detect the distinctive morphology of the fungus.[10]

Our patient primarily received liposomal amphotericin B but it was stopped in the view of AKI. Amphotericin B is a widely used antifungal drug that has been around for more than fifty years, primarily for treating serious fungal infections and it plays a key role in treating Mucormycosis.[11] Liposomal amphotericin B (LAmB), while exhibiting lower toxicity compared to alternative formulations, remains linked to a significant incidence of adverse effects. These adverse effects encompass infusion reactions, hepatotoxicity and potentially the most concerning nephrotoxicity.[12]

A study conducted by Gunathilaka et al, stated that Isavuconazole has considerable efficacy in the treatment of mucormycosis, achieving a notable success rate of 78.6% in pediatric patients, along with encouraging outcomes in adult cases and Isavuconazole, a wide-ranging triazole, has received approval for the treatment of mucormycosis when Amphotericin B is either inadequate or regarded as a primary treatment option. Importantly, Isavuconazole presents numerous benefits compared to other triazoles, like fewer chances of drug interactions, lower risk of organ toxicity, and convenient in having both IV and oral forms.[13]

In our case the patient underwent laparotomy and sleeve gastrectomy. A single antifungal treatment is typically inadequate, while, fundamental approach in Management of gastric mucormycosis typically requires intravenous antifungal therapy combined with surgical procedures like debridement or gastrectomy, which have proven effective in controlling the infection.[14] Orihara et al report that the patient's clinical condition significantly improved following a combination of antifungal medication and surgery.[15]

CONCLUSION

Gastrointestinal mucormycosis is a rare but extremely deadly fungal infection, especially in patients with weakened immune systems. It's crucial to have early suspicion, quick endoscopic assessment and histopathological confirmation for diagnosing gastric mucormycosis. Surgical procedures such as laparotomy and sleeve gastrectomy, when paired with an antifungal medication are key in enhancing patient outcomes.

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