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"A Rare Encounter with Gastrointestinal Mucormycosis: Diagnostic and Therapeutic Challenges"

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Abstract:
Mucormycosis is a very rare, life-threatening infection caused by fungi. Frequently observed in those patients having underlying immunosuppression, rarely found in immunocompetent patients. The infection can cause pulmonary, rhinocerebral, skin and soft tissue, central nervous system and gastrointestinal system. Nevertheless, gastrointestinal involvement is the rarest presentation. We present a rare case of invasive intestinal mucormycosis causing Gastrointestinal bleed in an adult female and review the literature, highlighting the rare clinical presentation, the need for high index of suspicion in the timely diagnosis and management of mucormycosis.
Keyword: *Gatrointestinal mucormycosis, gastrointestinal bleed, intestinal mucormycosis, fungal*

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I. Introduction

Fungi of the subphylum Mucoromycotina, order Mucorales cause mucormycosis—a rare, often fatal, angioinvasive infection, characterized by vascular invasion by hyphae with thrombosis and necrosis primarily of immunocompromised hosts.[1] *Rhizopus* species are the predominant human pathogens. Traditional risk factors for the development of invasive mucormycosis include diabetes, defects in host phagocytes, corticosteroid use, organ or stem cell transplantation, and increased levels of available serum iron as a result of acidosis or administration of deferoxamine.[2] In recent years, the disease has also increasingly been described in patients without traditional risk factors.[2]

The infection can cause pulmonary, rhinocerebral, skin and soft tissue, central nervous system, gastrointestinal and disseminated disease.[3] Gastrointestinal (GI) mucormycosis is an uncommon, usually opportunistic, life-threatening angio-invasive infection, and accounts for 4 to 7 % of all cases of mucormycosis. Nonetheless, the incidence of gastrointestinal mucormycosis appears to be on the rise. The stomach is the most common site of gastrointestinal mucormycosis, followed by the colon and ileum. Invasive mucormycosis is reported to be very rare in immunocompetent patients with primary gastrointestinal disease being the least common.[3]

In this case report, we are presenting a rare case of gastrointestinal mucormycosis causing upper gastrointestinal bleeding.

II. Case Presentation

A 44 year old healthy female, known case of bronchial asthma presented to the hospital with h/o recurrent bronchospasm, and acute exacerbation of bronchiectasis, patient was intubated and being medically managed for the same in the Intensive care unit for about sixteen days. During the course of her stay in the ICU, she was treated with IV antibiotics Meropenem and Polymyxin with steroids. Patient developed malena with significant drop in Hemoglobin for which Upper GI endoscopy was done which revealed antral ulcers - endotherapy and hemoclippping was done. Patient continued to have episodes of malena for which colonoscopy was done on 22/6/23 which revealed ulcers in ascending colon and cecal ulcers. (Figure – 1) Biopsy taken from the lesions showed **inflammatory polyp and mucormycosis**. CBNAAT - for Mycobacterium tuberculosis was found to be negative. (Figure – 2)

On microscopy sections studied show multiple bits of ceacal and colonic mucosa in a polypoidal configuration with increased mixed inflammation in lamina propria, and cryptitis. Epithelium shows erosion with granulation tissue response. Focal areas of broad aseptate hyphae with right angle branching seen (

Mucormycosis). The patient was being managed supportively but due to the multiorgan dysfunction and severe manifestations of the comorbid illness patient expired before the initiation of Antifungals in our case. However, the need for high index of suspicion of mucormycosis in such presentations must be present for timely diagnosis.

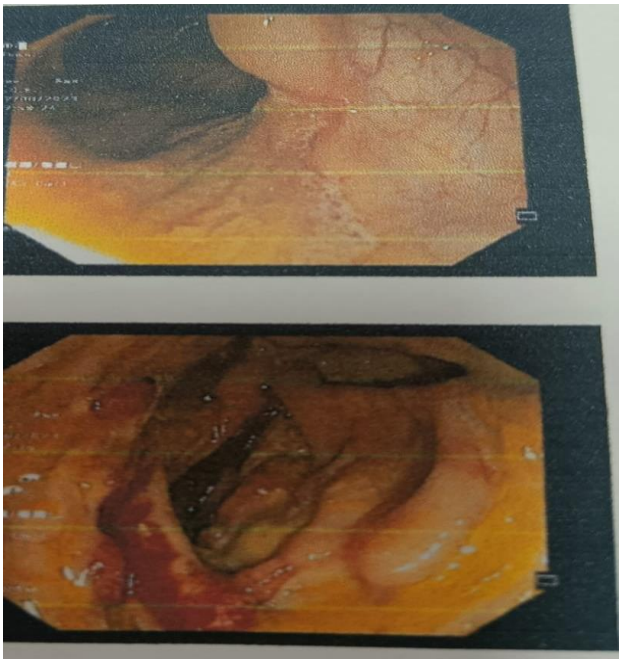

Figure 1

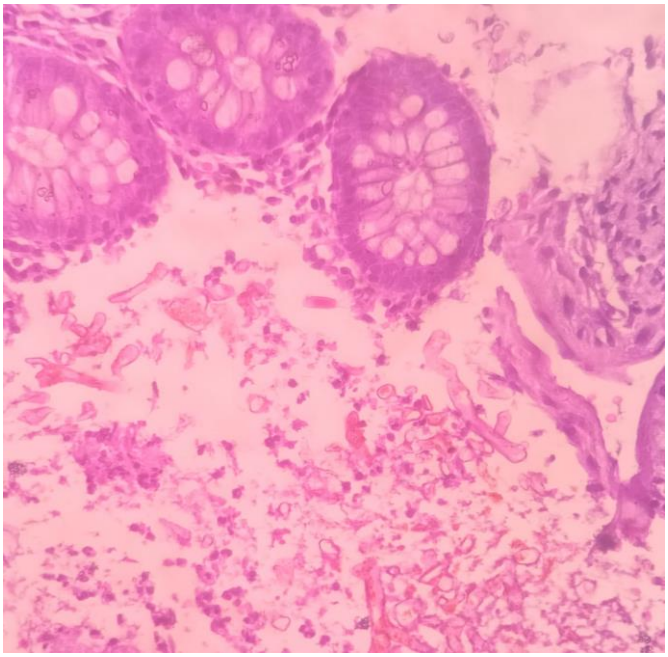

Figure 2 - Focal areas of broad aseptate hyphae with right angle branching seen (Mucormycosis)

III. Discussion

Mucormycosis is an acute opportunistic fungal infection that is caused by fungus from the class Mucorales. In a systematic review and meta-analysis of 851 cases of mucormycosis, rhino-orbital-cerebral mucormycosis (ROCM) involvement was most commonly observed among the reviewed cases (34%), followed by skin (22%) and lung involvement (20%).[4] Gastrointestinal mucormycosis was reported only in 8% of the cases. GIM (Gastro-intestinal Mucormycosis) accounts for only 7% of all cases, but the mortality rate can be as high as 85%.[5] The transmission mechanism of mucormycosis entails ingestion or inhalation of spores, and direct inoculation of damaged mucocutaneous surfaces. Contaminated medical devices comprise another route of entry for the filamentous fungus. Subsequently, Mucorales invade the nearby blood vessels resulting in vessel

thrombosis and tissue necrosis.[6]

Intestinal mucormycosis has wide range of clinical manifestation, ranging from presenting with peptic ulcer disease to an aggressive and life threatening intestinal invasion by fungal filaments causing systemic fungemia.[2] The pathologic hallmark of mucormycosis is infarction of host tissue resulting from angioinvasion by fungal hyphae. This gives rise to necrotic ulcers with resultant acute abdominal pain, hematemesis, perforation and peritonitis. Gastrointestinal mucormycosis can also involve the liver, spleen and pancreas. The diagnosis of gastrointestinal mucormycosis is often delayed because of the non-specific presentation. Infection may present with an abdominal mass (appendiceal, cecal or ileal) mistakenly thought to be an intra-abdominal abscess.[2] Given the rapid progression, prognosis is poor, only 25% of cases are diagnosed antemortem, as it is an extremely rare disease with significant fatal outcome even with treatment.[7]

A literature review of 31 cases showed that gastric mucormycosis most commonly presented in middle-aged male patients, with abdominal pain and GI bleeding being the most frequently encountered symptoms.[8] Rare diseases like gastric mucormycosis may present as upper gastrointestinal bleeding, mimicking peptic ulcer disease. This is consistent with our case, as the patient was a 45-year-old, but female patient who presented with a life-threatening GI bleed. The severity of the bleeding, significant Hemoglobin drop, and concomitant acute kidney injury can be explained by the pathogenic invasion of Mucorales into the blood vessels.

There are unfortunately no PCR-based or serological tests available for early diagnosis.Diagnosis is established by detailed microscopic and histopathological evaluation of a tissue biopsy that shows aseptate, fungal hyphae in proximity to necrotic areas. This can be obtained endoscopically or surgically. [9] The successful management of mucormycosis requires (1) early diagnosis, (2) reversal of predisposing risk factors (where possible), (3) surgical debridement and 4. prompt antifungal therapy. In our case due to delayed and sevrely compromised hemodynamic status on presentation, patient expired before she could receive the required management. In summary, we report the case of a 44- year-old female patient who presented with malena due to gastric mucormycosis diagnosed by emergent endoscopy,colonoscopy and histopathological examination of a tissue biopsy, emphasizing on the need for a high index of suspicion and emergent diagnostic evaluation in patients with nonspecific gastrointestinal symptoms to allow timely diagnosis of mucormycosis, early initiation of antifungal and surgical therapy.

IV. Conclusion

Mucormycosis is a catastrophic infection. Gastric mucormycosis is a very rare entity that can affect patients who are usually predisposed, but also immunocompetent patients. Clinical manifestations are not very characteristic and the confirmation of diagnosis is based on anatomopathological examination. Though usually fatal, timely recognition with high index of suspicion of gastric mucormycosis, holistic treatment and intervention at its early stage may lead to recovery in patients.

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