



Ileal mucormycosis in an immunocompetent individual presenting as septic shock: One of its kind presentations

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Abstract

Mucormycosis is a fatal invasive fungal infection caused by members of class Phycomycetes, mainly mucoraceae. It is associated with immunocompromised patients, uncontrolled diabetics, malignancies, post transplant recipients, long term steroid users, and in acidosis or deferoxamine administration where there is increased availability of iron. Recently, there is a sharp rise in incidence amongst immunocompetent individuals. Gastrointestinal mucormycosis (GIM) is an unusual form of presentation of this lethal fungal infection. Here we present a case of a young middle aged immunocompetent individual, presenting with septic shock and later diagnosed as GIM.

Keywords: *Gastrointestinal Mucormycosis, septic shock, immunocompetent individuals.*

Introduction

Mucormycosis, also known as Zygomycosis or Phycomycosis, is a rare, life-threatening angio-invasive infection, primarily of immunocompromised hosts, caused by the fungi of order mucorales.¹ However, it is now being reported with increased frequency in immunocompetent individuals.² GIM accounts for 4%–7% of all cases with only one previous report involving the jejunum. Entire intestine is vulnerable, with stomach, ileum and colon being most commonly involved. Diagnosis is often made by histopathological examination, with mortality rate being around 85%.¹

Case Report

A 44 year old female with no co-morbidities was admitted with sudden onset hypotension following a vague abdominal discomfort. She was recently treated for severe community acquired pneumonia and discharged a month back. On examination her abdomen was tense and rigid. She was hypotensive (80/40 mm Hg), tachycardic (125/min), tachypnoeic (38/min) in the emergency room requiring intubation and ionotropic support. Arterial Blood Gas (ABG) showed severe metabolic acidosis with elevated lactate (>15 mmol/L). She was initiated on broad spectrum intravenous antibiotics for suspected intra-abdominal sepsis.

Baseline investigations revealed leucocytosis ($38.6 \times 10^3/\text{mm}^3$), transaminitis (AST 285 U/L; ALT 166 U/L) and deranged coagulation profile (PT 18/11 seconds, INR 2.4, APTT 96/27 seconds). On day 2 and 3, she was hemodynamically unstable, requiring multiple inotrope. She had anuria with creatinine of 2 mg/dl (baseline 0.7 mg/dl) and hence continuous renal replacement therapy (CRRT) was started. On day 4, Computed Tomography of Chest and Abdomen with Angiography showed oedematous duodenum and jejunum with mucosal enhancement. Narrowing of Superior and Inferior Mesenteric Artery (SMA, IMA) and bilateral renal arteries were noted. Thrombophilia and vasculitis work-up were negative. C3 was low and C4 was normal.



Fig 1: CECT Abdomen showing oedematous duodenum and jejunum with mucosal enhancement.

On day 5, laparotomy with thrombolectomy of terminal branch of SMA was performed. Mesenteric pulse was well felt, with bowel loops appearing dusky. No obvious gangrene was present. Between Day 6 and Day 12, inotropes, antibiotics and CRRT were continued. Anti-fungal prophylaxis with anidulafungin was initiated in the view of prolonged antibiotics exposure, prolonged intensive care stay, gastrointestinal surgery with total parenteral nutrition and persistent negative blood cultures. On day 13, patient deteriorated further with hemodynamic instability and worsening of leucocytosis, anaemia and coagulation profile, requiring transfusion of

multiple blood products. Re-look laparotomy was done subsequently, which showed dusky small bowel with necrotic patch of 5-7 cm, 20 cm from ileo-caecal junction with no mesenteric pulse felt in that segment of ileum. Necrotic patches were resected and end ileostomy was performed.

The following day her ABG showed severe metabolic acidosis, elevated lactates and hyperkalemia with worsening clinical parameters, she suffered a cardiac arrest and despite best efforts she could not be revived and was declared dead. Biopsy from ileum revealed ischemic necrosis with numerous broad aseptate hyphal forms within blood vessels. Gomori Methanamine (GMS) stain confirmed the presence of fungus. Diagnosis of invasive mucormycosis of the ileum was made post-mortem.

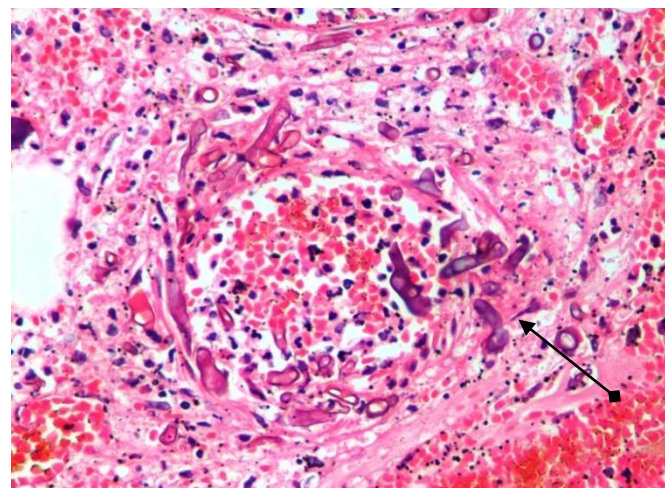


Fig 2: Numerous broad aseptate hyphal forms (arrowhead) consistent with mucor. Fungal elements seen within blood vessels (X 40 times)

Discussion

Stomach is the most common site of GIM, followed by colon and ileum. It is acquired by ingestion of pathogens in foods such as fermented milk, dried bread products and fermented porridge.² Maravi-Poma et al. reported a case series of GIM transmitted by sporangiospore contaminated wooden tongue depressors.³ Other sources include healthcare associated contaminated intravenous fluids, adhesive tapes bandages, ostomy bags, catheters, drains, peritoneal dialysis and intravascular devices.⁴

Clinical presentation is nonspecific, with vague abdominal pain, distension, fever, and hematochezia. Hallmark of GIM is colonization, infiltration, and angioinvasion. Histological features include wide, non-septate, branching at right angles, and look empty when haematoxylin and eosin stained. In a largest series by Roden et al., 66 cases 7% were gastrointestinal; and mortality rate was high 85%, related to bowel perforation and upper gastrointestinal hemorrhage.⁵ Sharma and associates reported isolated gastrointestinal mucormycosis in 8 patients of which 2 of them were middle-aged individuals without predisposing factors.⁸

The successful management includes 1. Early diagnosis, 2. Reversal of predisposing factors, 3. Surgical debridement and 4. Anti-fungal therapy. Polyenes and triazoles are the two main family of drugs used to combat mucormycosis. Amphotericin B and isavuconazole are used for the primary therapy of mucormycosis while posaconazole is sometimes used as off-label salvage therapy in patients who are intolerant to amphotericin B. Isavuconazole has excellent oral bioavailability, linear and predictable pharmacokinetics with minimal CYP450 interactions, hence used as both primary and salvage therapy.⁶ Surgical debridement plays a vital role, despite advances in medical management, as overall mortality is high. Therapy duration is highly individualized and encompasses the resolution of associated symptoms and findings, normalization of radiographic findings, negative cultures from the affected site, and resolution of immunosuppression.⁷

Conclusion

This case has several interesting points. i) Patient was immunocompetent with no co-morbidities. ii) Despite asymptomatic, initial presentation was septic shock. iii) Source, duration of exposure, and mode of transmission of mucormycosis remains unknown. iv) Most blood investigations were negative and diagnosis was made from histopathological examination.

In patients who have negative blood workup, and not responding to conventional treatment, the possibility of invasive fungal infections, including mucor, should be considered even in immunocompetent individuals as in our case. Rapid non-invasive diagnostic tests for mucormycosis in the near future will immensely help the treating physician, as timely diagnosis and early initiation of treatment is of paramount importance in these invasive fungal infections.

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