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Fatal haemorrhagic duodenal mucormycosis in a non-immunocompromised host: A case report

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ABSTRACT

Mucormycosis is an opportunistic infection caused by the fungi of the Mucorales order of the class Zygomycetes. Gastrointestinal mucormycosis is an uncommon, fatal condition accounting for only 7% of the cases. We present the case of a gastroduodenal mucormycosis presenting as recurrent massive hematemesis. We report this case to alert clinicians of this rare but fatal condition and to encourage further research into its pathogenesis and management.

1. Introduction

During the past two decades, mucormycosis has emerged as an important fungal infection with high associated mortality rates [1]. Mucormycosis is a rare and often fatal angioinvasive infection primarily of immunocompromised hosts [2]. While any organ system may be affected, rhino-orbital-cerebral and pulmonary infections dominate literature [2]. The most common reported sites of invasive mucormycosis have been the paranasal sinuses (39%), lungs (24%), and skin (19%) [1]. Mucormycosis confined only to the gastrointestinal tract is uncommon and accounts for only 7% of cases [3]. Nonetheless, the incidence of gastrointestinal mucormycosis appears to be on the rise [2,4], suggesting the possibility of the emergence of more virulent fungal strains.

In this report we present a case of a 22-year-old male patient who succumbed to death on day +3 post admission, after being admitted on day 0 with a chronic history of recurrent hematemesis and symptomatic anaemia. After resuscitation and blood transfusion, on day +1 an urgent oesophago-gastro-duodenoscopy (OGD) showed a fungating mass involving the first and second parts of the duodenum. Histology results showed features of mucormycosis. The patient died from massive recurrent haemorrhage before any definitive treatment could be administered. We report this case to alert clinicians of this rare but fatal condition and to encourage further research into its pathogenesis.

2. Case

A 22-year-old male patient was admitted on day 0, after vomiting approximately 250 mL of fresh blood. He had chronic history of recurrent hematemesis and melena for 6months. The patient had dizziness, shortness of breath and palpitations. He was not diabetic, denied use of alcohol and tested negative for Human Immunodeficiency Virus (HIV). There was no history of ingestion of non-steroidal anti-inflammatory drugs (NSAIDs), anticoagulation drugs or smoking. He had no history of haematological malignancies.

On examination he was alert and communicating. He had marked pallor and cold peripheries with a blood pressure of 85/45 mmHg, a pulse of 100/min, temp of 35.1 °C. The chest was clinically clear and the abdomen was soft, non-tender with no hepatosplenomegaly. The rest of the examination was unremarkable. Laboratory investigations showed a raised white blood cell count (WBC) of 12,000 micromoles per litre (μmol/L) (range 4–11), haemoglobin (Hb) level of 4.2 g per decilitre (g/dl) (range 12–14), mean corpuscular volume (MCV) of 84.1 femtolitres (range 80–96) and a platelet (PLT) count 215×10^3 (range 150–450). Liver function tests (LFT's), urea and electrolytes (U/E) were normal. After resuscitation and transfusion of 3 units of packed cells, an urgent OGD was done day +1. It showed a fungating mass involving the first and second part of the duodenum that was not bleeding and had stippled milliary appearance (see Fig. 1). Multiple biopsies were taken.

The patient was managed in high dependent unit (HDU) and continued on oxygen administered via face mask, intravenous normal

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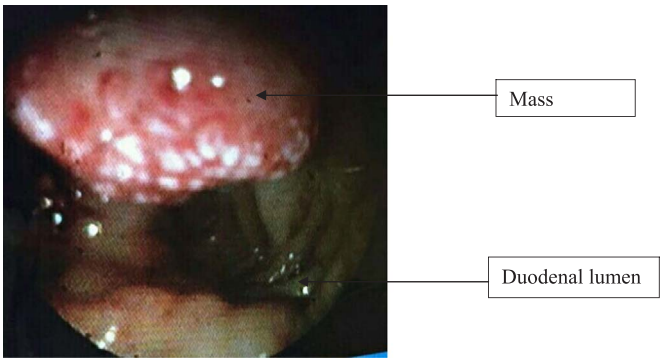

Fig. 1. Duodenal mass at endoscopy. (Oesophago-gastro-duodenoscopy (OGD) showing fungating mass involving the first part of the duodenum).

saline, Pylobact kit® Ranbaxy 2 tablets 12 hourly. He was put on a light diet. Post transfusion haemoglobin level was 7.8 g/dl. On day +3, the patient had an episode of massive hematemesis with passage of more than 1000 mL of blood and melena. He was haemodynamically unstable and had a reduced level of consciousness. Aggressive resuscitation was instituted and the patient was intubated to secure the airway. Unfortunately, the patient's condition continued to deteriorate and he finally succumbed to death. On day +5, the histopathological examination of the pyloro-duodenal mucosal biopsies revealed extensive ulceration and severe necrotising mixed inflammation associated with angioinvasive fungal organisms exhibiting thin walled broad aseptate hyphae morphologically consistent with Mucormycosis. There were no features of metaplasia, dysplasia or malignancy (Fig. 2).

3. Discussion

Mucormycosis is a rare and often fatal angioinvasive infection primarily of immunocompromised hosts [2]. It is an opportunistic infection seen in uncontrolled diabetes, haematological malignancies, iron overload, major trauma, prolonged use of corticosteroids, illicit intravenous drug use, neonatal prematurity, malnourishment and other chronic debilitating diseases [1,3,5]. Our patient was a young male, HIV negative, not diabetic and had no known chronic debilitating conditions that could have compromised his immune system. The frequent occurrence of gastrointestinal mucormycosis in a host without classical risk factors is an important observation [2], as it raises the possibility of the emergence of more virulent fungal strains. Such was the case on our patient. Interestingly, mucormycosis in patients with human immunodeficiency virus (HIV) or Acquired Immunodeficiency syndrome AIDS is very rare [1].

Gastrointestinal involvement of mucormycosis is uncommon and seldom diagnosed in living patients, with only 25% of gastrointestinal mucormycosis cases being diagnosed ante mortem [1]. Mucormycosis confined only to gastrointestinal tissue is uncommon and accounts for only 4%–7% of documented cases [2,3,5]. When the gastrointestinal tract is involved, the stomach is the most common site affected [3]. Gastrointestinal mucormycosis has a high mortality of 85% related to bowel perforation and upper gastrointestinal haemorrhage [5]. Our patient succumbed due to massive hematemesis. During the course of his illness, he did not show signs of peritonitis that could suggest a perforation. Gastrointestinal mucormycosis is acquired by ingestion of pathogens in foods such as fermented milk and dried bread products, fermented porridges and alcoholic drinks derived from corn and use of spore-contaminated herbal and homeopathic remedies [5–7]. It is difficult to ascertain how our patient could have acquired the pathogen since he died before definitive diagnosis could be made and no further history could be obtained from family members.

The infection usually presents with an appendiceal, cecal, or ileac mass or gastric perforation that may be associated with frequently massive upper gastrointestinal tract bleeding [1,6]. The diagnosis of gastrointestinal mucormycosis is delayed because of its nonspecific presentation and requires a high degree of suspicion, leading to early use of endoscopic biopsy analysis [1,2]. This was the case in our patient. Gastrointestinal mucormycosis ranges from colonisation of peptic ulcers in stomach to infiltrative disease or vascular invasion with dissemination [3]. The pathologic hallmark of mucormycosis is infarction of host tissue resulting from angioinvasion by the hyphae [2]. This gives rise to necrotic ulcers causing acute abdominal pain, hematemesis, perforation and peritonitis [2]. Due to the rapid progression the prognosis is poor [2,5].

Limited reports in literature are available describing the radiologic findings of mucormycosis [3]. Contrast enhanced computed tomography (CT) studies may show diffuse circumferential wall thickening with areas of both intense and poor contrast enhancement in intestinal wall correlating with areas of congestive changes and of necrosis and infarction caused by fungal proliferation respectively [3]. The histological detection of Mucorales organisms in tissue and their interpretation may be difficult [8]. Whilst these organisms are typically difficult to observe on hematoxylin-eosin stains (H & E), periodic acid–Schiff (PAS) and Gomori methenamine silver stains may be used to fully characterize the appearance of the organism [8]. Unfortunately, only fragments may be seen, even with the use of cell wall staining. Therefore, the use of immunohistochemical stains or the possibility of fluorescent and in situ hybridization or in situ polymerase chain reaction (PCR) may also be used to characterize and distinguish genera within the order of Mucorales [2,8].

Management of mucormycosis requires 1. early diagnosis 2. reversal of predisposing factors (where possible) 3. surgical debridement and 4.

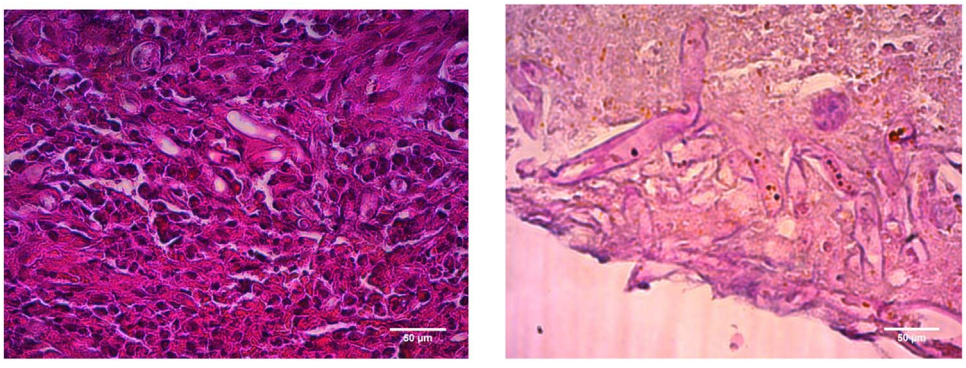

Fig. 2. A: Mucormycosis organisms within the mucosa. B: Mucormycosis organisms within the necrotic ulcer slough. (A. H & E X40 and B. H & E X40: Photomicrographs depicting ulceration and extensive necrotising mucosal inflammation associated with the presence of angioinvasive thin-walled broad and aseptate fungal hyphae morphologically consistent with mucormycosis).

prompt antifungal therapy [2,3]. Debridement of necrotic tissue appears to be critical for complete eradication because of poor tissue penetration and delivery of antifungal therapy to the infected site [2]. Primary antifungal therapy for mucormycosis should be based on a polyene with liposomal amphotericin (LAmB) being the preferred agent as opposed to Amphotericin B [2]. A high index of suspicion is required along with histopathological confirmation for diagnosis of isolated gastrointestinal mucormycosis, and greater awareness of the clinical settings in which it develops is a pre-requisite to improved survival and reducing the high mortality in such cases [3].

4. Conclusion

Mucormycosis is a rare and often fatal angioinvasive infection primarily of immunocompromised hosts. While any organ system may be affected, rhino-orbital-cerebral and pulmonary infections dominate literature. Mucormycosis confined to the gastrointestinal tract is uncommon. Increasing reports of such cases in non-immunocompromised hosts could suggest evolution of more virulent fungal strains. Gastrointestinal mucormycosis has a high mortality of 85% related to bowel perforation and upper gastrointestinal haemorrhage. A high index of suspicion is required along with histopathological confirmation for diagnosis of isolated gastrointestinal mucormycosis and greater awareness of the clinical settings in which it develops is a pre-requisite to improved survival and reducing the high mortality in such cases. The medical profession in Zimbabwe and elsewhere must be alert to the possibility of mucormycosis as a cause of massive upper gastrointestinal bleeding.

Conflict of interest

There are none.

Ethical approval

No ethical approval has applied for this case report study, only verbal and written consent by the patient's guardian.

Consent

Written informed consent was obtained from the patient's guardian for publication of this case report and accompanying images. A copy of the written consent is available for review.

Guarantor

Dr S G Mungazi.
Mr E G Muguti.

Author contribution

Simbarashe Gift Mungazi – case report design, subject research, consent and writing.

Blessing Zambuko – case report design, subject research and writing.

David Muchuweti – case report design, editing and writing.

Edwin Muguti – case report design, editing and writing.

Sizolwenkosi Mlotshwa – case report design, editing and writing.

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