

Gastrointestinal cryptococcoma – Immune reconstitution inflammatory syndrome or cryptococcal relapse in a patient with AIDS?

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ABSTRACT

The introduction of antiretroviral therapy (ART) may lead to unusual paradoxical and unmasking presentations of opportunistic infections. Intra-abdominal cryptococcosis is a rare manifestation of *Cryptococcus*. We present the case of an HIV-infected patient on ART, with a history of cryptococcal meningitis who presented with subacute, worsening abdominal pain during immune recovery. This evolved into chronic abdominal pain, with thickened bowel, and abdominal lymphadenopathy, while receiving empiric tuberculosis treatment. At 6-months, he developed intestinal perforation due to a histologically confirmed cryptococcoma.

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1. Introduction

Substantial improvement in survival of people living with HIV has been observed with the introduction of antiretroviral therapy (ART) in sub-Saharan Africa [1]. However, the introduction of ART has led to new immune-mediated complications from dysfunction of the recovering immune system, termed immune reconstitution inflammatory syndrome (IRIS) [2]. In patients with cryptococcal meningitis (CM), a very common opportunistic infection in sub-Saharan Africa, IRIS is a frequent complication that is most often associated with exaggerated inflammatory responses in the central nervous system. Although CM remains the most common cause of adult meningitis in the overall population in sub-Saharan Africa [3], there are only a few recognized, reported cases of gastrointestinal (GI) involvement with *Cryptococcus* in the literature [4]. The presentation of GI cryptococcosis is vague and often mistaken for other conditions [5]. Here, we describe intra-

abdominal cryptococcoma as an unusual manifestation of *Cryptococcus*. An HIV-infected patient on ART with a history of recent CM presented with chronic abdominal pain, thickened ileum, and abdominal lymphadenopathy. He was initially treated for abdominal Tuberculosis (TB) but later, he was shown to have a histologically confirmed cryptococcoma in the ileum. The major objective of this case report is to highlight the challenges in diagnosis and management of intra-abdominal cryptococcosis, especially in the setting of recent initiation of ART.

2. Case report

A 37 year old HIV-positive male was initially diagnosed and treated for CM in May of 2009 with amphotericin induction therapy for 2 weeks followed by fluconazole 400 mg/day. The initial fungal burden was 300 colony forming units/10 µL. He had a protracted hospital course lasting 4 weeks because of persistently high intracranial hypertension despite sterilization of his cerebrospinal fluid, and he, required repeated therapeutic lumbar punctures. He started ART (zidovudine, lamivudine, and efavirenz)

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on the 11th June 2009 with a baseline CD4 count of 5 cells/ μ L. At day +21 of ART, he reported abdominal pain with hypogastric tenderness that was empirically treated as urinary tract infection with a 5 day course of ciprofloxacin, and he noted some improvement. His CD4 count at the time had risen to 29 cells/ μ L. At day +35 of ART, the abdominal pain recurred associated with low grade fevers and a dry cough. His general exam was unremarkable, except for a tachypnea of 28 breaths per minute. The abdominal exam revealed tenderness in the right iliac fossa without any mass. A complete blood count, chest radiograph, and abdominal ultrasound were all unremarkable. The patient was managed as a possible atypical pneumonia with doxycycline, and his respiratory symptoms improved. However, the abdominal pain persisted intermittently with occasional vomiting. At day +84 of ART and in view of the persistent abdominal pain and an occasional dry cough, another chest radiograph was performed to exclude TB, which was also unremarkable. At this time, his CD4 was only 14 cells/ μ L, and the HIV-1 viral load was 22,000 copies/mL. He reported 100% adherence to his ART, and pill counts verified his adherence. At day +112 of ART, the patient still had similar complaints of abdominal pain and occasional vomiting. An abdominal ultrasound revealed an appendicular mass and para-aortic lymphadenopathy. Repeat CD4 was 8 cells/ μ L, and the viral load was minimally decreased at 15,475 copies/mL. The patient initially declined an ultrasound-guided biopsy but consented to the procedure at day +140 of ART. This second ultrasound revealed a thickened ileum up to 6mm, with adjacent 1 cm lymph nodes. Two biopsy specimens from the lymph nodes demonstrated no abnormality at histology. At day +168, the patient still had the same complaints with almost unchanged CD4 of 24 cells/ μ L and viral load of 23,755 copies/mL. He was presumed to be failing ART, possibly due to poor absorptive surface because of the thickened gut wall. A decision was made to initiate empiric anti-TB treatment for possible gastrointestinal TB. After one week of TB empiric therapy, the patient presented with an acute abdomen, having signs of focal peritonitis in the right iliac fossa. An upright abdominal radiograph demonstrated evidence of perforation with free air visible under the right hemidiaphragm. An emergency laparotomy was performed, revealing fecal matter with purulent fluid, adhesions, pneumoperitoneum, and intestinal perforation at 10 cm proximal to the ileocecal junction. Ten cm of thickened ileum was resected (Fig. 1). His post-operative course was unremarkable. The confirmatory histopathology report received 2 weeks later revealed a cryptococcoma in the ileal wall as the cause of the perforation with exuberant inflammation



Fig. 1. This gross pathology photograph shows a matted ileum with a thick fibrinopurulent yellow suppurative exudate and fibrin covering the serosal surface.

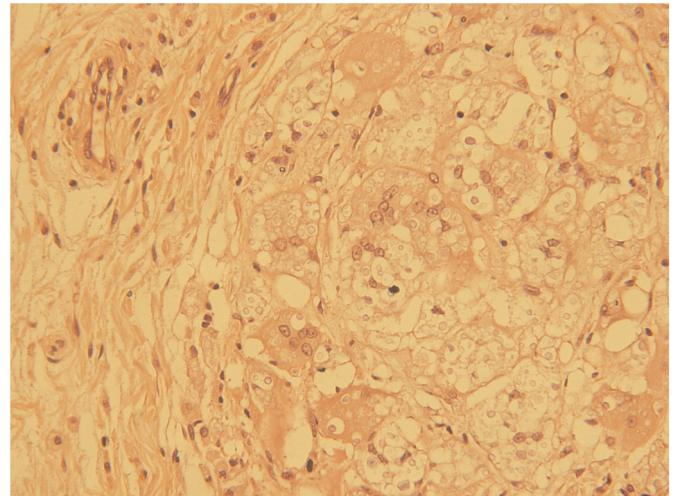


Fig. 2. This photomicrograph of a hematoxylin and eosin stained section of the ileum at magnification $\times 20$ objective shows *Cryptococcus neoformans* yeast seen in the cystic empty spaces. The yeasts appear as small round structures.

demonstrated by the multinucleated giant cell (Figs. 2 and 3 on hematoxylin and eosin stain and Figs. 4 and 5 on Periodic acid-Schiff stain). The patient's marked clinical improvement after surgery, the lack of any evidence of Cryptococcal infection elsewhere in the body especially in the central nervous system and a well formed granuloma formed the basis for the patient's continuation with maintenance dose of fluconazole 200 mg/day under observation. At this point, his TB medications were stopped and he was switched to second line ART with subsequent viral suppression. Through December 2014, he continues to remain in care on

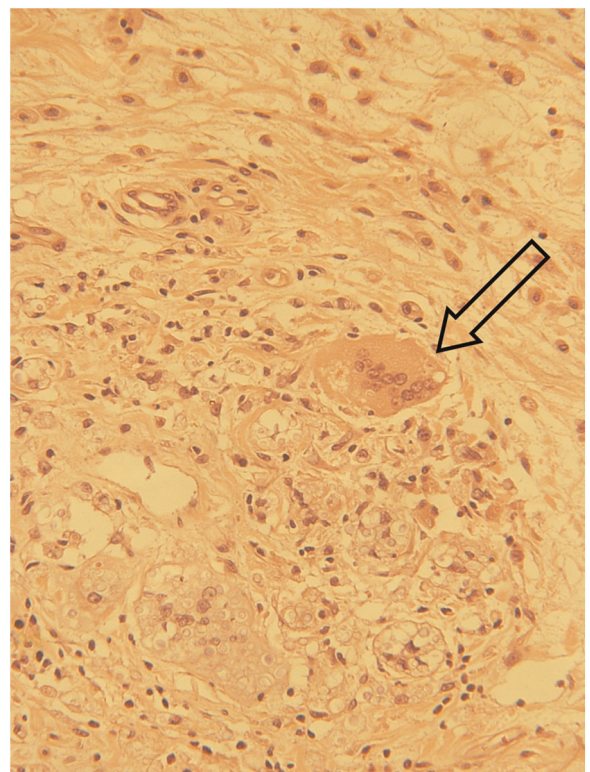


Fig. 3. This photomicrograph of a hematoxylin and eosin stained section of the ileum at magnification $\times 20$ objective also shows *Cryptococcus neoformans* yeasts seen in the cystic empty spaces. Take note of the giant cell with numerous yeast forms in its cytoplasm (arrow), representing intracellular parasitism by the *Cryptococcus*.

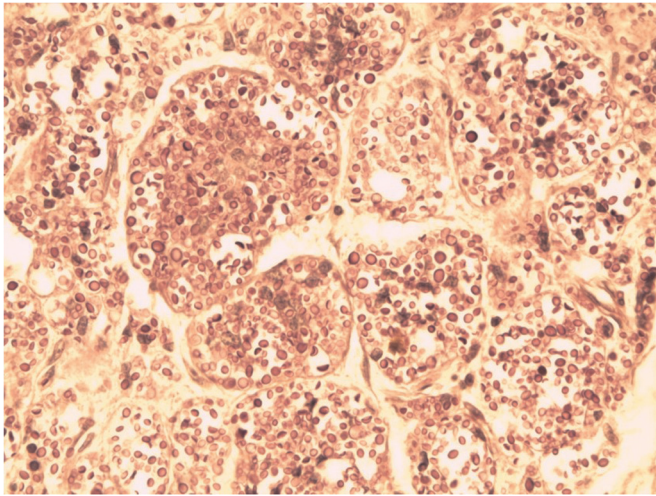


Fig. 4. The photomicrograph of Periodic acid-Schiff (PAS) stained sections of the ileum at magnification $\times 40$. Cryptococcosis demonstrated as PAS positive spores which are seen as magenta.

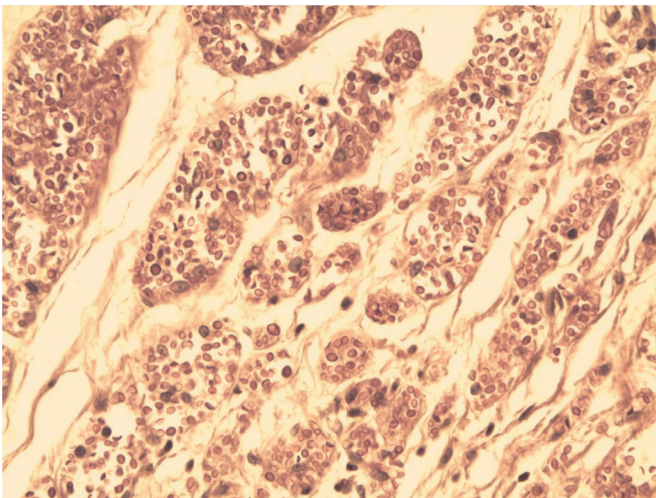


Fig. 5. The photomicrograph of Periodic acid-Schiff (PAS) stained sections of the ileum at magnification $\times 40$. Cryptococcosis demonstrated as PAS positive spores which are seen as magenta.

second line ART without any complaints.

3. Discussion

We have presented a 37 year old HIV positive male, with a history of recent CM who subsequently developed chronic abdominal pain, eventually manifesting as a cryptococcoma of the ileum. After treatment for CM and initiating ART, he had presented with chronic abdominal pain and low grade fever without diarrhea. He subsequently developed an intestinal perforation and presented with an acute surgical abdomen requiring bowel resection. Histology confirmed a cryptococcoma. We suspected an IRIS phenomena, in accordance with the patient presentation shortly after initiation of ART, recent history of CM, and exuberant inflammation in the granuloma on histology. Although, the initial immune recovery coupled with falling HIV-1 viral loads is consistent with IRIS [2], the subsequent virological failure makes the diagnosis of paradoxical IRIS less clear. In cryptococcosis, IRIS and treatment failure are not always mutually exclusive [6,7]. Ideally, intra-operative cultures would have been performed which could have helped distinguish IRIS from cryptococcal relapse, based on

culture sterility vs. growth, respectively.

Our patient had *Cryptococcus neoformans* var. *grubii* as identified by Wiesner et al. [8]. *C. neoformans* classically is associated with central nervous system involvement. Lung involvement is common but frequently missed [9], yet gastrointestinal involvement is rare [10]. *Cryptococcus* organisms can be acquired in the gut primarily through hematogenous dissemination [11] or less commonly through direct inoculation during paracentesis or via a neurosurgical shunt [12]. The presentation in these GI cases of cryptococcal infection is usually vague, as seen in our patient, with subacute fevers, constitutional symptoms, asthenia, and anorexia [13]. Virtually every intra-abdominal organ has been reported to be affected by cryptococcal infection [4].

The diagnosis of GI cryptococcosis requires a high index of suspicion, yet as in this case, clinicians may often initially focus on other common etiologies in immunocompromised persons, such as TB. Although abdominal TB was found to be the most common diagnosis in patients with HIV/AIDS presenting with chronic abdominal pain and abdominal lymphadenopathy [14], these studies were conducted predominantly in persons without cryptococcosis. Among persons with a known pre-existing opportunistic infection, such as CM, the pre-test probability changes as paradoxical IRIS enters into the differential diagnosis. In our case, the diagnosis of granulomatous cryptococcoma was confirmed on biopsy. The characteristics of granulomas found in HIV-infected persons varies depending on whether or not they are receiving ART [15]. In pulmonary cryptococcomas, persons not receiving ART demonstrate yeast proliferation with a histiocytic response but only minor lymphocytic and neutrophilic components [15]. Conversely, cryptococcal granulomas in persons on ART are characterized by the presence of CD4⁺ T cells, greater response of histiocytes, and multinucleated giant-cell formation [15], as demonstrated in our patient.

There is a paucity of evidenced-based data for the management of cryptococcomas. In our case, the initial abdominal lymph node biopsy (5 weeks prior to the perforation) did not reveal a diagnosis. The question raised is, if we had confirmed the diagnosis of GI cryptococcoma before the perforation, would we have been able to effectively intervene. To answer this question, it might be important to know if the cryptococcoma were due to IRIS or cryptococcal relapse. Could the patient have benefited from immunosuppressive therapy to treat IRIS and perhaps, avoid the perforation, or would more enhanced fungal therapy be needed to eradicate the *Cryptococcus*? Two case reports have described cryptococcomas due to paradoxical IRIS; one in the brain [16] and the other in the retroperitoneal abdomen [17]. In both cases, they simply observed the patients but also emphasized the importance of confirming sterility of contents in the cryptococcoma by culture. In a case report by Katchanov et al., a similar presentation of a central nervous system cryptococcoma was initially treated with antifungals exclusively with radiological worsening until steroids were added to direct therapy at paradoxical IRIS [6]. We have previously reported the challenges and dangers of using corticosteroids for CM because they may be contraindicated in cases of fluconazole-resistant cryptococcal relapse [7]. Surgery, corticosteroids, and interferon-gamma have been tried in IRIS-like cryptococcomas due *Cryptococcus gattii* [18]. The IDSA guidelines consider observation for most of the lesions [19].

In this case, empiric TB therapy, including rifampin, could have induced the metabolism of fluconazole, possibly lowering plasma levels by $\sim 50\%$ [20]. These lower levels may have removed the fungistatic control of the *Cryptococcus*, precipitating the perforation. However, after the surgery, the patient was observed on secondary prophylaxis doses of fluconazole, and he did well. To treat a cryptococcoma in the setting of recent initiation of ART, where IRIS versus relapse cannot be determined due to the

absence of culture results, treatment with a combination of enhanced antifungal therapy and anti-inflammatory therapy may be most prudent.

In conclusion, GI cryptococcosis has been described as a rare occurrence, with only a few published case reports. We have discussed an HIV-infected patient with profound immunosuppression and recent CM who developed a GI cryptococcoma during initial immune recovery followed by virological failure after initiation of ART. The cryptococcoma was not identified and he developed perforation of the ileum, requiring surgery. We anticipate that with the roll out of ART in sub-Saharan Africa, we are bound to see rare presentations of some of common conditions such as CM. We recommend that health workers have a high index of suspicion for unusual complications of opportunistic infections in the setting of ART-associated IRIS. Often treatment of IRIS requires only observation or anti-inflammatory drugs, but the presence of active infection needs to be excluded.

Conflict of interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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