Case Report

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Isolated Appendiceal Cryptococcoma in a Woman with Non-HIV Infection Mimicking Ovarian Tumor: A Case Report and Literature Review

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Although abdominal cryptococcomas and visceral cryptococcal lymphadenitis as a presentation of disseminated fungal infection have been reported mostly in patients with human immunodeficiency virus (HIV) infection, localized appendiceal involvement due to Cryptococcus has not been previously described in patients with non-HIV-infection. We report a patient who presented with a localized cryptococcoma over the appendix without obvious evidence of being immunocompromized. In addition, we conducted a literature review focusing on the general aspects of the intra-abdominal and gastrointestinal involvements by Cryptococcus in patients without evidence of immunodeficiency.

Key words: cryptococcoma, appendix, Cryptococcus, non-HIV infection, ovarian tumor

Introduction

Cryptococcosis is an invasive fungal infection caused by *Cryptococcus neoformans (C. neoformans)* or *Cryptococcus gattii (C. gattii)*. Generally, the organism enters the body through the respiratory tract and may be disseminated hematogenously to other sites. It is usually a subacute or chronic fungal infection with several typical clinical manifestations, including pneumonia, meningitis, peritonitis, disseminated infection, and cutaneous or skeletal involvement.[1]

Although abdominal cryptococcomas and visceral cryptococcal lymphadenitis as a presentation of disseminated fungal infection have been reported mostly in patients with human immunodeficiency virus (HIV) infection, localized intra-abdominal cryptococcal involvement in patients without HIV infection is rarely reported. Among people not infected with HIV, those with *Cryptococcus* infection usually present with lesions localized in the lungs, central nervous system, or skin. To our knowledge, appendiceal involvement without HIV infection has not been reported.[2] Here, we report a rare case of isolated appendical crypto-

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coccoma mimicking ovarian tumor in an adult patient without HIV infection.

Case Report

A 62-year-old woman with a history of hepatitis C infection without decompensated cirrhosis or other comorbid diseases presented to our hospital because of dull pain and soreness in her lower abdomen, which was associated with mildly impaired appetite for a few days. She denied fever, chills, night sweating, headache, neck pain, blurred vision, double vision, tinnitus, nausea, vomiting, diarrhea, constipation, chest pain, cough, urinary and fecal incontinence, and weight loss. Although there was a small pigeon loft one kilometer away from the patient's home, the patient denied any direct contact history with pigeons or chickens. She also did not remember any experience of contact with droppings of pigeons and chickens. On physical examination, the patient had stable vital signs without acute distress. Abdominal examination revealed mild tenderness over the lower abdomen. Neurological examination did not disclose any focal signs of anomaly.

Chest radiography revealed no abnormalities. A KUB (kidney, ureter, and bladder) radiograph revealed a calcification ring in the pelvic cavity (Fig. 1). Computed tomography identified a homogeneous cyst-like lesion measuring 4 cm × 3.5 cm with partial calcification located on the right side of pelvic cavity (Fig. 2). She was admitted to Obstetrics and Gynecology ward and received laparoscopic operation under the impression of ovarian tumor.

Surgical exploration revealed a round solid appendiceal mass without ascites or evidence of other tumor-like lesions or enlarged lymph nodes over the liver, spleen, stomach, intestine, colon, and peritoneum. The appendix was smoothly removed along with the mass (Fig. 3). Histopathological examination of the lesion showed many yeast-like microorganisms surrounded by a granulomatous inflammation (Fig. 4A). Fungal budding of the mucoid capsules was observed with positive staining of the cell wall with Gomori methenamine silver (GMS) (Fig. 4B) and periodic acid-Schiff (Fig. 4C) stains. Together with red staining of the capsule with the mucicarmine stain (Fig. 4D), the histopathological picture was compatible with cryptococcosis.

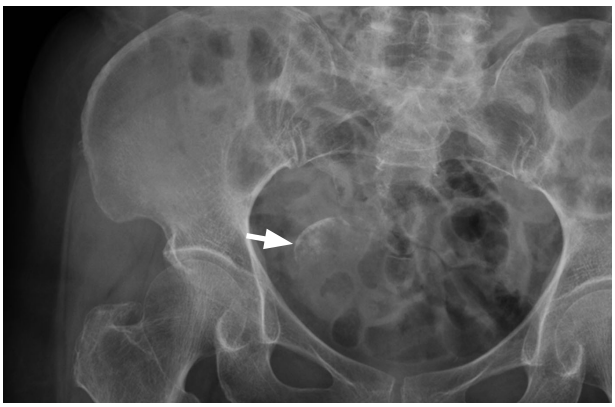

Fig. 1 Plain abdominal radiograph showing a ring of calcification in the pelvic cavity.

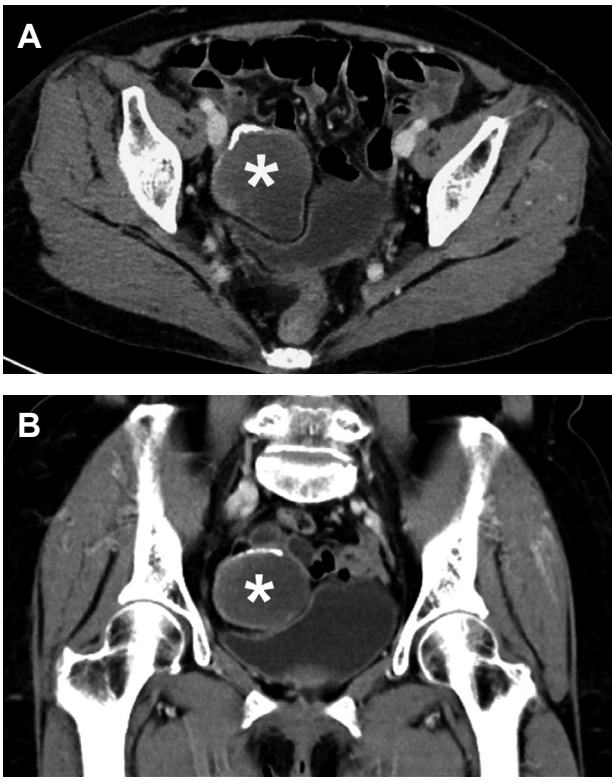

Fig. 2 Computed tomography with contrast on (A) axial, and (B) coronal views revealing a homogeneous cystic lesion measuring 4 cm × 3.5 cm with partial calcification on the margin without obvious enhancement (asterisk).

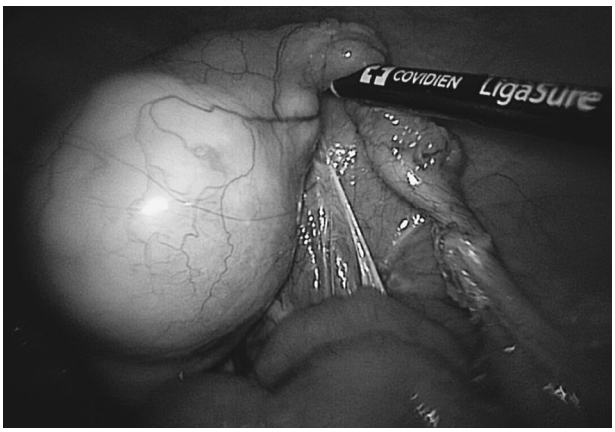

Fig. 3 Laparoscopic view of a round mass on the appendix.

The patient recovered uneventfully. After consultation with infection control specialist, a series of tests was suggested. The results of the HIV test and latex agglutination test for serum cryptococcal antigen were negative. It is noteworthy that antigen detection is not a sensitive test for the diagnosis of cryptococcal infection in immunocompetent patients and that positive results are often found in immunocompromised hosts with *C. neoformans* pneumonia. In addition, laboratory studies demonstrated negative results for rheumatoid factor and HBsAg as well as normal expressions of immune cell markers (CD3+, CD4+, CD8+, CD19+). The guidelines of the Infectious Diseases Society of America recommend oral fluconazole 400 mg (6 mg/kg) daily for 6 to 12 months for the treatment of cryptococcosis in immunocompetent patients with non-meningeal and non-pulmonary cryptococcosis without fungemia (e.g., only single site of infection). Because there was no evidence of another infection focus after excision of the cryptococcoma, she received oral fluconazole (400 mg/day) for two months without notable discomfort or complications during the course of treatment.

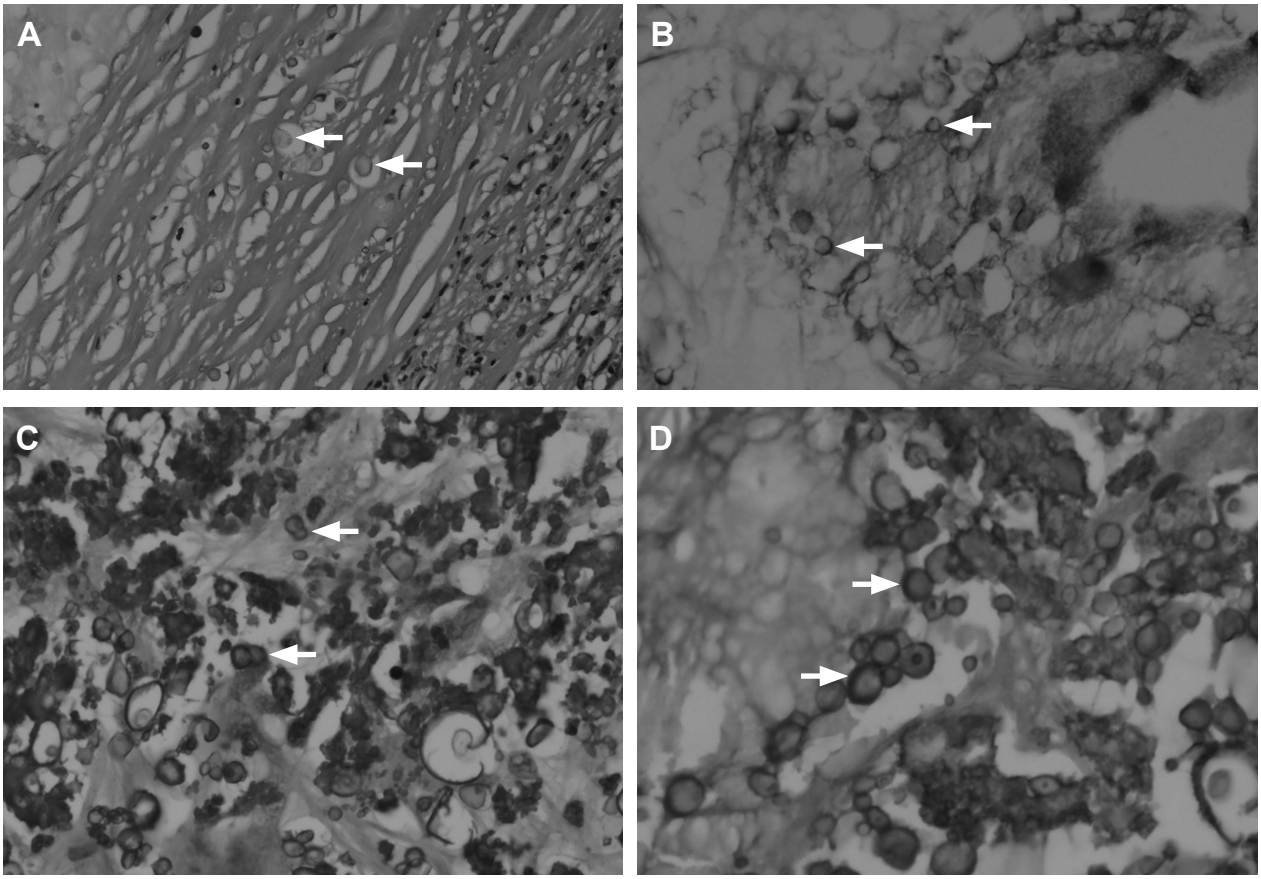

Fig. 4 Pathological examination of the specimen showing (A) many yeast-like microorganisms surrounded by a granulomatous inflammation and fungal budding of the mucoid capsules Hematoxylin and Eosin (H&E) staining as well as a positive staining of cell wall with (B) Gomori methenamine silver (GMS), (C) Periodic acid-Schiff, and (D) Mucicarmine (red) stains (white arrows).

Discussion

We report a patient who presented with a localized cryptococcoma on the appendix mimicking ovarian tumor without obvious evidence of an immunocompromized status.

Cryptococcosis is a fungal infection due to *C. neoformans* or *C. gattii* that has become increasingly prevalent in immunocompromised patients. Most patients with *C. neoformans* infection are in an immunocompromised status attributable to AIDS, liver disease, treatment with steroid, organ transplantation, malignancy, or sarcoidosis.[3] The species *C. neoformans* has been found in soil samples around the world in areas frequented by birds, especially pigeons and chickens. *C. neoformans* has also been isolated from roosting sites of pigeons and in association with rotting vegetation.[4] The immunosuppressive conditions that appear to increase the risk of *C. gattii* infection include AIDS, organ transplantation, malignancies, treatment with steroid, and chronic lung disease. *C. neoformans* typically causes disease in patients with compromised cell-mediated immunity, but some cases of *C. gattii* have been found in persons with normal immune systems. Some patients with *C. gattii* infection may have subclinical defects in immunity.[5] *C. gattii* has been isolated from eucalypts in some parts of the United States, Brazil, and Italy.[6] Trees native to Vancouver Island in Canada, such trees include the cedar, Garry oak, coastal western hemlock, grand fir, Douglas fir, and alder, have been implicated as an environmental niche for *C. gattii*.[6]

Abdominal cryptococcomas and visceral cryptococcal lymphadenitis as part of disseminated fungal infection have been reported mostly in patient with HIV infection.[2] Among people not infected with HIV, *Cryptococcus* infection usually presents as lesions localized in the lungs, central nervous system, or skin.[2] Localized intra-abdominal involvement due to *Cryptococcus* were rarely reported in patient without HIV infection. A review of literature (Table 1) revealed various intra-abdominal locations of *Cryptococcus* infection, including the omentum, visceral peritoneum, mesenteric lymph nodes, and other sites in patient without HIV infections or immunodeficiency.[2,7] One case of *Cryptococcus* was reported in a patient without HIV infection who presented with disseminated cryptococcosis and showed lymphadenopathy in the thorax and abdomen.[8] Another case of *Cryptococcus* infection was reported in a patient without HIV infection who presented with isolated biliary cryptococcosis and showed extra- and intrahepatic biliary dila-

Table 1. Reported cases of intra-abdominal cryptococcoma/cryptococcosis in patients without evidence of an immunocompromised status.

Reference	Sex	Age	Clinical presentation	Outcome
Araujo et al.[2]	Male	29	One 8 cm lesion in the omentum	Alive
	Male	36	Multiple granulomas in the visceral peritoneum	Alive
	Female	34	Mesenteric lymphadenitis (abdominal mass)	Alive
	Male	50	Jejunal perforation	Death
	Male	51	Large abdominal palpable painless mass	Alive
Lee et al.[7]	Male	80	A large abdominal cyst of the upper left abdominal cavity	Alive
Kim et al.[8]	Female	23	Lymphadenopathy in the thorax and abdomen (disseminated cryptococcosis)	Alive
Cai et al.[9]	Female	54	Extra- and intrahepatic biliary dilatations (isolated biliary cryptococcosis)	Alive
Our case	Female	62	A cryptococcoma on the appendix	Alive

tations.[9] Our case did not have any risk factor for *Cryptococcus* infection (i.e., no HIV infection, no prolonged treatment with glucocorticoids, no organ transplantation, no malignancy, no symptoms/signs of sarcoidosis), and was not associated the use of medical device such as ventriculoperitoneal shunt as previously reported.[7] Our case report is the first to describe cryptococcosis confined to the appendix.

All previous cases *Cryptococcus* infection showed lymph node involvement as part of its invasion of the immune system. The distinct abundance of immune cells in the appendix may explain the localized cryptococcosis in the appendix in our case.

Conclusion

We report a rare case of a woman who presented with a localized cryptococcoma on the appendix without an immunocompromised status. Our case demonstrated that cryptococcoma could not be ruled out even in the absence of immunodeficiency on encountering a patient with a suspicious image presentation.

Author Contributions

Conceptualization, JHC and CWL; Data curation, CWL, CCH and JHC; Writing articles, CCH; Preparing tables and Figures, CWL and CCH.

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Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Telephone informed consent was obtained from the patient's family for publication of this case report and any accompanying images.

Data Availability Statement

Not applicable.

Conflict of Interest

The authors declare no conflict of interest.

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