

All that glitters is not gold: a case report of a diffuse peritoneal aspergillosis

Cristian Tefas^{1,2}, Bobe Petrushev³, Cristina Pojoga¹, Radu Badea^{2,4}

¹Gastroenterology Department “Octavian Fodor” Institute of Gastroenterology and Hepatology, ²“Iuliu Hatieganu” University of Medicine and Pharmacy, ³Pathology Department “Octavian Fodor” Institute of Gastroenterology and Hepatology, ⁴Ultrasonography Department “Octavian Fodor” Institute of Gastroenterology and Hepatology, Cluj-Napoca, Romania

Abstract

Invasive aspergillosis is a rare disease, more frequently encountered in immunocompromised patients. We report a case of diffuse peritoneal aspergillosis. A 56-year old female with a history of recent renal transplantation was admitted with a suspicion of peritoneal carcinomatosis following a native computed tomography scan. Gray scale abdominal ultrasound showed multiple peritoneal masses. Upon performing contrast-enhanced ultrasound these masses demonstrated peripheral arterial enhancement and slow wash-out during the venous phase. The final histopathological examination confirmed a diagnosis of peritoneal aspergillosis. Gray scale ultrasonography in combination with contrast-enhanced ultrasonography is useful in the evaluation of intraabdominal masses. The procedures are of great value especially in patients with a high risk of contrast-induced nephropathy where contrast-enhanced CT or MRI are contraindicated.

Keywords: aspergillosis; carcinomatosis; peritoneum; contrast-enhanced ultrasound

Introduction

Aspergillosis comprises a variety of diseases caused by fungal infections from species of *Aspergillus*, with *A. fumigatus* and *A. flavus* being the most frequent [1,2]. The resulting illnesses usually affect the respiratory system. However, in immunocompromised patients, such as those with hematological malignancies, recipients of hematopoietic stem cells or solid organ transplantation, *Aspergillus* may cause many clinical forms. Diagnosis is usually made by serological, histopathological or imaging tests, while treatment strategies include corticoster-

oids and antifungal medication sometimes in combination with surgical debridement [3–6].

We present a case of peritoneal aspergillosis in a patient with a recent renal transplantation. We emphasize the importance of contrast-enhanced ultrasonography (CEUS) in the evaluation of intraabdominal masses in patients where intravenous contrast-enhanced computed tomography (CT) or magnetic resonance imaging (MRI) are not available or they cannot be performed because of acute or chronic kidney injury.

Case report

A 56-year old female patient with a history of hepatorenal polycystic disease, right nephrectomy and renal transplantation four months previously, was admitted to our gastroenterology unit with the suspicion of peritoneal carcinomatosis. This diagnosis was raised after performing a native CT scan in another hospital. The patient complained of diffuse abdominal pain and a 20-kilogram

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Corresponding author: Bobe Petrushev

19-21 Croitorilor Street,

400162, Cluj-Napoca, Romania

Phone: 0040742828871

Email: bobe.petrushev@gmail.com

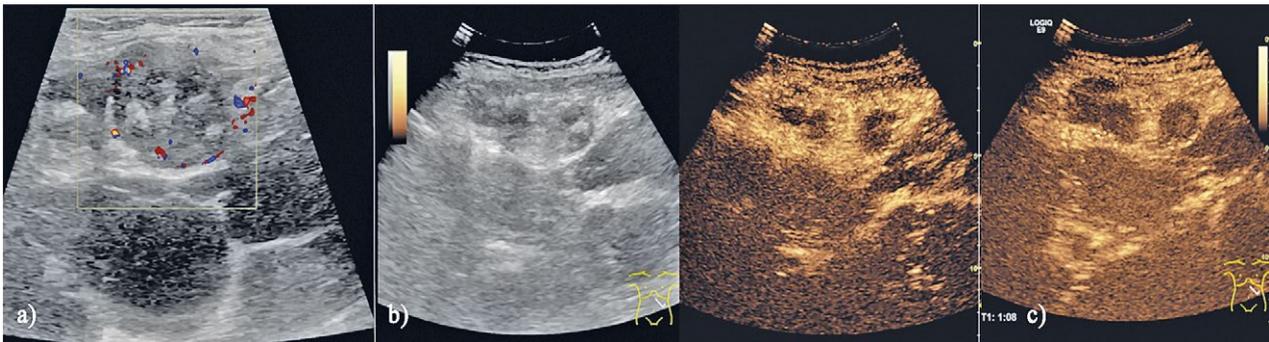


Fig 1. a) Gray-scale US showing an inhomogeneous hypoechoic peritoneal mass with a peripheral Doppler signal; b) CEUS showing peripheral arterial enhancement at 30 seconds from contrast injection (parametric evaluation of arterial phase); c) CEUS showing persistent contrast enhancement at 68 seconds from contrast injection (parametric evaluation of venous phase).

weight loss over the past weeks. Post-transplant immunosuppression was attained using a combination treatment of a calcineurin inhibitor and corticosteroids.

Physical examination revealed pallor and a diffusely enlarged abdomen. Laboratory tests revealed moderate grade anemia (Hb = 8.7 g/dl), hyperglycemia (209 mg/dl), hypoalbuminemia (2.9 g/dl) and an increase in creatinine levels (1.72 mg/dl) with a glomerular filtration rate (eGFR) of 37 ml/min.

Imaging evaluation started with conventional gray-scale abdominal ultrasound (US) which showed multiple nonhomogeneous hypoechoic masses on the peritoneum and in the left lower flank abdominal wall, up to 35 mm

in size (fig 1a). Follow-up CEUS was then performed and 1.6 ml of contrast agent (Sonovue – Bracco SpA, Milan, Italy) was injected, followed by a 10-cc bolus of saline. A mechanical index of 0.10 was used. The exploration was continuous for 5 minutes using longitudinal and transversal section planes of the abdomen. The peritoneal masses showed peripheral arterial enhancement, starting at 13 seconds after contrast-agent injection, with slow wash-out during the late venous phase (around 120 seconds) (fig 1b,c). Gray-scale US and CEUS were performed using a General Electric LOGIQ E9 imaging system. EF-SUMB recommendations were respected [7].

A US-guided percutaneous biopsy from one of the peritoneal masses was performed using a Bard Magnum biopsy system (Bard Biopsy, Tempe, Arizona, USA) with a 16G needle, producing a 5 mm tissue fragment. Subsequent histopathological examination with a Leica DM1000 microscope and a Leica CMOS DMC5400 camera using hematoxylin-eosin staining showed an inflammatory background and numerous hyphae with the tendency to form “masses” (fig 2a). Follow up periodic acid-Schiff (PAS) and Grocott’s methenamine silver (GMS) stains confirmed the diagnosis of aspergillosis (fig 2b).

The patient was then transferred to an infectious diseases unit where she underwent systemic antifungal treatment with a good outcome.

Discussion

In the case of peritoneal solid nodules, the first diagnosis to be usually considered is peritoneal carcinomatosis. However, there are a number of differential diagnoses to be taken into account, including infectious conditions. This case highlights how a prompt diagnosis is essential for a good patient outcome.

In immunocompromised patients, such as those who undergo therapeutic immunosuppression after organ

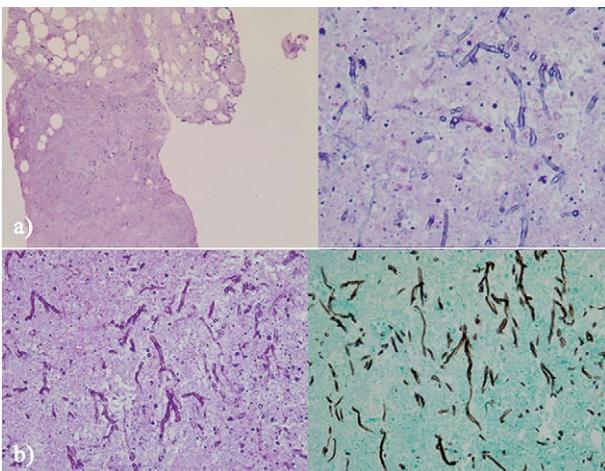


Fig 2. a) Hematoxylin-eosin staining using a 5x objective (left) and a 40x one (right). The staining highlights necrobiotic tissue with an inflammatory background and numerous hyphae with the tendency to form “masses” (left). The hyphae are uniform, tubular, narrow and regular, 2-5 micrometers in width. Branching is regular, progressive and dichotomous (right); b) *Aspergillus* hyphal morphology is demonstrated with special stains such as Periodic Acid Schiff (PAS) (left) and Grocott’s Methenamine Silver (GMS) (right).

transplantation, aspergillosis is the most frequent type of mold infections. In these patients, the most common form is pulmonary, which can subsequently disseminate, leading to organ failure, with death rates that can reach 90-100% [8,9]. *Aspergillus peritonitis* is very rare and usually encountered in patients undergoing peritoneal dialysis [8]. Risk factors associated with invasive aspergillosis after kidney transplantation include prolonged high dose corticosteroids, immunosuppressive therapy and graft failure [10]. To our knowledge, this is the first reported case of peritoneal aspergillosis in a patient who had undergone renal transplantation.

Invasive aspergillosis is frequently misdiagnosed as the clinical symptoms and physical findings are non-specific. Imaging findings are variable and transient. The halo sign is a characteristic finding on imaging studies and denotes nodules with surrounding ground-glass infiltrates [11,12]. These appear because of bleeding into the area surrounding the fungus and can be encountered in only up to 60% of patients, disappearing within a week. The air-crescent sign, which is secondary to the enlargement and cavitation of these nodules appears only after 3 weeks of illness [12].

In the reported case, the native CT scan showed multiple peritoneal nodules, well depicted in the greater omentum, suggesting the presence of peritoneal carcinomatosis. However, due to the patient's renal impairment, an intravenous contrast agent could not be used to further characterize the nodules.

CEUS showed peripheral arterial enhancement with a slow wash-out phase, similar to the behavior of an abscess. Due to the absence of any previous or current neoplasia in this patient and her immunocompromised status, CEUS was paramount in reorienting the diagnosis suggesting a more probable infectious cause for the peritoneal masses. In the absence of CEUS, having a suspicion of peritoneal carcinomatosis in mind, the patient would have been submitted to a series of costly and invasive procedures, with no additional benefit.

In **conclusion**, although the most common diagnosis of peritoneal masses is that of peritoneal carcinomatosis, we must always take into consideration other causes, especially in immunocompromised patients, where systemic opportunistic infections may appear, in order to send the patient for the right treatment in a timely manner.

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