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CLINICAL NOTES

Peritoneal tuberculosis. Radiographic diagnosis

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ABSTRACT

Peritoneal tuberculosis (TB) is an extrapulmonary form of presentation of tuberculosis. HIV infection is a primary risk factor for this condition. Diagnosis requires microbiological or histopathological confirmation in addition to supporting radiological imaging studies. Abdominal ultrasonography and CT are useful to obtain a radiographic diagnosis, with typical findings including diffuse peritoneal thickening, presence of ascites in varying volumes, adenopathies, and caseating nodes. We report 2 cases of patients with ascites and nodular peritoneal thickening on diagnostic images, as well as high CA-125 levels in laboratory tests. In both patients, a diagnosis of peritoneal tuberculosis was reached following a US-guided peritoneal biopsy.

Key words: Peritoneal tuberculosis. Cancer antigen (CA) 125. Ascites. Peritoneal carcinomatosis.

CASE REPORT 1

A 40-year-old male patient with a history of HCV-related cirrhosis and HIV without treatment. He arrives at the ER complaining of increased abdominal circumference, jaundice, dyspnea on exertion, abdominal pain and fever for 1 month. The physical examination reveals non-tense ascites, non-tender hepatomegaly, collateral circulation, telangiectasias, and edema in the lower limbs. In laboratory tests, tumor markers are notably high: CA 125 519 (n 0-35), CA 19.9 278 (n 0-37). Abdominal ultrasonography shows moderate ascites with thickened, nodular-looking parietal peritoneum fascia. In view of sonographic findings, a thoracoabdominal CT scan is performed, which reveals hypodense mediastinal adenopathies suggestive of caseating necrosis; hepatomegaly; abundant ascites with irregular, nodular thickening of the peritoneal fascia; and infiltration areas in peritoneal fat (Fig. 1). A US-guided peritoneal biopsy was carried out (Fig. 2), which found granulomatous peritonitis with focal caseating necrosis, consistent with TB. Ascitic fluid samples were obtained for culture, which resulted in *Mycobacterium tuberculosis* growth.

CASE REPORT 2

A 19-year-old female patient, without a relevant medical history, is seen in the ER because of intermittent fever, asthenia, and progressive abdominal distension for 6 months. The physical exam reveals hepatomegaly and positive ascitic wave. Laboratory test highlights include: Mantoux +, CA 125 797.7, white blood cells 4,000, Hb 9.7. A thoracoabdominal CT scan shows: Ascites and serosal thickening with multiple nodular lesions suggestive of peritoneal implants, primarily in the omentum. Mild splenomegaly. Multiple mesenteric, aortoiliac, retrocrural, and periceliac adenopathies (Fig. 3). A US-guided peritoneal biopsy is taken from the thickest peritoneal area, and samples are obtained for culture, which showed *Mycobacterium tuberculosis* growth. Tuberculostatics are initiated, which results in clinical improvement and in ascites and peritoneal thickening clearance (Fig. 4).

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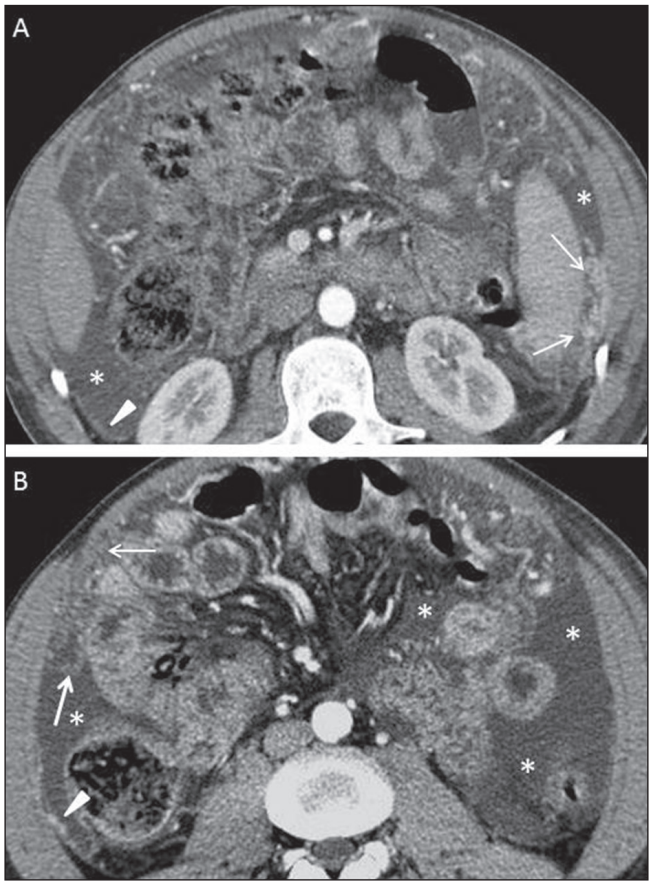

Fig. 1. Contrast-enhanced axial CT images of the abdomen. A. Ascites (asterisks) and nodular peritoneal thickening (arrows) may be seen. B. Ascites and enhanced parietal peritoneum (arrowheads); arrows point at the most thickened area of peritoneal fat on the right flank.

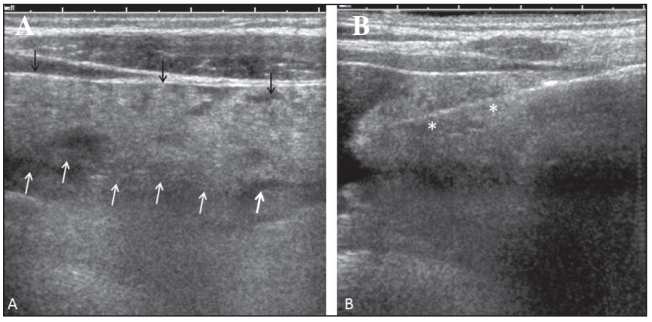

Fig. 2. Right flank ultrasonogram. A. Properitoneal fat infiltration by an echogenic lobulated structure consistent with peritoneal infiltrative tuberculosis; it coincides with the most thickened area of peritoneum seen in the CT scan on the right side (Fig. 1B). B. US-guided biopsy: The needle (asterisks) and peritoneal fat infiltration may be seen.

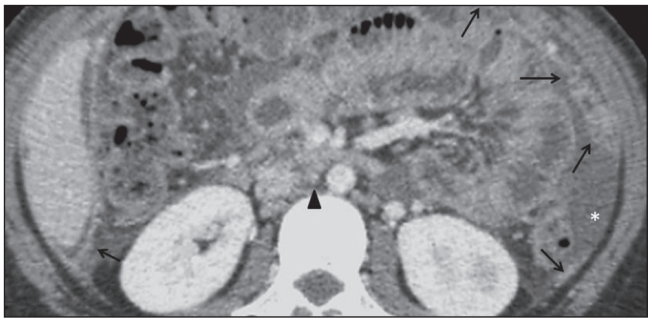

Fig. 3. Contrast-enhanced axial CT image of the abdomen. Nodular peritoneal thickening (arrows), ascites (asterisk), and retroperitoneal interaortocaval adenopathies (arrowhead).

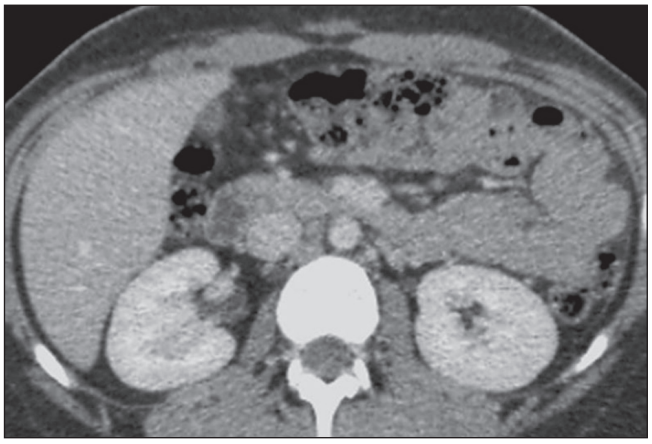

Fig. 4. Contrast-enhanced axial CT image of the abdomen after TB treatment, patient 2. Both ascites and peritoneal thickening are now cleared.

DISCUSSION

TB remains a primary public health challenge worldwide, the HIV epidemics having facilitated its recurrence and spread (1). On the other hand, because of the coexistence of HIV infection, extrapulmonary forms of tuberculosis, including peritoneal tuberculosis, which represents nearly 3.5 % of presentations, are now increasingly common. Risk factors for peritoneal TB include, besides HIV, cirrhosis, diabetes, neoplasms, and peritoneal dialysis (2). Its diagnosis requires a histological demonstration of TB with caseating necrosis, presence of acid-alcohol-fast bacilli (AAFB), or an *M. tuberculosis*-positive culture from ascitic fluid, peritoneal biopsy, or mesenteric lymph nodes. Imaging techniques allow a diagnostic approximation. Ultrasonography reveals ascites (which may contain fine echogenic filaments), and diffuse or irregular peritoneal thickening with nodules with a hypoechoic center suggestive of caseation (3). CT is the most sensitive technique for the assessment of peritoneal disease. This technique unveils a usually consistent peritoneal thickening with parietal peritoneum enhancement following the administration of a contrast. It is associated with mesenteric and peripancreatic adenopathies in 90 % of patients (4). When there is a nodular aspect to the peritoneal thickening, a

differential diagnosis with peritoneal carcinomatosis is due (3). Tree clinical forms have been described:

- *Wet form:* Characterized by abundant ascites with a high attenuation value (20 to 40 HU), as it is an exudate with high protein contents.
- *Dry form:* Characterized by loculated ascites with predominant adhesions, fibrosis, peritoneal thickening, and caseated nodes.
- *Fibrotic form:* Associated with low-volume ascites and intestinal adhesions to the mesentery, thus making up a fibrotic mass (1,5).

However, peritoneal TB may present as a combination of all the 3 types above.

Our two patients had the wet form of peritoneal TB in view of both radiological and microbiological findings. The first report was of a patient with 2 risk factors for peritoneal TB, such as HCV-related liver cirrhosis and infection with HIV. The history of untreated HCV-related cirrhosis led to consider decompensation as the potential cause for ascites (6), but sonographic findings such as a thickened peritoneum prompted us to rule out a different underlying origin. Various differential diagnoses are then considered, including peritoneal carcinomatosis, malignant mesothelioma, primary peritoneal lymphoma, and peritoneal tuberculosis. These 4 conditions are characterized by ascites and an irregularly thickened peritoneum (4). Malignant mesothelioma is a rare entitiy associated with asbestos exposure (7). Primary peritoneal lymphoma, while uncommon, may be considered in this case as it almost exclusively involves HIV-infected patients (4).

Increased tumor markers, including CA-125 and CA-19.9, raise suspicion of a causing malignancy, but elevated levels may also be seen in selected benign conditions. Thus, increased CA-19.9 levels suggest a pancreatic or colonic neoplasm, but other possible origins include liver cirrhosis and biliary disorders in association with cholestasis and liver cytolysis (8). CA-125 is commonly used as a marker of ovarian cancer progression and may also be elevated by other malignancies such as breast, lung, and gut adenocarcinoma, as well as lymphoma and leiomyosarcoma. It may be also increased in benign conditions with serosal compromise. One such instance is peritoneal TB, as seen in both case reports, this being a useful tool for diagnosis and follow-up. It may also increase in TB with pleural and pericardial involvement (9).

In contrast with the first report, it was in the second case that we found adenopathies as the most striking finding, and both patients presented with peritoneal thickening and ascites. Adenopathies prompt to include lymphoproliferative disorders in the differential diagnosis; peritoneal infiltration may be a manifestation of non-Hodgkin lymphoma in association with peritoneal thickening and ascites (10).

In both our cases peritoneal carcinomatosis was considered in the differential diagnosis as a result of radiographic findings and high CA-125 levels, hence peritoneal biopsy was decided upon to obtain samples for histological and microbiological studies, including mycobacteria.

In conclusion, a diagnosis of peritoneal tuberculosis must be considered in patients with ascites, peritoneal thickening of unknown origin, and increased CA-125 levels. Confirmation is obtained by combining radiological and microbiological findings with the study of peritoneal fluid or of a sample collected by means of percutaneous biopsy.

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