

Tomographic findings in peritoneal tuberculosis: case report

Hallazgos tomográficos en tuberculosis peritoneal: reporte de caso

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ABSTRACT

Introduction: Peritoneal tuberculosis (PTB) is a diagnostic challenge because the clinical, radiological and laboratory findings are nonspecific and can be confused with other pathologies.

Presentation of the clinical case: Patient who consulted for intense abdominal pain, fever and diarrhea. PTB was suggested based on abdominal CT findings, which was confirmed by histopathological analysis of parietal peritoneum biopsy and granulomatous lesions of the small intestine mesentery. The patient received an antituberculous regimen and was discharged from the hospital. **Discussion and literature review:** PTB represents between 25-50% of abdominal tuberculosis cases and 0.1-0.7% of all tuberculosis cases, its clinical presentation includes ascites, abdominal pain, fever and diarrhea, making it indistinguishable from bacterial peritonitis and other chronic abdominal conditions. **Conclusions:** The diagnosis of PTB is a challenge, however, the tomographic findings provide information that increases its suspicion and helps to avoid treatment delay and complications.

Keywords: Peritoneal tuberculosis, omentum, peritoneum, computed tomography.

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RESUMEN

Introducción: La tuberculosis peritoneal (TBCP) es un desafío diagnóstico debido a que los hallazgos clínicos, radiológicos y de laboratorio son inespecíficos y pueden confundirse con otras patologías. **Presentación del caso clínico:** Paciente que consultó por intenso dolor abdominal, fiebre y diarrea. Se sugirió TBCP a partir de hallazgos de Tomografía Computarizada abdominal, que fue confirmada mediante análisis histopatológico de biopsia de peritoneo parietal y de lesiones granulomatosas del mesenterio de intestino delgado. El paciente recibió esquema antituberculoso y fue dado de alta hospitalaria. **Discusión y revisión de la literatura:** La TBCP representa entre 25-50% de los casos de tuberculosis abdominal y 0.1-0.7% de todos los casos de tuberculosis, su presentación clínica incluye ascitis, dolor abdominal, fiebre y diarrea, volviéndola indistinguible de la peritonitis bacteriana y otras afecciones crónicas abdominales. **Conclusiones:** El diagnóstico de TBCP es un desafío, sin embargo, los hallazgos tomográficos aportan información que aumenta su sospecha y contribuyen a evitar retraso del tratamiento y complicaciones.

Palabras clave: Tuberculosis peritoneal, omento, peritoneo, tomografía computarizada.

I. INTRODUCTION

Peritoneal tuberculosis (PTB) represents approximately 25-50% of abdominal tuberculosis cases and 0.1-0.7% of all tuberculosis cases (1). It generally develops due to the reactivation of a latent tuberculosis focus in the peritoneum, secondary to hematogenous or lymphatic spread from an old pulmonary focus (2). The clinical presentation includes ascites, abdominal pain, fever, and diarrhea, making it indistinguishable from bacterial peritonitis and other chronic abdominal conditions (1). The diagnosis is made by radiological studies that suggest it, or histopathological studies that confirm it by means of peritoneum samples obtained by a surgical procedure, or by omentum samples obtained by fine needle aspiration (3, 4). Some tomographic findings include: thickening and / or nodularity of the peritoneum, mesentery, omentum, and intestinal wall surfaces. Ascites, mesenteric or retroperitoneal adenopathies with central areas of necrosis or calcifications, among others, can also be observed (5). The chest radiograph may show active lung disease, but in most cases it is normal (2). However, diagnosis is often

delayed due to the low specificity of biological markers, the long incubation periods in cultures and the absence of specific imaging signs to confirm it, generating delays or omission of the diagnosis. This article presents the case of a patient with peritoneal tuberculosis where imaging findings were essential to guide the diagnosis.

II. CASE PRESENTATION

A 69-year-old male patient from Popayan (Cauca-Colombia) with a history of type 2 diabetes mellitus, diabetic nephropathy, stage 5 chronic kidney disease on peritoneal dialysis. Consultation due to a 3-day history of abdominal pain, diarrhea, fever, drowsiness, diaphoresis, oliguria, hyporexia, with a peritoneal dialysis catheter without signs of tunnelitis and clear peritoneal fluid without detritus.

The paraclinics reported an inflammatory response, the initial chest X-ray did not show pleuropulmonary alterations, bacterial peritonitis associated with the catheter was suspected, broad-spectrum antibiotic management was initiated, and blood and peritoneal fluid cultures with cytochemicals were requested. Abdominal ultrasound identified signs of chronic kidney disease (decreased kidney size, loss of the cortico-medullary relationship) and abundant free fluid in the peritoneal cavity without septa or detritus. Abdominal CT reported in the contrasted phase, heterogeneous omentum with a wrinkled appearance with apparent striae, an “omental cake” appearance and a calcification of 3 mm towards the right contour of the omentum, surrounded by ascites and peritoneal thickening with smooth and irregular contour with nodular, no septa are identified (Figure 1 A-C). The density in phase with contrast is -15 Hounsfield units (HU); with these findings, the diagnosis of peritoneal tuberculosis is suggested as a cause of peritoneal omentitis. (Figure 1.D).

Microbiological analysis reports negative for bacterial peritonitis associated with the peritoneal dialysis catheter, however, an exploratory laparotomy was performed 2 days after admission due to the persistence of abdominal pain, with the following findings: crystalline peritoneal fluid, perihepatic fibrinoid membranes and on the intestinal loops, without evidence of pus; in addition, thickening of the intestinal mesentery with small granulomatous nodular lesions, thickened peritoneum, without evidence of internal hernias or ischemia (Figure 2).

A biopsy of the parietal peritoneum and granulomatous lesions of the small intestine is taken. Ziehl-Neelsen staining did not reveal acid-fast bacilli. Cultures for common germs were negative. However, cultures for mycobacteria were positive. Finally, GeneXpert MTB/RIF were performed, which led to the identification of *Mycobacterium tuberculosis* sensitive to rifampicin (Figure 3), confirming the diagnosis of peritoneal tuberculosis.

A complementary chest CT scan without contrast was indicated, which did not identify pleuropulmonary lesions suspicious of tuberculosis. The patient started an intensive anti tuberculosis regimen (Rifampicin, pyrazinamide, isoniazid, ethambutol), and developed good clinical evolution, was afebrile, with improvement of pain and infectious response, and was discharged from hospital 15 days after admission.

III. DISCUSSION AND LITERATURE REVIEW

The PTB is an uncommon occurrence of extrapulmonary tuberculosis. A recent review reports that abdominal pain (75%), fever (69%) and ascites (62%) are the most frequent clinical findings (2). However, these findings are indistinguishable from catheter-associated bacterial peritonitis. In our case, laboratory results were negative for this diagnosis.

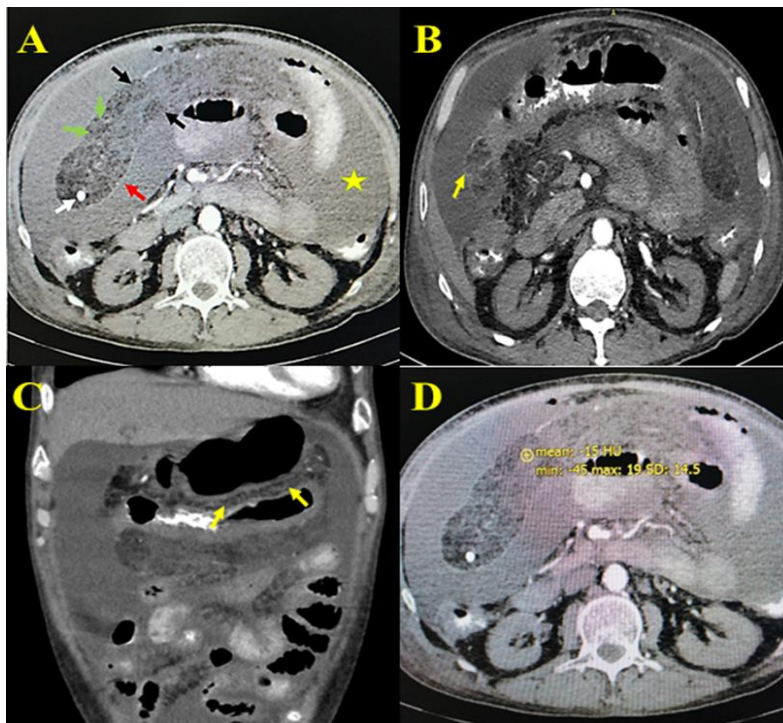
Imaging studies provide information that increases the suspected diagnostic of PTB. Abdominal ultrasound is considered an initial modality of choice, used to detect lymphadenopathies, ascites, peritoneal, omental and intestinal wall thickening in some cases (6). The absence of findings on chest x-ray does not exclude extrapulmonary tuberculosis since there is often no evidence of disease outside the abdomen and in 50% of cases, the chest x-ray is normal (2). In our case, the patient did not show

respiratory symptoms or radiographic findings in the lung parenchyma that would indicate an active or old pulmonary tuberculosis.

The tomographic findings in PTB reported in this article concur with those reported in the literature. The most frequent characteristics that have been described include: thickening and/or nodularity of the surfaces of the peritoneum, mesentery, omentum and intestinal walls. Ascites and lymphadenopathy with central areas of necrosis and calcifications are also present (1,5, 7).

For example, in a study performed by Flores *et al.*, (2015), 12 patients were reported with a CT diagnosis of PTB. The findings included: thickening of peritoneum and omentum, increased peripheral fat density, enlarged lymph, abdominal and retroperitoneal nodes, and calcified mesenteric nodules (8). Some of these findings are consistent with those reported in this case.

Figure 1. Contrast abdominal CT scan results



Source: authors' elaboration

A. Contrast abdominal CT scan, axial cut, heterogeneous wrinkled omentum with striae with omental cake appearance (black arrows), ascites (yellow star), calcification of 3 mm towards the right contour of the omentum (white arrow), peritoneal thickening of smooth and irregular contour (red arrow) and nodular pattern (green arrows). **B.** Contrast abdominal CT scan, axial cut, showing thickening of the visceral and parietal peritoneum with heterogeneous enhancement and irregular contour (yellow arrow). **C.** Contrast abdominal CT, coronal cut, showing distortion in the architecture of the omentum with an image of "Omental cake" (yellow arrow), with multiple striae, thickening of the parietal peritoneum and ascites. **D.** CT abdomen contrasted phase, density -15 HU of the omentum.

In the study of Na-Chiang-Mai W *et al.*, (2008), 17 patients with a diagnosis of PTB and a CT report were evaluated, the peritoneal involvement appeared in 88% of the patients showing a pattern of regular and smooth thickening, although irregular and nodular thickening pattern was also reported in two cases (9). Nevertheless, the latter is more common in peritoneal carcinomatosis. In our case, the peritoneum

had smooth and irregular pattern with nodular pattern by CT visible at surgery. The most frequent intraoperative findings include thickened peritoneum with small nodules and adhesions (10).

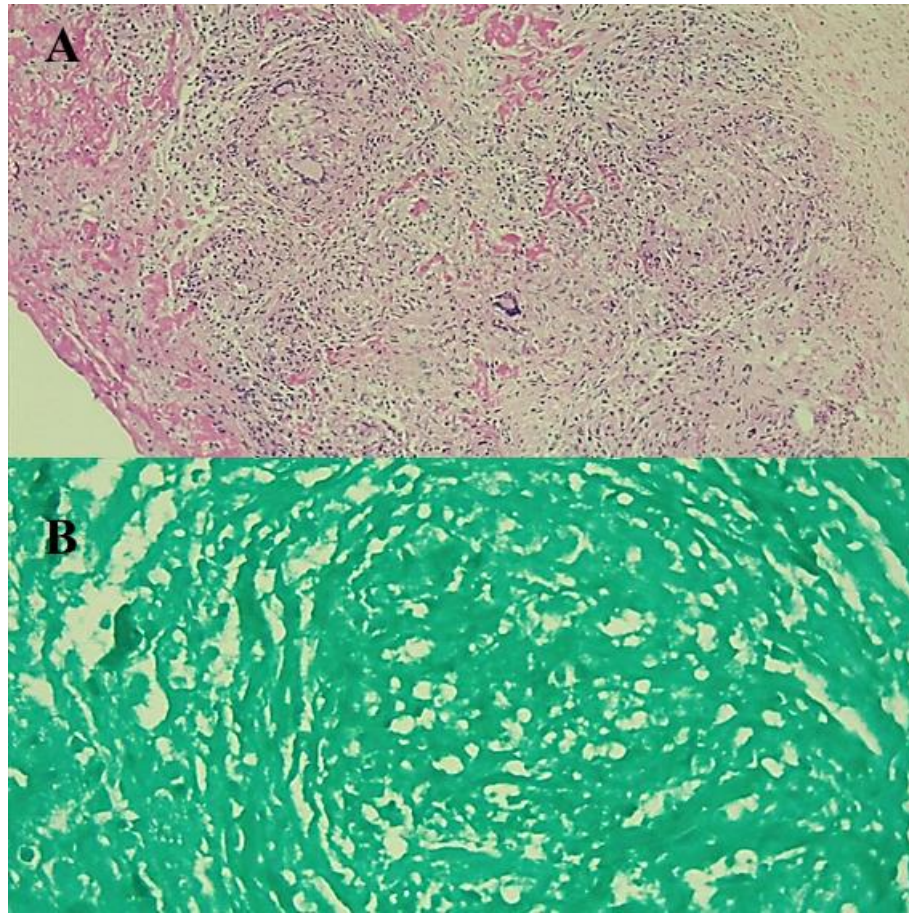
Omental involvement can occur in up to 80% of cases, appearing as diffuse, nodular and omental cake infiltration (5). The "omental cake" is a tomographic sign characterized by thickening and densification of the omental fat, acquiring an appearance similar to the top of a cake. This sign is common in ovarian, gastric or colon cancer metastases and is associated in up to 40% of cases with peritoneal carcinomatosis (5). Some authors have reported this sign in PTB (11) and estimate that it is present in less than 20% of PTB cases (8). In our case the CT images did not reveal any sign of malignancy that could explain the cause of the "omental cake". On the other hand, a classification of PTB into 3 types has been described: "wet" with free or loculated ascites; "dry or plastic" with caseous nodules, fibrosed peritoneum and adhesions; "fixed fibrotic" with mass formation of omentum, mesentery and occasionally loculated ascites (12). However, there is considerable overlap between the three types in CT. In our case we consider that there is a mixed pattern (fibrotic and wet). Finally, peritoneal thickening with smooth and irregular contour, omental calcification and ascites suggested the diagnosis of peritoneal tuberculosis which was confirmed by surgery, a report of histopathological studies and by the molecular diagnostic study performed with GeneXpert® (Cepheid, CA, USA).

Figure 2: Intraoperative findings: Small bowel mesentery is thickened with nodular lesions of granulomatous appearance, thickened peritoneum, no internal hernias or areas of ischemia were found.



Source: authors' elaboration

Figure 3. Histological findings Photomicrographs



Source: authors' elaboration

A. Photomicrograph (40x) hematoxylin-eosin staining of the peritoneum, showing the presence of chronic granulomatous inflammation composed of lymphocytes, fibroblasts, epithelioid-like cells and Langhans-type multinucleated giant cells with horseshoe nuclei. **B.** Photomicrograph (40x), histochemical staining for Ziehl Neelsen for acid-alcohol fast bacilli in peritoneum, the presence of proliferative granuloma is observed, the presence of bacilli was not found in this preparation.

IV. CONCLUSION

Peritoneal tuberculosis is an uncommon and treatable infection. Diagnosis remains a challenge due to the wide range of clinical presentations, long incubation time in culture, and nonspecific laboratory findings. Imaging findings on CT provide information leading to a diagnosis of PTB, with differential diagnoses of malignancy. Clinical judgment, imaging, microbiological and histopathological findings will confirm the diagnosis, avoiding treatment delay and complications.

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REFERENCE

1. Karanikas M, Porpodis K, Zarogoulidis P, Mitrakas A, Touzopoulos P, Lyrtzopoulos N, et al. Tuberculosis in the peritoneum: not too rare after all. *Case reports in gastroenterology*. 2012;6(2):369-74. DOI:10.1159/000339764.
2. Wu DC, Averbukh LD, Wu GY. Diagnostic and therapeutic strategies for peritoneal tuberculosis: a review. *Journal of clinical and translational hepatology*. 2019;7(2):140. DOI:10.14218/JCTH.2018.00062.
3. Sanai F, Bzeizi K. Systematic review: tuberculous peritonitis—presenting features, diagnostic strategies and treatment. *Alimentary pharmacology & therapeutics*. 2005;22(8):685-700. DOI:10.1111/j.1365-2036.2005.02645.x.
4. Rocha ELd, Pedrassa BC, Bormann RL, Kierszenbaum ML, Torres LR, D'Ippolito G. Abdominal tuberculosis: a radiological review with emphasis on computed tomography and magnetic resonance imaging findings. *Radiologia brasileira*. 2015;48(3):181-91. DOI:10.1590/0100-3984.2013.1801.
5. Kumar S, Gupta P, Sharma V, Mandavdhare H, Bhatia A, Sinha S, Dhaka N, Srinivasan R, Dutta U KR. Role of Ultrasound-Guided Fine-Needle Aspiration Cytology of Omentum in Diagnosis of Abdominal Tuberculosis. *Surg Infect (Larchmt)*. 2019;20(1):91-4. DOI:10.1089/sur.2018.165
6. Malik A, Saxena N. Ultrasound in abdominal tuberculosis. *Abdominal Radiology*. 2003;28(4):0574-9. DOI:10.1007/s00261-002-0061-z.
7. Gupta P, Kumar S, Sharma V, Mandavdhare H, Dhaka N, Sinha SK, Dutta U KR. Common and uncommon imaging features of abdominal tuberculosis. *J Med Imaging Radiat Oncol*. 2019;63(3):329–39. DOI:10.1111/1754-9485.12874
8. Flores LS, Solís AH, Gutiérrez AE, José LCC, Ortiz IC, González HG, et al. Peritoneal tuberculosis: A persistent diagnostic dilemma, use complete diagnostic methods. *Revista Médica Del Hospital General De México*. 2015;78(2):55-61. DOI:10.1016/j.hgmx.2015.03.009.
9. Na-Chiang Mai W, Pojchamarnwiputh S, Lertprasetsuke N, Chitapanarux T. CT findings of tuberculous peritonitis. *Singapore medical journal*. 2008;49(6):488.
10. Bhargava DK, Chopra P, Nijhawan S, Dasarathy S, Kushwaha AK. Peritoneal tuberculosis: laparoscopic patterns and its diagnostic accuracy. *American Journal of Gastroenterology (Springer Nature)*. 1992;87(1).
11. Aslan B, Tüney D, Almoabid ZAN, Erçetin Y, Seven İE. Tuberculous peritonitis mimicking carcinomatosis peritonei: CT findings and histopathologic correlation. *Radiology case reports*. 2019;14(12):1491-4. DOI:10.1016/j.radcr.2019.09.026.
12. Ahamed Z R, Shah J, Agarwala R, Kumar-M P, Mandavdhare HS, Gupta P, et al. Controversies in classification of peritoneal tuberculosis and a proposal for clinico-radiological classification. *Expert review of anti-infective therapy*. 2019;17(8):547-55. DOI:10.1080/14787210.2019.1642746.