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Case report

Peritoneal tuberculosis in an immunocompetent patient: A case report

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ABSTRACT

Introduction: Tuberculosis is endemic in Colombia, the prevalence of its pulmonary form in immunocompetent hosts is high, and peritoneal compromise instead is rare and difficult to diagnose.
Case presentation: A 24-year-old female patient living in a rural area presented to the emergency department with constitutional and gastrointestinal symptoms, including bloating, diarrhea, significant weight loss, nocturnal diaphoresis, and gradual onset of ascites with abdominal pain. Diagnostic workup, including paracentesis, a transvaginal ultrasound, and an abdominal CT scan, did not suggest malignancy or portal hypertension. However, diagnostic laparoscopy revealed a miliary pattern comprising the parietal and pelvic peritoneum, uterus, fallopian tubes, and major omentum suggestive of peritoneal tuberculosis. Anti-tuberculosis therapy was initiated with subsequent microbiological confirmation.
Conclusion: Abdominal compromise by tuberculosis is a diagnostic challenge, especially in patients with no apparent risk factors. The clinical manifestations and paraclinical data may be unspecific or inconclusive, requiring peritoneal biopsy and empirical treatment before definitive confirmation.

Introduction

Tuberculosis (TB) is endemic in Colombia. In 2017, there were 14,480 reported cases; of these, 1446 were between the ages of 20–24, most associated with pulmonary tuberculosis [1]. Peritoneal tuberculosis (PTB) is rare, especially in young immunocompetent individuals. Often the presentation mimics other pathologies, such as primary peritoneal carcinoma and metastatic ovarian cancer, and laboratory tests may be non-specific. We present a case of a patient whose initial concern was abdominal distension and ascites. Imaging studies and laboratory tests were unspecific and offered a clinical challenge. Finally, the diagnostic confirmation of peritoneal tuberculosis was made with a peritoneal biopsy and peritoneal fluid culture.

Case presentation

We present a case of a 24-year-old woman who works as a teacher on an indigenous reservation in a rural area. She often shared meals with the community, including dairy products like unpasteurized cheeses produced in the region. The patient has actively participated in animal sterilization events for dogs and cats and has been exposed to outdoor poultry. She has two children and no significant medical history, including hypertension or diabetes. The patient has never smoked or used drugs and has no significant sick contact, known TB exposure or recent travel to other endemic areas.

The patient consulted the emergency department due to a six-month history of constitutional and gastrointestinal symptoms, including bloating and diarrhea, along with a critical weight loss (15 kg), low-

List of abbreviations: PTB, Peritoneal Tuberculosis; ADA, Adenosine deaminase; TB, Tuberculosis; CA125, Cancer Antigen 125; mm Hg, Millimeters of mercury; CT, Computed Tomography; SAAG, Serum-Ascites Albumin Gradient; MTB/RIF, Mycobacterium Tuberculosis/Rifampicin; HIV, Human Immunodeficiency Virus; PPD, Purified Protein Derivative; NAAT, Nucleic Acid Amplification Tests; cells/mcL, cells per microliter; LDH, Lactate dehydrogenase; AFB, Acid-fast Bacilli.

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grade fever, nocturnal diaphoresis, gradual onset of ascites, and abdominal pain. The patient had previously consulted a local medical center, receiving treatment for gastrointestinal and urinary infections with frequent courses of antibiotics without clinical improvement. During the consultation, the patient reported no headache, cough, dyspnea, chest or joint pain, urinary symptoms, or menstrual cycle irregularities. Her vital signs were the following: Blood pressure of 100/70 mm Hg, heart rate of 90 beats/minute, respiratory rate of 14 breaths/minute, and temperature of 37.5 C°.

On physical examination, she appeared thin and pale, and tolerated decubitus. The most significant finding was abdominal distension with a positive ascitic wave without collateral circulation, telangiectasias, or pain upon palpation. The moist mucosa showed no signs of ulcers; there was no jaundice, no jugular vein distention, no neck masses, a rhythmic heart without murmurs, and normal lung sounds. The extremities had no edema present, and the neurological exam was unremarkable.

The patient underwent initial laboratory tests outlined in (Table 1). The PPD skin test was negative, and the results of autoimmune testing showed some alterations and an elevated CA-125 level. A chest X-ray was conducted but yielded no significant findings. However, an abdominal computed tomography (CT) scan revealed thickening of the parametrium, parietal peritoneum, omentum, gastric cavity, intestinal lining, and intraperitoneal liquid with intermediate density in all compartments (Fig. 1). To further analyze the ascitic fluid, abdominal paracentesis was performed. The fluid was predominantly lymphocytic and had a serum ascites albumin gradient (SAAG) index of 0.3 (Table 2), which ruled out portal hypertension. Therefore, additional investigations were conducted to exclude the possibility of malignant pathologies, infectious, and inflammatory diseases.

The patient was evaluated by a gynecologist who performed a transvaginal ultrasound to investigate the possibility of gynecologic malignancies but found no abnormalities. Similarly, to rule out gastrointestinal malignancies, the patient underwent both endoscopy and colonoscopy, which were unremarkable. On the fourth day of hospitalization, a diagnostic laparoscopy revealed a friable peritoneum with numerous miliary-like micronodules covering the entire peritoneal and pelvic cavity (Fig. 2). Three days later, the pathology report revealed fibroconnective tissue with multiple confluent granulomas, high histiocytic cellularity and multinucleated giant cells surrounded by a lymphoplasmacytic inflammatory infiltrate, some of which contained central necrosis (Fig. 3).

Table 1
Laboratory results.

	Results	Reference values
WBC count	4.72 10^3/uL	3.98 – 10.04
Neutrophils	3.13 10^3/uL	1.56 – 6.13
Lymphocytes	0.80 10^3/uL	1.18 – 3.74
Monocytes	0.71 10^3/uL	0.24 – 0.36
Eosinophils	0.01 10^3/uL	0.04 – 0.36
Basophils	0.03 10^3/uL	0.01 – 0.08
Hemoglobin	11.3 gr/dL	11.2 – 15.7
Hematocrit	33.1%	34.1 – 44.9
Platelet count	645 10^3/uL	182 – 369
Serum creatinine	0.80 mg/dL	0.51 – 0.95
Total bilirubin	0.39 mg/dL	0 – 1.2
Direct bilirubin	0.19 mg/dL	0 – 0.3
ALT	104.50 U/L	0 – 31
AST	93.20 U/L	0 – 32
ALP	62.4 U/L	35 – 104
LDH	223 U/L	135 – 214
C-reactive protein	23.07 mg/dL	0 – 0.5
CA 125	185 U/mL	0 – 35
CA19–9	5.7 U/mL	0 – 39
Albumin	2.92 g/dL	3.5 – 5.2
HIV I - II	0.14	0 – 0.99
ANAs	1:1280 (speckled pattern)	Positive
anti-dsDNA	Negative	
ENAs	Ro: 1.5 U/mL	< 15
	La: 6.9 U/mL	< 15
	Sm: 2.2 U/mL	
	RNP: 0.8 U/mL	
HBsAg	Negative	
ADA	47.9 U/L	< 30

WBC: white blood cells, ALT: Alanine aminotransferase, AST: Aspartate aminotransferase, ALP: Alkaline phosphatase, LDH: Lactate dehydrogenase, CA: Cancer antigen, HIV: Human immunodeficiency virus, ANAs: Antinuclear antibodies, anti-dsDNA: anti-double-stranded DNA antibodies. ENAs: Extractable nuclear antigen antibodies, HBsAg: Hepatitis B surface antigen. ADA: Adenosine deaminase

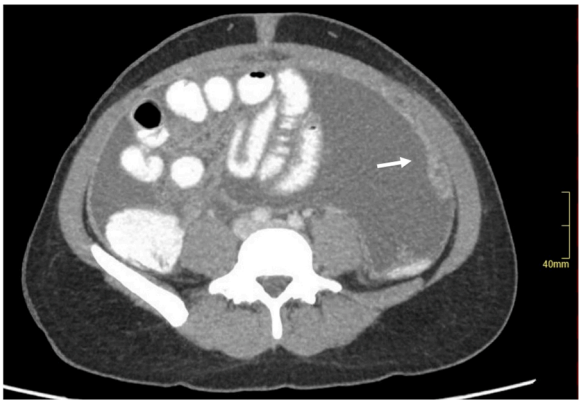

Fig. 1. Abdominal scan showing irregular thickening of the parietal peritoneum (**white arrow**), there is also a significant amount of ascitic fluid.

Table 2
Ascitic fluid and serum analyses.

	Units	Results	Reference values
Ascitic fluid			
Total cell count	cell/mm^3	8.735	–
RBC count		8.000	–
WBC count		735	–
Segmented		4	
Lymphocytes		96	–
Glucose	mg/dL	63.6	–
LDH	U/L	337	–
Proteins	g/dL	5.9	–
Albumin	g/dL	2.59	–
Serum			
Serum Albumin	g/dL	2.92	3.5 – 5.2

RBC: red blood cells, WBC: white blood cells, LDH: Lactate dehydrogenase

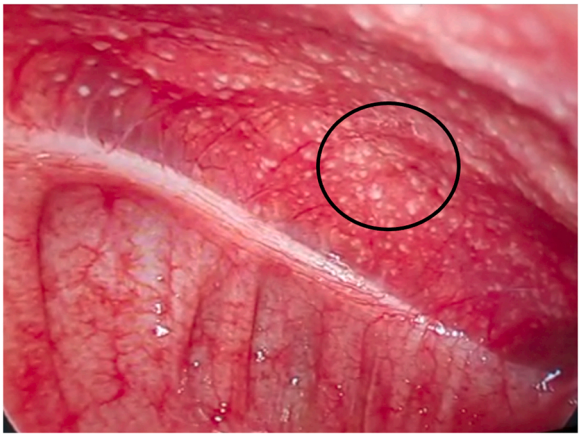

Fig. 2. The interior of the abdominal cavity can be seen during laparoscopy with parietal peritoneum in which innumerable micronodular lesions give the appearance of a miliary pattern (**black circle**).

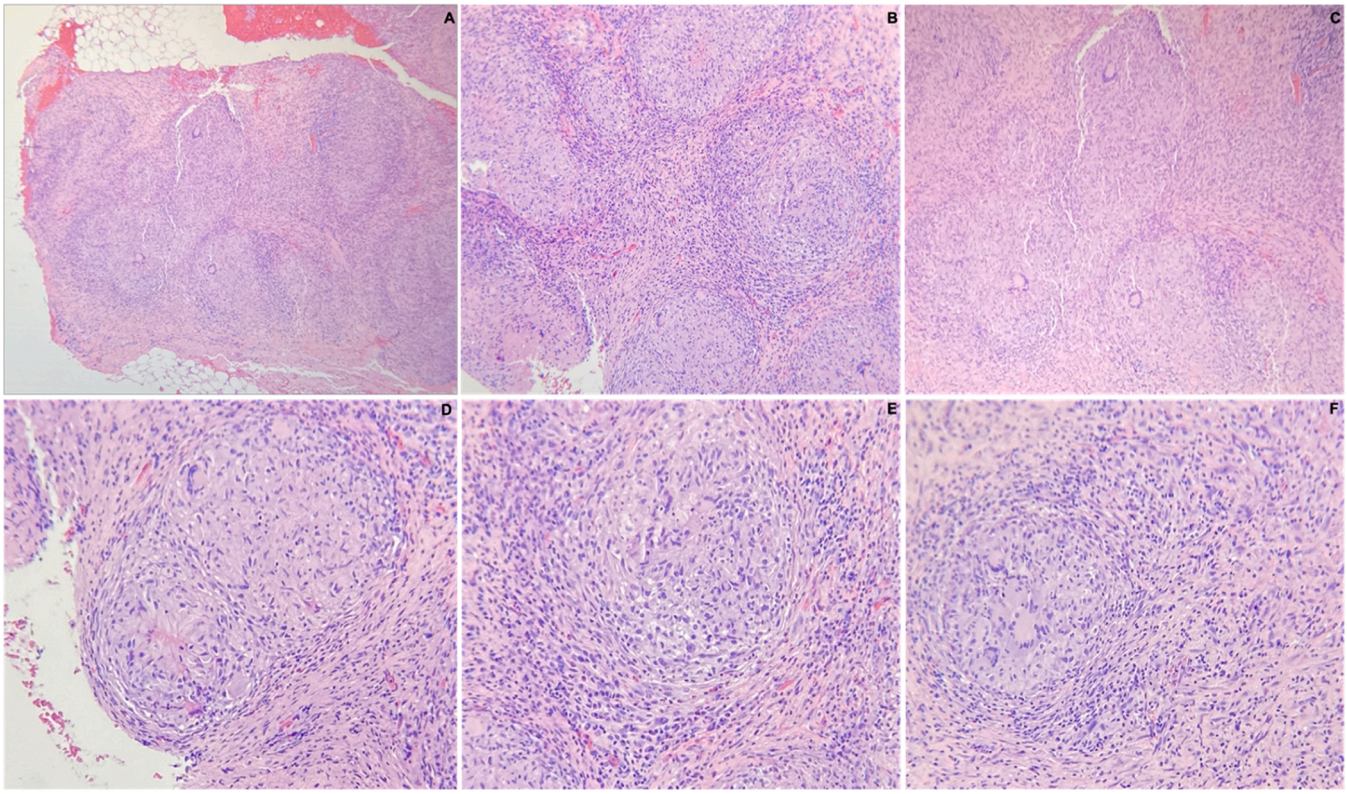

Fig. 3. A, B, C. H&E stain showing fibroconnective tissue with the presence of multiple granulomas with a crown of lymphocytes, epithelioid cells, and multinucleated giant cells, necrotic center. D, E, F. H&E staining at higher magnification shows chronic granulomatous inflammation, granulomas with necrosis, multinucleated cells, and epithelioid cells.

Under the suspicion of peritoneal tuberculosis (PTB), the patient was started on anti-tuberculosis therapy eight days after admission. She began a six-month regimen of isoniazid, rifampicin, pyrazinamide, and ethambutol. The patient showed progressive improvement with the current treatment. A positive adenosine deaminase (ADA) test result of the peritoneal fluid was reported the following day and supported the diagnosis of PTB. Despite negative microbiological culture for bacteria of ascites fluid, gram stain, Auramine-rhodamine stain, and GeneXpert MTB/RIF, peritoneal tuberculosis was confirmed four weeks after the diagnostic laparoscopy through a positive culture for mycobacteria in the peritoneal tissue.

The patient was discharged 15 days after admission with a noticeable improvement in the initial symptoms. She has been followed up in the infectious disease clinic for a year after finishing the antituberculous treatment. She reported weight gain, adequate oral tolerance, and no new episodes of diarrhea.

Discussion

Although pulmonary tuberculosis (PTB) is more frequently associated with HIV infection, diabetes, and other comorbidities [5], it can also occur in young females [3], as seen in this case, even in the absence of immunosuppression or a prior history of pulmonary TB [2]. It is crucial to highlight the importance of obtaining a comprehensive clinical history to identify other potential risk factors contributing to this condition. In this case, the patient reported consuming dairy products, such as unpasteurized cheeses, in a rural community. The consumption of such products has been reported as a possible source of peritoneal TB infection [3].

Diagnosis of PTB can be challenging as it can imitate infectious and non-infectious diseases. Its symptoms are nonspecific, including fever, abdominal pain, abdominal distension, ascites, diarrhea and weight loss [2,6]. PPD skin test may be positive in more than 50% of the cases [7], which was not the case in our patient. At the time of presentation, ascites is observed in more than 90% of PTB cases. There are three patterns described in the PTB presentation: wet-type (90%), fibrotic-fixed type (7%), and dry-plastic type (3%) [2,3,8]. However, it can combine these three variants [2]. In this case, the patient had wet and dry ascites features.

Paracentesis is necessary for all patients presenting with ascites. The ascitic fluid in PTB is usually straw-colored, and the white blood cell count depends on the patient's immune status. It can range from 150 to 4000 cells/mcL, with a lymphocyte majority [6,9]. The peritoneal fluid analysis should include routine tests, ADA levels, mycobacterial culture, and, if available, Nucleic Acid Amplification Tests (NAAT) for Mycobacterium tuberculosis. Increased lactate dehydrogenase (LDH) levels have the highest pooled sensitivity (77%); however same results can be associated with other diseases, such as pancreatic ascites and peritoneal carcinomatosis [2].

Elevated ADA levels aid the diagnosis of PTB as it has high sensitivity (100%) and specificity (97.2%). However, false positive results may appear in peritoneal carcinomatosis and spontaneous bacterial peritonitis [10]. All test results must be correlated with the clinical findings in every case. The SAAG index < 1.1 g/dL can rule out portal hypertension with a 100% sensitivity in patients without liver diseases and guide the diagnosis to PTB [11,12]. However, the specificity of this test is poor. In the peritoneal fluid, acid-fast bacilli (AFB) smears (<3%), cultures (<30%), and GeneXpert MTB/RIF have low sensitivity [7,13]. In this case, the AFB smear and cultures in the ascitic fluid were negative.

A laparoscopic peritoneal biopsy remains the gold standard for definitive PTB diagnosis. It gives a precise and faster diagnosis and allows to provide an earlier treatment [8]. Common findings during laparoscopy include thickened peritoneum with yellowish-white lesions, adhesions, and fibro-adhesive pattern. Biopsies of this nature usually

display AFB and chronic granulomatous inflammation with caseous necrosis on microscopic examination. In this case, mycobacterial cultures from the peritoneal biopsy were positive on both liquid and solid media after three weeks of bacterial growth.

During the evaluation process of PTB, it is crucial to exclude other causes with similar clinical manifestations and laboratory results, especially malignancies, which is crucial to avoid antituberculosis treatment when it is not necessary, as this entails a prolonged treatment course and a high risk of adverse effects. In this case, due to the patient's age, we considered ovarian cancer as a possible cause of the ascites. Ovarian tumors do not always result in ovarian architecture changes and can sometimes manifest with peritoneal involvement [14]. Even though the patient's CA125 levels were high, this marker is found in numerous conditions, including PTB and ovarian cancer, and therefore cannot be used to differentiate between them [2]. Other pathologies with a similar presentation on CT include diffuse lymphoma, mesothelioma, and metastatic gastric cancer [4].

For cases where the mycobacterial tests are nondiagnostic, and there is a high index of suspicion based on clinical, epidemiologic, and diagnostic findings (such as elevated ascitic fluid ADA), it is recommended to initiate an empiric trial of antituberculous therapy. The treatment for peritoneal tuberculosis is generally the same as that for pulmonary TB. The response to treatment typically takes at least three months, with gradual resolution of the ascites. If patients respond slowly to therapy, the treatment duration may be extended to seven months in the second phase [2]. Surgical interventions may be necessary for complex cases that involve flanges and extensive granulation tissue. Corticosteroids have been suggested as adjuvant therapy in peritoneal tuberculosis to prevent fibrosis and intestinal obstruction, but they are not universally recommended [2,3].

Conclusion

This case highlights the difficulty in diagnosing peritoneal tuberculosis (PTB). It is crucial to recognize this possibility, even in immunocompetent patients with few or no risk factors, in endemic areas, who exhibit vague or inconclusive clinical and paraclinical manifestations. After an extensive clinical workup, a peritoneal biopsy may still be necessary to confirm the diagnosis. On the other hand, if establishing a definitive diagnosis is not possible, and the clinical, epidemiologic, and laboratory results strongly suggest PTB, initiating an empiric trial of antituberculous therapy is appropriate. Other diseases that manifest similarly should always be ruled out.

Ethics approval and consent to participate

This report was prepared by the ethical standards of the institutional ethics committee and with the 1964 Helsinki Declaration. We have an approval letter from the Ethics Committee in biomedical research IRB /EC No. 027–2021 of the Fundación Valle del Lili to publish this manuscript.

Consent for publication

Written informed consent was obtained fromthe patient to publish this case report and any accompanying images. A copy ofthe written consent is available for review by the Editor-in-Chief of thisjournal.

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CRediT authorship contribution statement

All authors have read and approved the manuscript, and significantly contributed to this paper. **EEF**: Conception and design, literature review, manuscript writing, and correction, final approval of the manuscript. **MAA**: Literature review, manuscript writing and correction, and final approval of the manuscript. **PAM**: Conception and design, literature review, manuscript writing and correction, final approval of the manuscript. **JE**: Literature review, manuscript writing and correction, final approval of the manuscript. **LFT**: Conception and design, literature review, manuscript writing and correction, and final approval of the manuscript.

Declaration of Competing Interest

The authors declare that they have no competing interests. This manuscript has not been published and is not under consideration for publication elsewhere. Additionally, all authors have approved this paper's contents and agreed to the journal's submission policies.

Data Availability

Datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

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Not applicable.

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