



Disseminated extrapulmonary tuberculosis with abdominal and meningeal involvement in a pediatric patient: case report

Tuberculosis extrapulmonar diseminada con afectación abdominal y meníngea en un paciente pediátrico: informe de un caso

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ABSTRACT

Abdominal tuberculosis primarily affects the terminal ileum, cecum, and lymphoid-rich areas, manifesting with chronic abdominal pain, weight loss, persistent fever, exudative ascites, and altered bowel habits. The case of an adolescent with a one-month history of abdominal pain accompanied by joint pain, decreased appetite, fainting, weakness, and weight loss was presented. The patient was admitted to the operating room with a suspected acute abdomen, and surgical findings led to a suspicion of intra-abdominal tuberculosis, confirmed by GeneXpert and pathology results. She subsequently presented with clinical signs of meningeal tuberculosis, confirmed by laboratory testing. Peritoneal tuberculosis is uncommon in the pediatric population; Clinical manifestations are often chronic and unclear, leading to confusion with other abdominal pathologies. A high index of suspicion is crucial for ordering the necessary tests to reach a diagnosis and initiate timely treatment.

Keywords: Extrapulmonary Tuberculosis, Gastrointestinal Tuberculosis, Meningeal Tuberculosis, Pediatrics.



RESUMEN

La tuberculosis abdominal afecta principalmente al íleon terminal, ciego y áreas ricas en tejido linfoide, se manifiesta con dolor abdominal crónico, pérdida de peso, fiebre persistente, ascitis de tipo exudativo y alteraciones del hábito intestinal. Se presentó el caso de una adolescente con dolor abdominal de 1 mes de evolución acompañado de dolor articular, hiporexia, desvanecimiento, debilidad y pérdida de peso. La paciente ingresó a quirófano con sospecha de abdomen agudo y por hallazgos quirúrgicos se sospechó de tuberculosis intraabdominal confirmada con GeneXpert y resultados de patología, presentó posteriormente clínica de tuberculosis meníngea confirmada por laboratorio. La tuberculosis peritoneal es poco habitual en la población pediátrica, las manifestaciones clínicas suelen ser crónicas y poco claras lo que lleva a que exista confusión con otras patologías abdominales. Resulta importante la sospecha diagnóstica para solicitar los exámenes necesarios para llegar al diagnóstico y poder comenzar el tratamiento de manera oportuna.

Palabras clave: tuberculosis extrapulmonar, tuberculosis gastrointestinal, tuberculosis meníngea, pediatría.

INTRODUCTION

Tuberculosis (TB) is caused by *Mycobacterium tuberculosis*, along with other species relevant in pediatrics such as *Mycobacterium bovis* and *Mycobacterium bovis*- BCG.⁽¹⁾ Abdominal tuberculosis is a rare extrapulmonary form that can affect the gastrointestinal tract, peritoneum, intra-abdominal lymph nodes, and, less frequently, solid organs. It accounts for approximately 1 % to 3 % of all tuberculosis cases worldwide and 6 % to 13 % of extrapulmonary tuberculosis cases. Its incidence varies by geographic region⁽²⁾, and even so, it remains an uncommon entity, even in countries where *Mycobacterium tuberculosis* infection is endemic.⁽³⁾ In Ecuador, the incidence in children under 15 years of age reported in the 2015-2016 National Tuberculosis Program was 2.03 %, with extrapulmonary involvement in 0.75 %, peritoneal tuberculosis being an uncommon extrapulmonary presentation.⁽⁴⁾ Clinical manifestations are often nonspecific, most frequently presenting as abdominal pain, weight loss, hyperemia, and diarrhea,⁽⁵⁾ and can mimic manifestations of other gastrointestinal diseases such as intestinal perforation, appendicitis, or Crohn's disease.⁽⁶⁾ It can be classified into three types: wet tuberculosis, characterized by significant ascites; dry tuberculosis, with adhesions; and fibrotic tuberculosis, with omental thickening and loculated ascites.⁽⁷⁾ Abdominal tuberculosis can also be asymptomatic and be found incidentally as calcifications during radiological examinations performed for unrelated reasons. Due to nonspecific clinical manifestations, the diagnosis of abdominal tuberculosis is often delayed, leading to higher rates of morbidity and mortality.⁽⁸⁾

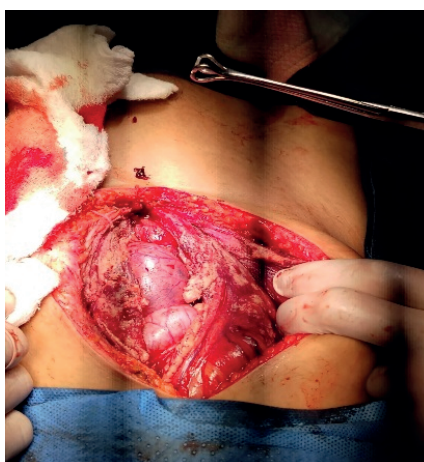
This work aimed to describe the clinical characteristics, diagnostic methods, and therapeutic approaches of intestinal and peritoneal tuberculosis, to raise awareness of its often-ambiguous clinical presentation, highlight the importance of early diagnosis, and update current management strategies to improve the prognosis of pediatric patients.



CASE PRESENTATION

A 14-year-old female patient, the product of the second pregnancy, with no significant personal or surgical history, residing in Quito, is under the care of her maternal grandmother. She lives in a small, one-bedroom, one-bathroom dwelling with a kitchen, sharing the property with her maternal grandmother and maternal uncle. She reports consuming unpasteurized milk three to four times a day. The patient was admitted to the emergency department of the Enrique Garcés General Hospital accompanied by her aunt, who reported a one-month history of abdominal pain accompanied by joint pain, decreased appetite, fainting, weakness, and weight loss. On physical examination upon admission, she was afebrile, with pale, dry skin, an expression of pain, a distended abdomen, decreased bowel sounds, and a tense, diffusely tender abdomen to superficial and deep palpation. Laboratory tests revealed a complete blood count with leukocytosis of 54 440 and neutrophilia of 90.6 %; anemia was evident with a hemoglobin of 10.3 g/dl and hematocrit of 30.8 %; platelets 412 000; and band neutrophils 20 %. Creatine kinase-MB (CPK MB) of 10, rapid hepatitis A antibody test (Anti-HAV IgM) negative, VDRL negative, human chorionic gonadotropin (β -HCG) negative. The patient was transferred from the emergency room to the operating room, where a laparotomy, cavity drying, adhesiolysis, and incidental appendectomy were performed. Surgical findings included 500 ml of hemoperitoneum, a mottled uterus, no visualization of the adnexa, an appendix without signs of acute inflammation, a thickened omentum, and a hardened texture (see Figure 1).

Figure 1. Laparotomy, cavity drying, adhesiolysis, incidental appendectomy.



Following the surgical procedure, the patient remained hemodynamically unstable and was therefore evaluated by the Intensive Care Unit. She was admitted with a Glasgow Coma Scale score of 3, requiring invasive mechanical ventilation in pressure-controlled mode; adequate volume, vasoactive medications, and antibiotic therapy were initiated with piperacillin/tazobactam, metronidazole, and meropenem. Three days after admission, a second exploratory laparotomy with omentectomy and Barker system was performed, revealing 1000 ml of intestinal fluid and severe adhesions (Zulkhe IV), perforation of the small intestine, and thickened, rigid fallopian tubes. Ovaries were not identified (see Figure 2).



Figure 2. Exploratory laparotomy, omentectomy, creation of Barker system



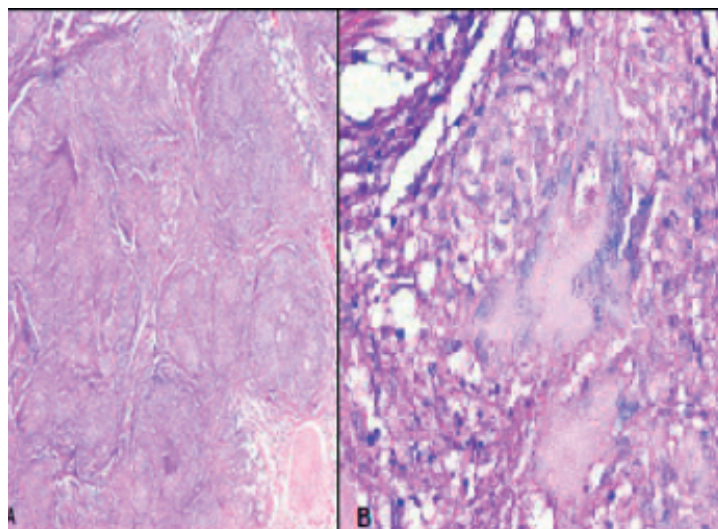
Six days after admission, the patient, with a Glasgow Coma Scale score of 15/15, remained hemodynamically unstable due to septic distributive shock secondary to pelvic peritonitis complicated by septic cardiomyopathy. Dual support was initiated with vasopressors and inotropes, along with oxygen via nasal cannula. Seven days after admission, an exploratory laparotomy was performed, followed by closure of the abdominal cavity with a reinforced tension line (RTL). A Jackson-Pratt drain was placed in the rectus abdominis fundus. A fungal culture was taken, an omental sample was obtained for histopathology, and an ileostomy was performed, which proved functional. Parenteral nutrition was initiated.

On her ninth day of hospitalization, tumor markers were requested, with the following results: CA 125 at 65.98 U/ml, CA 199 at 38 U/ml, and alpha-fetoprotein at 8.21 U/ml, showing slight alterations in the paraclinical tests described.

On her thirteenth day in the Intensive Care Unit, she remained on comprehensive supportive care. Clinical evaluation revealed dyslalia, sucking, and nuchal rigidity, leading to suspicion of meningitis. A lumbar puncture was performed, and cytochemical analysis revealed glucose: 50 mg/dL, protein: 1070.95 mg/dL; bacteriological analysis: colorless and transparent; Gram stain: no bacteria observed; acid-fast bacilli (AFB): negative; India ink stain: negative; cerebrospinal fluid (CSF) culture: negative; and GeneXpert was positive for *Mycobacterium tuberculosis*, thus confirming meningeal tuberculosis. A histopathological report of the omentum showing a granulomatous pattern was received (see Figure 3).



Figure 3. Histopathology of omentum reports a granulomatous pattern.



A peritoneal fluid culture showed the presence of *Candida albicans* and *Candida krusei*. Omental and peritoneum tissue cultures also showed *Candida albicans*. Due to a granulomatous pattern in the omentum, a GeneXpert molecular tuberculosis test was requested for omentum and peritoneum tissue, which yielded a positive result. An infectious disease consultation was requested, and antituberculosis therapy was initiated with rifampicin, isoniazid, ethambutol, and pyrazinamide, in addition to vitamin B1 and caspofungin. The antibiotic therapy was then switched to levofloxacin, amikacin, and linezolid.

On the fourteenth day, control tests were performed with results that reported normal leukocyte value at 8,050, neutrophils 85.9 %, lymphocytes 5.3 %, with a decrease in the value of hemoglobin at 9.4 g/dl and hematocrit 28.9 %, platelets 548,000, the rest of the tests such as glucose 129 mg/dl, urea 14.5 mg/dl, creatinine 0.26 mg/dl, albumin 2.2 g/dl, PCT 0.37, IL6 22.6 within normal parameters.

On the sixteenth day, the patient was in stable condition and transferred to the Pediatric ward, with oxygen support via nasal cannula at 1 liter, maintaining an oxygen saturation of 95 %, to continue treatment and clinical management. On the seventeenth day, the final blood culture results were negative. On the nineteenth day of admission, due to persistent fever and to rule out fluid collections or associated infections, simple CT scans of the skull, thorax, abdomen, and pelvis were performed, which showed no abnormalities (see Figures 4 and 5). Therefore, the abdominal drain was removed, and the patient was discharged by Pediatric Surgery for follow-up in the outpatient clinic after her final discharge.



Figure 4. Simple computed tomography of the skull, axial section, and simple computed tomography of the thorax without alterations.

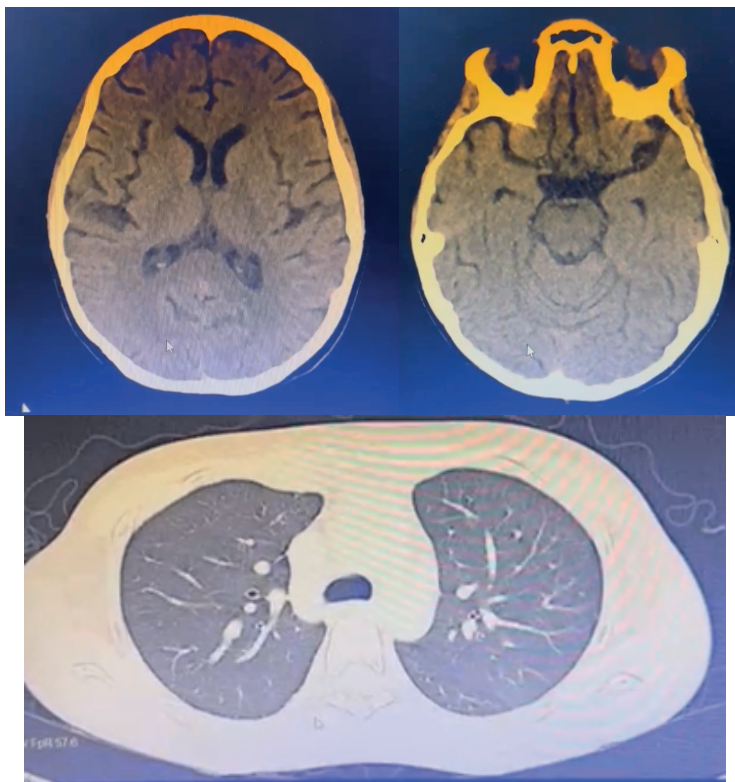
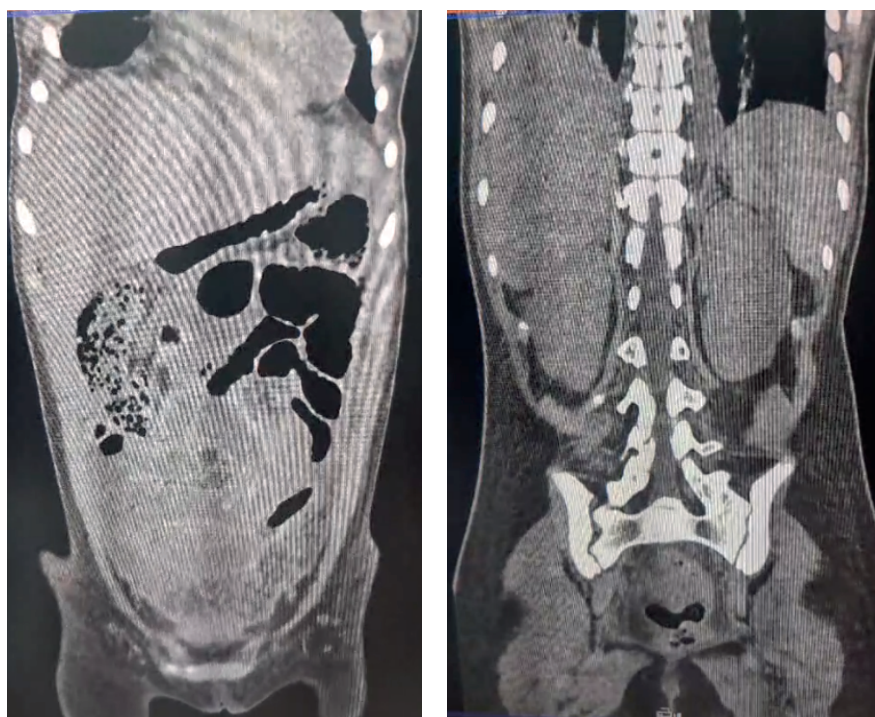


Figure 5. Simple abdominal tomography coronal section without alterations.





Since no new infectious focus was found and the fever persisted, treatment with Prednisone for tuberculous meningitis was initiated, and the fever subsided 24 hours after its initiation.

On the twenty-first day of hospitalization, she was discharged by the Infectious Diseases and Pediatrics services in good general condition to continue antituberculosis treatment with quadruple therapy for 2 months and triple therapy for 10 months, plus corticosteroids for 6 weeks.

DISCUSSION

Abdominal tuberculosis is an uncommon and difficult-to-diagnose presentation, especially in childhood.⁽⁹⁾ Pathophysiological mechanisms include the ingestion of mycobacteria, which can reach the intestine through the ingestion of infected sputum, the ingestion of cow's milk infected with *Mycobacterium bovis*,⁽¹⁰⁾ lymphohematogenous dissemination from an infected focus, and direct dissemination to the peritoneum from adjacent foci.⁽¹¹⁾ Of particular importance in our patient's history is the consumption of unpasteurized milk, which is the likely source of the infection.⁽¹²⁾ The symptoms of abdominal tuberculosis are often varied and sometimes chronic, and may include abdominal pain, fever, ascites, weight loss, abdominal distension, diarrhea, or constipation.⁽¹³⁾ Symptoms in children are often confused with common childhood infections, which complicates the evaluation.⁽¹⁴⁾ In this case report, the patient presented with diffuse abdominal pain of one month's duration, initially accompanied by joint pain. She sought medical attention, received oral analgesic therapy, and was discharged home. Subsequently, the described symptoms worsened, accompanied by decreased appetite, weight loss, weakness, general malaise, and nausea progressing to vomiting. Diagnosing tuberculosis in pediatrics is challenging because clinical and paraclinical manifestations are often nonspecific, compounded by the low sensitivity of microbiological studies for identifying and isolating *Mycobacterium* spp.⁽¹⁵⁾ The complementary tests performed during hospitalization were extremely important for resolving the condition. Abdominal tuberculosis should always be considered in the differential diagnosis of acute or chronic abdomen in endemic areas, in developing countries like ours, and in certain specific situations in developed countries.⁽¹⁶⁾ The peritoneal fragment biopsy, the histopathological result reporting the presence of Langhans cells, and especially the cytochemical analysis of the lumbar puncture were crucial in establishing the diagnosis of peritoneal and meningeal tuberculosis, in addition to ruling out other diagnostic hypotheses, including neoplasms. Few cases are reported with findings compatible with acute abdomen requiring emergency surgery, as presented by this patient.⁽¹⁷⁾ However, timely intervention and comprehensive multidisciplinary management reduced the risk of complications and death and improved the prognosis and quality of life.⁽¹⁸⁾ Regarding treatment, in the initial phase, pediatric patients with abdominal tuberculosis are indicated to begin with four drugs: Rifampicin, Isoniazid, Pyrazinamide, and Ethambutol.⁽¹⁹⁾ Concomitant treatment with corticosteroids reduces morbidity and mortality in patients with fibrotic complications;⁽²⁰⁾ however, evidence is insufficient to recommend their routine use in pediatric patients with abdominal tuberculosis.⁽²¹⁾ Corticosteroids decrease the inflammatory response in the subarachnoid space and prevent small artery vasculopathy, avoiding long-term neurological sequelae.⁽²²⁾



CONCLUSIONS

Peritoneal tuberculosis is uncommon in the pediatric population. Clinical manifestations are often chronic and vague, hindering early diagnosis and leading to confusion with other abdominal pathologies, as occurred in the case presented, where the patient did not receive timely treatment before arriving at the hospital. This resulted in infection in various regions, not only intra-abdominal areas but also the central nervous system, which led to the patient's critical condition. Laboratory and imaging tests are not always conclusive. In this case, laparoscopy was a useful and objective procedure for definitive diagnosis, revealing the appearance of the organs, which raised diagnostic suspicion. It also enabled the collection of samples for tuberculosis testing, preventing the disease from progressing and successfully treating complications such as intestinal perforation. Finally, it is important to conduct a thorough medical history and physical examination, and to combine radiological and histopathological findings to ensure diagnosis and initiate specific treatment early. The prognosis for this disease is very good with appropriate diagnosis and treatment.

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Contribution statement:

Stella Damaris Verdezoto Unda: writing the article, reviewing contributions, and making corrections.

César Fernando Vaca Salazar: writing the article, reviewing contributions, and making corrections.

Vanessa Alexandra Avalos Trujillo: writing the article, reviewing contributions, and making corrections.

Mayra Alejandra Gómez Mafla: writing the article, reviewing contributions and making corrections.

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