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Case Report

Tuberculous peritonitis in children: Two case reports highlighting the important role of imaging☆

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ABSTRACT

Tuberculous peritonitis is an uncommon extrapulmonary form of *Mycobacterium tuberculosis* infection, frequently presenting with nonspecific and insidious symptoms. Diagnosis is therefore difficult, unsuspected, and often delayed, especially in the pediatric patient without an obvious history of exposure to the pathogen.

This report presents a 9-year-old Hispanic girl and a 3-year-old African American boy presenting with nonspecific and insidious symptoms, such as abdominal pain, distention, and fever in whom computed tomography findings of peritoneal thickening and enhancement, high density ascites, lymphadenopathy, and bowel wall thickening acted as key components in establishing a final diagnosis of the condition. Computed tomography is an important clinical adjuvant in making this difficult diagnosis.

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Introduction

Although tuberculosis (TB) is on the decline in the United States, it remains a prevalent condition worldwide [1]. The disease is caused by the bacterium *Mycobacterium tuberculosis*, affecting nearly 10 million patients per year and causing approximately 1.5 million deaths [2]. While TB is typically known for affecting the lungs, the disease is also able to affect other parts of the body, such as the pleura, lymph nodes, skin, joints, bones, and abdomen [3]. Abdominal involvement of TB occurs in approximately 11% of patients with extrapulmonary TB, and may present in areas such as the peritoneum, gastrointestinal tract, hepatobiliary tract, or lymph nodes [4]. Patients who are at a high risk for such involvement include those who are immunosuppressed, with approximately 12% of new diagnoses occurring in patients who are HIV positive [2]. Other high risk factors include patients with

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cirrhosis, use of continuous ambulatory peritoneal dialysis in patients with chronic renal failure, diabetes mellitus, malignancy, and immigrants from areas with high prevalence of TB [5,6].

Abdominal TB, while more common in the 25–45 year old age group, is rare in the pediatric population. Within the small subset of pediatric cases, peritoneal involvement is more common than gastrointestinal, with the most frequent presentation being that of abdominal pain, distention, and fever. It has been reported that the incidence of peritoneal TB in children under the age of 20 in the United States is as little as 0.3% [7]. In this article, we present 2 pediatric cases of peritoneal TB with insidious onset of symptoms in which the radiographic findings acted as key components in establishing the final diagnosis.

Cases

Patient 1

A 9-year-old Hispanic girl with a history of traumatic brain injury with resultant hydrocephalus at the age 2 years, ventriculoperitoneal (VP) shunt, and cochlear implant was admitted with a 9-day history of daily fever, change in behavior, and decreased appetite. The patient was nonverbal but was able to sign some words; her mother said that her daughter felt nauseated and had decreased appetite. She was admitted to our hospital for treatment of right middle and right lower lobe pneumonia 10 months prior to this presentation.

On admission, she was febrile to 38.3 °C and appeared nontoxic but fatigued and pale. Her examination was significant for a palpable cochlear implant and a palpable VP shunt reservoir with no overlying erythema. Her lungs were clear. Her abdomen was soft and nontender with no palpable masses at that time.

Initial laboratory findings on admission were total white blood cells (WBCs) 5500 with 43% polymorphonuclear leukocyte, 16% bands, 23% lymphocytes, 16% monocytes, 1% eosinophil, and 1% atypical lymphocytes. The hemoglobin was 10.6 gm/dL and the platelet count was 545,000. C-reactive protein was 11.75 mg/dL and erythrocyte sedimentation rate was 71 mm/h.

Admitting diagnosis was suspected VP shunt infection or meningitis. Lumbar puncture revealed clear and colorless cerebral spinal fluid (CSF). There were 2 WBCs and 519 red blood cells; the CSF protein was 29 mg/dL and the glucose was 61 mg/dL (serum glucose was 83 mg/dL). On the second hospital day, her VP shunt was tapped. The protein was 7 mg/dL, glucose 64 mg/dL. There were 2 WBCs and 0 red blood cells.

Her hospital course was complicated by poor oral intake, weight loss, and daily spiking fevers despite broad spectrum antibiotics. Multiple blood cultures were sterile. Her CSF and VP shunt fluid cultures were sterile and she had a negative urine culture. Her hemoglobin dropped and inflammatory markers remained elevated. A gamma interferon release assay for TB was equivocal. On the fourth hospital day, she developed abdominal distention and pain on palpation. She underwent a computed tomography (CT) scan of the abdomen and pelvis (Fig. 1) revealing ascites, thickening, and nodularity of the omentum, as well as wall thickening of the small bowel loops without obstruction.

Based on the results of the CT scan, she underwent peritoneal fluid sampling by interventional radiology. The fluid had a protein of 4.9 mg/dL. The total WBCs were 1626 with 42% polymorphonuclear leukocyte, 27% lymphocytes, and 31% mono and/or macrophages. The Gram stain of the fluid showed no WBCs and no organisms. All cultures of the peritoneal fluid including routine, anaerobic, acid fast bacilli (AFB), and fungal were negative.

The patient was transferred to another institution for removal and replacement of her VP shunt and further work up. She was hospitalized at the second institution for 4 weeks during which time she continued to spike high fevers despite treatment with multiple broad spectrum antibiotics. Her VP shunt was externalized and ultimately replaced as ventriculoatrial shunt. Although afebrile at hospital discharge, her appetite and weight gain were poor.

The patient was readmitted to the referring hospital 10 days later with severe abdominal pain. She was taken to the operating room for exploratory laparotomy. Omentum was sent for histopathology and for culture. The histopathology revealed multiple giant cell granulomas, some of which were caseating. The AFB culture grew M tuberculosis complex, later confirmed as pan-susceptible TB. Peritoneal fluid also grew the M tuberculosis.

Patient 2

A 3-year-old African American boy with no known medical conditions was admitted for evaluation of daily fever of unknown origin for 4 weeks. He had presented to an outside hospital twice prior to arriving at our institution and was diagnosed with viral illness. His other symptoms included headache, chills, fatigue, and anorexia. For at least 3 weeks prior to admission, he had developed abdominal distention. He denied rash, cough, chest pain, adenopathy, nausea, vomiting, or diarrhea. Although born in the United States, he lived with his family in Sierra Leone, West Africa from the age of 10 months until 5 weeks prior to his illness onset and presentation at our hospital. He was behind on his vaccination schedule and had a 2 kg weight loss over the month prior to admission. On admission, he was febrile and ill-appearing but nontoxic. He was tachycardic and had subconjunctival and distal extremity pallor. His abdomen was distended and he had hepatosplenomegaly. Laboratory findings on admission were, hemoglobin 7.7 g/dL, platelet count 792,000, ESR > 100/h, and CRP 18.56 mg/dL. Blood and urine cultures were sterile. Malaria smears were negative. HIV 1 and 2 antibodies were negative. Flow cytometry showed no evidence of clonal B cell or T cell lymphoproliferative disorder.

An abdominal CT was performed (Fig. 2) revealing a large amount of ascites and nodular thickening and enhancement of the peritoneal lining. There was no free air. Following the CT, a diagnostic laparoscopy was performed to drain the ascites and sample the peritoneum. Proper precautions for peritoneal fluid were put in place during the procedure because peritoneal TB was on the differential diagnosis list.

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