SUNTEXT REVIEWS

SunText Review of Case Reports & Images
ISSN: 2766-4589

Open Access
Case Report
Volume 4:2

Abdominal Tuberculosis in Children: A Case Report Demonstrating the Role of Imaging

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Received date: 14 March 2023; **Accepted date:** 16 March 2023; **Published date:** 20 March 2023

Citation: Choayb S, El Harras Y, Allali N, Chat L, El Haddad S (2023) Abdominal Tuberculosis in Children: A Case Report Demonstrating the Role of Imaging. SunText Rev Case Rep Image 4(2): 172.

DOI: https://doi.org/10.51737/2766-4589.2023.072

Abstract

Tuberculosis (TB) is a major public health problem in the world. Abdominal tuberculosis is a rare manifestation in children with chronic and not particularly specific symptoms. We discuss the case of a 3-year-old child whose diagnosis of abdominal tuberculosis was established on the basis of clinical findings, laboratory tests, and radiological elements.

Keywords: Tuberculosis; Abdominal tuberculosis; Pediatric abdominal tuberculosis; Lymphadenopathy

Introduction

Pediatric abdominal tuberculosis is not very common, and its symptoms are long-lasting and not very specific. The diagnosis is hard to make and is based on a positive culture, but imaging is essential to get proof of a long-term infection [1].

Case Presentation

A 3-year-old girl with no known comorbidities came to the children's emergency department with a 2-month history of prolonged fever, abdominal distension, loss of appetite, and weight loss. During the clinical examination, the patient was found to have hyperthermia (38;5°), tympanitic abdominal distension, and several swollen lymph nodes in the cervical and axillary regions. No respiratory discomfort was noted. A blood test showed anemia (the hemoglobin level was at 10 g/dL) as well as an elevated CRP of 88 mg/L. Her chest radiography was normal (not shown). Abdominal ultrasound revealed free peritoneal fluid at the right paracolic gutter, ileocecal wall thickening, and multiple enlarged lymph nodes (Figures 1,2). A CT scan confirmed the bowel wall thickening of the ascendant colon, terminal ileum, and cecum and showed multiple retroperitoneal enlarged lymph nodes with central necrosis and ascites of the right paracolic gutter (Figure 3). No splenic or hepatic lesions were observed. Imaging suggested abdominal TB, which a positive gastric aspirate and geneXpert test later confirmed. Caseous necrosis was also found in the cervical lymph nodes. The patient received quadruple anti-TB therapy (rifampicin, isoniazid, pyrazinamide, and ethambutol) for 2 months and was maintained on double anti-TB therapy for 4 more months with a favourable outcome.

Discussion

Tuberculosis is a serious public health problem in both developing and developed countries [2]. However, while pulmonary TB is the most prevalent form, TB can occur in other systems such as the intestines, lymph nodes, bones, meninges, and so on [1]. About 11% of individuals with extra pulmonary TB develop abdominal tuberculosis, the sixth most common form. It can affect the peritoneum, gastrointestinal tract, mesentery, lymph nodes, hepatobiliary tract, or solid viscera like the spleen and liver [1-3]. Children have the greatest risk of developing extra-pulmonary TB and tend to progress more severely [4]. Abdominal TB may develop after the ingestion of sputum infected by Mycobacterium tuberculosis or milk infected by Mycobacterium bovis. It may also develop following hematogenous or lymphatic dissemination from an active site of TB or by direct extension from adjacent infected tissues. It is also possible for an earlier primary infection in older children and teenagers to result in the subsequent reactivation of a latent abdominal infection [2]. Clinical manifestations are not specific, and the progression of the

disease is slow and insidious. The most frequent signs are abdominal pain, vomiting, constipation, weight loss, anorexia, fever, night sweats, abdominal distension, and bleeding from the rectum. Acute presentations are not very common; nevertheless, they are more frequent in immunocompromised patients with severe forms [1,2].

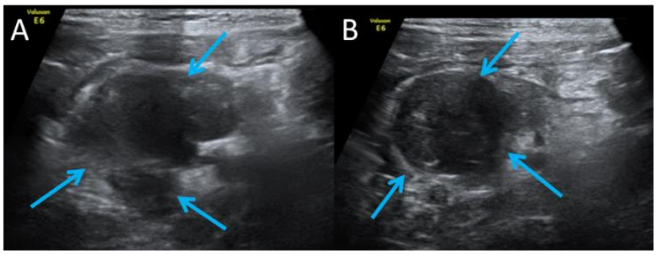

Figure 1: *A and B; para umbilical abdominal ultrasound revealing multiple enlarged and hypoechoic lymph nodes.*

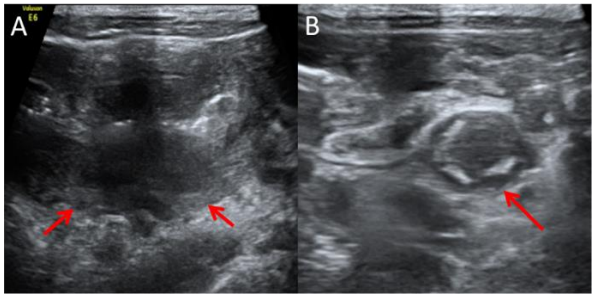

Figure 2: *A: longitudinal ultrasound image showing irregular thickening and decrease of echogenicity of the bowel wall. B: cross-sectional abdominal ultrasound showing eccentric thickening of the bowel wall.*

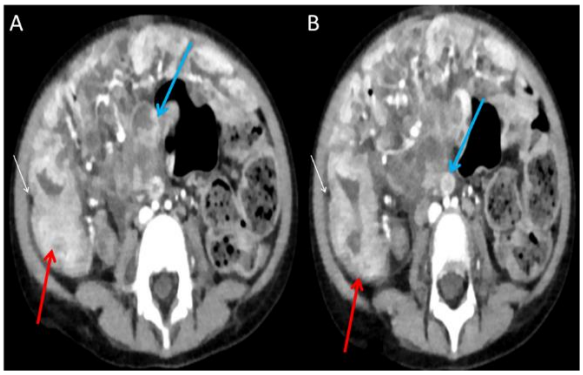

Figure 3: *A and B axial enhanced computed tomography of the abdomen show multiple enlarged and low-density lymph nodes with peripheral enhancement (blue arrows), thickening of the ascending colon wall and cecum (red arrows), and ascites of the right paraglottic gutter (white arrows).*

Tuberculosis peritonitis is rare and almost always affects young individuals. Besides the clinical symptoms, blood tests frequently reveal anemia and elevated infection indicators [1]. Imaging plays an essential role in the diagnosis and can detect potential complications such as perforation, fistula, and abscess. Further, it can assist in guiding an appropriate biopsy and evaluating the efficacy of treatment [2,3]. Lymphadenopathy is the most classic sign of TB, and in some cases, it is the only marker. Typically, they are located in the paraaortic and mesenteric areas. Their appearance ranges from a simple increase in the number of normal-sized nodes to clusters or mass-forming nodes. They tend to lose their elliptical shape and become ovoid or circular. On ultrasound and CT, caseous necrosis appears as a central hypoechoic or hypodense area. A different pattern of enhancement can be displayed, including homogenous, peripheral, or mixed. Additionally, they could be multiloculated or non-enhancing. The presence of calcifications is not necessarily indicative of inactivity. Caseous necrosis is not specific, as it can also be caused by metastases, lymphoma, and pyogenic infection in addition to tuberculosis [2-6]. Hepatic or splenic tuberculosis can cause hepatosplenomegaly, micro nodular multiple small lesions (0.5 to 1cm), and single or multiple macro nodular lesions. The most prevalent presentation is hepatosplenomegaly accompanied by several micro abscesses. Ultrasound and CT show hypoechoic or hypodense lesions with or without peripheral enhancement. They may heal with calcification. The differential diagnosis should include fungal or pyogenic infections, metastases, and sarcoidosis, although the latter is less common [2-6]. Gastrointestinal TB mainly affects the ileocecal region, terminal ileum, and colon. Thickening of the bowel wall, tangled masses resulting from thicker loops, lymphadenopathy, and ascites suggest it. The principal differential diagnosis is Crohn's disease. Left colonic involvement, a long segment, the existence of skip lesions, and the comb sign favor Crohn's disease. On the other hand, intestinal tuberculosis is more frequently associated with the involvement of the ileocecal area, a small segment, as well as the presence of lymph nodes greater than 1 cm. Differentiating these two entities is mandatory, as steroid therapy can have devastating consequences for patients who have underlying abdominal TB [2-6]. The presence of ascites is indicative but not pathognomonic. Fine septations, mobile strands, or particles can be detected on ultrasound. On CT, it tends to have a high density (high protein content) and can be associated with omental thickening as well as regular or nodular thickening of the peritoneal layers. Additionally, the mesentery can become thicker with a stellate appearance due to lymphadenopathy lining the vessels [2-6]. TB skin tests are considered diagnostic of recent infection with Mycobacterium tuberculosis in children under the age of 5 years. However, its reliability in older patients is significantly lower [2]. The interferon-gamma release has higher sensitivity and specificity in individuals with latent TB, particularly in children under the age of 5 [2,3]. Analysis of ascites fluid will reveal an exudative character with a lymphatic predominance. High levels of adenosine deaminase possess high sensitivity (100%) and specificity (97%) [7]. However, histological confirmation is

necessary before initiating long-term treatment. It could be done by culture of ascites fluid, peritoneal biopsy, or detection of Mycobacterium tuberculosis in the sputum [4-6]. In regions where the disease is prevalent and confirmation tests are unavailable, treatment may be initiated based on a strong clinical diagnosis and suggestive imaging. In these cases, the patient's response to treatment is a kind of indirect confirmation of the diagnosis [7]. Treatment is based on anti-tuberculous medications that are administered for a period of 6-9 months and proven to be effective. Surgery is performed in cases of complications such as bowel obstruction, fistula, bleeding, or perforation. Continued follow-up is required until disease resolution [3].

Conclusion

Abdominal tuberculosis is a serious public health problem and is rarely found in children. Clinical symptoms are not specific. Early diagnosis is necessary because abdominal TB is associated with high mortality and morbidity. CT and ultrasound play an important role in the diagnosis, which needs to be confirmed by histology or biology before starting a long-term treatment.

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