Case Report

Diagnostic Peritoneal Biopsy in Koch's Abdomen : A Case Report and Review of Literature

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Abdominal tuberculosis presents diagnostic challenges due to its subacute and non-specific clinical features. Diagnostic peritoneal biopsy, specifically using laparoscopy, plays a pivotal role in confirming the diagnosis by providing magnified visualization of peritoneal surfaces. A few contraindications to peritoneal biopsy in Koch's abdomen include unstable hemodynamics, bleeding diathesis, uncontrolled ascites and severe abdominal distension. An elevated Adenosine Deaminase (ADA) level suggests a probable diagnosis of tuberculosis, but ascitic fluid culture has limited diagnostic yield. Diagnostic peritoneal biopsy remains the gold standard, providing histopathological confirmation. In cases where biopsy is inconclusive, empirical antitubercular therapy should be considered. Careful evaluation of alternative etiologies is crucial for optimal patient management.

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Abdominal Tuberculosis (TB) is a condition that involves the gastrointestinal tract, peritoneum, lymph nodes and/or solid organs. It accounts for approximately 5 percent of all reported TB cases. The peritoneum is a common site for extrapulmonary TB and becomes overtly manifest when the latent tubercular foci get activated due to immense spread from the primary sites of infection in the lung.

Koch's abdomen is often difficult to diagnose due to its subacute nature and non-specific clinical presentation. The routine clinical manifestations of peritoneal TB include ascites, abdominal pain and fever. These symptoms often range over weeks to months before a patient seeks the attention of a physician.

Abdominal TB is diagnosed by various modalities including ascitic fluid analysis, calculating the Serum-ascites Albumin Gradient (SAAG), performing microbiological tests such as mycobacterial culture growth, conducting a peritoneal biopsy, laparoscopy, or mini-laparotomy. More than 90 percent of patients with tuberculous peritonitis have ascites at the time of presentation and a SAAG <1.1 g/dL (in the absence of cirrhosis) is typically observed. An elevated level of Adenosine Deaminase (ADA) activity in the ascitic fluid (≥30 U/L) is also suggestive of TB, especially in cirrhotic patients. However, additional investigations like ascites cytology and imaging studies are recommended given false positives[1,2].

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Editor's Comment :

- Koch's abdomen is challenging to diagnose due to its non-specific symptoms.
- Elevated adenosine deaminase levels in recurrent ascites suggest tuberculosis, with diagnostic peritoneal biopsy being the gold standard.
- Empirical antitubercular therapy should be initiated in TB endemic areas even when the biopsy is inconclusive, after excluding other causes of ascites.

The diagnostic procedures for abdominal Tuberculosis (TB) have limitations, such as low diagnostic yields from Acid-fast Bacilli (AFB) staining and fluid culture. Although radiological abnormalities on Computed Tomography (CT) imaging can differentiate between peritoneal carcinomatosis which typically has more nodules and generalized irregularity from abdominal TB findings, even that is quite nonspecific. As a result, acquiring tissue samples via diagnostic peritoneal biopsy is critical for a more reliable diagnosis, allowing direct evaluation of the afflicted tissue and identification of mycobacteria or other TB-related abnormalities. A diagnostic peritoneal biopsy is critical in verifying the diagnosis of abdominal Tuberculosis[3]. We present a case of Koch's abdomen confirmed with a diagnostic peritoneal biopsy and discuss the advantages of doing one, and contraindications of the procedure with emphasis on recent advances on Abdomen Koch's.

Case Report

A 36-year-old female presented to the Medicine Outpatient Department with a one-month history of progressive abdominal distension, weight loss (8 kg), fever, and generalized weakness. Physical examination revealed fever, non-jaundiced appearance, normal breath sounds and large amounts of non-tense ascites. Initial blood tests were normal, including complete blood count, prothrombin time, and liver enzymes. The Mantoux test for tuberculosis was negative and the chest X-ray appeared

normal. Diagnostic paracentesis showed increased cellularity with predominantly lymphocytes and the serum-to-ascites albumin gradient was less than 1.1, consistent with Tubercular Ascites. However, Acid-fast Bacilli (AFB) stain*, gene Xpert* and AFB cultures of the ascitic fluid were negative. Adenosine Deaminase (ADA) activity was elevated (84 IU/L), further supporting the possibility of tubercular ascites. The patient was started on Anti-tuberculosis Treatment (ATT), (HRZE) and discharged in stable condition with follow-up advice. However, after 23 days on ATT, the patient returned with complaints of recurrent abdominal distention, decreased appetite, nausea and vomiting. Liver enzymes were within normal limits, and further screening for viral hepatitis and HIV was negative. An abdominal and pelvic CT scan revealed omental nodularity and diffuse streakiness. A repeat paracentesis ruled out malignancy but showed high ADA activity. Diagnostic laparoscopy was then performed, revealing multiple small nodules consistent with peritoneal Tuberculosis. Peritoneal biopsies (Figs 1-3) confirmed the presence of granulomas suggestive of tuberculosis, patient was restarted on first-line ATT and responded considerably well.

Discussion

Abdominal Tuberculosis, including tuberculous peritonitis and gastrointestinal tuberculosis (GITB),

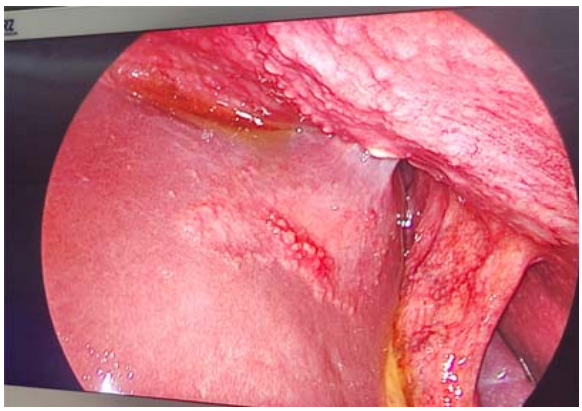

Fig 1 — Peritoneal Surface Showing Multiple Tiny Tubercles

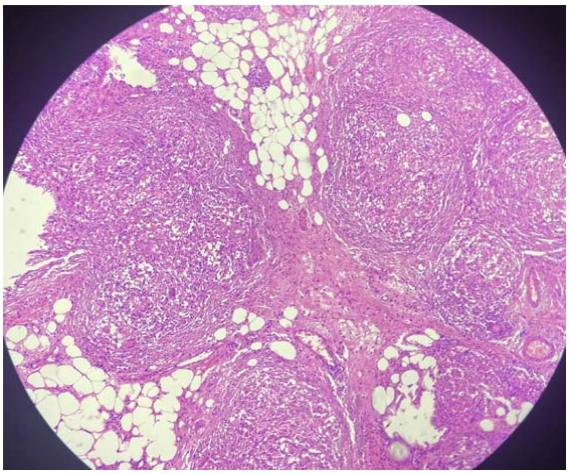

Fig 2 — H&E, Granulomas, Gaint Cells, Epitheloid Cells

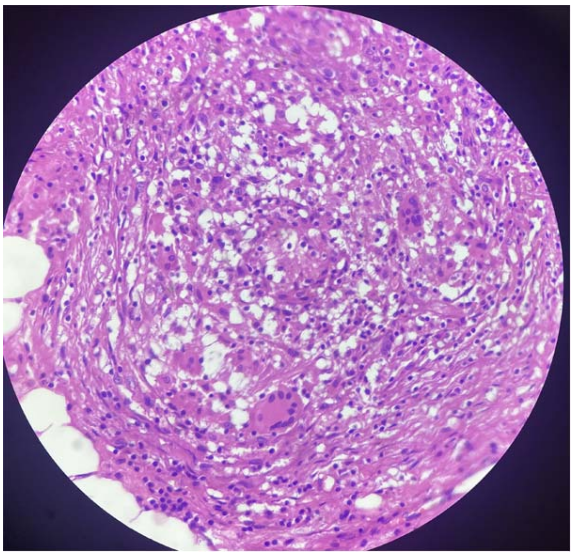

Fig 3 — H&E, Granulomas, Gaint Cells, Epitheloid Cells

presents a complex challenge in diagnosis and treatment despite its historical existence. Alongside the more prevalent forms, such as tuberculous peritonitis and GITB, there are also rarer manifestations affecting the esophagus, gastroduodenal region, pancreas, liver, gallbladder and biliary system. Accurate differentiation from conditions like peritoneal carcinomatosis and Crohn's disease is crucial in clinical practice.

Imaging techniques such as ultrasound, Computed Tomography (CT), Magnetic Resonance Imaging (MRI), and occasionally Positron Emission Tomography (PET) play vital roles in evaluating abdominal tuberculosis. Imaging alone is often insufficient for reaching a conclusive diagnosis of tubercular involvement of solid abdominopelvic organs due to the potential for overlapping imaging features with neoplastic and nonneoplastic conditions. Therefore, image-guided tissue sampling is crucial to obtain definitive histopathological confirmation and differentiate tuberculosis from other potential differential diagnoses.Advances in diagnostic research, particularly in imaging and endoscopy, have improved the ability to obtain tissue samples for histological and microbiological analysis[4].

While rapid diagnostic tests like the Xpert Mtb/Rif Polymerase Chain Reaction (PCR) offer quick results, their sensitivity may be limited.Nowadays, Interferon-Gamma Release Assays (IGRAs) are being considered as an important tool for the diagnosis of latent TB infection. In such cases, additional investigations like ascitic adenosine deaminase levels and histological features (eg, granulomas, caseating necrosis, histiocyte-lined ulcers) can enhance diagnostic specificity.

In challenging scenarios where the diagnosis remains uncertain, particularly in regions with high Tuberculosis prevalence, a diagnostic trial of Anti-tubercular Therapy (ATT) may be considered as a last resort after exhausting other diagnostic avenues. Early response assessment can be based on factors like mucosal healing (ulcer

closure within two months) and resolution of ascites. Biomarkers such as faecal calprotectin show promise in detecting intestinal Tuberculosis.

Most forms of abdominal Tuberculosis typically require a six-month course of ATT. However, complications associated with GITB may necessitate interventions such as endoscopic balloon dilatation for intestinal strictures or surgical procedures to manage recurrent intestinal obstruction, perforation, or severe bleeding[1].

In Tuberculosis peritonitis, the worsening of symptoms in some cases can be attributed to a paradoxical reaction, which is a known phenomenon associated with Antitubercular Therapy (ATT) as we noticed in this case (? Paradoxical Reaction? TB immune inflammatory reconstitution syndrome)[5]. The paradoxical reaction occurs when the immune system is boosted after initiating treatment, leading to a temporary exacerbation or recurrence of symptoms. This reaction is believed to be a result of the immune system recognizing residual mycobacterial antigens or inflammatory components in the peritoneal cavity. The approach followed by us in the present case is summarised in Fig 4.

Diagnostic peritoneal biopsy in Koch's abdomen (abdominal Tuberculosis) serves multiple purposes, including diagnostic confirmation in cases of high clinical suspicion but inconclusive other diagnostic tests; differentiation from other conditions such as peritoneal carcinomatosis or peritoneal lymphomatosis; assessment of disease severity to guide treatment and prognosis viz, (mesenteric lymphadenopathy extent, involvement of peritoneal surfaces, etc); identification of drug-resistant strains when there is a lack of response to standard Anti-tubercular Therapy (ATT); evaluation of complications like fibrosis, strictures, or perforation that may require specific interventions or surgical management[6]. Abdominal Tuberculosis should be considered in patients with non-specific abdominal symptoms, unexplained peritoneal thickening on CT scan, and elevated ADA levels. Laparoscopy is highly regarded as the optimal approach for early diagnosis due to its ability to provide magnified visualization of the peritoneal surfaces[7].

A few general contraindications to peritoneal biopsy in Koch's abdomen (abdominal tuberculosis) include unstable hemodynamic status, active bleeding diathesis, uncontrolled ascites, and severe abdominal distension.

Conclusion

In conclusion, while an elevated adenosine deaminase (ADA) level suggests a probable diagnosis of Tuberculosis (TB) in cases of recurrent ascites, it is essential to maintain a clinical suspicion for alternative causes like peritoneal carcinomatosis. The diagnostic yield of ascitic fluid analysis for culture is generally low, and no other less invasive procedure can definitively confirm TB. Diagnostic Peritoneal Biopsy (DPB) remains the gold standard, providing a reliable method for obtaining tissue samples to confirm TB. However, in cases where DPB fails to provide a conclusive diagnosis, a clinical diagnosis of TB should be considered, and empirical Anti-tubercular Therapy (ATT) should be initiated.

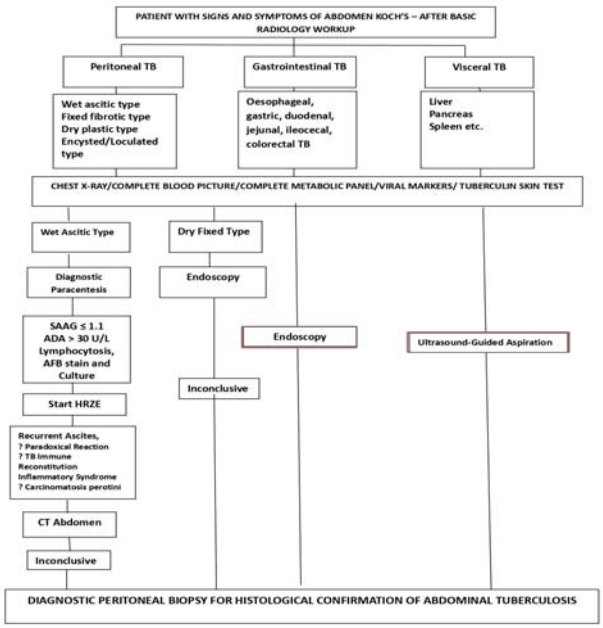

Fig 4 — Diagnostic Workflow in the Present Case

Conflicts of Interest : None to declare.

Ethics and Patient Privacy Issues : Addressed by the authors.

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