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Case Report

Laparoscopic management of ileal enterolith in abdominal tuberculosis: a case report and literature review

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ABSTRACT

Enterolithiasis is a rare condition characterized by the formation of stone-like concretions within the gastrointestinal tract. While commonly reported in the duodenum and colon, its occurrence in the ileum is rare and typically associated with intestinal stasis caused by pathological conditions such as Crohn's disease, strictures, or tuberculosis. Enterolithiasis in the setting of abdominal tuberculosis is exceptionally uncommon and poses significant diagnostic and therapeutic challenges. This report presents the case of a 60-year-old female with a history of abdominal tuberculosis on anti-tubercular therapy, presenting with recurrent subacute intestinal obstruction. Radiological investigations revealed a calcified intraluminal mass in the distal ileum. An initial attempt at enteroscopic retrieval failed due to luminal narrowing. She subsequently underwent laparoscopic segmental ileal resection with extracorporeal isoperistaltic anastomosis. Postoperative recovery was uneventful. Histopathology confirmed healed tuberculous ileitis without granulomatous activity or features of Crohn's disease. Ileal enterolithiasis should be considered in tuberculosis-endemic regions when evaluating unexplained or recurrent small bowel obstruction. Early imaging, high clinical suspicion, and prompt surgical intervention are critical. This case highlights the importance of differentiating tuberculosis-related strictures from other causes and supports laparoscopic resection as a safe and effective therapeutic strategy.

Keywords: Ileal enterolith, Abdominal tuberculosis, Laparoscopy, Intestinal obstruction, Anti-tubercular therapy

INTRODUCTION

Enterolithiasis refers to the formation of mineral concretions within the gastrointestinal tract, most commonly seen in the colon or duodenum. Its occurrence in the ileum is rare and often associated with pathological conditions that cause intestinal stasis, such as diverticulosis, Crohn's disease, or post-surgical loops. These stones are broadly classified as primary or secondary enteroliths, with primary enteroliths forming in situ due to localized biochemical and motility changes, while secondary enteroliths migrate from other parts of the digestive tract.[1] The ileum's naturally alkaline pH, particularly distal to areas of narrowing or fibrosis, facilitates calcium salt precipitation, leading to radiopaque stone formation.[1] However, because the ileum typically has rapid transit time, enterolith formation here is almost always associated with some predisposing factor. Crohn's disease remains a common cause of stricturing and impaired transit in younger populations, while tuberculosis is a leading etiology in developing countries.[2]

Abdominal tuberculosis (TB), a significant health burden in regions such as South Asia and sub-Saharan Africa, frequently affects the ileocecal region. It causes transmural inflammation, fibrosis, and adhesions that lead to segmental narrowing, delayed transit, and localized stasis, all key factors in enterolithogenesis.[3] The chronicity and often subclinical progression of abdominal TB may allow for silent stone formation, with obstruction being the first presenting symptom.

Although tubercular strictures are a recognized cause of subacute obstruction, reports of associated enterolithiasis are exceedingly rare. Differentiating TB from Crohn's disease can be difficult due to overlapping clinical, radiological, and intraoperative findings.[2,3] Imaging, especially contrast-enhanced CT, plays a pivotal role in diagnosis and surgical planning.[4] Herein, we present a rare case of an ileal enterolith in a patient on anti-tubercular therapy, managed successfully through laparoscopic resection.

CASE REPORT

A 60-year-old woman with a history of type 2 diabetes mellitus, hypertension, and hypothyroidism presented with intermittent, crampy abdominal pain for four months. The pain was postprandial and gradually progressive. Over the past 20 days, she experienced increased bloating, nausea, and constipation. There was no history of obstipation, gastrointestinal bleeding, or fever. The patient was undergoing anti-tubercular therapy (ATT) for biopsy-proven abdominal tuberculosis diagnosed five months earlier. Her prior surgical history included a laparoscopic cholecystectomy 12 years ago and a total abdominal hysterectomy for fibroids 7 years ago.

On clinical examination, she was hemodynamically stable. Mild abdominal distension was noted without guarding or tenderness. Bowel sounds were sluggish. Laboratory investigations revealed haemoglobin of 10.8 g/dl and an erythrocyte sedimentation rate (ESR) of 46 mm/hour. Leukocyte count and liver function tests were within normal limits. Figure 1 shows the presence of a radiopaque shadow in right lower quadrant on Xray abdomen, erect view.

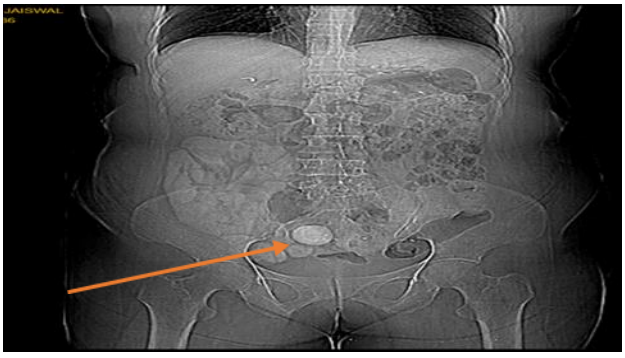

Figure 1: Plain abdominal radiograph (erect view) showing a discrete, radiopaque shadow in the right lower quadrant (arrow), suggestive of a calcified intraluminal mass consistent with an enterolith.

A contrast-enhanced CT scan of the abdomen showed a rounded, calcified intraluminal mass measuring 4 cm located in the distal ileum, with proximal small bowel dilatation suggestive of mechanical subacute obstruction (Figure 2). The radiological impression favoured an enterolith proximal to a tubercular stricture. A trial of enteroscopic retrieval was attempted but failed due to poor scope navigation beyond the narrowed ileal lumen and an impacted, non-mobile calculus. In view of persistent symptoms and failed endoscopic management, the patient was taken up for diagnostic laparoscopy. Intraoperatively, a 20 cm segment of thickened distal ileum containing an impacted enterolith was identified, with associated mesenteric fat stranding and mild adhesions. The involved bowel segment, including the stricture and the stone, was resected (Figures 3 and 4). An extracorporeal isoperistaltic side-to-side ileo-ileal anastomosis was performed.

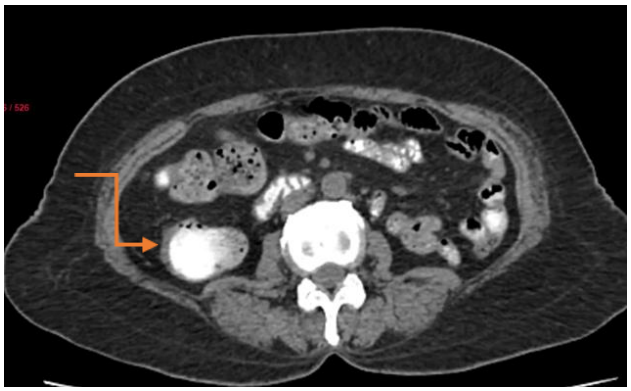

Figure 2: Axial contrast-enhanced CT scan image demonstrating a 4 cm rounded, hyperdense lesion (arrow) in the distal ileum with proximal bowel dilatation, indicative of a subacute mechanical obstruction caused by an enterolith.

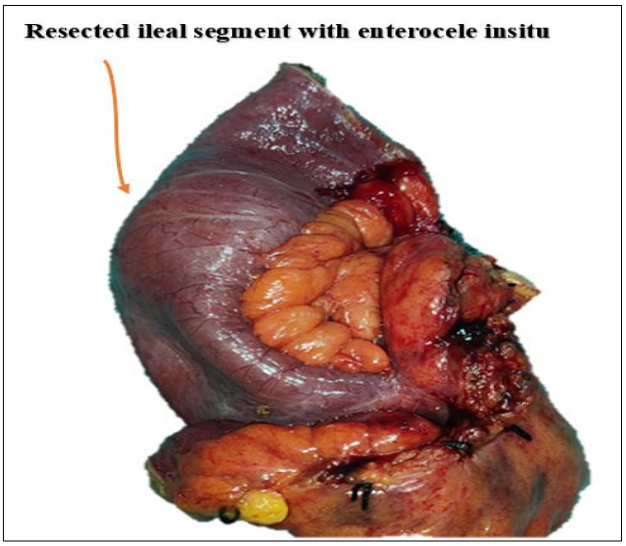

Figure 3: Intraoperative laparoscopic view revealing a thickened segment of distal ileum with mesenteric fat stranding and adhesions. The enterolith was palpable within the bowel lumen at the site of the stricture.

The patient's postoperative recovery was uneventful. Oral intake was resumed on postoperative day 3, and bowel movements returned by day 4. A brief episode of abdominal distension on day 5 resolved with conservative measures. She was discharged on postoperative day 8 in stable condition.

Histopathological examination showed chronic inflammatory changes with transmural fibrosis consistent with healed tubercular ileitis. No granulomas or features suggestive of Crohn's disease were observed (Figure 5). The patient was advised to complete the full course of ATT and has remained asymptomatic at 1-month follow-up.

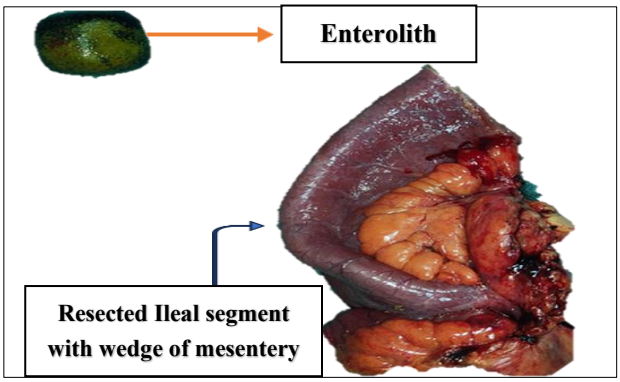

Figure 4: Excised ileal segment with enterolith in situ. The gross specimen shows the impacted stone within a fibrotic stricture, confirming the cause of the subacute intestinal obstruction.

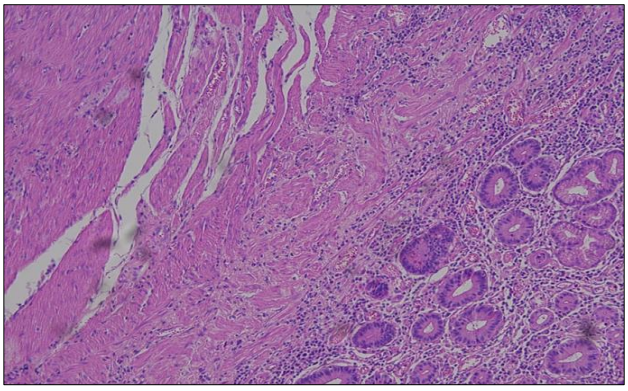

Figure 5: Histopathological section of the resected ileal segment showing chronic inflammatory changes with transmural fibrosis. No granulomas were seen. Features are consistent with healed tubercular ileitis (H&E stain, 40× magnification).

DISCUSSION

Enteroliths form due to chronic intestinal stasis that facilitates the accumulation and precipitation of mineral salts. Their occurrence in the ileum is relatively uncommon, primarily due to the rapid transit time of this segment. However, when transit is impeded by strictures, adhesions, or segmental dysmotility, enterolith formation becomes possible.

In the alkaline environment of the distal small bowel, these concretions often consist of calcium salts and are characteristically radiopaque on imaging.[1] Conditions like diverticulosis, Crohn's disease, and tubercular strictures are well-documented predisposing factors.[2] Abdominal tuberculosis most frequently involves the ileocecal region and may lead to transmural inflammation, caseating granulomas, and fibrosis. These changes result in luminal narrowing and disturbed motility, creating localized zones of stasis conducive to enterolith development.[3] In endemic regions like India, tuberculosis must remain a high-priority differential in cases of obscure small bowel obstruction. The development of an enterolith in patients already undergoing ATT, as in our case, may be attributed to paradoxical worsening or immune reconstitution inflammatory syndrome (IRIS), where inflammatory responses flare during early treatment.[4]

Clinically, patients may present with vague symptoms such as intermittent pain, bloating, and constipation, often mimicking adhesive obstruction or incomplete Crohn's-related strictures. Diagnosis remains a challenge. Plain radiographs may miss enteroliths unless they are heavily calcified. Contrast-enhanced CT is the most reliable imaging modality, capable of demonstrating the exact location, size, and relationship of the enterolith to adjacent strictures, as well as excluding gallstone ileus or foreign bodies.[4,5] In our case, CT findings were pivotal in guiding the surgical strategy.

Endoscopic retrieval has been described in literature using devices such as double-balloon enteroscopes or capsule-assisted systems. However, success is limited to proximal or mobile enteroliths. In the presence of distal strictures, fixed calculi, or technical limitations, such approaches are rarely successful.[6] In our case, an enteroscopic attempt was made but failed due to luminal narrowing and poor visualization.

Laparoscopic intervention, as performed here, offers diagnostic and therapeutic advantages. It allows targeted resection of diseased segments with lower morbidity and faster recovery compared to open surgery.[7] Our patient underwent an extracorporeal, isoperistaltic, side-to-side ileoileal anastomosis after resection of a 20 cm segment of affected ileum. The postoperative course was uneventful.

Histopathological confirmation is crucial. While tuberculosis was the known diagnosis, Crohn's disease remains an important differential, especially in non-responders. The overlap in clinical, radiologic, and gross intraoperative appearance can be misleading. Granulomas, transmural inflammation, crypt distortion, or fissures may point toward Crohn's disease, while caseating necrosis favours tuberculosis. However, neither is always present.8 In our patient, the histology confirmed healed tuberculous ileitis without granulomas or features suggestive of Crohn's disease.

Interestingly, true primary enterolithiasis, where stone formation occurs without underlying pathology has also been described, though rarely. Most reported cases, however, involve a secondary mechanism: altered motility or mechanical obstruction due to stricture formation.[2] Sharma et al documented a similar instance of small bowel

obstruction caused by an enterolith, emphasizing the diagnostic ambiguity in such patients.[7]

This case reinforces the critical importance of a high index of suspicion for enteroliths in patients with abdominal TB presenting with subacute obstruction. It also emphasizes that failed endoscopy should not delay surgical referral. Minimally invasive resection with restoration of bowel continuity remains the gold standard, especially when definitive histologic diagnosis and symptom resolution are the goals.

CONCLUSION

Ileal enterolithiasis is a rare but significant complication of abdominal tuberculosis. It should be considered in patients with recurrent or subacute intestinal obstruction, especially during ATT. While endoscopic management may be attempted, surgical resection remains the definitive treatment. Early diagnosis and prompt intervention are key to optimizing outcomes and preventing recurrence. This case reinforces the importance of a high index of suspicion, especially in TB-endemic settings, where atypical obstruction patterns should prompt consideration of this entity. Multidisciplinary collaboration, appropriate imaging, and timely surgical referral can greatly improve patient prognosis and ensure a favourable long-term outcome. This study highlights ileal enterolithiasis as an exceptionally rare complication of abdominal tuberculosis, emphasizes the diagnostic overlap between TB strictures and Crohn's disease in endemic regions, demonstrates the limited utility of endoscopic retrieval in distal ileal enteroliths with associated strictures, showcases the effectiveness of laparoscopic resection as both a diagnostic and definitive therapeutic modality, reinforces the importance of high clinical suspicion and early imaging in atypical intestinal obstruction, contributes a regionally relevant, surgically managed case to the limited existing literature on enterolithiasis in TB and provides a framework for management in patients with subacute obstruction unresponsive to medical or endoscopic therapy

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