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CASE SERIES

Enterolithiasis: A Rare Cause of Small Bowel Obstruction

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Abstract

Enterolithiasis is characterized by the formation of gastrointestinal stones, leading to symptoms such as abdominal pain, distention, nausea, and vomiting. This case examines two instances of enterolithiasis, detailing their clinical presentations, diagnostic processes, and treatment approaches. The first case involves a 67-year-old woman with partial improvement after conservative management for intestinal obstruction. The second case describes a 55-year-old diabetic woman with small bowel obstruction and pneumobilia. Both cases required surgical intervention, resulting in successful outcomes and no recurrence over a six-month follow-up. This study highlights the importance of timely diagnosis and appropriate surgical management to prevent complications**.**

Keywords: Enterolith, Small bowel obstruction, Gallstone Ileus, Enterolithotomy, Surgery

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Introduction

Enterolithiasis, the formation of stones within the gastrointestinal tract, manifests with symptoms such as abdominal pain, distention, nausea, and vomiting. The condition primarily affects adults and can be categorized as primary or secondary based on the origin of the stones [1,2]. Enteroliths were first identified on imaging by Pfahler and Stamm in 1915 [3]. The prevalence of primary and secondary enterolithiasis varies widely, ranging from 0.3% to 10% [4]. Primary enteroliths form within the intestines, often in areas of stasis such as diverticula, and are influenced by factors such as diverticular disease, altered luminal propagation, and specific luminal pH conditions [5]. On the other hand, secondary enteroliths typically result from gallstones migrating into the intestines through biliary-enteric fistulas, leading to obstruction. This case explores the clinical presentations, diagnostic processes, and treatment strategies for two patients with enterolithiasis, emphasizing the necessity of prompt and effective management to prevent complications and improve patient outcomes.

Case 1

Clinical Presentation

A 67-year-old woman presented to the surgical outpatient department with a 10-day history of generalized abdominal pain, distention, vomiting, and constipation. Initially managed conservatively at a local hospital, her symptoms showed partial improvement with infrequent passing of flatus. She had a history of abdominal surgery for intestinal obstruction 10 years prior. Upon examination, her respiratory rate was 20 breaths per minute, and oxygen saturation was 96% in room air. Her abdomen was soft and mildly distended with audible bowel sounds. Laboratory tests were unremarkable. Imaging studies, including an abdominal X-ray, revealed two radiopaque calculi mimicking bladder stones (Figure 1a). However, a contrast-enhanced computed tomography (CECT) scan indicated that the radio-opaque stones in the pelvic area were two enteroliths (3x2 cm and 2x2 cm) floating near the terminal ileum, with one located in a diverticulum. There was no evidence of pneumobilia or radio-opaque gallstones. The gallbladder and surrounding structures appeared normal. The patient was admitted and treated with intravenous fluids and analgesics. She underwent a midline laparotomy, during which two stones were found: one proximal to a stricture and another within a diverticulum. Enterolithotomy (Figure 1b,1c) with diverticulectomy and strictureoplasty was performed, and the site was repaired with polyglactin 910, 3-0 suture in a single layer. The postoperative course was uneventful, and the patient was discharged on the seventh postoperative day. A six-month follow-up showed no complications.

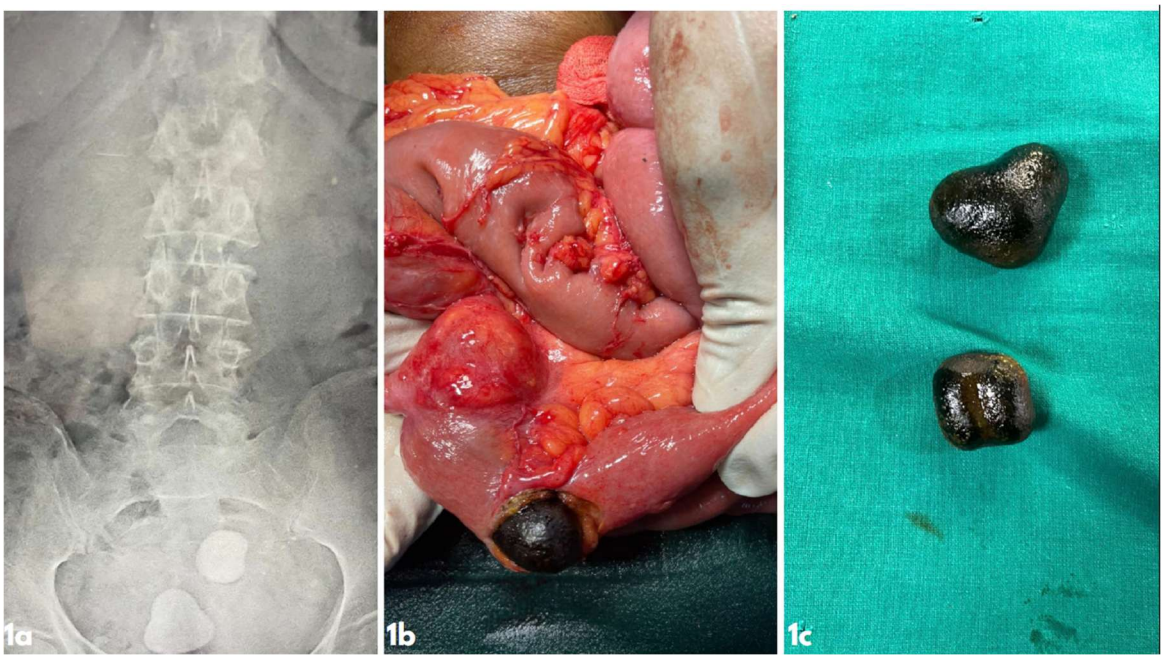

Figure 1. Primary enterolith; 1a: Abdominal X-ray revealing two radio-opaque calculi in the pelvis; 1b: Enterotomy showing enteroliths with associated stricture and diverticula; 1c: Extracted enteroliths.

Case 2

A 55-year-old woman with a history of diabetes mellitus presented to the surgical outpatient department with a 5-day history of generalized abdominal pain, progressive distention, nausea, vomiting, and constipation. The patient was admitted to the Intensive Care Unit for sepsis with jaundice and acute kidney injury. She had no prior history of abdominal surgery. Upon examination, her respiratory rate was 24 breaths per minute, and her oxygen saturation was 92% in room air. Her abdomen was soft and mildly distended with absent bowel sounds. Laboratory tests revealed hyperglycemia, jaundice, and raised serum creatinine. Initial imaging studies, including an abdominal X-ray, revealed signs of small bowel obstruction (Figure 2a). A contrast-enhanced computed tomography (CECT) scan showed indications of intestinal obstruction (Figure 2b). Evidence of pneumobilia indicated a biliary-enteric fistula (Figure 2c). The gallbladder showed signs of chronic cholecystitis with the presence of additional smaller gallstones. The patient was admitted for further management and was treated with intravenous fluids, analgesics, and insulin for glucose control. A midline laparotomy was performed, revealing multiple stones. The surgical team performed an enterotomy to remove the stones and repaired the site using polyglactin 910, 3-0 suture in a single layer. We did not repair the fistula at the initial operation but repaired it after one and a half. The post- operative course was uneventful, and we discharged the patient on the 7th post operative day. A patient was asymptomatic at 6 month follow up.

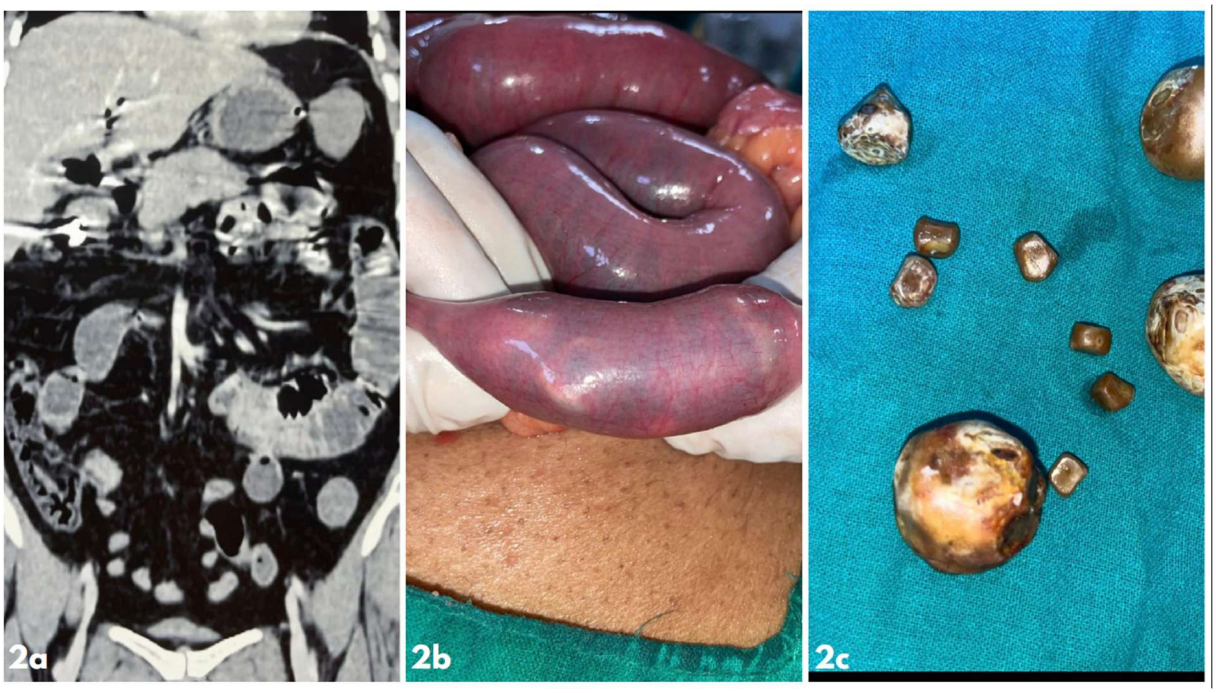

Figure 2. Secondary enterolith; 2a: Computed tomography scan displaying pneumobilia and small bowel obstruction; 2b: Small bowel showing the impression of a stone; 2c: Multiple gallstones removed via enterotomy.

Discussion

Enterolithiasis is a rare condition of the gastrointestinal tract. The term "enterolith" means stones formed within the intestine, and these can be broadly classified into primary and secondary enteroliths based on their origin and composition [1,2]. Knowledge about etiopathology, clinical presentation, investigation is crucial for effective treatment and prevention of complications. Enteroliths were first described on imaging by Pfahler and Stamm in 1915 [3]. The prevalence of primary and secondary enterolithiasis ranges between 0.3% and 10% [4]. Primary enteroliths form within the intestines themselves, typically in areas of stasis such as diverticula or strictures. Conditions predisposing to primary enterolith formation include diverticular disease, altered intestinal motility, Crohn's disease, tuberculosis, anastomotic strictures, and low luminal pH [5]. The stones can be composed of cholic acid or calcium salts such as calcium phosphate, calcium oxalate, and calcium carbonate. In contrast, secondary enteroliths are formed outside the intestinal tract and migrate within the intestine and the most common being gall stone. That is associated with biliary-enteric fistula formation.

The clinical presentations differ depending on the stone's size, location, and number of stones. Common symptoms include abdominal pain, distention, nausea, and vomiting [6,7]. These symptoms can be acute or insidious in onset and may lead to

complications such as intestinal obstruction, which was observed in the presented cases. The tumbling nature of the stones can result in recurrent obstruction in gall stone ileus, posing a significant challenge in clinical management [8]. In both cases mentioned here. Patients were presented with abdominal pain, distention, vomiting and constipation which are cardinal symptoms of Intestinal obstruction secondary to enterolithiasis. Gallstone less than 2 cm in size can pass spontaneously into the large intestine [9]. 90% of obstructing gallstones are larger than 2 cm in diameter, with the majority exceeding 2.5 cm [10].

Radiological imaging plays a pivotal role in diagnosing enterolithiasis. The radio-opacity of enteroliths is influenced by their calcium content, with calcium-rich stones appearing more radio-opaque than cholic acid stones. Initial diagnostic workup typically includes plain abdominal X-rays, which may reveal radio-opaque stones. However, more detailed imaging such as contrast-enhanced computed tomography (CECT) scans provides comprehensive information about the size, number, and exact location of the stones and any associated diverticula or strictures. In the presented cases, both abdominal X-rays and CECT scans were instrumental in identifying the enteroliths and guiding subsequent surgical intervention.

The optimal treatment of enterolithiasis focuses on removing the enterolith and addressing the underlying pathology to prevent the future formation of enteroliths. Surgery involving crushing and milking the stone down to the colon is the least invasive approach [9]. If unsuccessful, an enterotomy may be performed proximal to the obstruction site to remove the enterolith [11]. In more complicated cases, a resection of the segment involved may be considered. Treatment options include enterolith removal and addressing the underlying cause. Expectant management is limited and may be considered for symptomatic enteroliths <2 cm without luminal compromise. Open surgery with enterolithotomy and manual removal is the mainstay of treatment, although successful laparoscopic surgeries have been reported. Endoscopic electrohydraulic lithotripsy has been successful in some cases [12]. To prevent stone recurrence, underlying pathology for compromised intestinal motility should be treated with medical, endoscopic, or surgical interventions.

Conclusion

These cases underscore the complexity and clinical significance of enterolithiasis. Prompt diagnosis, appropriate surgical intervention, and comprehensive postoperative care are crucial for successful management. Addressing the underlying causes of stone formation is essential to prevent recurrence and improve patient outcomes. The insights gained from these cases contribute to the growing body of knowledge on enterolithiasis and provide valuable guidance for clinicians managing this challenging condition.

Informed Consent

Written informed consent was taken from the patients for the publication of these

images. This is not a research article and does not require ethical committee approval.

Conflicts of interest

The authors declare that they do not have conflict of interest.

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