

Recurrent Small Bowel Obstruction Due to Jejunal Diverticular Enterolith

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Background	Jejunal diverticulosis is a rare condition that occurs primarily in elderly patients; its complications occur infrequently. Jejunal diverticular enterolith migration and small bowel obstruction are described in case reports. To date, no case of recurrent enterolith-association small bowel obstruction has been reported.
Summary	We report the first known case of recurrent small bowel obstruction due to recurrent jejunal enterolith migration and the diagnostic and treatment challenges associated with it.
Conclusion	As our patient population ages, general surgeons will be expected to encounter this unusual condition with increased frequency. It may be difficult to diagnose using current imaging modalities. When determining treatment options for this condition, surgeons should be aware that recurrence is possible and is newly described.
Key Words	jejunal; diverticular; diverticulosis; enterolith; obstruction

DISCLOSURE STATEMENT:

The authors have no conflicts of interest or financial disclosures.

To Cite: Harris MD, Fleetwood VA, Gupta SK, Siparsky NF. Recurrent Small Bowel Obstruction Due to Jejunal Diverticular Enterolith. *ACS Case Reviews in Surgery*. 2021;3(3):34-37.

Case Description

Except for a Meckel's diverticulum, diverticulosis of the small bowel is uncommon. When observed, diverticulosis of the small intestine is most frequently seen in the duodenum (79 percent), followed by the jejunum and ileum (18 percent), versus diffuse type (3 percent).¹ Diverticulosis of the jejunum and ileum has a reported prevalence on conventional barium studies of 0.3 percent to 1.9 percent and at autopsy of 0.3 percent to 1.3 percent.² The etiology of jejunoileal diverticula is multifactorial; it accompanies various pathological processes, including visceral myopathy, visceral neuropathy, and systemic sclerosis of the intestinal wall.³ Diverticuli result from herniation of the mucosa and submucosa through the muscular layer (muscularis) of the small intestine. They develop at sites of weakness in the muscularis, where the vasa recta are located. While case reports and case series of jejunal diverticulosis and its complications are well established, to our knowledge, this is the first reported case of recurrent jejunal diverticular enterolith-associated small bowel obstruction.⁴

The patient is an 82-year-old female with a past medical history of Parkinson's disease and past surgical history of cholecystectomy, hysterectomy, and exploratory laparotomy for jejunal diverticular perforation. At laparotomy, jejunal diverticular perforation was noted to be accompanied by small bowel obstruction due to a migrated diverticular enterolith. An enterectomy was performed, and the obstructing enterolith was milked back and retrieved before enteroenterostomy creation. She was noted to have diffuse diverticulosis of the jejunum. An extensive resection would have been needed to remove all of the diverticular disease and would have resulted in short gut syndrome. Instead, a local resection was performed to prevent short gut syndrome, treat the diverticular perforation, and retrieve the obstructing enterolith. She recovered uneventfully from that procedure.

Two years later, she presented with one week of increasing abdominal distention, diffuse lower abdominal crampy pain, and 36 hours of nausea, vomiting, and obstipation. Her medications included carbidopa/levodopa, melatonin, and senna-docusate. Her physical examination revealed a distended, minimally tender abdomen that was tympanic to percussion throughout, with hyperactive bowel sounds. Well healed Kocher and midline vertical scars were appreciated. Laboratory studies revealed a white blood cell count of 23.69 K/uL, hemoglobin of 14 g/dL, and an acute elevation in her creatinine of 1.1 mg/dL. Computed tomog-

raphy (CT) revealed dilated small bowel loops with an area of circular hyperdensity consistent with a target sign was noted in the small bowel and decompressed small bowel distal to this point, consistent with small bowel obstruction (Figure 1).



Figure 1. CT scan demonstrating thickened loops of small intestine, old stapled small bowel anastomosis, and the target sign associated with enterolith impaction

Scattered colonic and jejunal diverticulosis were noted, but a concretion was not observed. Due to the patient's history of multiple abdominal surgeries, jejunal diverticulosis, and previous small bowel obstruction, it was uncertain whether the patient's symptoms resulted from another obstructing enterolith, adhesions, or possibly intussusception. The patient was admitted to the hospital for intravenous fluid therapy for dehydration, bowel rest, and gastric decompression by nasogastric tube suction. Forty-eight hours after admission, she failed a Gastrografin challenge, for which contrast (administered through the nasogastric tube) did not transit to the colon within eight hours. While undergoing nonoperative management, her white blood cell count began to increase. It was recommended the patient undergo exploratory laparotomy due to the risk of bowel ischemia and/or perforation and lack of recovery with nonoperative management.

We explored the abdomen by re-entry through a midline vertical laparotomy incision. The omentum was found adhered to the anterior abdominal wall, and the presence of several adhesive bands was noted and lysed with cautery. The omentum was placed to the side and dilated small bowel was appreciated.

The small bowel was eviscerated, revealing a significant proximal section of six to eight wide-mouthed, large jejunal diverticula filled with palpable enteroliths. Downstream this area of diverticulosis, we encountered a healed anastomosis from her prior surgery as well as a large, impacted enterolith. Due to the size of the enterolith and our inability to milk the mass proximally toward the collection of diverticula, an enterotomy was made over the enterolith in hopes of extracting it and salvaging the bowel; we extracted a 3.1 cm enterolith (Figure 2). However, the bowel in this area was chronically edematous and stenotic, and we did not feel it could be safely closed and left behind due to the risk of stricture.



Figure 2. Enterolith retrieved from the small intestine (approximately 2.6 cm x 3.1 cm)

Similarly, given her elder age and comorbidities, we did not feel she would tolerate a more extensive resection to clear all diverticular disease. Lastly, we thought it would be exceedingly unlikely that she would suffer from a third recurrence of enterolith obstruction. As such, we performed a short segment enterectomy with enteroenterostomy, in a side-to-side (functional end-to-end) stapled fashion. She recovered uneventfully.

Discussion

Jejunal diverticulosis complicated by enterolith formation and subsequent small bowel obstruction is a rare event, and recurrent small bowel obstruction from these concretions has not been documented in previous case reports to our knowledge.^{3,5,6} This case is presented for consideration

because it represents a challenging clinical situation. In this case, the surgeon had to decide whether extensive small bowel resection was necessary to cure the patient of the problem that caused recurrent small bowel obstruction. In this case, the patient was elderly, with advanced Parkinson's disease; it was not felt that her life expectancy could be measured beyond a few more years. Conversely, extensive bowel resection was unlikely to be tolerated well by a frail, elderly patient. A “damage-control” approach was taken to clear the cause of obstruction with the safest option possible. Similarly, to our knowledge, recurrent enterolith-induced obstruction has never been reported before; it is unknown what the actual incidence is, but it is likely to be very low. When all risks and benefits were considered, the surgeon felt a “less-is-more” approach would suit the patient best.

Furthermore, this case highlights a diagnostic challenge faced by all surgeons and radiologists. Obstructing enteroliths are notoriously misdiagnosed as intussusception, as a target sign often accompanies them. A target sign is most commonly appreciated in the setting of small intestinal edema and inflammation; the layers of the small intestine enhance more impressively with intravenous contrast on CT scan. In the case of enterolith impaction, chronic impaction may result in inflammation and edema, thereby generating the target sign, typically attributed to enteritis or intussusception, rather than enterolith impaction. Jejunal diverticulosis may be equally challenging to identify by CT scan.³

Conclusion

This is the first reported case of recurrent jejunal diverticular enterolith-associated small bowel obstruction. It highlights diagnostic and management challenges associated with jejunal diverticulosis, including the limited nature of CT scans to identify obstructing enteroliths. Surgical decision-making around stone extraction and the management of extensive small bowel diverticulosis may also be challenging, as this disease occurs almost exclusively in elderly patients, who are less likely to tolerate extensive small bowel resection well.

Lessons Learned

Jejunal diverticulosis complicated by enterolith formation and subsequent small bowel obstruction is a rare event. Recurrent enterolith small bowel obstruction has never been described in the literature to our knowledge. At the

time of surgery, the surgeon must weigh the risk of a proximal small bowel resection, (which carries a higher risk of leakage) versus the risk of recurrent enterolith-associated small bowel obstruction (which is rare). Obstructing enteroliths are notoriously misdiagnosed as intussusception, as they are often accompanied by a target sign. Consider surgical intervention for adult patients with a target sign and known jejunal diverticulosis.

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