

CASE REPORT

Laparoscopic plication and retroperitonealization of the sigmoid colon in frail patients with volvulus: A revived surgical option with lessons from Africa informing 2 cases in the Netherlands

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Abstract

Although sigmoid volvulus is not common in Western countries, its prevalence is increasing with the ageing population. The management of older, frail patients with sigmoid volvulus and multiple comorbidities is challenging. Conservative treatment is preferred but is associated with a high recurrence rate.

Based on insights from endemic regions, nonresectional surgical approaches are gaining traction. We propose a minimally invasive, nonresectional technique designed to mitigate the elevated risks associated with frail patients: laparoscopic plication and retroperitonealization of the sigmoid colon (PROSC).

Two older adults with extensive comorbidities underwent laparoscopic PROSC for persistent or recurrent sigmoid volvulus. There were no procedural or postoperative complications. No recurrent volvulus, constipation, or infection was reported at a 12-month follow-up evaluation.

These results show that laparoscopic PROSC could be an attractive and safe minimally invasive alternative technique for treating older, frail patients with (recurrent) sigmoid volvulus. The technique may be a superior alternative for treating nongangrenous sigmoid volvulus.

Keywords: sigmoid volvulus, recurrent volvulus, intestinal obstruction, sigmoidopexy, geriatric surgery, older adults, frail patient, minimally invasive surgery, Netherlands

Introduction

Sigmoid volvulus is characterized by torsion of the sigmoid colon around its central mesenteric axis, resulting in a closed-loop obstruction.^{[1],[2]} It is the third leading cause of colonic obstruction (after colon cancer and complicated diverticulosis), as well as the leading cause of bowel strangulation.^[3]

Sigmoid volvulus is common in Africa, the Middle East, India, Pakistan, Iran, and Russia but rare in Western populations.^{[3]-[5]} Treatment is often challenging because of its main prevalence in older, institutionalized, or chronically constipated patients, who often have pulmonary or cardiovascular comorbidities and whose nutritional states are frequently suboptimal.^[6]

Although nonoperative decompression is the preferred treatment modality, surgery is often warranted because of the high recurrence rate.^{[1],[7]} Additionally, long-term follow-up has shown higher survival rates among surgically treated patients with sigmoid volvulus than among those managed conservatively.^[1]

There are numerous surgical options, such as Hartmann's procedure, resection, and primary anastomosis or sigmoidopexy, but there is a significant risk of perioperative and postoperative complications, such as anastomotic leakage and, eventually, death, especially in frail patients.^{[8],[9]}

Drawing on insights gained from endemic regions, Western medical practice is increasingly adopting nonresectional surgical techniques.^{[8],[10],[11]} These treatment approaches offer enhanced safety and are particularly well suited for patients who are frail.



Figure 1. Abdominal x-ray revealing sigmoid volvulus in patient 1

Significant distension of the sigmoid colon, measuring up to 18 cm, is displayed as an arc (cranial view). Both small and large intestinal loops appear distended.

We present a minimally invasive nonresectional technique suitable for frail or older patients with recurrent or persistent sigmoid volvulus: laparoscopic plication and retroperitonealization of the sigmoid colon (PROSC).

Case presentations

Between September and December 2018, 2 patients were treated for recurrent or persistent sigmoid volvulus at the Department of Surgery, Medisch Spectrum Twente, a large referral hospital in Enschede, the Netherlands.

Written informed consent was obtained from both patients before the interventions. The operations were performed by highly experienced laparoscopic surgeons.

Patients

Patient 1, an 87-year-old White male with a past medical history of Parkinson's disease, ileus, and recurrent sigmoid volvulus (ASA [American Society of Anesthesiologists] physical status class II), was admitted with intestinal cramps, constipation, and a distended abdomen. There were no signs of peritonitis. An abdominal x-ray showed a new episode of sigmoid volvulus (Figure 1). Within 1 year, the patient presented 3 times with recurrent sigmoid volvulus, for which detorsion and decompression were conducted each time by endoscopic decompression and a rectal tube. Elective surgery was scheduled, but the patient presented for a fourth time with sigmoid volvulus before the elective surgery could be conducted.

Detorsion and decompression were achieved by passage of a rectal tube once again, and subsequently, 3 days later, a laparoscopic PROSC was performed.

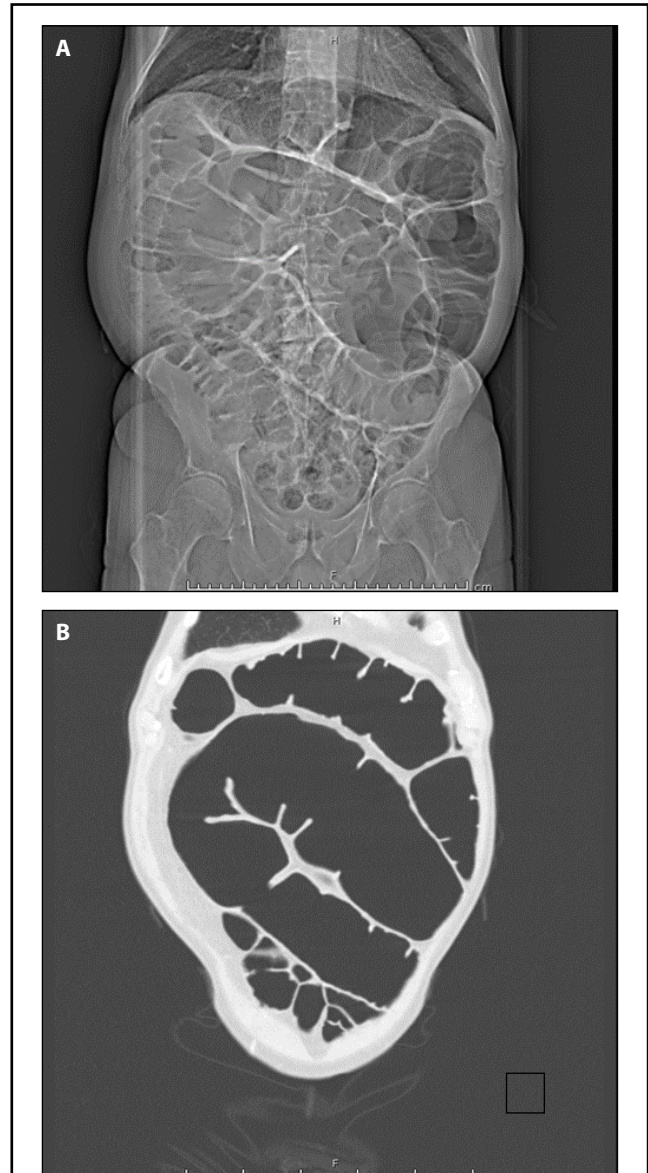


Figure 2. Imaging of recurrent sigmoid volvulus in patient 2 following failed conservative management with a rectal tube

The (A) x-ray and (B) coronal-view computed tomography images display the coffee bean sign, indicative of a closed loop of the distended sigmoid colon filled with gas. This sign is a classic radiographic finding signifying sigmoid volvulus. No significant dilation of the small intestinal loops, oedematous wall thickening, or pneumatosis intestinalis is evident in these images.

Patient 2, an 85-year-old White male with a past medical history of constipation and ileus (ASA class III), presented to the emergency department with diarrhoea, (faecal) vomiting, and a distended abdomen. There were no signs of peritonitis. Abdominal computed tomography revealed a sigmoid volvulus with an 11-cm dilatation.

Detorsion and decompression were achieved by endoscopic decompression and rectal tube insertion. Initially, the patient improved clinically, but his symptoms returned after 3 days. Subsequent computed tomography revealed a recurrent sigmoid volvulus (Figure 2). Laparoscopic PROSC was performed on the same day.

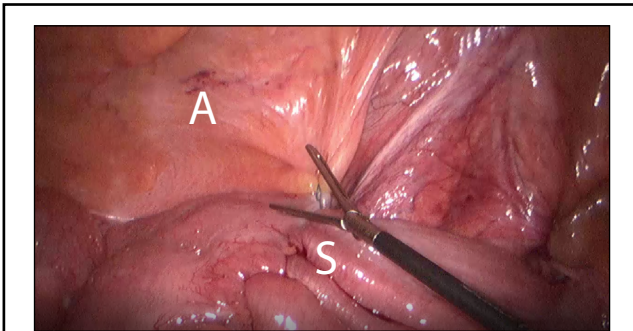


Figure 3. Intraoperative view of the final position of the plication

Seen from the paraumbilical trocar port and facing the left abdominal wall (A), the antimesenteric taenia of the distended sigmoid colon (S) was sutured to the left abdominal wall using barbed sutures.

Management: laparoscopic PROSC procedure

The patient is positioned in a modified lithotomy position with the legs supported by stirrups. The procedure is performed with the surgeon standing on the right side of the patient.

Access to the peritoneal cavity is achieved by an open introduction technique: a paraumbilical incision is made, and a 10-mm trocar port is inserted, after which pneumoperitoneum (15 mmHg) is established. Two 5-mm ports are inserted in the left upper quadrant of the abdomen under direct visualization. If the colon is still distended, decompression is first achieved by inserting a rectal tube with proctoscopy.

Then, the peritoneum must be dissected, lifting it off the (left) lateral abdominal wall, after which the sigmoid colon is mobilized retroperitoneally. The flaccid part of the sigmoid is placed retroperitoneally, and the peritoneal flap that has been raised is sutured to the antimesenteric taenia of the sigmoid colon with barbed suture (Figure 3).

After thorough inspection of the sigmoid and confirmation that there are no complications, the trocars are removed under direct vision. Fascia is closed with 0-Vicryl sutures, and the skin is intracutaneously closed with 4-0 Monocryl sutures.

The rectal tube is left in situ for up to 4 days.

Outcome and follow-up

There were no procedural or postoperative complications in either of the patients.

For patient 1, the time under anaesthesia was 66 minutes. He had normal bowel movements on the second postoperative day when oral intake was started. Patient 1 was discharged on the fourth postoperative day.

Patient 2 had a dolichosigmoid. Therefore, additional fixation of the tip of the dolichosigmoid with barbed suture to the left subcostal abdominal wall was performed. The time under anaesthesia was 52 minutes. He had normal bowel movements on the fourth postoperative day when oral intake was started. Patient 2 was discharged on the seventh postoperative day.

At respective 12-month postoperative follow-up visits, neither patient had experienced complications—such as recurrent volvulus, constipation, or infection—and none were detected by our evaluations.

Discussion

With the ageing population in the Western world, coupled with an increase in institutionalized patients and those with chronic constipation due to abundant opioid usage, a rise in the prevalence of sigmoid volvulus is expected.

Managing older, frail patients presents a challenge. While surgery is the preferred option for preventing recurrence, as it is in younger patients, it also comes with a higher risk of perioperative morbidity and mortality, particularly when a sigmoid resection is performed.[2],[8],[9],[12] To mitigate this risk, nonresectional operative procedures could be considered.

In Malawi, where 1 of the authors previously worked, sigmoidopexy is the most common procedure used to treat nongangrenous volvulus, and it is associated with low recurrence rates.[8] The principle of sigmoidopexy, used in this endemic region, is the foundation of laparoscopic PROSC, a minimally invasive alternative to sigmoidopexy.

It is important to use nonabsorbable sutures to minimize the risk of recurrence. Studies have shown the use of absorbable sutures to be associated with recurrent sigmoid volvulus, while recurrences have not yet been reported in association with the use of nonabsorbable sutures.[8]

A major complication associated with fixation of the sigmoid colon to the abdominal wall is internal herniation.[13] This risk is averted by the mobilization of the sigmoid colon retroperitoneally.

Although plication is an old technique that has been somewhat abandoned, the combination of minimally invasive plication with retroperitonealization of the colon is an attractive option for treating prefrail and frail patients.

Successful results after nonresectional surgery have been reported widely.[1],[8],[10],[11] However, the most recent guidelines suggest that nonresectional operative procedures are inferior to sigmoid colectomy for the prevention of recurrent volvulus.[14] Percutaneous endoscopic colostomy tube insertion is suggested for high-risk patients who are unfit for surgery.[14] These recommendations, however, are based on low-quality evidence.[15]

Although laparoscopic-assisted endoscopic sigmoidopexy appears safer than standard percutaneous endoscopic colostomy tube insertion, the former is associated with significant complications, such as infection and faecal leakage.[6],[10] These risks are minimized with laparoscopic PROSC.

If the sigmoid colon is not gangrenous, and there is an increased risk of anastomotic leakage, laparoscopic PROSC could be an attractive and safe minimally invasive alternative technique that minimizes the risk of recurrence and anastomotic leakage.[11] As such, this procedure is particularly useful in the management of older and frail or prefrail patients, for whom sigmoid resection is a high-risk procedure.

Future research is warranted to help elucidate specific characteristics, including biochemical and clinical markers, to identify patients most likely to benefit from this procedure, as well as those who would be unsuitable surgical candidates.

Conclusions

The inherent elevated risks associated with surgery in older and frail patients may be mitigated through this nonresectional approach. Laparoscopic PROSC emerges as a viable and safe minimally invasive option for this patient demographic, especially those with recurrent volvulus. It has the potential to serve as an advantageous surgical modality for patients with nongangrenous sigmoid volvulus.

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