

Minilaparotomy without general anesthesia for the treatment of sigmoid volvulus in high-risk patients: A case series of 4 patients

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ABSTRACT

BACKGROUND: Sigmoid volvulus (SV) is a common cause of large bowel obstruction worldwide. Presenting symptoms can be nonspecific and varied amongst the elderly population, making medical and surgical management challenging. This population is at markedly increase risk of complications and mortality with surgery under general anesthesia. In this case series, we describe 4 cases of sigmoid volvulus in octogenarians.

GOALS: To demonstrate that sigmoid colectomy under local anesthesia, with or without intravenous conscious sedation, is feasible and can be done safely and with a low rate of converting to a general anesthetic.

RESULTS: Four patients, mean age 90 years, were admitted a total of 4 times for acute sigmoid volvulus. All patients had serious comorbidities and were classified as ASA III. There was no relevant past surgical history. All patients were severely physically deconditioned but alert and able to interact meaningfully with their families and caregivers. Three patients suffered recurrent volvulus following endoscopic decompression and one patient underwent immediate surgery due to abdominal tenderness.

CONCLUSION: Our experience demonstrates that minilaparotomy for sigmoid volvulus is effective and safe. The techniques can extend the applicability of definitive surgical intervention to this high-risk population of patients. In our series postoperative outcomes were excellent, however, additional studies are needed to determine if this technique results in improved 30-day and long-term mortality and morbidity in high-risk patients and to determine the utility of extending the technique to all patients with sigmoid volvulus.

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1. Introduction

Sigmoid volvulus is a common cause of large bowel obstruction in adults worldwide. In the US, about 60% of LBO are caused by neoplasms, 20% by diverticular disease, and 5% due to colonic volvulus [1–3]. This usually presents in older adults around the age of 70 [4,5].

The mainstay of treatment for uncomplicated sigmoid volvulus has been endoscopic detorsion and decompression. Turan et al. and Tan et al. [5,6] report a 60%–75% success rate of successful decompression using this technique. Unfortunately, patients frequently have recurrent volvulus after endoscopic detorsion making primary resection and anastomosis the preferred therapeutic approach in many cases [7–9]. Patients with sigmoid volvulus are often institutionalized, debilitated and usually suffering from neurogenic and psychological disorders [7,14–16]. Many have complex comorbidities

[10,11] that place them at a substantial risk for postoperative complications with the traditional surgical approach for sigmoid volvulus.

Longstanding intermittent sigmoid volvulus is associated with anatomic changes that render such patients amenable to colon resection under local anesthesia with or without intravenous conscious sedation. This is due to marked redundancy of the colon, consistent location of mesenteric torsion, as well as, atrophy and atony of the anterior abdominal wall musculature. Risks and complications attributable to general anesthesia can be eliminated by performing the procedure under a local anesthetic with or without intravenous conscious sedation (Figs. 1–6).

In this paper we report our experience with 4 elderly patients successfully treated in this fashion with excellent postoperative results. No patients required conversion to a general anesthetic. Post-operatively, patients recovered bowel function rapidly and were quickly able to resume oral or enteral feedings. 30-day surgical morbidity and mortality were excellent. We posit that expanding the use of this technique to patients who are at severe risk of complications with general anesthesia may dramatically improve outcomes in high-risk patients and that this technique

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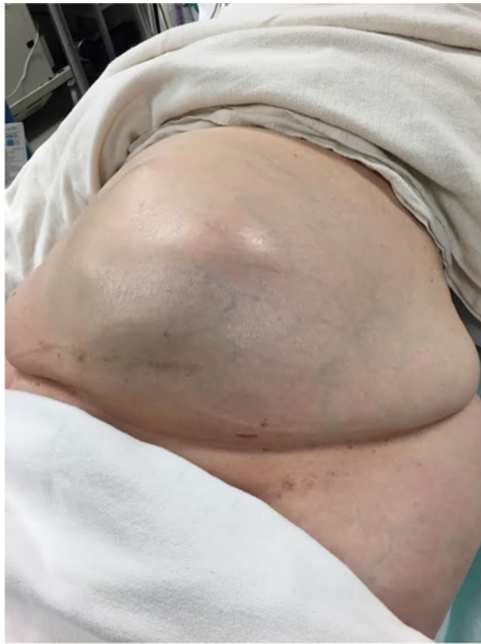


Fig. 1. Patients are placed supine with the head of the bed elevated to minimize aspiration risk. Insertion of a nasogastric tube to suction is considered if imaging studies or clinical picture suggests gastric distension and a high-risk for aspiration. The volvulized colon is commonly visible through the atrophic and atonic abdominal wall musculature.

could extend the applicability of sigmoid colectomy to patients who were previously deemed poor candidates for this procedure. Additional studies are needed to evaluate the utility and benefit of this approach in patients who are at low or moderate risk for a general anesthetic. The work has been reported in line with the SCARE criteria [12].

2. Materials and methods

2.1. Study population

2.1.1. Patient 1

An 89 year old Caucasian female with a medical history remarkable for atrial fibrillation, coronary artery disease (CAD), congestive heart failure (CHF) with an ejection fraction of 55%–60%, gastroesophageal reflux disease (GERD), hypertension, hyperlipidemia, mild aortic stenosis, moderate tricuspid regurgitation, moderate

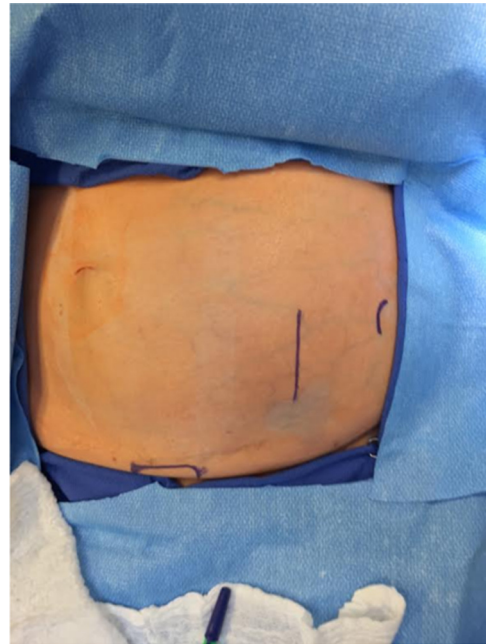


Fig. 2. The Incision is placed in the left lower quadrant. Relation to the anterior superior iliac spine and the symphysis pubis is shown in this image.

pulmonary hypertension, obstructive sleep apnea, and a history of pulmonary embolism. She presented to the emergency department with acute onset of abdominal distension and nausea. CT scan showed radiographic stigmata of a sigmoid volvulus. Due to significant abdominal tenderness, she was taken to the operating room urgently. There were no surgical or postoperative complications and she was discharged to a long-term care facility on postoperative day 5.

2.1.2. Patient 2

An 85 year old Caucasian female with a medical history remarkable for aortic regurgitation, CAD, CHF with an ejection fraction of 40%–45%, chronic obstructive pulmonary, diastolic remarkable for aortic regurgitation, CAD, CHF with an ejection fraction of 40%–45%, chronic obstructive pulmonary, diabetes type 2 (DM 2), first degree heart block, ischemic cardiomyopathy (ICM), mitral regurgitation, paroxysmal atrial fibrillation, rheumatic heart disease, and stroke. She presented to the emergency department with acute abdominal pain and distension. Abdominal x-ray showed marked colonic distension with retained stool in the right hemicolon. Barium enema

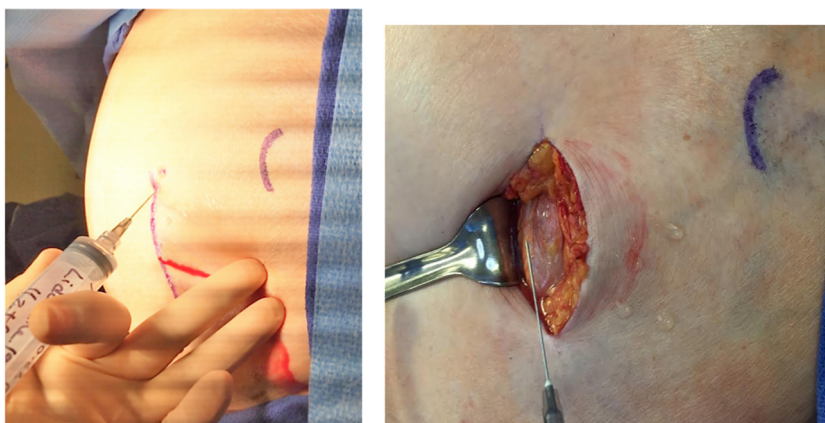


Fig. 3. Local anesthetic is injected into the skin, subcutaneous tissues, and peritoneum. Mild IV conscious sedation is administered if the patient is unable to tolerate the procedure using local anesthetic alone.

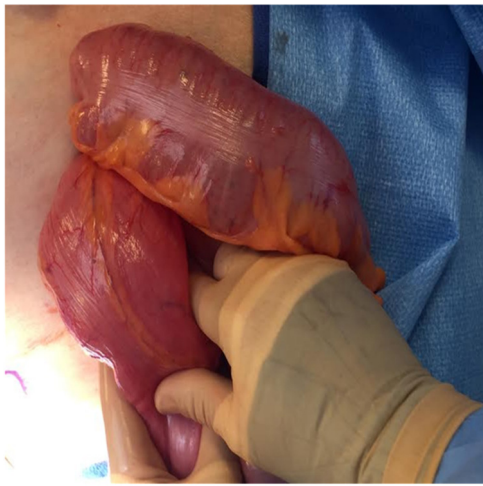


Fig. 4. The peritoneal cavity is entered and the redundant colon is easily delivered and detorsed. Distal and proximal segments are distinguished by noting fusion of tenia coli distally.

was performed demonstrating sigmoid volvulus. Colonoscopy with successful detorsion and decompression was promptly performed. She quickly re-volvulized and had to undergo surgery on hospital day 8. There were no surgical or postoperative complications. She was discharged on POD 10.

2.1.3. Patient 3

A 91 year old Caucasian male with a medical history remarkable for chronic anemia, CAD, CHF with an ejection fraction of 30–35%, chronic kidney disease stage 3, deep vein thrombosis, DM 2, GERD, hypertension, hyperlipidemia, ICM, myocardial infarction, severe mitral regurgitation, and stroke, presented to the emergency department with abdominal pain, nausea, and vomiting. A CT scan of the abdomen and pelvis showed radiographic stigmata of a sigmoid volvulus. Colonoscopy with successful detorsion and decompression was promptly performed. The patient developed clinical signs of recurrent volvulus and underwent surgery on hospital day 5. There were no surgical or postoperative complications and he was discharged on postoperative day 7.



Fig. 6. Layered closure of the incision is performed.

2.1.4. Patient 4

A 93 year old Caucasian male with a medical history remarkable for benign prostatic hypertrophy, CHF with an ejection fraction of 35–45%, CAD, hypertension, ICM, moderate aortic regurgitation, and stroke. He presented to the emergency department with rapid onset of abdominal pain and shortness of breath along with 3 days of constipation. Abdominal x-ray and CT scan showed severe distension of the colon with a maximum diameter of 11 cm. Colonoscopy with successful detorsion and decompression was promptly performed. Over the following 3 days he developed progressive abdominal distension and recurrent volvulus. He underwent surgery on hospital day 4. There were no surgical or postoperative complications. He promptly recovered bowel function, however resumption of enteral feedings was delayed due to concomitant management of *Clostridium difficile* colitis. He was discharged on postoperative day 13.

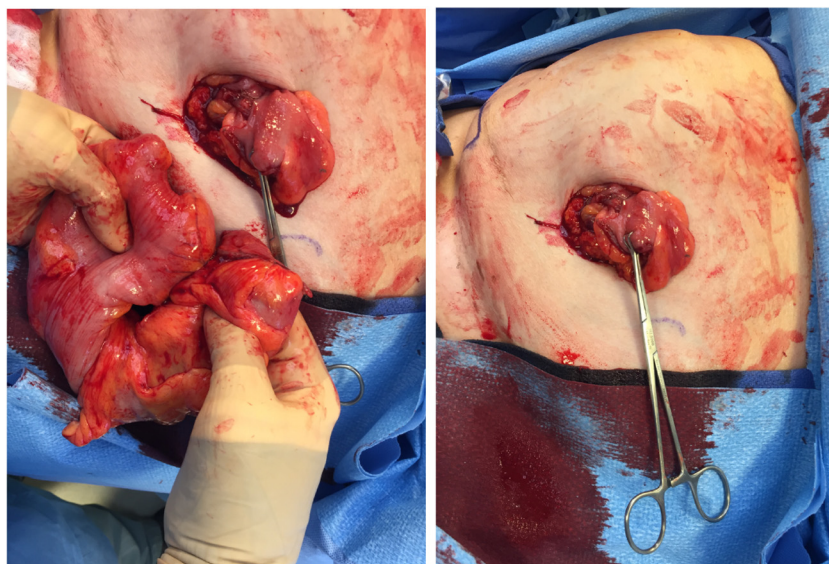


Fig. 5. The redundant colon is resected, anastomosed and re-introduced into the peritoneal cavity.

Table 1
Patient information.

	Case 1	Case 2	Case 3	Case 4
Age (years)	89	85	91	93
Sex	Female	Female	Male	Male
Length of stay (days)	17	18	12	17
Postoperative days	13	10	7	13
Admission to surgery (days)	4	8	5	4
Endoscopic decompression attempted	No	Yes	Yes	Yes
Recurrent SV after detorsion	–	Yes	Yes	Yes
Readmission within 30 days	No	No	No	Yes
Hospitalization mortality	No	No	No	Yes

3. Results (Table 1)

Between October 13, 2009 and August 15, 2016 four patients with sigmoid volvulus were identified as being at a very high-risk for traditional surgical resection. The age distribution of the patients was $90 \text{ years} \pm 4 \text{ years}$. There were 2 females and 2 males who presented with abdominal pain, abdominal distension, shortness of breath, nausea, and vomiting. For all patients, this was the first episode of sigmoid volvulus and no patients had previous abdominal surgeries. The diagnosis was established using barium enema in 1 patient and using abdominopelvic CT in 3 patients.

Successful colonoscopic decompression was achieved within 48 h of admission in 3 patients, however, all 3 had recurrent abdominal distension and pain shortly after the initial detorsion. One patient was found to have signs of peritonitis on physical examination and accordingly underwent urgent surgery without first attempting colonoscopic decompression. Timing from date of admission to surgery was $6 \text{ days} \pm 2 \text{ days}$. According to the cardiac risk index [13] these patients were considered class IV risk for cardiac complications following a non-cardiac surgical procedure. Per the American Society of Anesthesiologists physical status classification system, all 4 patients were considered ASA III. By using local anesthesia alone in 1 patient and combined intravenous conscious sedation and local anesthesia in 3 patients, sigmoid colectomy was successfully completed without intraoperative complications and without converting any patients to a general anesthetic. Average length of stay was $15 \text{ days} \pm 4 \text{ days}$. Patients were discharged 10 days after surgery $\pm 3 \text{ days}$. One patient received a blood transfusion prior to surgery for low hemoglobin and hematocrit. No patients had recurrence of their sigmoid volvulus.

4. Conclusion

This case series highlights an alternative treatment option for high-risk patients presenting with sigmoid volvulus and who are deemed to be poor candidates for a general anesthetic. As patients live longer, with more comorbidities than ever before, this approach may acquire increasing relevance and importance.

We demonstrate here that sigmoid colectomy through a small incision using local anesthesia alone or with conscious sedation is feasible, safe and effective in treating high-risk patients with sigmoid volvulus. Additional studies are needed to determine if this technique results in improved 30-day and long-term mortality and morbidity in the high-risk patient population. Other studies are also needed to determine if extending this approach to all patients with sigmoid volvulus would improve the mortality and morbidity of surgery in this setting.

Conflicts of interest

No conflicts of interest to report.

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Ethical approval

Na.

Authors contribution

All authors have seen and approved the manuscript and are fully conversant with its contents. Both authors contributed equally on retrospective case reviews, literature review, and revisions.

Research registration

researchregistry1985.

Guarantor

Both authors are guarantors.

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