

Colonic Volvulus



Bartley Pickron, MD^{a,*}, Jocelyn Di Nolfi, MD, MPH^b,
Jessica Hall, MD^a, Dalton Hegeholz, MD^a

KEYWORDS

• Sigmoid volvulus • Large bowel obstruction • Cecal volvulus • Cecal bascule

KEY POINTS

- Colonic volvulus typically presents as a surgical emergency.
- Initial treatment of sigmoid colon volvulus is endoscopic decompression followed by elective sigmoid colon resection.
- Initial treatment of cecal volvulus or bascule is ileocolic or right colon resection.
- Although there are options for nonresectional procedures, colonic resection is the mainstay of treatment for colonic volvulus.

EPIDEMIOLOGY

Colonic volvulus is defined as the torsion of the large bowel around its mesenteric axis, causing intestinal obstruction and compromise of its blood supply. Globally, colonic volvulus is the third most common cause of colonic obstruction after malignancy and diverticulitis-related strictures. Colonic volvulus is most common in areas of Africa, the Middle East, and South America, where it accounts for up to 40% of intestinal obstructions. These areas are occasionally referred to as the “volvulus belt.”¹ In the United States, colonic volvulus accounts for 10% to 15% of colonic bowel obstructions.²

PATHOPHYSIOLOGY

The etiology of colonic volvulus is likely multifactorial, with a variety of environmental, dietary, and genetic elements contributing to redundant segments of the colon. Factors common to colonic volvulus include an elongation of the mesentery and an associated narrow base. This combination of anatomic features allows for the colon to torse along the axis of the mesentery. While this phenomenon can be seen in any segment of bowel, it most commonly occurs in the sigmoid colon, followed by the cecum. Compared to sigmoid volvulus, cecal volvulus is less common, accounting

^a Division of Surgical Oncology, Department of Surgery, University of Utah, 1950 Circle of Hope, Salt Lake City, UT 84112, USA; ^b Department of Surgery, Santa Barbara Cottage Hospital, Santa Barbara, CA, USA

* Corresponding author.

E-mail address: bartley.pickron@hsc.utah.edu

Abbreviation
CT computed tomography

for 25% to 40% of cases of colonic volvulus. Colonic volvulus rarely occurs in segments of the transverse colon or splenic flexure. Cecal volvulus more often presents in young women, while sigmoid volvulus more often presents in older men.² There is also a well-reported association of colonic volvulus and patients with neuropsychiatric diseases,³ prior abdominal surgeries, patients who reside in nursing facilities, and patients with chronic constipation.¹

Cecal bascule is a distinct anatomic variant of cecal volvulus and occurs when there is anterior-superior folding of the cecum without axial rotation. There is no mesenteric torsion in this case.⁴ However, cecal bascule can still cause obstruction and ischemia and should be treated similarly to classic cecal volvulus, as described later.⁵

CLINICAL PRESENTATION AND DIAGNOSTICS

Patients with colonic volvulus have similar presentations regardless of which segment of the colon is involved. Presenting symptoms typically include abdominal pain, distention, obstipation, nausea, and vomiting.⁴ Patients with sigmoid volvulus typically present with a gradual onset of symptoms with an average symptom duration of 2 to 5 days. As opposed to those with sigmoid volvulus, patients with cecal volvulus present more acutely, usually within hours.^{6,7} Patients suspected to have any type of colonic volvulus should initially be evaluated for hemodynamic stability and peritonitis. If presenting with peritonitis or hemodynamic instability that is refractory to resuscitation, emergent operative evaluation is indicated. Between 5% and 25% of patients with volvulus will present with ischemia, perforation, peritonitis, or septic shock.⁸ Laboratory evaluation including complete blood count (CBC), comprehensive metabolic panel (CMP), arterial blood gas (ABG), or lactate can help assess the severity of the patient’s condition, keeping in mind that a normal venous lactate should not lower suspicion for volvulus given the possibility for lack of venous return from a potentially ischemic segment of bowel. Attempted stabilization with fluid resuscitation, correction of electrolyte abnormalities, and coagulopathy should be initiated on presentation for all patients.

Upright abdominal radiograph is a fast and potentially diagnostic tool for volvulus (sensitivity 26%–42%) and can be performed while mobilizing an operating room in an unstable patient or a patient presenting with peritonitis. Volvulus should be suspected if radiographs reveal bowel obstruction with a distended loop of colon projecting toward the right or left upper quadrant of the abdomen. The classic “coffee bean” or “bent inner tube” sign may be observed. The diagnosis of volvulus is made based on radiograph findings in 26% and 66% of patients with cecal and sigmoid volvulus, respectively.⁹ Of note, when shorter segments of the cecum are involved, it may appear located in its normal location in the right lower quadrant and therefore missed on kidney, ureter, bladder (KUB) alone. Abdominal series may also show evidence of bowel ischemia or perforation with findings of pneumoperitoneum or pneumatosis.⁶

In stable patients and in the event that diagnosis is unable to be made with radiographs alone, confirmatory contrast-enhanced computed tomography (CT) should be pursued. CT yields a diagnosis in 71% of cases of cecal volvulus and 89% of cases of sigmoid volvulus.¹⁰ A water-soluble contrast enema may also aid in the diagnosis. Following contrast enema, a CT demonstrating a “bird’s beak” at the site of the colonic torsion and a “whirl sign,” created by spiraled loops of colon mesentery (Figs. 1 and 2) and crossing loops of bowel at the obstruction transition point, would be suggestive of



Fig. 1. CT scan demonstrating the “bird’s beak” appearance at the site of colonic torsion, characteristic of colonic volvulus.

colonic volvulus. CT is also helpful in identifying evidence of bowel ischemia, surrounding inflammation, perforation, or free fluid. If utilized, water-soluble contrast is preferred over a barium enema in the event of colonic perforation leading to barium peritonitis.⁶

MANAGEMENT—SIGMOID VOLVULUS

Initial Endoscopic Management

In the absence of evidence of peritonitis, perforation, clinical deterioration, or hemodynamic instability, the treatment of sigmoid volvulus begins with endoscopic detorsion. Methods of detorsion include rigid sigmoidoscopy, flexible sigmoidoscopy, or colonoscopy. In addition to therapeutic intervention, endoscopy also allows for



Fig. 2. CT scan showing the “whirl sign” formed by spiraled loops of the colon mesentery and crossing bowel loops at the obstruction transition point.

evaluation of the health and viability of the colonic mucosa. Endoscopy is also helpful in determining alternative or contributing causes of obstruction such as an obstructing mass. Detorsion is successful in 70% to 80% of cases.¹ Endoscopically, sigmoid volvulus will appear as a point of abruptly twisted colonic mucosa in the counterclockwise direction.¹¹ Once identified, the endoscopist will gently pass the endoscope through the twisted segment encountering dilated proximal bowel. Following this maneuver, decompression should be performed and will often result in spontaneous detorsion.¹¹ Following detorsion, it is generally recommended that a rectal tube be left in place for 2 to 5 days.^{6,7} Placement of the tube can facilitate continued decompression, prevention of volvulus recurrence, and aid in mechanical bowel preparation for ultimate surgical intervention.

Caution should be exercised in endoscopic detorsion. Findings of unsuccessful reduction including ongoing presence of twisting spirals of mucosa and/or inability to pass the endoscope beyond the twisted mucosa, bloody drainage, or mucosal ischemia should prompt termination of the procedure in favor of sigmoid resection.

Definitive Surgical Management

Upfront surgical intervention should be pursued in patients with evidence of peritonitis, perforation, unsuccessful endoscopic detorsion, or evidence of ischemia during endoscopy. Additionally, following successful endoscopic detorsion, there is a high risk of recurrence of sigmoid volvulus (40%–75%) and mortality following conservative treatment alone varies from 9% to 36%.^{7,10,12–16} Therefore, following endoscopic intervention patients who are appropriate surgical candidates should undergo surgical resection due to the 40% to 50% risk of recurrence. Sigmoid colectomy is the most effective method of preventing recurrence, and the entire length of redundant colon should be removed. Timing of resection may depend on individual patient factors, however, where possible, operative intervention should be strongly considered during or soon after the index admission.

Following successful decompression and in the elective or semi-elective setting, mechanical and antibiotic bowel preparation may be performed. In cases which successful bowel preparation is performed, primary anastomosis without diversion is the preferred operative intervention. In cases of perforation with contamination, persistent hemodynamic instability, or older frail patients, end colostomy or primary anastomosis with proximal diversion may be considered.

Both sigmoid colectomy with primary anastomosis and Hartmann's procedure are safe and viable options, as highlighted by a single-institution retrospective study of patients who presented with sigmoid volvulus. Of the patients who required urgent or emergent surgical intervention, 146 underwent a Hartmann's procedure and 51 patients underwent a sigmoid resection with primary anastomosis. The success rate of emergent surgical intervention was 83.5%. The overall complication rate was slightly lower in the Hartmann's versus sigmoid resection with primary anastomosis group (52.7% vs 54.9%) as was the overall mortality (19.2% vs 21.6%).⁷

Non-resective Procedures

While sigmoid colectomy is the most definitive surgical management option for sigmoid volvulus, resection carries a degree of morbidity and mortality. These risks are escalated in the urgent or emergent setting and in frail or severely comorbid patients. In patients who are exceedingly high-risk surgical candidates (eg, persistent hemodynamic instability, elderly, frail) with viable bowel demonstrating no evidence of ischemia on detorsion, it is important for surgeons to keep in mind the non-resective options available, recognizing resection remains the mainstay of treatment.

Mesosigmoidoplasty is a described non-resective option for managing sigmoid volvulus for patients able to tolerate general anesthesia and are vehemently opposed to ostomy creation or the risk associated with an anastomosis. It is performed by incising the mesosigmoid peritoneum vertically on both sides of the sigmoid mesentery, raising flaps, and then transversely approximating said flaps on both sides using synthetic absorbable sutures with the goal of shortening and broadening the sigmoid mesentery. It has been shown in some small studies to have relatively low morbidity, mortality, and recurrence.^{17,18} However, sigmoid colon resection remains the mainstay given its definitive outcomes with low recurrence rates and acceptable morbidity and mortality rates.⁷ See [Fig. 3](#) for a management algorithm for sigmoid volvulus.

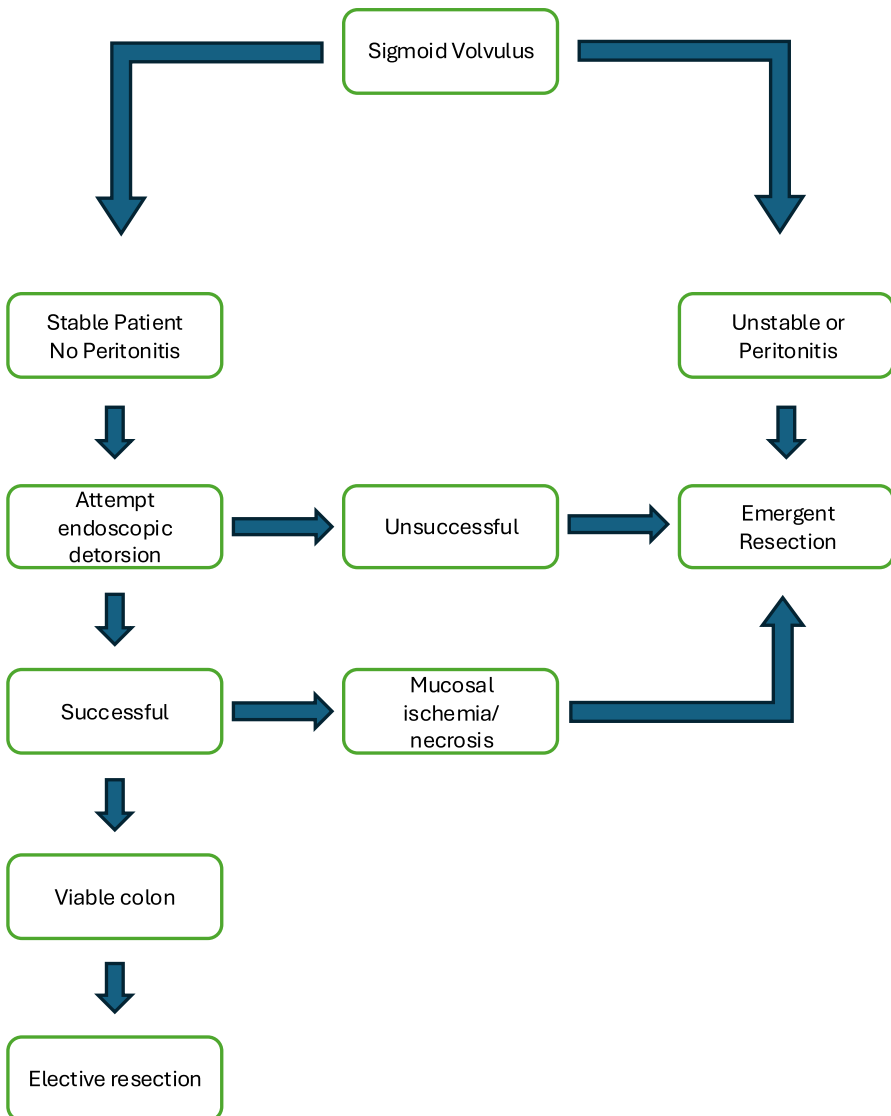


Fig. 3. Management algorithm for sigmoid volvulus.

Endoscopic therapies beyond decompression and rectal tube alone may also be considered in unacceptably high-risk patients without evidence of bowel compromise. Endoscopy-assisted percutaneous sigmoidopexy has been described in a few small studies. In one study, 8 patients with American Society of Anesthesiologists (ASA) status 3 or greater underwent sigmoidopexy using T-fasteners fixated in 5 to 10 sites (mean of 8.8) throughout the sigmoid colon with no recurrences noted in 12 month follow-up.¹⁹ Another study followed 15 patients who underwent percutaneous endoscopic sigmoidopexy for recurrent sigmoid volvulus. These authors utilized pigtail Chait catheters for fixation and noted no recurrence at a median 10 month follow up.²⁰ While technically feasible, these procedures are not well studied enough to claim with confidence the same level of efficacy as resection in preventing recurrence, and their potential is also limited by the availability of an endoscopist comfortable doing so given that it is a nonstandard approach.

MANAGEMENT—CECAL VOLVULUS

Unlike sigmoid volvulus, cecal volvulus should be managed with upfront surgery. Colonoscopic decompression is not recommended given low success rates (~8–12%) and high recurrence rates (nearly 100%).^{4,10} Surgical options include resection of the involved bowel (with primary anastomosis or ileostomy), cecopexy, or cecostomy. While most cases are managed in an open manner, laparoscopic techniques are appropriate in hemodynamically stable patients under the care of surgeons experienced in minimally invasive colon surgery.

In most retrospective studies, operative detorsion with resection is the most commonly performed procedure (55%–89% of cases) followed by cecopexy (7%–33%) and cecostomy (<5%).^{5,21} In cases of bowel ischemia, perforation, or compromise, resection is indicated. Standard principles for decisions regarding primary anastomosis versus ileostomy apply. In cases of hemodynamic instability, frank contamination, or extensive necrosis or peritonitis, ileostomy may be preferred.²²

In cases without evidence of bowel ischemia or perforation, surgical intervention without resection may be considered. Detorsion with cecopexy or cecostomy has been described as alternatives to resection in a stable patient with viable bowel. However, data comparing these interventions are limited and largely stem from retrospective studies performed prior to 2000.^{21,23–26} Overall, interventions involving resection are the most durable with lowest rates of recurrence. However, there is significant variability in the reported differences in morbidity of resection versus cecopexy.^{21,23,24} Given the lack of high-quality evidence, we recommend individualized, case-by-case decision making for operative intervention in patients with cecal volvulus and viable bowel. For example, in a medically unfit or frail individual who would be less likely to withstand postoperative complications such as anastomotic leak, cecopexy should be considered. Alternatively, young, robust, and stable patients may benefit from the durability of a resection.

ILEOSIGMOID KNOTTING

Ileosigmoid knotting, though a different etiology for colonic obstruction, shares a similar obstructive presentation to sigmoid volvulus. It is a rare form of obstruction caused by wrapping of the ileum around the base of the sigmoid colon in a clockwise direction (Type 1A) or counterclockwise direction (Type 1B), or by wrapping of the sigmoid colon around the passive ileum (Type 2).²⁷ This mechanical wrapping leads to an obstructive, and potentially ischemic process. This double-loop obstruction is rare, with 923 reported cases reported worldwide from 1967 to 2022, and only 5 of those

cases coming from the United States.¹² It is thought to arise from a mobile terminal ileum and an elongated sigmoid colon, both with elongated mesentery.

If ileosigmoid knotting is suspected on cross-sectional imaging, endoscopic decompression should not be attempted, as endoscopy cannot allow for proper assessment of the involved small bowel and potential for ischemia or necrosis, nor has it been demonstrated to have reliable success in detorsion. Instead, these patients should undergo rapid resuscitation and proceed to the operating room expeditiously for detorsion and resection of any non-viable bowel. In cases where there is no bowel ischemia, sigmoid colectomy should still be performed and remains the definitive treatment for prevention of recurrence.²⁸

SIGMOID VOLVULUS IN PREGNANCY

In pregnant patients, sigmoid volvulus is rare. The largest documented review of sigmoid volvulus in pregnancy includes just 73 cases.²⁹ As in typical cases of sigmoid volvulus, prompt evaluation, examination, resuscitation, and decompression are paramount. These guidelines are especially true in pregnancy to minimize the risk of morbidity and mortality in both the mother and the fetus. There have been various case reports outlining different management strategies, including pitocin-augmented delivery of a term neonate followed by Hartmann's³⁰ and exploratory laparotomy with primary anastomosis in a 25 week pregnant female followed by an uncomplicated delivery of a term infant 4 months later.³¹ While these cases were managed with positive outcomes, in Alshawi's review, the authors proposed colonoscopic detorsion with rectal tube decompression alone until fetal maturity and delivery, if possible. In recurrent cases, decompression is recommended until the second trimester, at which time a sigmoid resection can be performed. In any cases with concern for bowel compromise or gangrene, emergent resection should be performed, regardless of gestational age.²⁹

SUMMARY

Colonic volvulus is a common cause of large bowel obstruction. Diagnosis hinges on imaging including upright KUB and CT scans. Management is dependent on the segment of involved colon. Sigmoid volvulus is usually initially managed with endoscopic detorsion followed by early colectomy whereas cecal volvulus should be managed with upfront surgery. Ultimately, management should be individualized and take into consideration patient factors such as comorbid conditions, frailty, hemodynamic stability, and goals of care to determine the most appropriate intervention.

CLINICS CARE POINT

- Colonic volvulus is primarily a surgical disease.

DISCLOSURES

The authors have nothing to disclose.

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