



Review Article

The Twisted Colon: A Review of Sigmoid Volvulus

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Abstract:

In sigmoid volvulus (SV), the sigmoid colon wraps around itself and its mesentery. Sigmoid volvulus accounts for 2% to 50% of all colonic obstructions and has an interesting geographic dispersion. SV generally affects adults, and it is more common in males. The etiology of sigmoid volvulus is multifactorial and controversial; the main symptoms are abdominal pain, distention, and constipation, while the main signs are abdominal distention and tenderness. Routine laboratory findings are not pathognomonic: Plain abdominal X-ray radiographs show a dilated sigmoid colon and multiple small or large intestinal air-fluid levels, and abdominal CT and MRI demonstrate a whirled sigmoid mesentery. Flexible endoscopy shows a spiral sphincter-like twist of the mucosa. The diagnosis of sigmoid volvulus is established by clinical, radiological, endoscopic, and sometimes operative findings. Although flexible endoscopic detorsion is advocated as the primary treatment choice, emergency surgery is required for patients who present with peritonitis, bowel gangrene, or perforation or for patients whose non-operative treatment is unsuccessful. Although emergency surgery includes various non-definitive or definitive procedures, resection with primary anastomosis is the most commonly recommended procedure. After a successful nonoperative detorsion, elective sigmoid resection and anastomosis is recommended. The overall mortality is 10% to 50%, while the overall morbidity is 6% to 24%.

Key Words: Intestinal obstruction, Sigmoid colon, Volvulus

Introduction:

Volvulus of the bowel refers to a twisting or torsion of the intestine about its mesentery. The term volvulus, which may involve any segment of the intestinal tract from stomach to rectum, is a Latin word for twisted used by the Romans to signify this condition.¹ Volvulus of the colon usually occurs in the sigmoid or cecum, but may involve any segment of colon. In addition, synchronous volvulus of the sigmoid and cecum,² or sigmoid and ileum may occur.³

Sigmoid volvulus (SV), first described by von Rokitansky in 1836^{4, 5}, is a condition in which the

sigmoid colon wraps around itself and its own mesentery, causing a closed-loop obstruction (Figure 1). It remains a rare but important intestinal obstruction^{4, 6}.

Incidence:

Although it is the most common form of volvulus seen, volvulus of the sigmoid colon is not very common in the western countries, accounting for less than 10% of all cases of large bowel obstruction.^{8,9,10,11} In some regions of Asia, Africa, and other less-developed portions of the world, however, the situation is significantly different. In these areas, sigmoid volvulus accounts for 20%–50% of the cases of intestinal obstruction. Overall, there is a substantial male predominance, especially in developing nations. However, sigmoid volvulus is the most common cause of intestinal obstruction in pregnancy, accounting for nearly 45% of all intestinal obstructions in this group of women.^{6, 7, 8, 9}

Pathology:

It is a closed loop bowel obstruction. The obstructed lumen being blocked distally is unable to decompress

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proximally. Blood supply to the affected bowel is impaired due to the twisted mesocolon leading to ischaemia. Fermentation of bacteria within closed loop produces gas and increased osmotic pressure between intestinal content and capillaries, which draws the fluid into the bowel lumen. Distension from this compromised blood supply leading to worsening ischaemia and eventually perforation, bacterial translocation into the portal circulation leading to systemic sepsis. (Figure 1)



Figure 1. Redundant sigmoid loop before and after twisting 180°. Note long redundant sigmoid colon with a narrow-based mesentery leading to the twist (arrowed). 24.

Sigmoid volvulus can present as two types; Indolent and Fulminant. Indolent variety is insidious in onset with slow progressive course, here pain and vomiting are often late. Fulminant volvulus is sudden in onset, pain is severe, and vomiting occurs early. Patient also deteriorates early. Unrecognised and untreated volvulus will almost inevitably progress to ischaemia, gangrene, perforation and death. 13,14,15

Aetiology:

The aetiology of sigmoid volvulus is multifactorial and controversial. The anatomical constitution of the sigmoid colon is a prerequisite for sigmoid volvulus.



Picture 1: Clinical appearance of sigmoid volvulus – asymmetrical distention in abdomen (distended sigmoid colon)

Band and adhesions, overloaded pelvic colon, long pelvic mesocolon and narrow attachment of pelvic mesocolon all are considered effective factors for the development of sigmoid volvulus. (Figure 2) Some authors have shown positive correlations between comorbidities like Parkinson's disease, Alzheimer's disease, Multiple sclerosis with sigmoid volvulus. In our subcontinent, anatomical factors with high dietary fibre intake give rise to fecal bulk and loaded colon which is the commonest cause of sigmoid volvulus in elderly. Males are more affected than female. 13,14,15

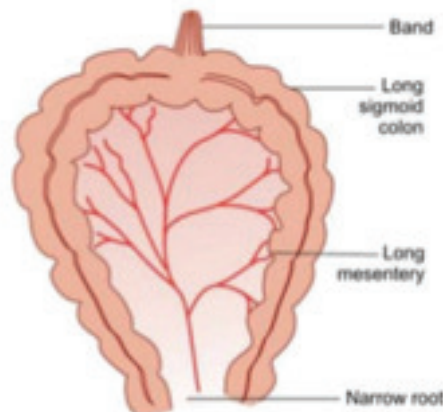


Figure 2: Causes predisposing to volvulus of the sigmoid colon, 25.

Clinical Features:

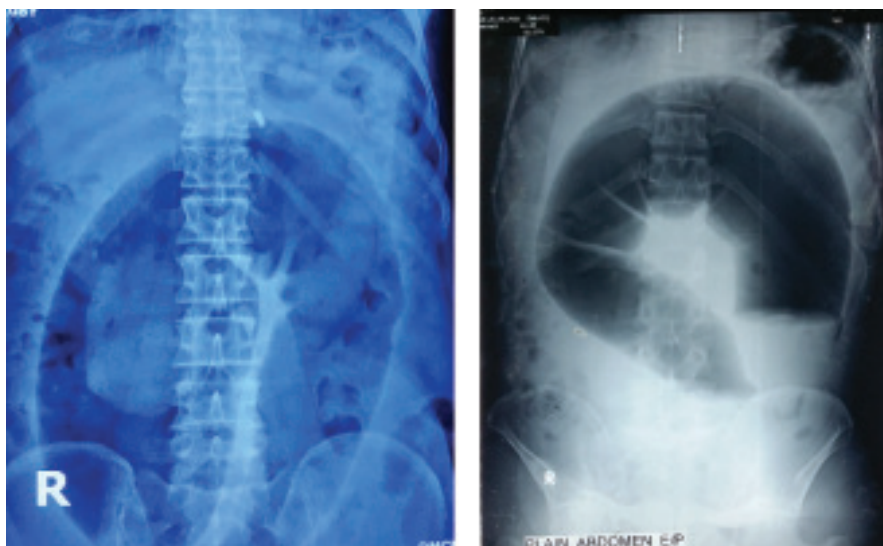
Patient with sigmoid volvulus may present as acute or subacute intestinal obstruction when presents acutely presents with abdominal pain, absolute constipation and distension asymmetrically noted in upper abdomen toward right hypochondrium (**Picture 1**), tenderness and empty rectum. Vomiting is a late feature. Most patients may have history of similar previous attack which resolves spontaneously with passage of large quantities of flatus and faeces. Signs of peritonitis (rebound tenderness) and sepsis suggest ischaemia of sigmoid loop. 13,14,15



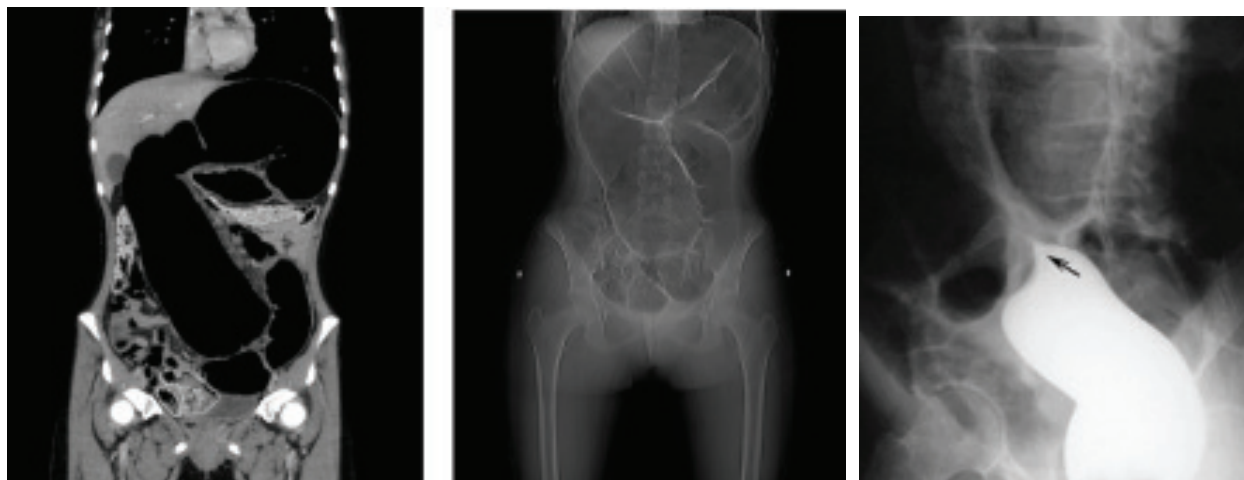
Investigations:

Routine laboratory findings for SV are not pathognomonic, and the findings are related to intestinal obstruction and/ or bowel ischemia or gangrene¹⁸. Plain abdominal X-ray radiographs usually show a dilated air-filled sigmoid colon with an inverted U-shaped appearance or omega shape or coffee bean shape (**Picture 2**). Plain abdominal radiography has been found diagnostic in 57%-90% of patients^{4, 5, 6, 18, 19}. CT scan helps to confirm the diagnosis. It shows whorl pattern in mesocolon (characteristic mesenteric whorl) associated with dilated haustra free sigmoid

colon. Contrast enema and colonography may be diagnostic (typically demonstrable bird's beak deformity) and therapeutic as it can untwist and also eliminating other causes of large bowel obstruction (**Picture 3**). A barium or water-soluble contrast enema generally shows the obstructive lumen as a beak-like termination^{4, 5, 16, 17}. Nevertheless, the possibility of bowel perforation and the risk of overlooking bowel gangrene are potential hazards (**Picture 5**). Thus, enemas are used if the patients do not have peritonitis, bowel gangrene, or perforation^{5, 18, 20}. Colonoscopy also helps in diagnosis and therapy. More importantly it rules out other causes of obstruction.

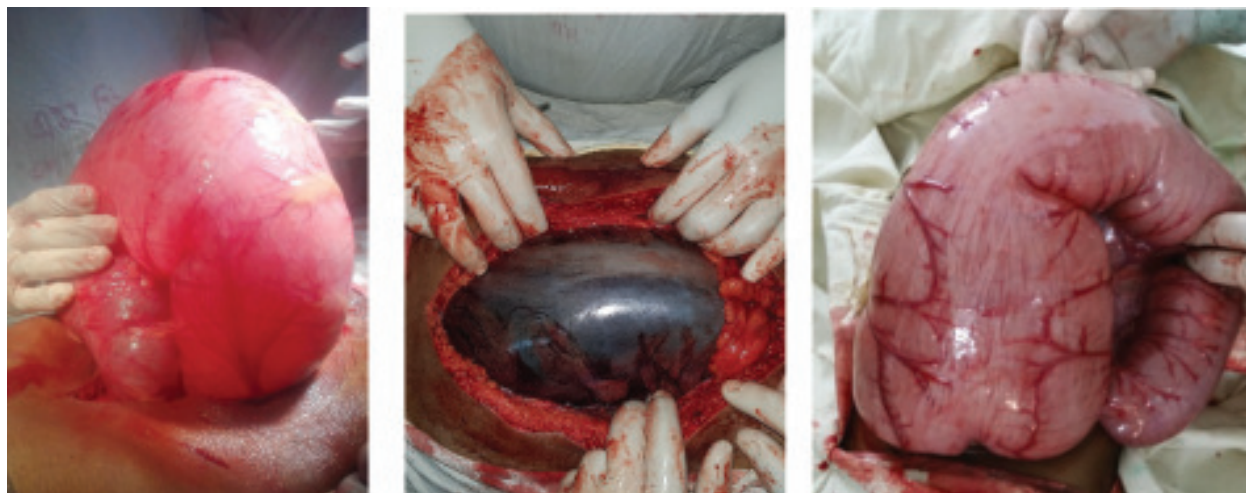


Picture 2: Abdominal X-ray demonstrating a sigmoid volvulus ('coffee bean' appearance).



Picture 3: CT-Scan of a sigmoid volvulus (Source - radiopaedia.org)

Picture 4: Barium enema - massive sigmoid volvulus. Barium enema of the colon shows a tapered obstruction at the rectosigmoid junction with a typical bird's-beak deformity (black arrow) (Source - www.medscape.com)



Picture 5: *Sigmoid volvulus - per-operative view*

Management:

Depends upon presentation. In absence of perforation initially symptom control and resuscitation, correction of hypovolaemia and electrolyte imbalance. When established spontaneous untwisting rarely occurs and definitive treatment is indicated.

Because patients with SV have a tendency to be hypovolemic and in toxic shock, they require effective resuscitation including fluid-electrolyte imbalance, nasogastric aspiration, and parenteral feeding^{7, 12}.

With flexible or rigid sigmoidoscope or colonoscope gentle introduction with insufflation and advancement of scope beyond the point of obstruction decompress it (70-80%). Once decompressed, one flatus tube is kept in situ for 24-48 hours to prevent immediate recurrence. **(Picture 6)** During this manoeuvre taking precaution not to soil endoscopist himself with rapid egress of flatus and liquid stool. As recurrence rate of sigmoid volvulus is high (more than 90%) so after initial decompression is followed by elective resection of sigmoid colon with primary anastomosis after exclusion of malignancy (colonoscopy) is the choice of treatment (after resection descending colon to upper rectum anastomosis is preferable) If patient is not fit for surgery under general anaesthesia, then percutaneous endoscopic sigmoidopexy (3-point endoscopic fixation using percutaneous endoscopic gastrostomy tube PEG tube) can be done after decompression. When features of peritonitis present (radiological and biochemical signs of perforation) and patient is fit to take the surgical stress then simultaneous resuscitation with emergency surgery should be performed. Following are the surgical

options:^{21, 22, 23} Sigmoid resection with end colostomy and closure of rectal stump (Hartman's procedure), sigmoid resection and double barrel stoma (Paul-Mikulicz) or subtotal colectomy with end ileostomy or ileorectal anastomosis (in cases of non-viable colon in closed loop obstruction)



Picture 6: *Colonoscopic deflation –*

- Before and after – colonoscopic view (spiral sphincter-like twist of the sigmoid mucosa)*
- Before and after - X-ray film.*

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