

Case Report

## Laparoscopic Sigmoidopexy for Acute Sigmoid Volvulus – A Case report with Review of Literature

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**Abstract:** Sigmoid volvulus is the most common type of colonic volvulus and occurs when a portion or whole of the sigmoid colon twists around its blood supply. In sigmoid volvulus, this occurs at the base of the mesentery. Sigmoid volvulus often recurs and it is controversial whether preventive surgery should be performed in recurrent cases, especially in elderly and high-risk cases. Herein, we report the case of an 83 year old man with Parkinson's disease who presented with acute sigmoid volvulus and was successfully treated with laparoscopic sigmoidopexy i.e. fixation of the untwisted colon to the abdominal wall. Laparoscopic sigmoidopexy may be an acceptable treatment for acute sigmoid volvulus in patients unwilling to undergo definitive resection with colostomy.

**Keywords:** Sigmoid volvulus, Laparoscopic sigmoidopexy, Percutaneous endoscopic colostomy, Colostomy.

## INTRODUCTION

Sigmoid volvulus (SV) is the most common type of volvulus of the colon and accounts for 63% of all patients with colonic volvulus. Less commonly seen are caecal volvulus (33%) and volvulus of the transverse colon (3%) [1]. It presents most commonly in patients who are less mobile, bed bound and institutionalized, usually with a background of chronic constipation. It also has a higher preponderance among patients suffering from neurological ailments. Its prevalence differs greatly across different geographical areas. It is 1% to 7% in the United States of America and upto 80% in South America. The highest incidence among African nations has been reported from Ethiopia, where it is the culprit in 56% of the patients presenting with intestinal obstruction [2]. This is ascribed to the fact that among Africans, food intake is of high fiber [3]. Also, the base of the sigmoid mesentery in the African population is narrow compared with other ethnic groups, leading to an anatomical situation that makes the population more susceptible to developing aSV.

Sigmoid volvulus can cause large bowel obstruction in adults and may result in death due to necrosis and perforation of the involved colon, if not treated in good time. Sometimes the small bowel gets entrapped along with the sigmoid volvulus, thereby forming a knot. This is termed as ileo-sigmoid knotting [2].

## CASE PRESENTATION

An 83-year-old man, a known case of Parkinson's disease on treatment, was admitted to another hospital with a history of abdominal distension, constipation and vomiting. As per available clinical notes, his abdomen was found to be severely distended on examination, with diffuse tenderness all over and hyperperistalsis in the lower abdomen. A per rectal exam revealed an empty rectum. A plain X-ray of the abdomen, done at admission there, revealed the classical 'coffee bean' sign (Fig 1A). He was, thus, diagnosed to have SV. A contrast enhanced computed tomography (CECT) scan of the abdomen was then done and confirmed the diagnosis (Fig 1C, D). He, then, underwent sigmoidoscopic decompression of the SV and flatus tube placement (Fig 1B). He had mild symptomatic relief after this. But, on the very

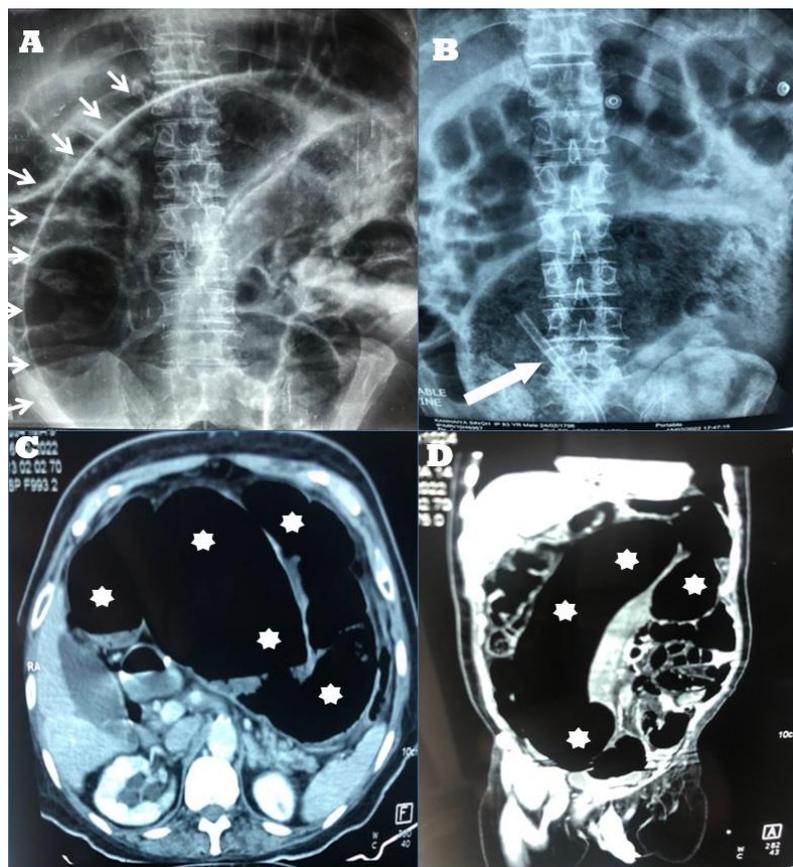
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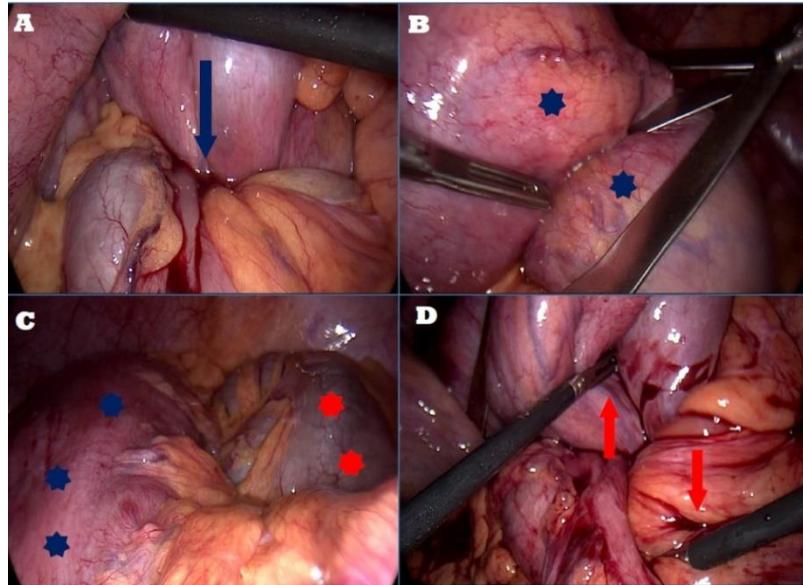
next day, the symptoms recurred. At this point in time, the patient was shifted to our institution (3 days after onset of initial symptoms).

On admission to our institute, he had a pulse of 90 beats/minute, blood pressure of 130/90 mms of Hg, a respiratory rate of 16/minute and SpO<sub>2</sub> of 99% on room air. On per rectal examination, his rectum was found to be empty, with the flatus tube in situ. His abdomen was severely distended. The bowel sounds were sluggish. Relevant blood tests revealed the following: Hb – 11.5 gm%, WBC - 10270, Serum C-Reactive Protein was 0.40 mg/dl and Serum Creatinine was 1.2 mg/dl. The patient along with his relatives were counselled for definitive surgery i.e. sigmoid resection along with Hartmann’s pouch and proximal colostomy.

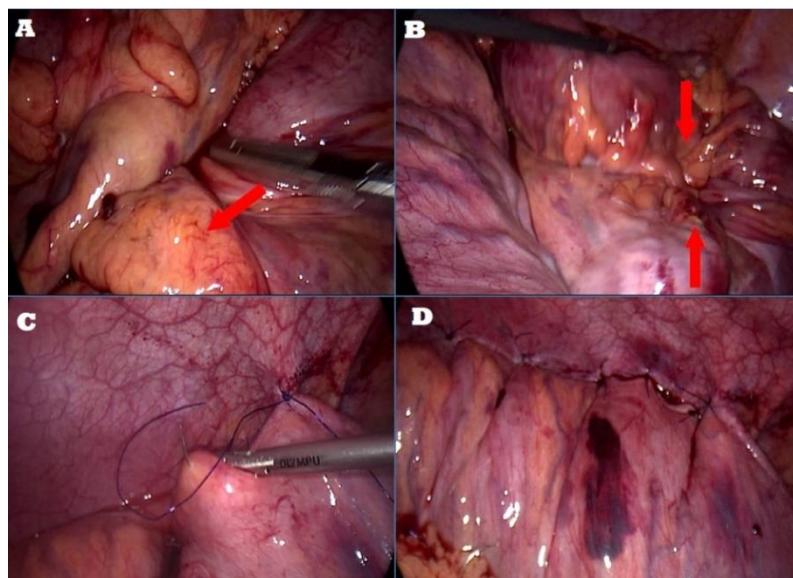
But the patient refused to undergo the colostomy procedure. Hence, he was taken up for a laparoscopic sigmoidopexy (LS), with the explicit understanding with the patient and his family along with a written informed consent, that, should we find devitalised bowel ‘on table’, while performing LS, we would then be left with no choice but to resect and then perform a colostomy. At laparoscopy, a careful exploration of the abdomen and then the area of focus, was first performed. It revealed a very redundant and hugely distended sigmoid colon in volvulus (Fig 2A-D). There was serous straw coloured free fluid around the volvulus. However, there was no bowel gangrene. The twisted sigmoid colon was then carefully untwisted and fixed to the left lateral parietes using 2-0 Prolene<sup>®</sup>, with multiple sutures (Fig 3A-D). A peritoneal toilet was given and a 32 Fr tube drain left in situ, in the left iliac fossa; before conclusion of the operation. The flatus tube was retained in situ. On post operative day (POD) 3, the naso-gastric tube was removed after he passed flatus and he was started on clear liquids, per orally. The flatus tube and the abdominal drain were removed on POD 4. After he tolerated liquids orally, he was started on soft diet from POD 5. He had the first postoperative bowel movement on POD 6 and was discharged from the hospital on POD 7. On his postoperative day 12 out patient department follow up visit, his 4 trocar site (two 10 mm & two 5 mm) wounds had healed well and he was asymptomatic. At the time of writing this paper, a telephonic interview was conducted with him and his family. Eight months after his surgery, he continues to be asymptomatic and has not had a recurrence of the volvulus, in the interim.



**Fig 1: Imaging pics. A) Plain Xray abdo showing classical ‘coffee bean’ sign(white arrows), B) Plain Xray abdo after endoscopic decompression with flatus tube in situ(white arrow), C&D) CECT abdo – axial (C) & coronal (D) views showing the hugely dilated sigmoid colon in volvulus (white asterisks)**



**Fig 2: Operative pics. A)** Close up view of root of Volvulus(blue arrow) showing ‘whirlpooling’ of the root of the mesentery, **B)** Use of 10mm fan retractor to keep dilated bowel(blue asterisks) away from operative field, **C)** Dilated descending(red asterisks) & sigmoid colon(blue asterisks) before reduction of volvulus, **D)** Initiation of gentle attempts at reduction of volvulus(red arrows)



**Fig 3: Operative pics. A & B)** Show complete reduction / untwisting of the volvulus (red arrows), **C)** Suture – fixation of the redundant sigmoid colon to parietes in progress, **D)** The endresult

## DISCUSSION

Sigmoid volvulus is the most common cause of strangulation of the colon and is also the cause for 1% to 7% of all intestinal obstructions in western countries [4]. The male to female ratio among SV patients is 3:1 [5]. This is thought to be due to the fact that females have a more capacious pelvis with more laxity in their abdominal musculature and hence can accommodate and permit untwisting of a redundant sigmoid [6]. It is commoner in older age group, the mean age being 69 years [2]. This shows that elongation and redundancy of the sigmoid colon develop over a long period, caused by continuous exposure to predisposing factors [2].

A common feature among patients who have SV is a disorder of bowel movement, most commonly constipation and abdominal distention even before the development of a SV. Other risk factors that predispose to SV are as follows: (1) predominant consumption of high fiber diet, (2) pregnancy, (3) pelvic tumors or cysts, (4) previous abdominal surgery [4]. Concerning the last factor, the presence of a band attaching the sigmoid colon to the abdominal wall can act as an axis around which a volvulus can occur.

These conditions listed above can produce a large, redundant sigmoid colon, associated with a relatively short & narrow root of mesocolon. This results in the two ends of the loop being close together. This predisposes to the bowel twisting around its central mesenteric axis. Sigmoid volvulus is also thought to be associated with Hirschsprung's disease by a few of the researchers [4]. Literature also suggests that patients undergoing sigmoid resection for SV frequently suffer from elongation and dilatation of the remaining colon and a few may be in requirement of surgery for re-volvulus [4]. In children, SV is a rare entity. As and when it occurs, it commonly results in an acute intestinal obstruction [4]. In adults the obstruction of SV is usually subacute and progressive.

A simple basic imaging modality such as a plain X-ray abdomen is usually adequate to diagnose SV, as we have seen in this report. A CECT scan of the abdomen further confirms the diagnosis and comments on whether there is a tumor present, distally.

The therapy for SV is still emerging and evolving, inspite of the fact that it has been extensively studied through the decades, the world over. There is general consensus about initial endoscopic decompression and detorsion of the affected colon with flatus tube placement [7]. If there is no accompanying necrosis or perforation, endoscopic repositioning of the SV is the first choice. Unfortunately it is not always successful. In western countries a 30% failure has been reported [4]. As and when it succeeds, the reported recurrence rate is 41.7% to 55% [8]. Due to such a high recurrence rate, a successful endoscopic detorsion is usually followed up with a semi-elective definitive surgical resection.

Once necrosis or perforation has set in, emergency surgery with sigmoid resection is required. Also, if repositioning fails, emergency surgery becomes necessary.

If the patient is hemodynamically stable and medically fit, surgical therapy is the definitive treatment of choice. If the clinical situation (in the subacute to elective presentations) has enabled a pre-operative bowel preparation to be given, resection and primary anastomosis is the procedure of choice. If not (in the acute presentations which are unresponsive to initial endoscopic de-compression manoeuvres), resection, proximal colostomy & Hartmann's procedure have emerged as the preferred treatment for SV [4]. The reported mortality rates after sigmoid resections vastly differ depending on whether the colon is viable or not. The post resection mortality rate in the former group of patients is 1%-9%, while it is as high as 25% in the latter group [4].

Preventive surgeries like mesocoloplasty, sigmoidopexy, and extraperitonealization, can be performed in low risk patients, if they are unwilling for a colostomy [9]. The mortality of these elective procedures to prevent recurrence in elderly persons is reported to range from 5% to 16% [10].

Another endoscopic procedure that deserves a mention especially in high risk patients is Percutaneous Endoscopic Colostomy (PEC). To prevent the recurrence of SV, PEC has been carried out for high risk patients, of late. The technique used for PEC is the same as percutaneous endoscopic gastrostomy. The PEC is indicated for recurrent sigmoid volvulus, functional constipation, neurological constipation, and colonic pseudo-obstruction [11]. The mortality, morbidity, and recurrence rates of this procedure are reported to be 5%, 21%, and 70%, respectively [12]. The available data on PEC for SV is limited. The published studies on PEC for SV have small volumes, are mostly retrospective and hence the cause of uncertain results and conclusions. Besides, there is no available level 1 or level 2 evidence in this regard [12].

Finally, we consider LS to be less invasive than any other treatment, including sigmoid colon resection, extraperitonealization, mesocoloplasty and open sigmoidopexy. Various publications have reported the recurrence rate after LS at 16-40% [13]. It is not indicated, however, for patients with sigmoid colon cancer, ascites or those who are considered low risk for surgery. Because sigmoid colon with recurrent SV is thought to cause severe chronic constipation and the loss of normal digestive function, we believe that sigmoid colon resection is the best treatment for recurrent SV patients with low surgical risk. The patient's risk status should always be considered in choosing optimum therapy for recurrent SV. A comparison of morbidity, mortality and recurrence rates of commonly performed procedures for SV is summarised in Table 1.

**Table 1: Post operative adverse results of commonly performed procedures for Sigmoid Volvulus**

Procedure	Morbidity	Mortality	Recurrence
Endoscopic repositioning	22.5%	30%	41.7-55%
PEC	21%	5%	70%
Sigmoid resection	Ileus-8.2%,leak-6.1%	16%	0%
Sigmoidopexy	23.1%	6%	16-40%

## CONCLUSION

Although it is not the preferred therapeutic procedure for SV, LS certainly has a place of its own, as seen in this report. As seen here, it is a good option for those patients who refuse to undergo a colostomy, associated with emergency sigmoid resection. Also, though the published recurrence rates after LS are high, we have not encountered recurrence over 8 postoperative months, as seen here.

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