# Sigmoidopexy versus sigmoidectomy for sigmoid volvulus through left iliac incision in high-risk patients

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**Background**
Sigmoid volvulus (SV) is the commonest form of colonic volvulus (50–80%). It accounts for 3–5% of all causes of intestinal obstruction. Redundant sigmoid with long narrow mesentery and chronic constipation are the main predisposing factors. It usually affects elderly and may be unfit for surgery, so it is difficult to be managed and pushes surgeons to look for a simple surgical procedure, especially in failed or unavailable endoscopic deflation.
**Patients and methods**
This study was conducted on 26 uncomplicated SV cases in high-risk patients. Patients were divided into two equal groups: group A was managed by open deflation, detorsion, and sigmoidopexy, whereas group B was managed by sigmoidectomy and primary anastomosis. The procedures were carried out under local anesthesia (bilateral ultrasound-guided transversus abdominis plane block) with sedation through left iliac incision.
**Results**
The study included 26 cases of SV in high-risk patients (American Society of Anesthesiologists III–IV) with age ranged between 50 and 75 years. Patients presented mainly with distention, vomiting, pain, and intestinal obstruction. Postoperative complications such as recurrence were detected in 23% of patients in group A only, and anastomotic leak in 15.4% of patients in group B. Wound infection was detected in 23% of patients in group A and 15.4% of patients in group B.
**Conclusion**
Although deflation, detorsion, and sigmoidopexy is a safe and simple maneuver for SV, it has a high recurrence rate. Sigmoidectomy carried out under local anesthesia and sedation, through a left iliac incision nearly, has the same advantages but with no recurrence. It can extend the possibility of definitive surgical intervention and improve postoperative outcomes in high-risk patients.

**Keywords:**
deflation, detorsion, left iliac fossa incision, sigmoid volvulus, sigmoidopexy

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## Introduction

Sigmoid volvulus (SV) is one of the common causes of large bowel obstruction in adults worldwide. It accounts for 3–5% of all acute intestinal obstruction and usually presents around the age of 70 years [1]. SV is the commonest form of colonic volvulus [2]. It is presented by an acute obstruction, pain, distension, and vomiting [3].

Narrow mesentery and long sigmoid are the main causes of the disease; however, it can be predisposed by a diet with high-fiber contents, old age, chronic constipation, previous abdominal operation, and megacolon [2,4,5]. Many patients give a history of previous similar attacks [6]. Standard management starts with endoscopic detorsion and then midline exploration and resection anastomosis in fit patients [7].

Distended bowel and inability of patients with comorbidity to tolerate general anesthesia and unavailability of endoscopic decompression especially in low economic countries make limitations for standard management [8]. Morbidities can be minimized by a left iliac fossa small incision [9]. This incision can be made under local anesthesia, transversus abdominis plane block (TAP block), with sedation. This can be suitable for failed colonoscopic detorsion in patients with uncomplicated SV and bad general conditions [1]. This can save cost, lead to better cosmesis, and improve postoperative pain and

recovery. This technique can extend the possibility of SV colectomy to unfit patients, who were previously unable to bear this procedure [10].

## Patients and methods

This was a prospective study conducted on 26 cases of uncomplicated SV in patients with poor general conditions for definitive surgery according to the American Society of Anesthesiologists (ASA III, IV), at Zagazig University Hospitals, Egypt, in the period from January 2019 to May 2021 after being approved by the ethical committee, IRP. Informed written consent was obtained from all patients.

### Inclusion criteria

The following were the inclusion criteria:

(1) Age 50–80 years old.
(2) Uncomplicated SV.
(3) Patients with a high risk of anesthesia (ASA III and IV).

### Exclusion criteria

The following were the exclusion criteria:

(1) Fit patient for definitive surgery (stages I and II ASA).
(2) Complicated SV.

Patients were divided into two equal groups using the sealed envelope method of randomization. Group A included 13 patients operated by open deflation, detorsion, and sigmoidopexy, whereas group B included 13 patients who were managed by sigmoidectomy and primary anastomosis. All patients of both groups were operated on through a lift iliac fossa incision under local anesthesia (bilateral TAP block) with sedation.

Preoperative, history about previous episodes, operation, and comorbidity was taken; moreover, preoperative abdominal radiograph, ultrasound, and full laboratory investigations were done.

### Operative procedures

Prophylactic intravenous antibiotic, 1 g ceftriaxone, and 1-g metronidazole were administered an hour preoperatively.

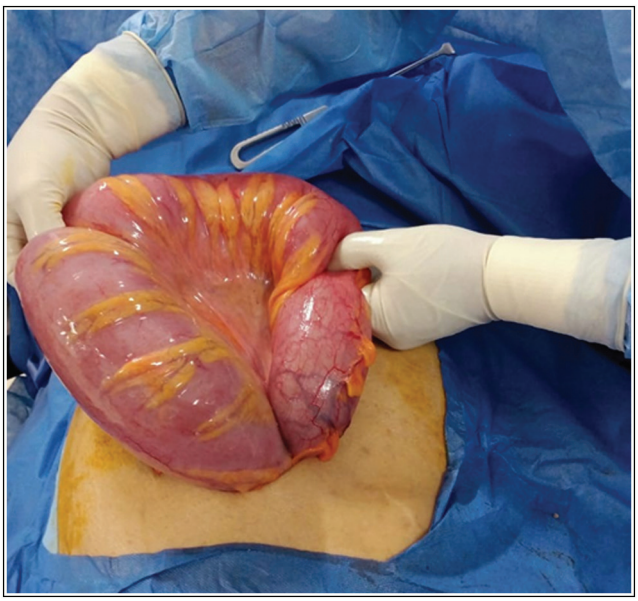
The procedure was carried out under local anesthesia (ultrasound-guided TAP block) with sedation. Left iliac fossa incision (7–10 cm) was created. A trial was attempted to deliver the distended colon through this incision (Fig. 1), and if failed, needle decompression was done to evacuate the colon by a wide-bore needle (16 G) to facilitate its delivery with no or minimal spillage as most contents were gases.

In group A, after needle colonic deflation to facilitate detorsion, if further deflation was needed, a rectal tube was inserted transanally after detorsion of the colon (Fig. 2). The site of the needle was secured by a double purse-string suture. Then, the colon was fixed to the anterior abdominal wall by three interrupted stitches at least (Fig. 3).

**Figure 1**

Delivery of the sigmoid colon through left iliac fossa incision. The sigmoid colon shows twisting 'volvulus.'

**Figure 2**

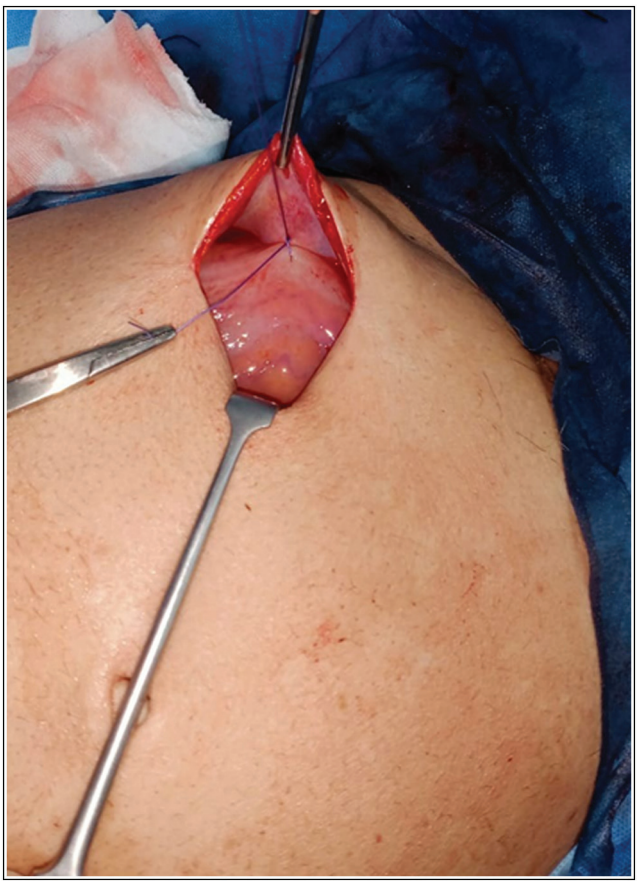


Sigmoid colon after detorsion.

In group B, after delivery of the sigmoid colon with or without needle deflation, sigmoid resection was done with primary anastomosis in two layers.

Oral fluids were started when the intestinal sound became audible. Postoperatively, monitoring of vital signs and assessment of abdominal pain and tenderness were done; moreover, abdominal ultrasound was done to detect the possibility of anastomotic leak. The patients were followed up for at least 6 months for recurrence, morbidity, and mortality.

**Figure 3**



Sigmoidopexy to the anterior abdominal wall through a left iliac incision.

### Statistical analysis

Data were analyzed using IBM SPSS 23.0 for Windows (SPSS Inc., Chicago, Illinois, USA) and NCSS 11 for Windows (NCSS LCC, Kaysville, Utah, USA). Quantitative data were expressed as mean±SD. Qualitative data were expressed as frequency and percentage.

The following tests were done:

(1) Independent samples *t* test of significance was used when comparing between two means.
(2) $\chi^2$ test of significance was used to compare proportions between two qualitative parameters.
(3) Fisher exact test is a test of significance that is used in place of the $\chi^2$ test in 2 by 2 tables, especially in cases of small samples.

*P* value was set as follows: *P* value less than or equal to 0.05 was considered significant, *P* value less than 0.001 was considered as highly significant, and *P* value more than 0.05 was considered insignificant.

## Results

Group A included 13 patients, comprising 10 males and three females, with a mean age of 66.5 ± 6.71 years. However, group B included 13 patients, comprising 11 males and two females, with a mean age of 65.9 ± 6.92 years. There was no statistical difference between both groups regarding sex and age, with *P* values 0.62 and 0.82, respectively (Table 1).

Nearly all our patients had comorbidities. There were four (30.8%) cardiac, two (15.4%) hypertensive, four (30.8%) diabetic patients, and three (23.1%) had

**Table 1 General characteristics of the studied groups**

| Types | Group A (*N*=13) [*n* (%)] | Group B (*N*=13) [*n* (%)] | *P* value |
|---|---|---|---|
| Age | | | |
| Mean±SD | 66.5 ± 6.71 | 65.9 ± 6.92 | 0.82 |
| Sex | | | |
| Male | 10 (76.9) | 11 (84.6) | 0.62 |
| Female | 3 (23.1) | 2 (15.4) | |
| Comorbidity | | | |
| Cardiac | 4 (30.8) | 7 (53.8) | 0.68 |
| HTN | 2 (15.4) | 1 (7.7) | |
| DM | 4 (30.8) | 3 (23.1) | |
| Senile prostatic hyperplasia | 3 (23.1) | 2 (15.4) | |
| History of past operation | 4 (30.8) | 3 (23.1) | 0.54 |
| History of past episodes | 2 (15.4) | 4 (30.4) | 0.65 |

DM, diabetes mellitus; HTN, hypertension.

**Table 2 Preoperative data of the studied groups**

| Preoperative | Group A (*N*=13) [*n* (%)] | Group B (*N*=13) [*n* (%)] | *P* value |
|---|---|---|---|
| TLC | | | |
| Mean±SD | 7.73 ± 1.51 | 8.02 ± 1.23 | 0.59 |
| CT | | | |
| Not done | 2 (15.4) | 1 (7.7) | 0.75 |
| Whirlpool sign | 11 (84.6) | 12 (92.3) | NS |
| Radiograph | | | |
| Coffee bean sign | 13 (100) | 13 (100) | – |
| ASA | | | |
| III | 8 (61.5) | 10 (76.9) | 0.67 |
| IV | 5 (38.5) | 3 (23.1) | |

ASA, American Society of Anesthesiologists; CT, computed tomography; TLC, total leukocyte count.

senile prostatic hyperplasia in group A. However, in group B, there were seven (53.8%) cardiac, one (7.7%) hypertensive, and three (23.1%) diabetic cases, and two (15.4%) patients had senile prostatic hyperplasia. There was no statistically significant difference between both groups of patients regarding patient comorbidities, with *P* value of 0.68 (Table 1).

Four (30.8%) patients in group A versus three (23.1%) patients in group B gave history of previous abdominal operations, with *P* value of 0.54, which was insignificant. Patients who gave history of previous similar attacks were two (15.4%) in group A versus four (30.4%) in group B; this was statistically insignificant, with *P* value of 0.65 (Table 1).

All our patients had noncomplicated SV. Patients who had preoperative signs suggestive for gangrene or perforation were excluded from the study. Patients showing intraoperative unviability of the sigmoid were excluded as well. The mean preoperative leukocytic count was 7.73 ± 1.51 in group A versus 8.02 ± 1.23 in group B, with *P* value of 0.59 (Table 2).

Abdominal radiograph was done for all patients and showed coffee bean sign in all patients of both groups. Computed tomography abdomen was done for 11 cases in group A versus 12 patients in group B (Table 2).

All patients in this study had comorbidities, and according to ASA, there were eight patients and five patients classified as ASA III and IV in group A, respectively, whereas in group B, there were 10 patients and three patients classified as ASA III and IV, respectively. There was no significant difference between both groups, with *P* value of 0.67 (Table 2).

All patients presented with abdominal distension, as 100% of patients of both groups had distension. Pain, constipation, and vomiting were found in 11 (84.6%), 11 (84.6%) and seven (53.8%) in group A, respectively, versus 12 (92.3%), 12 (92.3%), and eight (61.5%) in group B, respectively, with no significant differences between both groups (*P* value of 0.68) (Table 3).

**Table 3 Preoperative presenting symptoms of the studied groups**

| Preoperative | Group A (*N*=13) [*n* (%)] | Group B (*N*=13) [*n* (%)] | *P* value |
|---|---|---|---|
| Distension | 13 (100) | 13 (100) | – |
| Pain | 11 (84.6) | 12 (92.3) | 0.55 |
| Constipation | 11 (84.6) | 12 (92.3) | 0.55 |
| Vomiting | 7 (53.8) | 8 (61.5) | 0.67 |

**Table 4 Operative time and hospital stay among both studied groups**

| Types | Group A (*N*=13) | Group B (*N*=13) | *P* value |
|---|---|---|---|
| Operative time (min) | | | |
| Mean±SD | 90.8 ± 8.62 | 103.1 ± 9.47 | 0.002 |
| Range | 70–100 | 90–120 | |
| Hospital stay (days) | | | |
| Mean±SD | 4.846 ± 1.772 | 8.923 ± 3.73 | 0.002 |
| Range | 3–9 | 6–18 | |

The operative time was significantly shorter in group A (90.8 ± 8.62) than in group B (103.1 ± 9.47) (*P*=0.002). Hospital stay was significantly longer among patients of group B (*P*=0.002) (Table 4).

Wound infection occurred in three (23.1%) patients in group A versus two (15.4%) patients in group B, with no significant difference (Table 5).

Three patients in group A developed recurrence versus no recurrence in group B, but this was found to be insignificant (*P*=0.22). Intestinal leakage was noticed in two patients of group B only, which was insignificant (*P*=0.48) (Table 5).

Four patients in group A needed postoperative ICU admission versus three patients in group B, without significant difference between both groups (Table 5).

**Table 5 Postoperative outcome among both studied groups**

| Types | Group A (*N*=13) [*n* (%)] | Group B (*N*=13) [*n* (%)] | *P* value |
|---|---|---|---|
| Recurrence | 3 (23.1) | 0 | 0.22 |
| Wound infection | 3 (23.1) | 2 (15.4) | 0.54 |
| Intestinal leak | 0 | 2 (15.4) | 0.48 |
| Mortality | 1 (7.7) | 0 | 0.51 |
| Postoperative ICU | 4 (30.8) | 3 (23.1) | 0.52 |

## Discussion

SV is one of the obstructive diseases of the bowel because of abnormal torsion of the sigmoid colon and its mesentery [11]. It is the most famous type (50–80%) of the colonic volvulus and 10% of all intestinal obstruction cases [12].

However, endoscopic detorsion is the first choice for the management of uncomplicated SV and is efficient in 60–80% of patients. It has a high recurrence rate, so resection and primary anastomosis take the upper hand. Other options of management include deflation by rectal tube insertion and elective resection or sigmoidopexy [13].

In this study, endoscopic deflation was not available on an emergency basis.

Patients of our study were classified according to ASA, where eight (61.5%) patients of group A and 10 (76%) patients of group B were stage III, whereas five (38.5%) patients of group A and three (23%) patients of group B were stage IV. There was no significant difference between both groups of patients regarding the ASA class, with *P* value of 0.67.

All patients of both groups were operated on through a left iliac incision (7–10 cm). Al Dhaheri *et al.* [3] reported that left iliac fossa mini-incision, mirror image of Mc Burney's one, for SV is safe, feasible, and has low morbidity. Sigmoid colon in SV can be easily delivered via a left iliac fossa incision. This approach may be associated with cost savings while avoiding the added risks of the long midline approach. The left iliac fossa incision is potentially associated with improved recovery and less pain [3].

The hospital stay of our patients in group A ranged between 3 and 9 days, with a mean of 4.846 ± 1.772 days, whereas it ranged between 6 and 18 days in group B, with a mean of 8.923 ± 3.73 days. This goes with a study carried out by Kaneria *et al.* [14], where the mean hospital stay for sigmoidopexy was 8.3 versus 11.6 days for the resection and primary anastomosis group.

In this study, wound infection was detected in three (23%) patients of group A and two (15.4%) patients of group B, with no significant difference between both groups. Patients who developed wound infection were managed by wound drainage, repeated dressing, and antibiotics. This was matched with Nasir and Khan [15] who detected wound infection in 12 of 63 patients after sigmoidectomy and primary anastomosis for acute SV.

Recurrence was observed in three (23%) patients of group A only, with no recurrence in group B through the postoperative follow-up (6 months). This was statistically insignificant ($P>0.05$). Patients who developed recurrence were managed by sigmoid colectomy and primary anastomosis through a left iliac incision. Kaneria *et al.* [14] reported a recurrence in 4/8 (50%) patients after sigmoidopexy. Basato *et al.* [13] reported no recurrence after open sigmoidectomy for 30 patients presented with acute SV. Suleyman *et al.* [16] reported that nonoperative treatment of acute SV is an effective option for risky patients but with a high rate of recurrence (20%) through the first postoperative 3 months. Primary resection of the SV decreased the recurrence to 3%.Anastomotic leak was observed in only two (15.4%) patients of group B, which was statistically insignificant. Patients with leak were managed conservatively with no need for a second intervention. Basato *et al.* [13] detected leakage in 8% (1/13).

There were no mortalities in group B but only one (7.7%) case in group A. This was statistically insignificant. The patient died on the eighth postoperative day from myocardial infarction.

Halabi *et al.* [17] reported that the mortality rate depends on patients' clinical state and accounts for 10% according to the American multicenter study.

Seven (53.8%) patients of the present study were admitted to ICU postoperatively: four (31%) of them from group A versus three (23%) patients from group B.

## Conclusion

Although deflation, detorsion, and sigmoidopexy is a safe and simple maneuver for SV, it has a high recurrence rate. Sigmoidectomy and primary anastomosis carried out under local anesthesia and sedation through a left iliac incision nearly has the same advantages but with no recurrence. It can extend the possibility of definitive surgical intervention and improve postoperative outcomes in high-risk patients.

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**Conflicts of interest**
There are no conflicts of interest.

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