

General Surgery

Laparoscopic Sigmoid Colectomy with Natural Orifice Specimen Extraction in Sigmoid Volvulus

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ABSTRACT

Sigmoid volvulus (SV), the twisting of the sigmoid colon around its own base, is a relatively rare colonic obstruction form. Endoscopic detorsion is the first-line management option in uncomplicated patients. However, recurrence risk is as high as 90%, with a risk of mortality up to 35%. Although procedures such as sigmoidopexy, sigmoidomesopexy, sigmoidomesoplasty, extraperitonealization, or percutaneous endoscopic sigmoidopexy may prevent or reduce SV recurrence, laparoscopic sigmoid colectomy with natural orifice specimen extraction appears to be the optimal choice in selected cases.

Keywords: Sigmoid volvulus, elective treatment, laparoscopic sigmoid colectomy, natural orifice specimen extraction

Introduction

Sigmoid volvulus (SV) rarely untwists spontaneously and typically requires urgent and effective management due to its relatively poor prognosis.¹⁻⁵ According to current guidelines, resuscitation followed by flexible endoscopic detorsion is the first treatment choice in patients with viable sigmoid colon.⁶⁻⁸ Large-series reports support this clinical practice.⁹⁻¹¹ Although the success rate of endoscopic detorsion is as high as 55%-94%, SV recurrence is not a surprise, which develops in 15%-55% of the cases.^{9,11-13} For this reason, practitioners recommend elective treatment, including various surgical or endoscopic procedures, in some selected patients. However, the selection of the process based on patient characteristics is controversial.^{5,12,14-17}

In this editorial, I discuss elective treatment of SV, particularly laparoscopic sigmoid colectomy (LSC) and natural orifice specimen extraction (NOSE), based on our experience with 1076 SV cases over 57.5 years (from June 1966 to January 2024), which constitutes the most comprehensive single-center SV series worldwide.^{2,4,6,9,18}

Elective Treatment and Laparoscopic Sigmoid Colectomy in SV

Dolichosigmoid, an elongated and dilated sigmoid colon with a long mesentery, is the primary contributing factor in recurrent SV, while the other effective agents are advanced age, male gender, early SV onset, high-fiber diet habit, living in high altitude, and constipated defecation habit.¹⁹⁻²² For this reason, the basic principle in the prevention of recurrence is disfiguring the dolichosigmoid.^{2,12,23} Sigmoidopexy, sigmoidomesopexy, sigmoidomesoplasty, extraperitonealization, or percutaneous endoscopic sigmoidopexy (PES) may help in reducing the risk of recurrence.^{2,5,7,8,16,23-38} However, sigmoid colectomy, particularly LSC, is the most effective surgical technique in preventing recurrence. The mortality, morbidity, and recurrence rates associated with this procedure are 0%-2%, 10%-25%, and 0%-1%, respectively.^{2,16,24,33,34,39-46}

Regarding the decision-making process in the elective treatment of SV, there are two important parameters: health status and age of the patients. In the literature, "good/bad," "low risk/high risk," or "uncomplicated/complicated" terms are generally used in the evaluation of general health status, while the term "young age/old age" is not standardized in the evaluation of age.^{1,5,33,34,39} As seen, such an evaluation is far from objectivity. However, the American Society

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Table 1. Reports on Laparoscopic Sigmoid Colectomy with Natural Orifice Specimen Extraction in Sigmoid Volvulus										
Publication	Year	Number	Age	Gender	ASA	BMI (kg/m ²)	Trochar	Extraction	Morbidity	Discharge (day)
Hamada et al ⁴⁹	2010	1	10	M	n/a	n/a	4	A	–	n/a
Christoforidis et al ⁵⁰	2013	1	n/a	n/a	n/a	n/a	n/a	A	–	n/a
D'Hondt et al ⁵¹	2014	1	85	F	n/a	21	SPD	V	—	8
Wolthuis et al ⁵²	2015	1	n/a	F	n/a	n/a	4	V	n/a	n/a
Hsieh et al ⁵³	2019	2	n/a	n/a	n/a	n/a	n/a	A	–	4
Sia et al ⁵⁴	2019	1	22	M	n/a	n/a	4	A	–	n/a
Chen et al ⁵⁵	2021	16	59 (19-88)	n/a	n/a	28.2 (17-45)	4	A	n/a	5 (2-71)
Seow-En et al ⁵⁶	2021	6	68 (16-84)	3M, 3F	n/a	22.9 (21.5-23.9)	4	A	–	4 (2-9)
Devane and Martin ⁵⁷	2022	1	69	M	n/a	n/a	n/a	A	–	n/a
Uylas et al ⁵⁸	2022	8	n/a	n/a	n/a	n/a	4	A	n/a	n/a
Seow-En et al ⁵⁹	2023	1	66	M	n/a	18	3	A	–	1

A, transanal; ASA, American Society of Anesthesiologists score; BMI, body mass index; F, female; M, male; n/a, not applicable; SPD, single port device. V, transvaginal.

of Anesthesiologists (ASA) status is an objective parameter in the evaluation of health status. Similarly, as an alternative to the age limit, “life expectancy” is a better choice, which varies from country to country and generally decreases in due course. According to this objective rating system, ASA 1-3 patients younger than the life expectancy limit are optimal candidates for elective LSC, while other alternatives, particularly PES, may be applied in cases with ASA >3 or older than the life expectancy limit.⁴⁰

Clinical Experience

Contrary to its low incidence in some areas, including North America, Western Europe, and Australia, SV is relatively common in Türkiye, particularly in our region, Eastern Anatolia. My colleagues and I treated 1076 SV cases over a 57.5-year period between June 1966 and January 2024. In our series, nonoperative detorsion was used in 795 patients (13 barium enema, 351 rigid endoscopy, 431 flexible endoscopy, the latter of which was used since 1988). The success rate was 83.2%, while the mortality, morbidity, and early recurrence rates were 0.6%, 2.1%, and 5.5%, respectively. Urgent surgery was preferred in 488 cases, with 17.4% mortality,

34.2% morbidity, and 0.6% early recurrence rates. Elective sigmoid colectomy (95 open and 21 laparoscopic, the latter of which was used since 2002) was applied in 116 patients. The mortality and morbidity rates were 0% and 11.2%, respectively, while no recurrence was determined in the 57 cases followed up over a mean 22.7-year follow-up period.

Natural Orifice Specimen Extraction in SV

According to a search of the last 79-years’ literature (between 1945 and 2024) in Web of Science^{47,48} database under the headings of “sigmoid volvulus” and “natural orifice specimen extraction,” there are only 11 publications on LSC with NOSE out of 1285 articles on SV and 427 papers on NOSE (Table 1). NOSE by using eversion, was first described by Hamada et al⁴⁹ in 2010. Practitioners revised and upgraded trochars, anvils, staplers, and resection and extraction techniques in the later years.⁵⁰⁻⁵⁹ Shorter incision dimension, reduced postoperative pain, better patient comfort, earlier degassification and defecation, shorter discharge period, and better cosmetic result are major advantages of NOSE.⁴⁹⁻⁵⁹ However, there are still some limitations in the usage of NOSE in cases of SV:

5. There are only 11 publications, including 7 single case reports.⁴⁷⁻⁵⁹ Better interpretations require larger case series.
6. Different practitioners use different operative techniques, and some clinicians use robotic surgery in addition to laparoscopy.^{47,48,57,58} The techniques are not standardized.
7. The numbers, sizes, and sites of the trochars vary.⁴⁷⁻⁵⁹ The instruments are heterogeneous with different options available.
8. Transvaginal extraction is possible in women, unlike the common practice of the trans-anal route.^{51,55,56,58,59} The extraction ways of the specimens are variable.
9. Some surgeons split the specimen in contrast to the favorite technique, delivering the specimen intact.^{51,55,56} The extraction techniques are incompatible.
10. Almost all reports focus on adults, with only one addressing childhood SV.⁴⁹⁻⁵⁹ Sigmoid volvulus is not common in childhood.⁶⁰⁻⁶⁴ Nevertheless, its usage in children is controversial.
11. There is no pregnant patient in the reported cases.⁴⁹⁻⁵⁹ Although SV is uncommon in females, the disease is relatively common in pregnant women.⁶⁵⁻⁷⁰ The results on pregnant women are unclear.
12. Although sporadic elderly cases are present, the mean age is under 75 years in most of the reported series.^{49,50,52-55,57,58} Sigmoid volvulus is common in elderly people.⁷¹⁻⁷⁵ The results on elderly individuals over 75 years old are not clear enough.
13. Body mass index is under 30 kg/m² level in most patients.^{55,56,58,59} The results of its usage in morbid individuals are not bright enough.
14. Almost all cases suffers from recurrent SV.⁴⁷⁻⁵⁹ Its usage in primary SV is a mystery.

Main Points

- Endoscopic detorsion is the first-line treatment route in uncomplicated patients with sigmoid volvulus (SV).
- However, SV tends to recur in 15%-55% of the patients following endoscopic detorsion, with a high mortality risk up to 35%.
- Although some procedures including sigmoidopexy, sigmoidomesopexy, sigmoidomesoplasty, extraperitonealization, or percutaneous endoscopic sigmoidopexy may prevent or reduce SV recurrence, laparoscopic sigmoid colectomy with natural orifice specimen extraction seems to be the optimal choice in selected cases.

1. About half of the cases with SV require urgent surgical management.^{1,2,12,17,25,29,38,39} This urgency prevents the usage of NOSE in most patients.
2. It was first used in 2010.⁴⁷⁻⁴⁹ It is still regarded as a new technique.
3. Only 7 cases were reported before 2021.^{47,48,58} Long-term outcomes remains unclear.
4. The total number of cases reported to date is 39.^{47,48,55,56,58} Healthier comments require larger patient populations.

15. All reports involve elective or semi-elective patients.⁴⁷⁻⁵⁹ Its usage seems as difficult or impossible in emergency cases due to the extremely enlarged sigmoid colon.

Conclusion

Laparoscopic sigmoid colectomy with NOSE has some nonignorable operative and postoperative advantages apart from some paramount issues. Nevertheless, it seems to be the new surgical trend in the elective treatment of SV. In my opinion, the next step may be the urgent LSC with NOSE following endoscopic or percutaneous decompression of SV.

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