ORIGINAL RESEARCH PAPER

Surgery

KEY WORDS: Sigmoid volvulus, Intestinal obstruction.

PATTERN AND OUTCOME OF SURGICAL TREATMENT IN SIGMOID VOLVULUS AT TERTIARY CARE HOSPITAL

Reddi Jhansi MS General Surgery, SV Medical college, Tirupathi.

Dr Sharanabasappa Rudrawadi* MS, MCh Urology, BTGH, Kalburagi. *Corresponding Author

ABSTRACT

Acute sigmoid volvulus is the third most common cause of large bowel obstruction; with wide geographic variations. The aim of this study was to assess the pattern and outcome of surgical treatment offered in sigmoid volvulus patients. We performed a prospective study in 30 consecutively hospitalized patients with sigmoid volvulus. These patients represented 33% of all the large bowel obstruction cases appeared to the surgical department. The patients were given treatment options based on the presence of the gangrene. Four patients underwent Derotation and fixation to the anterior abdominal wall (13.3%), two patients with Primary sigmoid resection and end to end anastomosis (6.6%) and twenty-four patients with Hartmann's procedure (80%). Rate of success of the procedure was good and because of fewer patients in the entire procedure group, the result cannot be concluded. The mortality rates were 50% and 12.5% with Primary sigmoid resection and end to end anastomosis and Hartmann's procedure respectively. Our study shows that the surgical approach to sigmoid volvulus should be diversified according to the absence or presence of the gangrene and viable bowel.

INTRODUCTION:

Sigmoid volvulus is one of the common causes of large bowel obstruction worldwide. In developing countries, it affects relatively young people whereas in developed countries the mortality remains significantly high in patients with the late diagnosis. [1] If left untreated, often results in life-threatening complications, such as bowel ischemia, gangrene, and perforation. [2] Anatomical predispositions, advanced age, medications altering intestinal motility, a high-fiber diet, chronic constipation, previous abdominal surgery, pregnancy, high altitude, neurological or psychiatric illness, and megacolon have all been reported in association with the development of the condition. [3,4]

Patients with sigmoid volvulus may present with the symptom triad of constipation, severe abdominal pain, and a distended abdomen. [5]Most common presenting symptom is abdominal pain and constipation while vomiting is usually a late symptom. Usually, huge abdominal distension is present and erect abdominal skiagram reveals omega sign which is a distended loop of sigmoid colon filling the entire abdomen with its base in the left iliac region. Diagnosis is determined by plain radiograph with computed tomography (CT) scan and barium studies. [6] The management of sigmoid volvulus posses a great challenge in resource-limited societies as found in developing countries like India. Early and correct diagnosis of this disease is essential for appropriate treatment aimed at correcting abnormal pathophysiological changes and restoring intestinal transit caused by the volvulus.

Various surgical procedures for sigmoid volvulus (such as resection and primary anastomosis, derotation and sigmoidopexy, exteriorization (Hartmann's procedure), Paul–Mikulicz colostomy, and mesocoloplasty are advocated for surgical treatment) in the emergency setting are available with conflicting results leads to various studies regarding the superiority of one procedure over the others. [7]

There is a paucity of information regarding sigmoid volvulus in India and particularly the study area due to lack of evidence published local data. Therefore the present study was taken to describe our experience on the management of sigmoid volvulus outlining the clinical presentation, occurrence, etiopathogenesis, and various non-operative & operative surgical treatment outcome of sigmoid volvulus. This study also aims at assessing the pattern and outcome of surgical treatment in sigmoid volvulus patients.

MATERIAL AND METHOD:

This was a prospective study conducted at SV Medical College, Tirupathi, for the duration of 2yrs between July 2014 to October 2016. The patients attending the emergency ward of the surgical department with the features of intestinal obstruction suggestive of sigmoid volvulus on radiological testing were included for the study after the obtaining informed consent from the patient. The ethical approval was obtained prior to recruiting the patients for the study. Patients not willing to participate, History of Hirschsprung disease and patients with volvulus of another part of gastrointestinal tract other than sigmoid was excluded from the study. The proforma based data collection of the patient details and treatment management was documented including the clinical examination, essential investigations and x-ray erect abdomen. Diagnosis of the sigmoid volvulus was based on radiological findings correlated with the clinical presentation. Diagnosis of sigmoid volvulus was made if patient presented with classical symptoms of abdominal pain, distension, and constipation that showed asymmetrical abdominal distension and tenderness upon evaluation and if upon investigation, plain x-ray showed dilated sigmoid colon and multiple fluid levels [with omega or horseshoe sign or bird beak sign or inverted V sign or Y sign or Northern exposure sign or coffee bean sign]. [4,8] Different modalities of the treatment were performed in the patient appropriate for the disease severity and necessity; derotation, derotation, and fixation to the anterior abdominal wall, primary sigmoid resection, and end to end anastomosis and Hartmann's procedure. The outcome after the offered treatment procedure was followed until discharge from the hospital.

STATISTICS:

The demographic details of the patient are presented as frequency, percentage, mean and SD. Chi-square test was used to analyze the difference in proportion in patterns using Institution licensed SPSS v23.

RESULTS:

Total of 30 cases of sigmoid volvulus was included in this study after selecting 90 patients with complaints of bowel obstruction.

Following the diagnosis of the acute sigmoid volvulus among the 90 large bowel obstructions, an initial basic workup of the patient was conducted. The demographic details of the patients including the age, gender distribution, occupation of patients, the initial symptoms, signs and the radiological findings in the patient [is presented in table 1].

Table 1: Demographic details of sigmoid volvulus patients included in the study.

Age		Total	percentage
	11-30yrs	7	
	31-50yrs	16	
	51-70yrs	7	

Gender	Male	21	70
	Female	9	30
Occupation	Daily laborer	18	60
	Agriculture	9	30
	Housewife	3	10
Symptoms	Pain in the abdomen	30	100
	Distension of abdomen	30	100
	Constipation	27	90
	Vomiting	15	50
	Retention of urine	02	6.66
	Fever	03	10
Signs	Abdominal distension	30	100
	Dehydration	30	100
	Abdominal tenderness	24	80
	Rigidity	6	20
	The absence of bowel sounds	12	40
	Operative scar	03	10
Radiological findings	Specific	20	66.67
	Non-Specific	10	33.33
Status of bowel	Gangrene	6	20
	Viable	24	80

Table 2: Details of the operative procedures performed in sigmoid volvulus and their outcome.

Procedure	No of patients (%)	Cured	Expired
Derotation	0		
Derotation and fixation to the anterior abdominal wall.	4 (13.33)	4	0
Primary sigmoid resection and end to end anastomosis.	2 (6.66)	1	1
Hartmann's procedure.	24 (80)	21	3

The number of patients subjected for various methods of surgical treatment includes; derotation, derotation, and fixation to the anterior abdominal wall (13.33%), primary sigmoid resection and end to end anastomosis (6.66), Hartmann's procedure (80%). [As shown in table 2]

DISCUSSION:

Sigmoid volvulus is wrapping of the sigmoid colon around its mesentery, with interesting dispersion in the world. [8,9] sigmoid volvulus, described by von Rokitansky in 1836, remains an important intestinal obstruction till today. (10) Acute sigmoid volvulus is the third most common cause of large bowel obstruction, with wide geographic variations. [11] Raveenthiran et al[4] recently provided more insight into pathophysiology related to acute sigmoid volvulus. An increasing intraluminal pressure found to impair the capillary perfusion following which there is the occurrence of the acute sigmoid volvulus. The mechanical obstruction occurring due to twisting of mesenteric blood vessels and thrombosis of the mesosigmoid veins contribute for ischemic changes. This ischemic injury occurs in mucosa earlier than colonic layers and hence facilitating the bacterial colonization and translocation with toxemia. Converting the proximal colon into a second loop (closed loop). Increase in abdominal pressure causes the episode of abdominal compartment syndrome-like features with obstruction and pain. Prompt correction of these events is vital in improving and reversing the events with better prognosis of acute sigmoid volvulus.

Present study based on the sigmoid volvulus, a total of 30 cases were selected out of 90 cases presented with large bowel obstruction. Incidence of the sigmoid volvulus among the large bowel obstruction in present study was found to be 33.33% compared to similar study with rate of 43% in Ballantyne GH et al.[12] the mean age of the subjects was 41.5yrs (21-60yrs of age group, which was in relation to many of other studies with a male to female ratio of 2.3:1.[12,13] The mean age was found to be between 56-77yrs and one-third of all colonic emergencies in elderly patients were due to sigmoid volvulus. [14]

All the patients in our study had a chief clinical presentation with pain and distension of abdomen, whereas study done in past showed 98.7% had abdominal pain and 96% presented with distension. The incidence of constipation was only 90% in our study, whereas another study was up to 92.5%. Similarly, the incidence of vomiting was higher (71.5% in another study), whereas it was only 50% in our study. Uncommon presentation of fever and retention of urine was seen in our study, whereas no such symptoms were observed in other studies. The incidence of the high rate of uncommon symptoms seen in our study could be due to the fact that population of the study was more prone to infection, as seen in developing countries with malnutrition predisposing infection thus forming a vicious cycle. [14]

In our study, all the patients showed abdominal distension with tenderness, whereas it is 96% and 98.7% respectively as reported in some studies. 40% of patients showed the absence of bowel sounds that was very similar to other studies. The rate of diagnosis of x-ray findings along with clinical presentation was 66.67%, whereas other studies reported up to 80% correct rate.[14]

Treatment of the sigmoid volvulus still remains varied with the absence of the concrete evidence of which method is superior with a reduction in mortality and morbidity in patients. The variation depends on many factors, such as general health of the patient, condition at the time of operation, anesthetist and individual preference of the surgeon. A high recurrence rate is found with sigmoid volvulus followed by endoscopic detorsion. [15] In gangrenous cases, resection and primary anastomosis are preferred if the patient is stable and a tension-free anastomosis if possible. Resection of sigmoid colon prevents recurrence rate and is noted in various studies.[13,16,17] various authors have done derotation and fixation to the abdominal wall, primary sigmoid resection and end to end anastomosis and Hartmann's procedures in patients with the sigmoid volvulus as shown in the table with cure rates compared with our result. [18–20] Our study did not show a significant difference in cure rates compared to other various studies, revealing similar results related to morbidity and mortality with the various treatment modalities used in the treatment of sigmoid volvulus in patients. [Table 3]

Various surgical treatment modalities offered in our study were

Table 3: Comparison of the result of various studies compared with the present study outcome and the proportion difference is calculated.

Procedure	Study	N (%)	Cured	p-value (X^2)	Expired
Hartmann's procedure	Present study	24 (80)	3(12.5%)		3(12.5%)
	Diaz plasencia et al[18]	35 (28.7)	24 (68.6%)	0.096 (2.76)	11 (37.4%)
	People's J.B et al[19]	15 (26.6)	13 (87%)	0.965 (.002)	2 (13%)
	Diaz plasencia J, Rebaza Iparraguirre H[20]	29 (58)	21 (72%)	0.17 (1.86)	8 (28%)
Primary sigmoid resection and end to end anastomosis	Present study	2 (6.66)	1 (50%)		1 (50%)
	Diaz plasencia et al[18]	69 (56.9)	60 (87%)	0.14 (2.17)	9 (13%)
	People's J.B et al[19]	19 (47.5)	14 (73.7%)	0.49 (0.47)	5 (26.3%)
	Diaz plasencia J, Rebaza Iparraguirre H[20]	21 (42)	17 (67%)	0.636 (0.22)	4 (25%)
Derotation and fixation to the abdominal wall	Present study	4 (13.33)	3 (75)		0
	Diaz plasencia et al[18]	19 (15.4)	19 (100)`	HS	0

p<.05 considered being statistically significant. HS- p<.001 is considered statistically highly significant (HS)

compared with a study done by the Asbun HJ et al. [21] We found no statistical difference in a cure rate of 86.6% as seen in our study. Asbun HJ et al included a total of 66 patients of various modalities shown in the table below, against the 30 patients in our study subjected to same surgical modalities. [21] In our observation with Hartmann's procedure had a high rate of mortality compared to other, which cannot be concluded because of low sample numbers operated in different modalities. The mortality was lower with the primary sigmoid resection and end to end anastomosis in the treated patients similar to other studies. [22] Atamanalepet et al conducted various procedures in the sigmoid volvulus patients (n=19) with mortality of 21%.

Table 4: Comparison of present study result with Asbun HJ et al study, and the proportional difference between the treatment outcomes

	Derotation and fixation totheabdominal wallN (%)	Primary sigmoid resection and end to end anastomosis N (%)	Hartmann's procedure N (%)	Cured (%)	Sig (X^2)	Expired (%)
Asbun HJ et al(21)	25 (38)	33 (50)	8 (12)	**86.5**	**NS**	**13.55**
Present study	4 (13.3)	2 (6.66)	24 (80)	**86.66**		**23.44**

p<.05 considered being statistically significant. HS- p<.001 is considered statistically highly significant (HS); NS- statistically non-significant.

Our 4 patients underwent sigmoidopexy, 2 presented with recurrent who were previously managed conservatively for the initial time with no obstruction. Other 2 patients presented with pain abdomen with x-ray finding of sigmoid volvulus with no features suggesting the obstruction hence managed conservatively. Here it can be concluded that resection is a definitive procedure for sigmoid volvulus followed by anastomosis. Some patients (n=17) who underwent Hartmann's procedure were re-admitted for the closure of colostomy after 3months and were doing well during the follow-up. The Hartmann's procedure and primary sigmoid resection and end to end anastomosis are the two definitive procedures for treatment of sigmoid volvulus with minimal recurrences.

CONCLUSION:

Though classical symptom presentations are seen in almost all the patients, the uncommon presentation is rarely seen. Sigmoid volvulus constituted 45% of total large bowel obstruction. Colonoscopic decompression and derotation is the primary emergency treatment of choice in uncomplicated acute sigmoid volvulus and is a safe treatment modality. Emergency laparotomy is reserved for gangrene and failed decompression and in patients with a high recurrence rate, it may be prudent to consider selective resection and end to end anastomosis and Hartmann's procedure. The occurrence of the sigmoid volvulus is more common in males than the females with high incidence in the middle-aged people belonging to low socio-economic strata.

REFERENCE

1. Janardhana Rao K, Kumar Podili N, Rajagopal M. Review of sigmoid volvulus: a 5 years experience in tertiary care hospital, Visakhapatnam. J Evid Based Med Healthc. 2018;5:1948–53.
2. Katsikogiannis N, Machairiotis N, Zarogoulidis P, Sarika E, Stylianaki A, Zisoglou M, et al. Management of sigmoid volvulus avoiding sigmoid resection. Case Rep Gastroenterol. 2012;6(2):293–9.
3. Akinkuotu A, Samuel JC, Msiska N, Mvula C, Charles AG. The role of the anatomy of the sigmoid colon in developing sigmoid volvulus: a case-control study. Clin Anat. 2011;24(5):634–7.
4. Raveenthiran V, Madiba TE, Atamanalp SS, De U. Volvulus of the sigmoid colon. Colorectal Dis. 2010;12(7):e1-17.
5. Atamanalp SS. Sigmoid volvulus. Eurasian J Med. 2010;42(3):142–7.
6. Kotisso B, Bekele A. A three-year comprehensive retrospective analysis of Ilio-sigmoid knotting in Addis Ababa. Vol. 44, Ethiopian medical journal. 2006. 377-383 p.
7. Lal SK, Morgenstern R, Vinjirayer EP, Matin A. Sigmoid volvulus an update. Gastrointest Endosc Clin N Am. 2006;16(1):175–87.
8. Atamanalp SS, Atamanalp RS. Determination of patients requiring elective surgery following successful endoscopic detorsion in sigmoid volvulus. Pakistan J Med Sci. 2017;33(6):1528–30.
9. Oren D, Atamanalp SS, Aydinli B, Yildirgan MI, Basoglu M, Polat KY, et al. An algorithm for the management of sigmoid colon volvulus and the safety of primary resection: experience with 827 cases. Dis Colon Rectum. 2007;50(4):489–97.
10. Avots-Avotins K V, Waugh DE. Colon volvulus and the geriatric patient. Surg Clin North Am. 1982;62(2):249–60.
11. Grossmann EM, Longo WE, Stratton MD, Virgo KS, Johnson FE. Sigmoid volvulus in Department of Veterans Affairs Medical Centers. Dis Colon Rectum. 2000;43(3):414–8.
12. Ballantyne GH, Brandner MD, Beart Jr RW, Ilstrup DM. Volvulus of the colon. Incidence and mortality. Ann Surg. 1985;202(1):83–92.
13. Khanna AK, Kumar P, Khanna R. Sigmoid volvulus: study from a north Indian hospital. Dis Colon Rectum. 1999;42(8):1081–4.
14. Atamanalp SS, Ozturk G. Sigmoid volvulus in the elderly: outcomes of a 43-year, 453-patient experience. Surg Today. 2011;41(4):514–9.
15. Perrot L, Fohlen A, Alves A, Lubrano J. Management of the colonic volvulus in 2016. J Visc Surg. 2016;153(3):183–92.
16. Chakrabarty PB, Rath GC, Senapati NB, Misra P. Acute large gut obstruction. J Indian Med Assoc. 1979;73(7–8):113–6.
17. Anderson JR, Lee D. The management of acute sigmoid volvulus. BJS. 1981;68(2):117–20.
18. Diaz-Plasencia J, Sanchez C, Bardales M, Rebaza H, Calipuy W. Operative mortality in sigmoid volvulus. Rev Gastroenterol Peru. 1993;13(1):37–44.
19. Peoples JB, McCafferty JC, Scher KS. Operative therapy for sigmoid volvulus. Identification of risk factors affecting outcome. Dis Colon Rectum. 1990;33(8):643–6.
20. Diaz-Plasencia J, Rebaza-Iparraguirre H. An index of the severity of intestinal gangrene due to colonic volvulus. Rev Gastroenterol Peru. 1993;13(2):96–104.
21. Asbun HJ, Castellanos H, Balderrama B, Ochoa J, Arismendi R, Teran H, et al. Sigmoid volvulus in the high altitude of the Andes. Review of 230 cases. Dis Colon Rectum. 1992;35(4):350–3.
22. De U, Ghosh S. Single stage primary anastomosis without colonic lavage for left-sided colonic obstruction due to acute sigmoid volvulus: a prospective study of one hundred and ninety-seven cases. ANZ J Surg. 2003;73(6):390–2.