

# Comparison of Primary Resection and Anastomosis with Hartmann's Procedure In Management of Acute Sigmoid Volvulus

Sibaprasad Pattanayak, Debabrata Saha, Bipin Kishore Bara, Sanjit Kumar Nayak

## Abstract

**Background:** Sigmoid volvulus is a common surgical emergency in many regions of the world that carries significant morbidity and mortality. Volvulus occurs when an air-filled segment of the colon twists about its mesentery. In developing countries, it is a major cause of colonic obstruction. The sigmoid colon is involved in up to 90% of cases. It can be present as acute, sub-acute or chronic. Acute sigmoid volvulus requires emergency surgery. Various methods are used in its management.

**Aim:** The purpose of our study was to evaluate the comparative study of single-stage resection and anastomosis with Hartmann's procedure for management of acute left-sided colonic obstruction due to acute sigmoid volvulus.

**Methods:** This prospective study was conducted in a consecutive series of 122 patients with acute sigmoid volvulus, admitted to the department of general surgery at M.K.C.G Medical College. All 122 patients were submitted to laparotomy. In different groups, 87 patients underwent primary resection of the affected sigmoid colon with anastomosis while 35 patients underwent surgical resection of the rectosigmoid colon with closure of the rectal stump and formation of an end colostomy (Hartmann's procedure). The outcome of the two procedures was analysed in terms of mortality, postoperative complications and hospital stay.

**Results:** This study clearly shows that there is no statistically significant result between the two procedures, other than a slightly longer hospital stay recorded for the resection and anastomosis group than that of the Hartmann's group.

**Conclusions:** This study demonstrated that the outcome of two procedures are the same. Resection and anastomosis should be performed safely in uncomplicated acute sigmoid; in complicated cases, Hartmann's procedure is the surgery of choice.

**Key words:** *Sigmoid volvulus, Hartmann's procedure, resection anastomosis*

## Introduction

Acute sigmoid volvulus is defined as torsion of the sigmoid colon around its mesenteric axis. If left untreated,

Sibaprasad Pattanayak  
Associate professor, Department of Surgery, M.K.C.G. Medical College Hospital

Debabrata Saha  
Post graduate (junior resident) Department of Surgery, M.K.C.G. Medical

Bipin Kishore Bara  
Asst Prof. Department of Surgery, M.K.C.G. Medical College Hospital

Sanjit Kumar Nayak  
Senior Resident, Department of Surgery, M.K.C.G. Medical College Hospital

Corresponding author: Debabrata Saha  
Berhampur, District- Ganjam, State- Odisha, Pin- 760004, India  
Post graduate (junior resident) Department of Surgery,  
M.K.C.G Medical  
Tel.: +918908051724, +919641360926,  
e-mail- debebratabsmc@gmail.com

Received 16 March 2016; Accepted 25 April 2016

it will lead to complications such as gangrene and bowel perforation [1]. Sigmoid volvulus was first described by Von Rokitansky in 1836 [2], and is a very significant cause of closed loop colonic obstruction worldwide [2, 3]. In some countries, like Eastern Europe, India and Africa, it accounts for almost 50% of large bowel obstruction [4, 5]. The aetiology of the disease is multifactorial: high fibre and a long sigmoid loop with a narrow mesentery leading to a predisposition to torsion, and chronic constipation are among some of the causes [6, 7]. Acute sigmoid volvulus mainly presents with abdominal distension, pain abdomen, no bowel movement, and vomiting [8]. Abdominal radiography shows the typical omega sign [9]. Emergency surgery is the only treatment of choice in complicated volvulus [8]. Various types of operations have been described in the management of acute sigmoid volvulus; the Hartmann's procedure is the treatment of choice in gangrenous, or toxic megacolon and unstable vitals [10, 11]. However, single stage primary resection and anastomosis have also been preferred [12].

## Materials and Methods

This prospective study was conducted in a consecutive series of 122 patients who were admitted between September 2010 and February 2016 to the department of general surgery at M.K.C.G Medical College for acute sigmoid volvulus as diagnosed by clinical examination and by abdominal radiography, ultrasound scanning, of the abdomen and pelvis, and routine blood investigations. All patients initially received adequate fluid resuscitation, broad spectrum antibiotics, and ryles tube aspiration decompression, before undergoing a laparotomy. Primary resection of the affected sigmoid colon with anastomosis was performed on 87 patients while surgical resection of the rectosigmoid colon with closure of the rectal stump and formation of an end colostomy (Hartmann's procedure) was performed on 35 patients in different groups. The outcome of the two procedures were analysed in terms of mortality, postoperative complications and hospital stay. Statistical data were compared by Fisher's exact test with a p value < 0.05 considered as significant.

## Results

The study included 84 male and 38 female patients: ratio 2.2: 1 (Table 1). Accounting for 65 cases (53.27%), the most commonly affected age group was the 51- 60 years group, and the least affected age groups were the 20-30 years and 71-80 years with just two cases (1.63%) in each group; the mean age was 58 years (Table 2). The most frequent symptom was abdominal pain as presented in 108 cases (88.52) %, followed by abdominal distension in 102 (83.06%). The least common was shock which was observed in seven patients (5.73%) (Chart 1). Plain abdominal radiography detected

104 cases (85.24%) with the typical distended omega-like dilated sigmoid loop (Figure 1), while an ultrasound scan of the abdomen and pelvis revealed dilated loops and decreased peristalsis in 75 cases (69.67%). Blood investigation showed total leucocyte counts > 11000 /cu.mm. in 48 patients (39.34%), hyponatremia in 54 (44.26%), and hypokalaemia in 33(27.04%). Intraoperative findings in the RA group (resection and anastomosis) included 70 cases of viable bowel, 15 cases of gangrene, and two cases of perforated bowel loop. Findings in the HP group (Hartmann's) included nine cases of viable loop, 22 cases of gangrenous loop, and four cases of perforation (Table 3). As concerns postoperative complications, wound infection was more common for both groups: eight patients (9.19%) in the RA group and two in the HP group (5.71%) with a p value of 0.722 which was not statistically significant, followed by seven cases of chest complications (8.04%) in the RA group, and two in the HP group (5.71%) with a p value of 1 which again was not statistically significant. Anastomotic leakage in the RA group was recorded in six cases (6.89%) as opposed to one case in the HP group (2.85%); wound gaping was noted in four patients in the RA group (4.59) and one in the HP group (2.85%) with an insignificant p value of 1; anastomotic leakage occurred in three patients in the RA group (3.44%), colostomy-related complication in 1 patient (2.85%)in the HA group; seven cases in the RA group had prolonged paralytic ileus (8.04%) vs. just one case

**Table 1.** Sex distribution: male: female ratio - 2.2: 1.

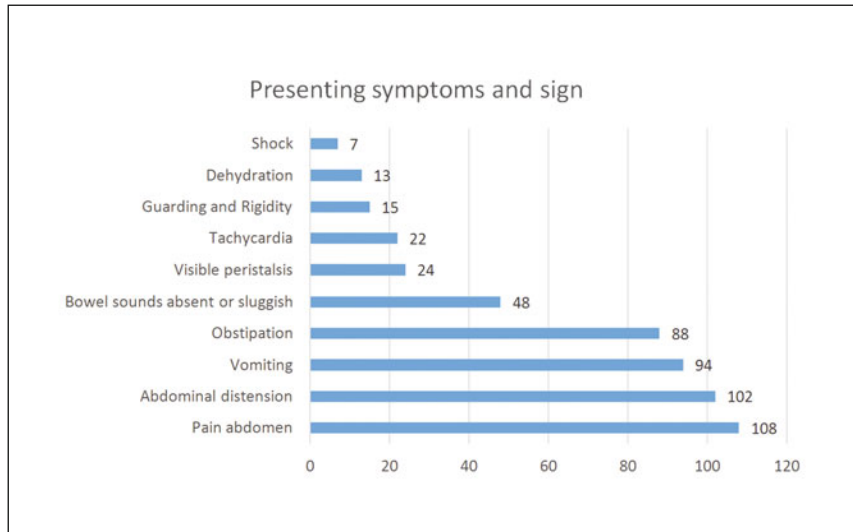
Sex	Number of patients	Percentage
Male	84	68.85%
Female	38	31.14%

**Table 2.** Age distribution of acute sigmoid volvulus.

Age groups	No. patients	Percentage
20-30	2	1.63%
31-40	5	4.09%
41-50	7	5.73%
51-60	65	53.27%
61-70	41	33.60%
71-80	2	1.63%



**Figure 1.** Abdominal plain X-Ray of acute sigmoid volvulus typical omega sign.



**Chart 1.** Different presenting signs and symptoms of acute sigmoid volvulus.

in the HP group (2.85%) with a p value of 0.43 which is not significant. The mortality rate was 5.74% (five patients) and 2.85% (one patient) for the RA and HP groups respectively,

giving a p value of 0.6723 which was not significant (Table 4). The mean hospital stay for the RA group was 12 days against seven days for the HP group.

**Table 3.** Intraoperative findings of acute sigmoid volvulus.

Sigmoid loop condition	RA Gr. No. (n= 87)		HP Gr. (n= 35)	
	No of Pts	Percentage	No of Pts	Percentage
Viable loop	70	57.37%	9	25.71%
Gangrenous	15	12.29%	22	64.70%
Perforation	2	1.63%	4	11.4%

**Table 4.** Different postoperative complications compared for both groups.

Postop complications	RA gr.	HP gr.	P value
Wound infection	8 (9.19%)	2 (5.71%)	0.722
Chest complication	7 (8.04%)	2 (5.71%)	1
Wound gaping	4 (4.59%)	1 (2.85%)	1
Anastomotic leakage	3 (3.44%)	NA	NA
Colostomy complications	NA	1 (2.85%)	NA
Prolonged paralytic ileus	7 (8.04%)	1 (2.85%)	0.43
Incisional hernia	2 (2.29%)	0	0.55
Mortality	5 (5.74%)	1 (2.85%)	0.673

**Discussion**

Acute sigmoid volvulus is the third most common cause of colonic obstruction [13]. In our study, the mean age of presentation was 58 years, and the most commonly affected age group was the 51-60 years group. This is in line with other published findings [9, 14]. Our study showed a male prevalence with a male female ratio of 2.2:1[15]. The most commonly presenting symptom was abdominal pain, abdominal distension, vomiting, and obstipation [14]. An abdominal X-ray can detect 57-90% cases [16]. In our study, plain abdominal radiography detected 85.24% cases. In spite of recent techniques used to manage this disease, final conclusions could not be reached [9]. Several procedures have been used for the management of acute sigmoid volvulus, with the mainstay of surgery operation focused on the relief and prevention of obstruction To achieve this goal, resection of the sigmoid colon is performed, with or without anastomosis [12]. Cases of emergency involving left-sided colonic resection and anastomosis without bowel preparation remain controversial. Some studies found no benefit of mechanical bowel preparation over on-table bowel irrigation [17-19]. Guer M et al. showed the feasibility of on-table bowel irrigation in the management of sigmoid volvulus [20]. The advantages of primary resection and anastomosis lie in the fact that it is a one-stage operation, there is no need for any stoma care, and it is easily acceptable by patients [9, 20, 21]. However, its disadvantages include prolonged operation time, the quantities of faeces

that are difficult to handle, and the risk of contamination [22]. Non-resection surgery, such as sigmoidopexy and mesosigmoidoplasty, carries a high recurrence rate [23]. It is preferable to perform the Hartmann's procedure in cases of gangrenous or perforated bowel loops [12]. The majority of our patients with viable bowel loops were submitted to primary resection and anastomosis (57.37%) while the Hartmann's procedure was performed in gangrenous cases (64.70%) or perforated bowel loops (11.4%). Several other studies support primary resection and anastomosis as the preferred treatment when there are no complications [9, 24]. A study by Okello et al. clearly showed that for gangrenous and perforated bowel loop cases, the treatment of choice is colostomy followed later on by reversal anastomosis in a two-stage operation, while for uncomplicated sigmoid volvulus, primary resection and anastomosis is proposed [25]. In cases of failure of decompression, gangrene, or perforation, Hartmann's procedure might reduce mortality [26]. As reported in other studies, we found the most common complication to be wound infection. Compared to other studies, our mortality rate was low [14, 27]. Anastomotic leakage is the most important and dreadful complication of primary resection and anastomosis: its incidence was 3.44% in our study. A study by De et al. found it to be 1.01% and according to Raveenthiran it was 10% when single-stage resection anastomosis was performed for acute sigmoid volvulus [3, 28]. We found no statistical difference in outcome between the two treatment groups. Our findings concur with those of Okello et al. and Akcan et al. [24,25]. The mean hospital stay for the RA group and HP group was 12 days and 7 days, respectively, which is comparable with that reported by Oren D et al. and Akcan et al [24,27].

## Conclusions

Our results show that there is no significant difference between the two treatment groups, other than the longer hospital stay for RA patients compared to the Hartmann's procedure group. Consequently, primary resection and anastomosis can be safely considered for uncomplicated acute volvulus. However, for complicated volvulus, such as gangrene, perforation, peritonitis, poor general condition or unstable vitals, it would be wiser to perform the Hartmann's procedure to reduce the risk of mortality.

**Ethical Approval-Informed Consent:** The protocol was approved by the ethical review board of the institute. Written informed consent was obtained from all participants in accordance with the principles of the Declaration of Helsinki 1975.

**Conflict of Interest:** The authors do not have any conflict of interest.

## References

1. Katsikogiannis N, Machairiotis N, Zarogoulidis P, et al. Management of sigmoid volvulus avoiding sigmoid resection. *Case Rep Gastroenterol* 2012; 6:293-9
2. Avots-Avotins KV, Waugh DE. Colon volvulus and the geriatric patient. *Surg Clin North Am* 1982; 62:248-60
3. Raveenthiran V. Observations on the pattern of vomiting and morbidity in patients with acute sigmoid volvulus. *J Postgrad Med.* 2004; 50:27-9
4. Naaeder SB, Archampong ED. One-stage resection of acute sigmoid volvulus. *Br J Surg* 1995; 82:1635-6
5. Welch GH, Anderson JR. Acute volvulus of the sigmoid colon. *World J Surg* 1987; 11:258-62
6. Lal SK, Morgenstern R, Vinjirayer EP, et al. Sigmoid volvulus an update. *Gastrointest Endosc Clin N Am* 2006; 16:175-87.
7. Cuschieri A, Steele PJC, Moosa AR. Disorders of the colon and rectum. In: *Essential Surgical Practice*. 4th edition 2002; p. 569-626
8. L, Martin D, McWhirt E, Napoli P. Colonic volvulus. The Army Medical Center experience 1983-1987. *Am Surg* 1991; 57:295-300
9. Z. Sule A, Misauno M, Opaluwa AS, et al. One stage procedure in the management of acute sigmoid volvulus without colonic lavage. *The Surgeon* 2007; 5:268-70
10. Remzi FH, Oncel M, Hull TL, et al. Current indications for blow-hole colostomy: ileostomy procedure. A single center experience. *Int J Colorectal Dis* 2003; 18:361-4
11. Poon RT, Law WL, Chu KW, et al. Emergency resection and primary anastomosis for left-sided obstructing colorectal carcinoma in the elderly. *Br J Surg* 1998; 85:1539-42
12. Madiba TE, Thomson SR. The management of sigmoid volvulus. *J R Coll Surg Edinb* 2000; 45:74-80
13. Grossmann EM, Longo WE, Stratton MD, et al. Sigmoid volvulus in Department of Veterans Affairs Medical Centers. *Dis Colon Rectum* 2000; 43:414-8
14. Atamanalp SS, Ozturk G. Sigmoid volvulus in the elderly: outcomes of a 43-year, 453-patient experience. *Surg Today* 2011; 41:514-9
15. Khanna AK, Kumar P, Khanna R. Sigmoid volvulus: study from a north India hospital. *Dis Colon Rectum* 1999; 42:1081-4
16. Burrell HC, Baker DM, Wardrop P, Evans AJ. Significant plain film findings in sigmoid volvulus. *Clin Radiol* 1994; 49:317-9
17. Slim K, Vicaut E, Panis Y, et al. Meta-analysis of randomized clinical trials of colorectal surgery with or without mechanical bowel preparation. *Br J Surg* 2004; 91:1125-30
18. Zmora O, Mahajna A, Bar-Zakai B, et al. Colon and rectal surgery without mechanical bowel preparation. A randomized prospective trial. *Ann Surg* 2003; 237:363-7
19. Fa-Si-Oen P, Roumen R, Buitengeweg J, et al. Mechanical bowel preparation or not? Outcome of a multicenter, randomized trial in elective open colon surgery. *Dis Colon Rectum* 2005; 48:1509-16
20. Gurel M, Alic B, Bac B, et al. Intraoperative colonic irrigation in the treatment of acute sigmoid volvulus. *Br J Surg* 1989; 76:957-8
21. Gibney EJ. On-table lavage in the management of sigmoid volvulus: A review. *West Afr J Med* 1992; 11:223-5

22. Smith SR, Connolly JC, Gilmore OJ. The effect of faecal loading on colonic anastomotic healing. *Br J Surg* 1983; 70:49-50
23. Bruusgaard C. Volvulus of the sigmoid colon and its treatment. *Surgery* 1947; 22:466-78
24. Akcan A, Akyildiz H, Artis T, et al. Feasibility of single-stage resection and primary anastomosis in patients with acute noncomplicated sigmoid volvulus. *Am J Surg* 2007; 193:421-6
25. Okello TR, Ogwang DM, Kisa P, et al. Sigmoid volvulus and ileosigmoid knotting at St. Mary's Hospital Lacor in Gulu, Uganda. *East Cent Afr J Surg* 2009; 14:58-64
26. Nuhu A, Jah A. Acute sigmoid volvulus in a West African population. *Ann Afr Med* 2010; 9:86-90
27. Ören D, Atamanalp SS, Aydinli B, et al.; An Algorithm for the management of sigmoid colon volvulus and the safety of primary resection: experience with 827 cases. *Diseases of the Colon & Rectum*, 2007; 50: 489-97
28. 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; 73:390-2