Research Article

Comparison of Primary Resection and Anastomosis with Defunctioning Stoma in Cases of Uncomplicated Sigmoid Volvulus Patients: A Retrospective Study

Anurag Chauhan[1], Ajay Gangji[2], Ajay Venugopal Menon*[3]
[1]Assistant professor, Department of surgery, GR medical college, Gwalior, MP
[2]Associate professor, Department of surgery, GR medical college, Gwalior, MP
[3]PG student, Department of surgery, GR medical college, Gwalior, MP

*Corresponding author
Ajay Venugopal Menon
Email: menonvajay@gmail.com

Abstract: Volvulus is twist (rotation) in the axis of the loop of bowel either clockwise or anticlockwise. The best management of sigmoid volvulus (commonest volvulus), still remains obscured. The aim of our study is to select the best feasible method out of single stage primary resection and anastomosis versus two stage de-functioning stoma approach. In this study, a total of 102 patients were selected who had undergone surgery for uncomplicated sigmoid volvulus in our institute, in last 10 years and were evaluated retrospectively. Primary resection and anastomosis was done in 68 patients, while sigmoid resection with Hartmann's colostomy or double barrel colostomy was done in 34 patients. Second surgery for colostomy closure was done in 33 patients. We found no significant difference among the groups with respect to age, sex, re-surgery because of complications and mortality. Definitely, there was significant longer hospital stay for stoma group than in the other group. Primary sigmoid resection and anastomosis is practically feasible in uncomplicated sigmoid volvulus cases which are having no perforation or gangrene. It did not increase any morbidity and mortality rates, rather they required a shorter hospital stay with less financial constraints.
Keywords: Volvulus, Primary sigmoid resection, Anastomosis.

INTRODUCTION

Volvulus is the twist or rotation in the axis of the loop of bowel, either clockwise or anticlockwise. It is more common in males. Of the large bowel volvulus, two third are sigmoid volvulus, which is responsible for 15% of intestinal obstruction cases in India. In our country it affects middle and old age group, more common in rural group of south India because of their high fibre diet. In western world, it is common in Turkey, Peru and Bolivia due to high altitude. Other causes for sigmoid volvulus have been chronic constipation [1], excessive use of laxatives, pregnancy, pelvic mass etc. It typically occurs in older patients who have multiple co-morbidities.

The two limbs of the sigmoid colon approximate each other due to narrow base of the root of sigmoid mesocolon. The colon gradually elongates, dilates and subsequently twists around its mesenteric axis to result into sigmoid volvulus. As a result of their twist, blood supply to the twisted part is impaired and complications such as gangrene, perforation and peritonitis may occur. Mortality may reach up to 33% in gangrenous patient, depending on duration of symptoms [2].

The best management for sigmoid volvulus remains controversial. The appropriate surgical procedure depends on the general status of the patient, viability of the gut, presence of perforation or peritonitis and the surgeon's skill. Non-resective procedures have been used in patients with a viable colon, although high recurrence rates have been reported in such cases[3]. But if gangrene has developed, resection is necessary [4]. The Hartmann's procedure provides a good result, but requires a second surgery for closure of colostomy. Nowadays, primary resection and anastomosis is regarded as a better and safe alternative for treatment of sigmoid volvulus [4-6]

However, still we do not have adequate information regarding morbidity, mortality and hospital stay of those patients who have been operated for Hartmann's procedure with colostomy. In previous studies, mainly complicated cases having gangrene or peritonitis were compared with uncomplicated cases, thus reporting abnormally high morbidity and mortality rates.

In this retrospective study from our institution, we aim to study only similar uncomplicated cases that underwent either resection and anastomosis or

Hartmann's colostomy. Patients who have been initially treated medically and then electively operated or those having perforation or gangrene of sigmoid colon, were not considered. Comparing the single stage primary resection and anastomosis group with two stage Hartmann's colostomy with later on colostomy closure group, having similar pathology, allowed us to better evaluate the effectiveness of a definitive single stage surgical approach.

MATERIALS AND METHODS

From Jan 2005 to Dec 2013, in general surgery Deparament of J A Group of Hospitals, GR Medical College, Gwalior, MP (India), 124 patients of sigmoid volvulus have been operated. Of these, we excluded those (n=6) who were initially treated conservatively and then posted for elective surgery. Those patients were also excluded (n=16) who were found to have sigmoid perforation or gangrene during surgery. Hence, the remaining 102 patients were considered as our study population and assessed retrospectively.

Out of these, primary resection of redundant sigmoid and anastomosis was done in 68 patients. Sigmoid resection with Hartmann's colostomy was done in the rest of the 34 patients, in whom later on colostomy closure, a second operation, was done.

Diagnosis

Diagnosis of sigmoid volvulus was made based on clinical findings, abdominal X-rays and ultrasonography. All the patients were also investigated by routine pathological tests.

Pre-Operative Preparation

Before surgery, all patients were resuscitated. They were catheterised, NG tube was placed and received iv fluids to correct electrolyte imbalance. In all patients flatus tubing was done per rectally, but 30 patients of the study group (30.6%) could not be decompressed pre- operatively. No pre- operative bowel preparation was performed. All patients received broad spectrum antibiotics in the pre- operative ward.

Surgery

Intra- operatively the distended sigmoid colon was rotated clockwise to decompress it, then a rectal flatus tube was positioned to evacuate it completely. The redundant and distended portion of sigmoid colon was resected. We performed primary double layered anastomosis using silk 2-0 round body and vicryl 2-0 round body in patients (n=68), whom we found that both the ends of gut is suitable to hold suture. The criteria's taken into consideration being less bowel wall oedema, viable ends with adequate bleeding and compatible diameter of ends. A Hartmann's procedure was done in remaining 34 patients.

Statistical Analysis

Differences among the group were compared using Chi-square test and p value <0.05 was considered as significant.

RESULTS

The main presenting symptoms of these patients were sudden onset colicky pain in abdomen (85%) and inability to pass flatus/motion (60%). Almost every patient had severe abdominal distension and guarding of abdomen. The bowel sounds were either low or absent in 49% and 30% of patients respectively. Mean duration of symptoms was 3.86± 1.86 days (range 2 to 8 days).

In 86% of patients plain upright X-ray abdomen suggested typical "omega loop" or "coffee bean sign". Ultrasonography did not pin- point the pathology to sigmoid colon, but suggested a morbidly dilated loop in peritoneal cavity with diminished peristalsis. Surgical procedures and patient demographics are shown in Table 1.

Table 1: Patient demographics

Patient demographics		Stoma Group (n=34)	RA Group (n=68)	p value
Age Group		44-79	46-82	0.456
Sex (M:F)		27:7	54:14	1
Co-morbid conditions	Respiratory	4	6	0.638
	Cardiac	7	10	0.452
	Neurological	3	4	0.580

A total of 102 patients were studied, 81 males (79.4%) and 21 females (20.6%). The male: female ratio was 3.86:1 (p value 1). Age of the patients ranged between 44 to 82 years. The mean age in stoma group was 58.44 years and in RA group was 60.70, the p value between the groups being 0.456. Co- morbid conditions were more frequent in stoma group, but were not statistically significant when compared to the RA group (p value >0.05).

Chest related pulmonary complications were the most frequent post-operative morbidity, arising in 4 patients in stoma group and 9 patients in RA group (p value 0.834). Cardiac complications also occurred post-operatively in 2 stoma and 5 RA patients but were statistically insignificant (p value 0.782). Wound infection was the most common surgical complication seen in stoma group (11.1%) and RA group (13.2%) with no significant statistical difference (p value 0.834). Anastomotic leak or dehiscence occurred in 4 cases of

RA (5.9%). These patients were re-operated and Hartmann's procedure was done in them. Post-operative outcome of the two study groups are shown in Table 2.

Table 2: Post- operative complications

Post- operative complications		Stoma Group (n=34)	RA Group (n-68)	p value
Medical	Cardiac	2	5	0.782
	Respiratory	4	9	0.834
	Others	3	8	0.652
Surgical	Wound infection	4	9	0.834
	Anastomotic leaks	NA	4	
	Stoma related compl	2	NA	
	Pelvic abscess	2	2	0.471
	Prolonged ileus	1	3	0.718
	Second operation	2	6	0.602
	Mortality	1	4	0.517

The medical and surgical complication rate was not statistically significant between the 2 study groups as shown by the p values in Table 2. In the RA group a second operation was done in 6 (8.8%) patients because of 4 incidences of anastomotic leaks and 2 incidence of pelvic abscess. In the stoma group, a second operation was done in 2 cases, due to stoma related complication in one patient and intra- abdominal pelvic abscess in the second patient. There was no statistically significant difference among the two groups with regard to rate of second operation (p value 0.602).

Mortality in the stoma group was 2.9% (n=1) and 5.9% (n=4) in the RA group. The single mortality in the stoma group was attributable to cardio-pulmonary failure and not due to any surgical complication. In the RA group, 2 patient's deaths were due to anastomotic leak, other 2 succumbed to medical diseases. There was no statistically significant difference in the two groups with regard to mortality (p value 0.517).

The mean duration of hospital and ICU stay ranged from 10 to12 days and 2 to 4 days respectively, in the stoma group. The duration of ICU stay in RA group was 2-6 days and that of hospital stay was 9-11 days. There was no statistically significant difference in mean duration of ICU stay between the two groups (p value 0.732). While, the duration of hospital stay was longer in stoma group with the p value being 0.019. These findings are summarised in Table 3.

Table 3: Mean duration of stay

Mean duration of stay	Stoma Group (n=34)	RA Group (n=68)	p value
ICU	3.5 days	3.45 days	0.732
Hospital	11.5 days	9.7 days	0.019

DISCUSSION

A total of 124 patients with acute sigmoid volvulus were admitted in our institution, of these only 102 patients having uncomplicated sigmoid volvulus, i.e. without gangrene or perforation (found intra-operatively) were selected. They were admitted in a span of 9 years ranging from Jan 2005 to Dec 2013. This is a high figure in comparison to similar series from the sub- continent [6].

The male: female ratio in our study is approximately 4:1, thus pre-dominantly making it a male disease, that too in older age. It is inconcurrence with other series [3, 5, 7] done on sigmoid volvulus. The male preponderance awaits a satisfactory explanation, but a wider more relaxed female pelvis allows for spontaneous reduction of sigmoid volvulus [8]. Other studies have found that males have longer and narrower sigmoid mesenteries than females, which leads to axial rotation of sigmoid [9].

A successful treatment of sigmoid volvulus is related to early diagnosis an appropriate intervention.[5]We identified the patients on the basis of clinical features like sudden onset of colicky pain, distension of abdomen and obstipation. Authors have reported diagnostic difficulty in diagnosing sigmoid volvulus, especially in the elderly, in the presence of co-existing diseases [10]. In our study the typical radiological "omega sign" or "coffee bean sign" was seen in 86% of the patients. Presently, multi-detector CT performed with iv contrast is the preferred modality of evaluation in sigmoid volvulus [11].

The patients were adequately resuscitated and posted for laparotomy. Those patients who had gangrene or perforation of sigmoid volvulus, were excluded from the study. During the laparotomy, the distended and redundant sigmoid colon was resected in every case. Primary anastomosis was performed in 68 patients and a de-functioning Hartmann's colostomy or double barrel colostomy was formed in 34 patients.

Non-operative techniques such as decompression by flatus tube/sigmoidoscope have been advocated in emergency in many patients due to serious co- morbidities, late admission and shock [3, 12]. Even if the intervention is successful, the recurrence rate of such procedures is 40% to 60% [3, 12, 13].

Surgical techniques like intestinal de-rotation, colpopexy, Hartmann's colostomy without surgical resection have been described [2]. Such techniques can be used only in the presence of a viable gut, even then recurrence rates are very high. If the sigmoid colon is ischaemic emergency resection is the only option.

In our study 30% (n=30) patients did not attain decompression following per rectal flatus tubing and all the patients were taken up for laparotomy. Sigmoid volvulus being more common in elderly, the incidence of co-morbidities is also high. In our study the incidence of co-morbidities was 33.33% and similar incidence has been reported by Akcan A [14], Yassaiel O [13] and Atamanalp SS [7] in their studies.

Wound infection was the most common post-operative complication (12.7%) and the mortality rate was around 5%, which is less when compared to similar studies [2, 3, 5]. This may be due to the fact that patients with gangrene and perforation of sigmoid colon were not included in our study.

Researchers [14, 15, 16] have described that the twisted, obstructed and distended sigmoid colon has hypertrophied muscular walls, that holds sutures well, producing a secure anastomosis. The incidence of anastomotic dehiscence in our study was around 6%, which is comparable to the result obtained by Coban S and workers (leak rate 6.3%) [17].

The mean duration of hospital stay in the stoma group was 11.5 days when compared to 9.7 days in the RA group. Work done by Oren D [5] and Akcan A [14] have yielded results similar to this.

CONCLUSION
In uncomplicated cases of sigmoid volvulus there seems to be definitive advantage for primary resection and anastomosis over Hartmann's procedure or double barrel colostomy. A primary anastomosis avoids the inconvenience of a staged operation, without increasing morbidity and mortality and providing a shorter duration of hospital stay.

REFERENCES
1. Osiro SB, Cunningham D, Shoja MM, Tubbs RS, Gielecki J, Loukas M; The Twisted Colon: A review of sigmoid volvulus. Am Surg., 2012; 78(3): 271-279.
2. Cirocchi R, Farinella E, Mura FL, Morelli U, Trastulli S, Milani D *et al.*; The sigmoid volvulus: surgical timing andmortality for different clinical types. World J Emergency Surg., 2010, 5: 1.
3. Atamanalp SS, Ozturk G; Sigmoid volvulus in the elderly: Outcomes of a 43-year, 453-patient experience. Surg Today, 2011; 41(4): 514-519.
4. Raveenthiran V, Madiba TE, Atmanalp SS; Volvulus of the sigmoid colon. Colorectal Disease. 2010; 12(7): 1-17.
5. Ören 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. Diseases of the Colon & Rectum, 2007; 50(4): 489-497.
6. Nasir M, Khan IA; Resection and primary anastomosis in the management of acute sigmoid volvulus. Pakistan J Surg., 2008; 24(2): 95-97.
7. Atmanalp SS; Sigmoid volvulus: diagnosis in 938 patients over 45.5 years. Tech Coloproctol., 2013; 17(4): 419-424.
8. Nuhu A, Jah A; Acute sigmoid volvulus in West African population. Ann African Med., 2010; 9(2): 86-90.
9. Ballantyne GH, Brandner MD, Beart RW Jr., Ilstrup DM; Volvulus of the colon: Incidence and mortality. Ann Surg., 1985; 202(1): 83-92.
10. Tiah, Ling, Hiang S; Sigmoid volvulus: diagnostic twists and turns. Eur J Em Med., 2006; 13(2): 84-87.
11. Saucier ML, Billiard JS, Lavallée JM, Lepanto L; Small and large bowel volvulus: Clues to early recognition and complications. Eur J Rad., 2010; 74(1): 60-66.
12. Tan KK, Chong SC, Sim R; Management of acute sigmoid volvulus: an institution's experience over 9 years. World J Surg., 2010; 34(8): 1943-1948.
13. Yassaiel O, Fawcett MT, Rossaaki J; Management of sigmoid volvulus: is early surgery justifiable? ANZ J Surg., 2013; 83(1-2): 74-78.
14. Akcan A, Akyildiz H, Artis C, Yilmaz N, Sozuer E; Feasibility of single-stage resection and primary anastomosis in patients with acute noncomplicated sigmoid volvulus. Am J Surg., 2007; 193(4): 421-426.
15. 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): 390-392.
16. Sule AZ, Misauno M, Opaluwa AS, Ojo E, Obekpa PO; One stage procedure in the management of acute sigmoid volvulus without colonic lavage. The Surgeon, 2007; 5(5): 268-270.
17. Coban S, Yilmaz M, Kirimlioglu V; Resection and primary anastomosis with or without modified blow-hole colostomy for sigmoid volvulus. World J Gastroenterol., 2008; 14(36): 5590-5594.