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## RESECTION AND PRIMARY ANASTOMOSIS IN THE TREATMENT OF ACUTE SIGMOID VOLVULUS

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**Abstract:**

**Objective:** To evaluate the effectiveness of resection and primary anastomosis (RPA) and RPA with modified foramen colostomy in case of sigmoid twist.

**Place and Duration:** In the Surgical Unit-II of Nishtar Hospital, Multan for one-year duration from August 2019 to August 2020.

**Methods:** 77 patients with acute sigmoid twist were treated. A total of 47 patients underwent RPA or RPA with an orifice modified colostomy. Twenty-five patients received RPA (Group A) and the remaining 22 patients received RPA with Modified Bore Colostomy (Group B). The clinical course and postoperative complications of both groups were compared.

**Results:** Mean hospital stay, wound infection, and mortality did not differ significantly between the groups. The rate of superficial wound infections was higher in group A (32% vs 9.1%). Anastomotic leakage was observed only in group A, with a frequency of 6.3%. The difference was numerically impressive but statistically insignificant.

**Conclusion:** RPA with Modified Bore Colostomy produces satisfactory results. It is easy to implement and may become the method of choice in patients with sigmoid volvulus. More research is needed to further establish its role in treating sigmoid volvulus.

**Key words:** Anastomosis; Primary resection; Surgical technique

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**INTRODUCTION:**

The epidemiology and clinical picture of the sigmoid volvulus are well known. Although the clinical signs of acute volvulus are often pronounced, the diagnostic dilemma is not uncommon. Sigmoid volvulus is the third most common cause of obstruction of the large intestine in the western world, after cancer and diverticular disease. It accounts for 4% of all colon obstruction in the US and UK. Sigmoid volvulus is relatively more common in Eastern Europe, India and Africa, accounting for 50% of all intestinal obstruction.

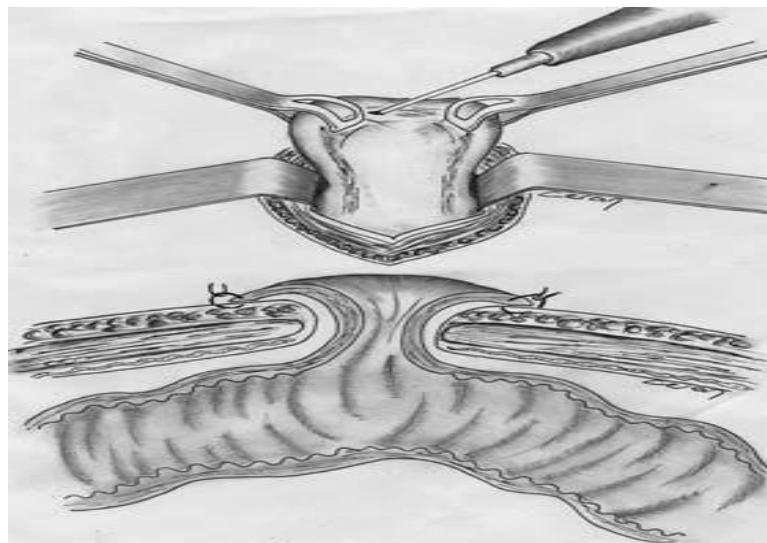
The exact etiology of the sigmoid volvulus remains speculative, and several etiological factors have been suggested, including chronic constipation, a high-fiber diet, defecation, high altitude, and enemas containing ginger, pepper, and herbal extracts. Patients with sigmoid volvulus present with abdominal distension, pain, nausea, vomiting and constipation, while peritoneal symptoms are rarely observed. The colon is often distended to an enormous size, especially when the patient has symptoms. Plain abdominal x-rays are often diagnostic for the volvulus. Fluid and air levels are present, and deformation of the bird's beak is often observed at the site of the twist.

Sigmoid volvulus has been described since ancient times, but its treatment is still evolving. Several therapeutic approaches were used, such as: resection, inoperable reduction using a colonoscope, sigmoidopexy and mesosigmoidoplasty. There is disagreement about optimal surgical management for an acute patient. Borehole proximal decompression colostomy has been used in patients with toxic dilatation of the colon secondary to IBD and Clostridium difficile colitis to avoid manipulation of the colon and passage through the critical phase. This procedure is also performed in haemodynamically unstable patients with malignant intestinal obstruction. Resection and primary anastomosis (RPA) have emerged as the treatment of choice for sigmoid twist over the past two centuries. Anastomotic leakage may

occur especially in elderly and haemodynamically unstable patients due to concomitant risk factors with this approach. In these situations, an orifice colostomy may play a protective role in avoiding anastomotic leak. The aim of the study was to compare the results of RPA with modified colostomy with or without an opening in the unprepared intestine in patients with acute sigmoid volvulus.

**MATERIALS AND METHODS:**

This study was held in the Surgical Unit-II of Nishtar Hospital, Multan for one-year duration from August 2019 to August 2020. 77 patients with acute sigmoid volvulus were selected. Colonoscopic derotation was attempted in 27 patients, which was successful in 19 patients. Ten out of 19 non-operatively reduced patients underwent semi-selective single-stage resection; the remaining 9 patients refused surgery after non-operative decompression. Hartmann's operation was performed in 11 unstable patients. After these 30 cases were excluded, the remaining 47 patients who underwent RPA with or without an orifice modified colostomy were included in the study. The diagnosis of sigmoid volvulus was made on the basis of clinical features and X-rays of the abdominal cavity. All patients underwent laparotomy after active fluid resuscitation and correction of electrolyte disturbances. Seftriacson 1000 mg and metronidazole 500 mg were administered intravenously during induction of anesthesia and continued every 12 hours after surgery for 5 days in patients with viable intestine and for 7 days in patients with gangrenous intestine. None of the patients included in the study were treated with pre-operative decompression techniques. During the laparotomy, the distended intestine was decompressed with a rectal tube and the remnants of the feces were digitally milked into the excised intestine. Despite the fact that the intestine was not prepared, none of the patients was rinsed. Informed consent was obtained from each patient prior to surgery. RPA was performed in 25 patients (group A), and in the remaining 22 patients a modified pinhole colostomy with RPA was performed (group B). All anastomoses were inverted and double-layered.



The clinical course and postoperative complications were documented. Wound infection was defined as the spontaneous discharge of pus from a wound or wound that required drainage. Anastomotic leakage was defined as the presence of a faecal fistula or the presence of feces in the drain.

#### Surgical technique of a modified colostomy with an opening

In group B, a proximal stoma was performed to protect the anastomosis. A 3 cm longitudinal incision was made through the thin hem and into the transverse colon. An opening in the abdominal wall for a colostomy was made in the upper right quadrant using a straight incision. The collapse of the colon allowed it to reach the incision and made it easier to perform a colostomy at skin level. In the above-described borehole colostomy technique, the colon and serous-muscular layers of the colon were attached to the peritoneum and the fascia by interrupted or continuous sutures. In this study, the cut edges of the colon were sutured to the skin with 3/0 vicryl without fascial or peritoneal sutures.

#### Statistical analysis

Statistical analyzes were performed using SPSS for Windows version 21.0. Continuous variables are given as mean  $\pm$  SD. Categorical variables are given as a percentage. Normality for continuous variables in groups was determined by the Shapiro Wilk test. The variables showed a normal distribution ( $P > 0.05$ ). Therefore, the Student's unpaired t-test was used to compare the variables (age and length of hospital stay) between the two groups. Fisher's tests and Pearson's c<sup>2</sup> tests were used to compare categorical variables between groups.  $P < 0.05$  was considered significant.

#### RESULTS:

Forty-seven consecutive patients (7 women and 40 men) who underwent RPA (25 patients) or RPA with modified pinhole colostomy (22 patients) were evaluated. There was no significant difference between the two groups in middle age or sex ratio. Surgical procedures and postoperative results are presented in Table 1.

**Table 1 Operative procedure, morbidity and deaths in 47 patients**

Procedure	No. of patients	Wound infection	Anastomotic dehiscence	Deaths
RPA (Group A)	25 (16V, 9G)	6V, 2G	2V, 1G	1V, 1G
RPA with modified blowhole colostomy (Group B)	22 (17V, 4G, 1P)	2V	-	1V, 1G
Total	47 (33V, 13G, 1P)	10 (8V, 2G)	3 (2V, 1G)	4 (2V, 2G)

Nine (36%) patients in group A and 5 (22%) in group B had intestinal gangrene. Mean hospital stays, wound infection, and mortality did not differ between groups (Table 2). However, superficial wound infection was almost four times more common in group A (32% vs 9.1%) and almost two times more common in patients with living colon. All infected wounds healed conservatively. Three patients (12%) in group A experienced anastomotic leak; two had a viable colon and one had gangrene of the sigmoid colon. Hartmann's procedure was performed during re-laparotomy in patients with anastomotic dissection. There was no anastomotic leakage in group B. In group A, oral intake was resumed on day 4 after surgery, in group B on day 1 due to the presence of a protective stoma. In all patients from group B, the stoma was closed on the 10th postoperative day, after radiological examinations. No patient developed leakage or wound infection following stoma closure.

**Table 2 Comparison of confounding variables between Group A (RPA) and Group B (RPA with modified blow-hole colostomy)**

Variable	Group A (n = 25)	Group B (n = 22)	Statistical test and significance
Age (yr)	66.12 ± 62.27 ± 16.26	14.17	Unpaired t-test, P = 0.391
Sex: Female ratio	4/25 (16%)	3/22 (13.6%)	Fisher's exact test, c <sup>2</sup> -test, P = 0.574
Hospital stay (d)	13.68 ± 8.47	16.72 ± 4.90	Unpaired t-test, P = 0.145
Wound infection	8 (32%)	2 (9.1%)	c <sup>2</sup> -test, P = 0.11
Anastomotic leak	3 (12%)	-Fisher's exact test, c <sup>2</sup> -test, P = 0.142	
Mortality	2 (8%)	2 (10%)	Fisher's exact test, c <sup>2</sup> -test, P = 0.645

The mortality was identical in both groups. One patient died of myocardial infarction and one died of sepsis as a result of anastomotic dehiscence in group A on the 1st and 4th postoperative days, respectively. In group B, one patient died on the 6th postoperative day due to pulmonary embolism, and one patient died as a result of multiple organ failure on the 16th postoperative day.

## DISCUSSION:

Treatment of sigmoid volvulus is to remove the obstruction and prevent relapse. Several operating procedures were used in the emergency treatment of sigmoid volvulus. However, permanent recovery involves resection of the sigmoid with or without anastomosis. Less extensive treatments are not always successful and are contraindicated in the event of gangrene or volvulus. Colonoscopic detection and laparotomy with detachment and colopexy are associated with significant morbidity. A recent study described the use of laparoscopic rectosigmoidectomy after colonoscopic decompression in nine patients. Although more studies are required in more patients, the technique appears to be a good option but can only be used in patients with decompression.

Traditional surgical teaching dictates that primary anastomosis should not be performed in an unprepared, obstructed intestine. A series of studies on sigmoid volvulus have investigated the feasibility of a single-stage resection using table lavage. The advantages of this approach are a one-step procedure, no need for a colostomy, possible lower morbidity and mortality, and a shorter hospital stay. The disadvantages include the extended operation time, the

need for several liters of irrigation solution and the risk of infection. However, clinical and experimental evidence supports the notion that a clean gut has an important advantage in left colon and rectal surgery, which are parts of the gut that contain solid feces and are rich in bacteria. Therefore, an emergency South Africa of an unprepared left colon is a controversial topic. Traditionally, obstruction of the left colon is treated by a multi-stage dysfunctional colostomy and resection. However, the acceptance of single-stage primary resection and anastomosis with the use of preliminary irrigation on the table is becoming more and more common. However, several studies suggest that table rinsing may not be necessary for a safe South African emergency of an unprepared left colon. Most experts agree that temporary proximal faecal evacuation or decompression can reduce the risk of sepsis from anastomotic leak. All patients in both study groups had RPA after intraoperative decompression without rinsing the table.

Symptomatic anastomotic leakage is the most important postoperative complication following an urgent colorectal resection with intestinal anastomosis. De et al. Described 197 patients who had

single-stage primary anastomosis without colonic lavage due to obstruction of the left side of the colon due to acute sigmoid volvulus; only 2 (1.01%) patients experienced symptomatic anastomotic leakage. Anastomotic leakage was observed in 10% of patients, with a higher rate of leakage in patients with gangrenous colon. Factors such as acute anemia, shock, and perioperative whole blood transfusion are believed to be associated with large anastomotic leakage in patients with gangrenous colon. Due to these concomitant risk factors, especially in patients with gangrenous sigmoid volvulus, the addition of an orifice modified colostomy appears to be a promising procedure to avoid anastomotic leakage. Another advantage of this treatment is early diet intake, which can improve the postoperative course. In the present study, anastomotic leakage occurred in 3 (6.3%) patients in group A, compared to none in group B. The difference was numerically impressive but not statistically significant. Comparing hospital stay, mortality, and wound infection did not show any significant differences between the two groups. The lower rate of wound infections in group B is a controversial topic. In our opinion, this is probably due to the beneficial effects of early dietary intake. Earlier studies have clearly demonstrated the benefits of early enteral nutrition in surgical patients in reducing septic complications and overall morbidity compared to parenteral nutrition.

### CONCLUSION:

In conclusion, RPA with modified bore colostomy provides satisfactory results in patients with sigmoid volvulus. This procedure is safe and effective in preventing anastomotic leakage and may be the treatment of choice in patients with sigmoid volvulus. More research is needed to definitively establish its role in the sigmoid twists.

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