

Challenges Of Surgical Management of Left Colonic Emergencies: A Multicentre Study

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ABSTRACT

Background: Major left colonic emergencies are a paramount surgical challenge to surgeons. Surgical options include Hartmann procedure (HP), resection anastomosis with covering colostomy or ileostomy (two-stage procedure) and primary resection anastomosis with on-table bowel preparation (one-stage procedure). Surgical modalities were evaluated in a multicenter study in three centers in Egypt, Kingdom of Saudi Arabia and Nigeria. **Patients and Methods:** This study was conducted prospectively including 105 patients operated at three different centers: Zagazig University Hospital in Egypt (51 cases); King Abdullah Hospital KSA (37 cases); and Dalhatu Araf Specialist Hospital, Nigeria (17 cases). The 3 modalities of surgical procedures practiced were Hartmann procedure, resection anastomosis with covering colostomy or ileostomy and primary resection anastomosis with on-table bowel preparation. **Results:** Of the 105 patients with left colonic emergencies, 34 patients (32.4%) had Hartman procedure, 35 patients (33.3%) had resection anastomosis with covering colostomy or ileostomy and 36 patients (34.3%) had primary resection anastomosis with on-table bowel preparation. Operative and postoperative data were collected, and a comparative study was performed. Mortality rates of resection with primary anastomosis (one-stage), resection anastomosis with covering colostomy, and resection with Hartmann procedure (2-stage procedure) groups was 8.1 %, 3.2% and 3.3%, respectively. The mortality rates in the one-stage procedure group was statistically higher than that of the two-stage procedure group ($p = 0.04$). Complication rate of one stage procedure was slightly higher than in two-stage procedure (22.2% vs.14.7 and 17.1% respectively). **Conclusions:** Left colonic emergencies are a common surgical challenge. HP, resection anastomosis with covering colostomy or ileostomy and primary resection anastomosis with on-table bowel preparation are surgical options. Surgical option depends on operative findings, patient's condition and surgeon's expertise and preference.

Keywords: left colorectal emergencies, Hartmann procedure, two-stage colonic procedure, one-stage colonic procedure

INTRODUCTION

Left bowel obstruction (LBO) and perforation remain common surgical emergencies facing Surgeons worldwide. The etiology is varied, but most cases are due to colorectal cancer, sigmoid volvulus or diverticular disease and penetrating injuries. Approximately 60% of mechanical LBOs are caused by malignancies, 20% are caused by diverticular disease, and 5% are the result Of colonic volvulus.^{[1], [2], [3]} Perforation of the distal colon secondary to diverticular disease Occurs in approximately 4 per 100,000 patients.^[4] Left colonic injuries are uncommon and may Follow penetrating, blunt and iatrogenic trauma. Large bowel perforation following colonoscopy

Occurs with a reported incidence of 0.1-0.9% and during barium studies in 0.01-0.04%.^[5]

Choice for modality is not always straightforward in the surgeon's mind. Whereas right colonic pathologies needing surgery are usually treated with one-stage resection and primary anastomosis in all cases as a rule, there is still controversy about emergency management of Obstructed or perforated left colonic pathologies.^[6]

Several options for obstructing or non-obstructing left colonic diseases are available:

- 1) Resection and covering colostomy or ileostomy and subsequent anastomosis (2 stage procedure)

- 2) Primary resection with end colostomy: Hartmann's procedure (HP); subsequent anastomosis (2 stage procedure)
- 3) Primary resection anastomosis (PRA);
 - a. (1 stage procedure) a. total/subtotal colectomy (TC)
 - b. Segmental colectomy, (SC), i. with intra-operative colonic irrigation (ICI) ii. with manual decompression (MD)
- 4) Endoscopic colonic stenting by self-expanding metallic stents (SEMS) for colorectal cancer as a bridge to surgery (2 or 3 stage procedure) Focusing on outcomes such as mortality, morbidity, long-term prognosis and cost effectiveness Are usually the objectives of surgical management. Many surgeons who perform colorectal Resection experience anastomotic leakage or stricture occasionally. These complications have been highlighted extensively in the literature without a significant reduction of incidence over the last 35 years.^{[7], [8]} Anastomotic leakage, a much-dreaded complication, is the leading cause of postoperative death after colorectal surgery and is reported to have a mortality of 6% 22%^[9] Morbidity is also increased as it leads to reoperations, prolonged hospital stay and high readmission rates with concurrent health care costs, radiological interventions and permanent Colostomy. Morbidity rate of up to 56% has been reported.^[9]

Leakage is not the only feared Complication of left colonic anastomosis. Anastomotic stricture is a relatively common Complication of left colonic anastomosis that requires further management if an obstruction Occurs. Pelvic abscess can also be a problem. The approach to surgical treatment differs according to operative finding and patient general Condition, surgeons' expertise and preferences. Each approach has advantages and Disadvantages.^[10]

Primary resection anastomosis is considered the optimal approach in Britain and the USA.^[11] It offers the advantages of a definite procedure without need for further surgery, but has increased technical challenge and may have the highest rate of anastomotic breakdown. It is the preferred choice for low-risk patients. Primary resection and colostomy is quicker with lower rate of anastomotic dehiscence and mortality but there is need for further surgery. On the other hand,

primary resection anastomosis with covering colostomy is also a good option with lower rate of anastomotic leak but with disadvantages of a colostomy. Colonic stenting is another Modality that has been used since the 90s as a bridge to subsequent resection in very ill patients or as palliation in inoperable cancer.^[12]

We analyzed three common modalities of colorectal resection in three high patient-volumes Centers.

PATIENTS AND METHODS

This is a prospective study comprising 105 patients in three different centers spanning 30 months (between April 2014 and October 2016). There were 51 cases from Zagazig University Hospital, Egypt, 37 cases from King Abdullah Hospital Bisha, Kingdom of Saudi Arabia and 17 cases from Dalhatu Araf Specialist Hospital, Lafia, Nigeria. Data of all patients who underwent a resection for left colorectal obstructing and non-obstructing emergencies from records were collected.

The following data were collected, patient characteristics (age, gender, ASA score), surgical characteristics (urgency of surgery, resection type), data on the pathology and location, overall complication rate, and mortality. The data was obtained after approval of the study protocol by the ethical committees of the respective centers. Patients were included for analysis when they met the following criteria:

ASA 1-2, Age 18-69 years, symptomatic colonic obstruction, perforation or abscess and distal location of the Pathology (descending colon, sigmoid colon and rectum). Emergencies included obstructing left colonic cancers, simple or compound sigmoid volvulus, penetrating injuries of the left colon, perforated diverticulitis.

The study sought to analyze outcome of three surgical options for colorectal resection, viz: resection and covering colostomy or ileostomy and subsequent anastomosis (2 stage procedure), primary resection with Hartmann's procedure (HP) and subsequent anastomosis (2 stage procedure), resection and primary anastomosis (one stage procedure). Those who had resection and primary anastomosis either had on-table lavage or intraoperative manual bowel decompression to clear the gut of fecal and gas

content. Colostomy was closed after 8 weeks from the time of initial surgery in all cases.

All patients had prophylactic antibiotic cover once 1 hour preoperatively. The primary outcome measures were, mortality and overall complication rate. Mortality was defined as death within 30 days or during hospital stay after resection. Overall complications were defined as surgical and nonsurgical complications occurring within 30 days or in-hospital. Statistical analysis was performed using SPSS statistics 22 to calculate continuous variables like mean or median and standard deviation. Categorical variables were described as counts or percentages.

RESULTS

Between April 2014 and October 2016, a total of 105 patients who had colorectal resection were eligible for the present study. A total of 51 cases were done at Zagazig University Hospital, Egypt, 37 cases at King Abdullah Hospital Bisha, Kingdom of Saudi Arabia and 17 cases at Dalhatu Araf Specialist Hospital, Lafia, Nigeria. Of the 105 patients, 71 were males and 34 were females with a male/female ratio of 2:1. They were aged between 21 and 68 years with a median of 52 years. Overall, 36 (34.3%)

patients had resection and primary anastomosis, 35 (33.3%) patients had resection with a covering colostomy and subsequent anastomosis, while 34 (32.4%) had resection with Hartmann procedure and subsequent anastomosis.

Mortality in the one-stage resection with primary anastomosis, anastomosis with covering colostomy, and resection with Hartmann procedure groups was 8.1 %, 3.2% and 3.3%, respectively. When anastomosis with covering colostomy and resection with Hartmann procedure patients were analyzed together as 2 stage procedure group and compared with resection and primary anastomosis (one stage procedure group), the difference in mortality was statistically significant ($p = 0.04$). Mortality rates for different subgroups based on age, ASA score, and type of resection for patients who underwent acute resection are shown in **Table 1**.

Complication rate after resection was similar between treatment groups. There is a slightly significant difference in favor of (2 stage procedure) compared to resection and primary anastomosis (14.7 and 17.1% vs. 22.2% respectively) (**Table 1**).

There was no significant difference in terms of reintervention between the treatment groups; in addition, the type of complication requiring reintervention did not differ. (**table 2**).

Table 1: Surgical outcome

N 105	Resection and Hartmann procedure followed by anastomosis N = 34 (32.7%)	Resection and covering colostomy followed by anastomosis N = 35 (33.7%)	Resection and primary anastomosis N=36 (34.6% %)	p value Primary resection and anastomosis	p value Resection and covering Stoma followed by anastomosis	p value Resection and Hartmann procedure followed by anastomosis
Complications	5/34 (14.7)	6/35 (17.1)	8/36 (22.2)	0.17	0.07	0.05
Anastomotic leakage	1	1	2	0.42	0.63	0.32
Abscess	1	1	1	0.99	0.94	0.90
Ileus	1	2	1	0.58	0.93	0.42
Fascia dehiscence	1	2	1	0.12	0.07	0.47
Other	1	0	5	0.30	0.37	0.64
30-day mortality (N = 5)	1/34 (2.9)	1/35 (2.9)	3/36 (8.3)	0.17		0.6

Table 2: Intervention of complications

N 105	Resection and Hartmann procedure followed by anastomosis N = 34 (32.7%)	Resection and covering colostomy followed by anastomosis N = 35 (33.7%)	Resection and primary anastomosis N=36 (34.6% %)	p value Primary resection and anastomosis	p value Resection and covering Stoma followed by anastomosis	p value Resection and Hartmann procedure followed by anastomosis
Reintervention (N = 15)	4 (28.6)	4 (34.5)	5(23.4)	0.32	0.20	0.63
Radiological	1 (6.7)	1 (6.7)	1 (6.7)	0.91	0.67	0.55
Laparoscopy	1 (6.7)	2 (13.3)	2 (13.3)	<0.01	<0.01	<0.01
Laparotomy	2 (13.3)	1 (6.7)	2 (13.3)	0.21	0.08	0.09

DISCUSSION

As can be seen from the study, morbidity and mortality rates did not differ in the 2-stage procedures. The reasons for the decision to do either, therefore, were similar in that the patients were older or of poor physical condition. This approach creates time to optimize the patients' condition. The acute nature of the surgery also comes with its attendant potential hazards. The choice between Hartmann procedure and anastomosis with covering colostomy is predicated upon the need to avoid anastomosis in patients with gross fecal peritonitis, poor bowel blood supply and poor tissue condition as of the time of surgery. The clinical importance of our

observation is that it may lead to a patient-tailored treatment strategy. Unfortunately, we cannot draw a definitive conclusion based on this study due to a relatively small sample size and being a cohort observational study, has its attendant selection bias. Recently, many authors recommend HP over the other procedures especially in high risk patients in emergency situations.^[13] Similarly, Trompetas considers primary resection with Hartmann procedure to be the safest option.^[14] The main advantages are that there is less chance of anastomotic dehiscence and the procedure can be carried out by less experienced and non-specialist surgeons. The main disadvantage of HP is that colostomy closure must be carried out which is another major surgery. In contrast to our study, other studies found no significant difference in outcome between 1-stage and 2-stage procedures. A German multicenter observational study in which 743 patients had radical resections of left colonic cancer, 57.9% had primary anastomosis, 30.4%

had HP and 11.7% had anastomosis and a covering stoma.^[15] The morbidity and mortality rates did not differ significantly between the procedures. They also recommended HP for patients in the emergency situation. Meyer et al in a non-randomized controlled study of 213 patients undergoing HP and 340 patients who had primary resection and anastomosis found no statistically significant difference in mortality (33% vs 39% respectively).^[16] As of the time of Publishing this article, there are no randomized controlled trials comparing HP and primary resection and anastomosis as far as the authors know; thus, neither grade A nor B evidence are available. It has been found that surgeon specialization also influences the choice of surgical approach. It has been shown that majority of colorectal surgeons favor one-stage operation rather than general surgeons, and by consultants rather than trainees.^{[16],[17],[18]} Similarly, complication rate is lower in specialized surgeons. Finally, alternative to emergency surgery is the use of self-expanding metal stents (SEMS) for acute malignant colonic obstruction. It is a means of transferring a patient from an emergency situation to an elective surgery. A loop colostomy is a simple alternative that can be performed by non-specialists. SEMS is a cost-effective alternative in acute malignant colonic obstruction since it allows single stage surgery and a shorter hospital stay.^[19] However, the use of SEMS needs appropriate expertise.

CONCLUSION

Left colonic emergencies are considered as challenging situations for surgeons. Although Hartmann procedure is deemed to be the safest and easiest surgery it has a disadvantage of

prolonged convalescence, repeated hospital admissions, delay in normal life with psychological drawbacks and stoma complication. Primary resection and anastomosis with covering ileostomy or colostomy appears to still carry the risk of leakage, stomal and nutritional problems, delay in normal life and psychological upset. Primary resection and anastomosis with on table colonic lavage or limited evacuation appears to be the most practical procedure with advantage of single stage final solution of the problem with shortest hospital stay ,early return to activity and least chance of psychological problems . The majority of colorectal surgeons favor one-stage operation rather than general surgeons. The approach to surgical treatment differs according to operative finding, patient general condition, and surgeons' expertise and preferences. If patient optimized treatment strategy is employed in colorectal resection, outcomes are similar

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