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Original Article

Comparison of the Short-Term Outcomes after Primary Anastomosis between an Emergency Operation with Manual Fecal Decompression in Completely Obstructed Left-Sided Colorectal Cancer and Non-Obstructed Colorectal Cancer in Elective Bowel Preparation: A Retrospective Single Center Study

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Abstract

Background: There are several emergency surgical methods for completely obstructed colorectal cancer, such as colostomy, tumor resection with Hartmann's procedure, or primary anastomosis with on-table lavage, sometimes adding protective ostomy. This treatment depends on the patient's condition and the surgeon's experience. As a result, patients need to undergo more than one operation. Therefore, if the effects of emergency surgery combined with manual fecal decompression and primary anastomosis are as effective as elective surgery, it will reduce patient complications.

Objective: To compare the short-term outcomes after primary anastomosis between an emergency operation with manual fecal decompression in completely obstructed left-sided colorectal cancer and non-obstructed colorectal cancer in elective bowel preparation.

Methods: A retrospective study comparing the short-term outcomes after primary anastomosis in completely obstructed left-sided colorectal cancer between an emergency operation with manual fecal decompression and elective bowel preparation in non-obstructed left-sided colorectal cancer in Buriram Hospital from 2009-2023. Short-term outcomes were analyzed, including anastomotic leak, surgical site infection, hospital stay, Dindo-Clavien classification, readmission, and mortality within 30 days after the operation. Given a statistically significant difference of p-value < 0.05.

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Results: There were 105 left-sided colorectal cancer patients, 52 men and 53 women. Emergency surgery, manual fecal decompression, and primary anastomosis 49 cases (46.7%), and elective surgery 56 cases (53.3%). There was no statistically significant in postoperative complication, Dindo-Clavien classification, and mortality in 30 days (p-value > 0.05). None of the patients had to be re-hospitalized within 30 days. Risk factors for complications were age ≥ 60 and preoperative comorbidity.

Conclusion: Emergency surgery for completely obstructed left-sided colorectal cancer with manual fecal decompression and primary anastomosis is as effective as the short-term outcomes in elective bowel preparation surgery for non-obstructed left-sided colorectal cancer.

Keywords: Left-sided colorectal cancer, Manual fecal decompression, Bowel preparation

Introduction

New cases of colorectal cancer are the fourth leading cause of death. Colon and rectal cancer prevalence is 38.55 and 38.73 per 100,000 people, respectively.[1] The sites of colorectal cancer are the cecum 14%, ascending colon 11%, transverse colon 5%, descending colon 5%, sigmoid colon 22%, and rectum 27%.[2] Signs and symptoms are colonic obstruction 78%, pain 71%, and weight loss 41%. Surgery is performed based on the location of colon cancer and the patient's condition at the time, with sigmoidectomy 39%, right hemicolectomy 29%, left hemicolectomy 14%, colostomy 8%, total colectomy 4%, transversectomy and ileostomy 3%, there are many surgical procedures after colon cancer resection such as terminal stoma technique 34%, primary anastomosis 26%, mucosal fistula 16%, derivative stoma 10%, and anastomosis with stoma protection 7%.[3] There are several treatment methods for colon cancer patients with colonic obstruction, such as colonic stent insertion, ileus catheterization, colonic lavage, and emergency surgery. It was found that colonic lavage can perform one-stage anastomosis in 37 out of 39 cases (94.8%).[4] Y. Hong discovered complications caused by left colon surgery and underwent colonic irrigation and primary anastomosis surgery. There was only one case of anastomotic leak (2.6%) and 7 cases of superficial surgical site infection (18.4%).[5] K L R Cross performed surgical treatment for colonic obstruction, using a decompression bowl technique at the height of 25 centimeters above the suture line with side-to-side anastomosis; there was 1 out of 29 cases of anastomotic leak (3.46%).[6] L Koskenvuo found no different results of preoperative bowel preparation plus antibiotics compared to no bowel preparation in elective right or left colon cancer surgery in surgical site infection, total complication index score, and anastomotic dehiscence.[7] Similarly, in the Selcuk Kaya study in obstructed colon cancer patients ≥ 65-year-old, using the on-table lavage technique, there was no difference between surgical site infection, anastomotic leak, intra-abdominal bleeding & infection, elongated ileus, and surgical evisceration.[8] Dung Anh Nguyen studied the surgical outcomes of obstructive colon cancer in the right-sided colon, left-sided colon, and rectum. There was no difference in anastomotic leak, surgical site infection, and mortality rate; 27 out of 110 patients (24.5%) with cancer in the left-sided colon underwent manual decompression.[9] Anemia, GFR ≤ 45 mL/min/1.73 m^2, and metastasis were factors that protective stroma surgery in obstructed left-sided colorectal cancer could not be closed.[10] Elective surgery is a preparatory surgery that results in a more planned outcome and fewer complications than emergency surgery. Therefore, if treating patients with obstructed left-sided colorectal cancer by emergency surgery, manual fecal decompression, and primary anastomosis is as effective as elective bowel preparation surgery in short-term outcomes, it would greatly benefit the patient. This study compares the short-term outcomes after primary anastomosis between an emergency operation with manual fecal decompression in completely obstructed left-sided colorectal cancer and non-obstructed colorectal cancer in elective bowel preparation.

Materials and Methods

A retrospective study of left-sided colorectal cancer patients admitted in Buriram Hospital from 2009-2023. The inclusion criteria for the emergency surgery group were completed colonic obstruction in left-sided colorectal cancer diagnosed by symptoms, abdominal signs, and acute abdominal series. After oncologic resection, the meticulous milking technique for manual fecal decompression started at the cecum, following through the distal end until nearly clear fecal content in the colon.

A 10% Povidone-iodine solution was applied at the proximal and distal parts of the colon before primary anastomosis. In the elective surgery group, non-obstructed left-sided colorectal cancer patients prepared their colon using polyethylene glycol 129.2 grams diluted in 2 liters of water and drinking from 18.00-20.00 O'clock until the defecation was a clear watery stool. Exclusion criteria were patients who had undergone a colostomy, Hartmann's procedure, or a protective ostomy. Two groups compared the short-term surgical outcomes of anastomotic leak, surgical site infection, hospital stay, Dindo-Clavien classification, readmission, and mortality, which were monitored within 30 days after the operation. Statistical data were analyzed using the statistical package for social sciences version 29.0 (SPSS Inc., Chicago, IL, USA). Kolmogorov-Smirnov tested distribution data and then reported as a number, percentage, and median. Odd ratio and Chi-Square were used for multivariate analysis. Statistically significant differences were determined with a p-value < 0.05. The Ethics Committee of Buriram Hospital approved this research (number BR 0033.102.1/32).

Results

There were 105 left-sided colorectal cancer patients, including 52 males (49.5%) and 53 females (50.5%), with a median age of 62. The completely obstructed colorectal cancer group received emergency surgery, manual fecal decompression, and primary anastomosis in 49 cases (46.7%) and elective bowel preparation surgery for non-obstructed colorectal cancer in 56 cases (53.3%). The most common cancer sites were 50 sigmoid colon (47.6%), followed by 21 descending colon (20.0%) and 18 rectum (17.1%). Sigmoidectomy was the primary surgical procedure, with 46 cases (43.8%). The most common cancer staging was 3b, with 29 cases (27.6%). Adenocarcinoma well differentiation was 86 cases (81.9%), as shown in Table 1.

Table 1 Characteristics of left-sided colorectal cancer patients.

Characteristics	Emergency operation with manual fecal decompression group (%)	Elective bowel preparation group (%)	Total (%)	*p*-value*
Numbers	49 (46.7)	56 (53.3)	105 (100)	
Sex				0.774
Male	25 (51.0)	27 (48.2)	52 (49.5)	
Female	24 (49.0)	29 (51.8)	53 (50.5)	
Age: median/IQR (years)	60/17	63/14.5	62/16 (range 18-93)	0.448
Tumor location				0.379
Splenic flexure colon	4 (8.2)	5 (8.9)	9 (8.6)	
Descending colon	14 (28.6)	7 (12.5)	21 (20.0)	
Sigmoid colon	23 (46.9)	27 (48.3)	50 (47.6)	
Rectosigmoid colon	3 (6.1)	4 (7.1)	7 (6.7)	
Rectum	5 (10.2)	13 (23.2)	18 (17.1)	
Upper rectum	2 (4.1)	4 (7.1)	6 (5.7)	
Mid rectum	3 (6.1)	8 (14.3)	11 (10.4)	
Lower rectum	-	1 (1.8)	1 (1.0)	
Surgical procedure				0.086
Left hemicolectomy	18 (36.8)	12 (21.4)	30 (28.6)	
Sigmoidectomy	23 (46.9)	23 (41.1)	46 (43.8)	
High anterior resection	5 (10.2)	8 (14.3)	11 (10.4)	
Low anterior resection	3 (6.1)	13 (23.2)	18 (17.1)	

Table 1 Characteristics of left-sided colorectal cancer patients. (cont.)

Characteristics	Emergency operation with manual fecal decompression group (%)	Elective bowel preparation group (%)	Total (%)	*p*-value*
Staging				0.004
1a	1 (2.0)	1 (1.8)	2 (1.9)	
1b	-	2 (3.6)	2 (1.9)	
2a	13 (26.5)	12 (21.4)	25 (23.8)	
2b	2 (4.1)	4 (7.1)	6 (5.7)	
3a	1 (2.0)	-	1 (1.0)	
3b	14 (28.6)	15 (26.8)	29 (27.6)	
3c	7 (14.3)	9 (16.1)	16 (15.2)	
4	11 (22.4)	13 (23.2)	24 (22.9)	
Pathology				0.004
Well diff. adenocarcinoma	34 (96.4)	52 (92.8)	86 (81.9)	
Moderately diff. adenocarcinoma	14 (28.6)	2 (3.6)	16 (15.2)	
Mucinous adenocarcinoma	1 (2.0)	1 (1.8)	2 (1.9)	
Non-Hodgkin's lymphoma	-	1(1.8)	1 (1.0)	

Notice: *data was analyzed by Chi-square test

According to the analysis, the operative time, postoperative complication (including anastomotic leak, superficial and deep surgical site infection), Dindo-Clavien classification, hospital stay, and mortality within 30 days were not significant statistically differences between emergency surgery, manual fecal decompression, and primary anastomosis to elective surgery with a *p*-value > 0.05. None of the patients required re-hospitalization within 30 days, as shown in Table 2. Risk factors contributing to an increase in postoperative complication and Dindo-Clavien classification (more than class 1) in the emergency surgery, manual fecal decompression, primary anastomosis, and elective surgery groups were age ≥ 60 years, and preoperative comorbidity. The prophylactic factor for surgical complications was normal BMI (18.5 - 22.9). Bowel preparation was a risk factor for postoperative complications, but it was beneficial in more than class 1 Dindo-Clavien classification (adjusted Odd-ratio = 0.435), as shown in Table 3.

Table 2 Comparing short-term outcomes of primary anastomosis in emergency operations with the manual fecal decompression and elective bowel preparation groups

Characteristics	Emergency operation with manual fecal decompression group	Elective bowel preparation group	*p*-value*
Operative time: median/IQR (minutes)	120/50	115/37.5	0.569
Postoperative complications (%)			0.822
Anastomotic leak	2 (4.1)	2 (3.5)	
Surgical site infection			
Superficial	2 (4.1)	2 (3.5)	
Deep	-	1 (1.7)	
Dindo-Clavien classification (%)			0.740
Class 1	40 (81.6)	51 (91.0)	
Class 2	2 (4.1)	1 (1.7)	
Class 3a	3 (6.1)	2 (3.5)	
Class 3b	1 (2.0)	1 (1.7)	
Class 4a	1 (2.0)	-	
Class 4b	-	-	
Class 5	2 (4.1)	1 (1.7)	
Hospital stays: median (days) (%)	9 (18.3)	9 (16.1)	0.624
Readmission in 30 days	-	-	-
Mortality in 30 days (%)	2 (4.1)	1 (1.7)	0.481

Notice: *data was analyzed by Chi-square test

Table 3 Risk factors of postoperative complication and Dindo-Clavien classification; adjusted Odd-ratio

Characteristics	Patients no. (%)	Postoperative complication	Dindo-Clavien classification (more than class 1)
Age (years)		1.556	1.068
≥ 60	60 (57.1)		
< 60	45 (42.9)		
BMI		0.368	0.310
Normal BMI (18.5-22.9)	44 (41.9)		
Abnormal BMI (< 18.5, > 23)	61 (58.1)		
Bowel Preparation		1.102	0.435
Yes	56 (53.3)		
No	49 (46.7)		
Preoperative comorbidity*		1.098	2.144
Yes	68 (64.8)		
No	37 (35.2)		

Notice: * Preoperative comorbidity includes diabetic mellites, hypertension, chronic kidney disease, etc. Some patients may have multiple diseases.

Discussion

According to the study, left-sided colorectal cancer patients with complete colonic bowel obstruction could be treated by emergency tumor resection, combined with manual fecal decompression and primary anastomosis, and there is no statistically significant difference in complications compared to elective bowel preparation in non-obstructed left-sided colorectal surgery. In addition, there is no difference in the operative time, length of hospital stays, and mortality. None of the patients must be re-admitted to the hospital within 30 days. Fecal decompression aims to reduce pressure in the colon caused by the force of the fecal on the colon wall; peristalsis results in the expansion and contraction of the anastomosis. To prevent fecal contamination from manual fecal decompression, use an aseptic technique with multiple layers of swabs; the end of the fecal outlet should protrude outside the abdominal cavity, and perform fecal decompression cautiously. This procedure can reduce the burden of patients who must perform multiple surgeries. The surgical treatment of completely obstructed colorectal cancer has several methods depending on the patient's condition. For example, a colostomy is a surgical procedure that solves the problem of colonic obstruction, changing emergency to non-emergency conditions. After the treatment, additional investigation can be performed to find further cancer staging. When the patient is ready, surgery is performed for elective treatment; the patient has to have it at least two times, which brings various risks, such as side effects from intraoperative anesthesia and postoperative complications. In addition, protective ostomy can also be reduced in case of emergency surgery, tumor resection, and primary anastomosis at the same time. The bowel preparation is more likely to cause complications than without the bowel preparation in this study, with an odds ratio of postoperative complication 1.102, according to Bucher P's study, mechanical bowel preparations pose a risk of anastomotic leak.[11] On the other hand, bowel preparation is beneficial for using the Dindo-Clavien classification, adjusted Odd-ratio 0.435, because the definition from class 2 to class 5 begins with the need for pharmacological treatment (without other than such allowed for class 1) or surgical, endoscopic, and radiological interventions to death then there is more precision in categorizing the complication.

Conclusion

It is safe to do emergency surgery for completely obstructed left-sided colorectal cancer with manual fecal decompression and primary anastomosis. The effectiveness of short-term outcomes is the same as elective bowel preparation in non-obstructed left-sided colorectal cancer surgery.

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