Revising Our Concepts about Stoma Covering a Low Rectal Anastomosis

Wael E. Lotfy[1] Ahmed Raafat Abdel Fattah[1] Osama A. Eltih[1] Peter H. Wasef[1] Hassan R. Ashour[1]

[1] Department of General Surgery, Faculty of Medicine, Zagazig University, Zagazig City, Egypt

J Coloproctol 2021;41(3):242–248.

Address for correspondence Wael E. Lotfy, MD, Department of General Surgery, Faculty of Medicine, Zagazig University, El Safwa Tower Mafarek El Mansoura, Floor 11, Flat 2, Zagazig City, Egypt (e-mail: waellotfy@hotmail.com).

Abstract

Introduction There has been conclusive evidence that defunctioning stoma with either transverse colostomy or ileostomy mitigates the serious consequences of anastomotic leakage. However, whether transverse colostomy or ileostomy is preferred for defunctioning a rectal anastomosis remains controversial. The present study was designed to identify the best defunctioning stoma for colorectal anastomosis.

Objective To improve the quality of life in patients with rectal resection and anastomosis and reduce the morbidity before and after closure of the stoma.

Patients and Methods The present study included 48 patients with elective colorectal resection who were randomly arranged into 2 equal groups, with 24 patients each. Group I consisted of patients who underwent ileostomy, and group II consisted of patients who underwent colostomy as a defunctioning stoma for a low rectal anastomosis. All surviving patients were readmitted to have their stoma closed and were followed-up for 6 months after closure of their stomas. All data regarding local and general complications of construction and closure of the stoma of the two groups were recorded and blotted against each other to clarify the most safe and tolerable procedure.

Results We found that all nutritional deficiencies, dehydration, electrolytes imbalance, peristomal dermatitis, and frequent change of appliances are statistically more common in the ileostomy group, while stomal retraction and wound infection after closure of the stoma were statistically more common in the colostomy group. There were no statistically significant differences regarding the total hospital stay and mortality between the two groups.

Conclusion and Recommendation Ileostomy has much higher morbidities than colostomy and it also has a potential risk of mortality; therefore, we recommend colostomy as the ideal method for defunctioning a distal colorectal anastomosis.

Keywords
- low rectal anastomosis'
- defunctioning stoma
- ileostomy
- colostomy

received
December 21, 2020
accepted after revision
March 22, 2021
published online
July 19, 2021

DOI https://doi.org/10.1055/s-0041-1730367.
ISSN 2237-9363.

Thieme Revinter Publicações Ltda., Rua do Matoso 170, Rio de Janeiro, RJ, CEP 20270-135, Brazil

Introduction

The incidence of anastomotic leakage (AL) after rectal surgeries is between 1 and 12% overall, and up to between 10 and 14% in low rectal resections. The rates of morbidity and mortality significantly increase after AL, with mortality reported between 12 and 27%.[1–3]

Prophylactic proximal fecal diversion for a low rectal anastomosis is practiced to decrease the incidence of anastomotic leakage and reoperation, which can be achieved by using either a loop transverse colostomy or a loop ileostomy.[2,4,5]

There has been conclusive evidence that stoma defunctioning with either transverse colostomy or ileostomy mitigates the serious consequences of anastomotic leakage. However, whether transverse colostomy or ileostomy is preferred for defunctioning a rectal anastomosis remains controversial.[3,6,7]

The present study was designed to compare the complications and short-term outcomes between loop ileostomy and loop colostomy when used to defunction a rectal anastomosis to identify the most safe and satisfactory method for fecal diversion to cover rectal anastomosis.

Objective

To improve the quality of life in patients with rectal resection and anastomosis and reduce the morbidity before and after closure of the stoma.

Patients and Methods

The present study included 48 patients with elective colorectal resection who were admitted to the Zagazig University Hospital in the period between March 2019 and September 2020.

Inclusion Criteria

1) Patients with low rectal carcinoma after receiving neoadjuvant therapy and planned to undergo elective resection and coloanal anastomosis with a defunctioning stoma.
2) Age between 16 and 70 years old.
3) Informed consent obtained from the patients.

Exclusion Criteria

1) Emergency surgery for colonic perforation or obstruction.
2) Patients on immunosuppressive or chemotherapeutic drugs.
3) Patients lost during follow-up.

Withdrawal Criteria

1) Intraoperative or early postoperative death.
2) Patients lost during the follow-up period.

The patients were serially numbered, and they were arranged into 2 groups:

Group 1: included 24 patients with odd numbers who were planned to undergo loop ileostomy covering the colorectal resection.
Group 2: included 24 patients with even numbers who were planned to undergo loop transverse colostomy covering the colorectal resection.

Preoperative Preparation

All cases were thoroughly examined and investigated preoperatively to confirm their operability and fitness for operations, and all cases received chemical and mechanical bowel preparation immediately before operation. Prophylactic anticoagulants were administered in full doses.

Operations

After radical resection of the rectal cancer and establishment of the anastomosis using EEA (End to End anastomotic) stapler, a covering proximal stoma was created; in group 1, loop ileostomy was performed, and in group 2, loop transverse colostomy was performed.

Postoperative Care

All cases were cared in the intensive care unit (ICU) in the immediate postoperative period and were kept only on sips of water on the first postoperative day (POD). Resumption to full diet was achieved gradually afterwards. Early ambulation was encouraged, and the patients were allowed to go home when they were surgically stable and on oral feeding.

All surviving patients were readmitted after they completed their postoperative courses of adjuvant therapy for closure of the covering stoma after confirmation of integrity of the anastomosis by a distal loopogram. The stomas were closed by simple intraperitoneal sutured closure.

Follow-up

The patients were followed-up in the outpatient clinic for 6 months after closure of the covering stoma. Regular monthly visits were scheduled, and a detailed follow-up sheet was completed on the basis of complaints, clinical examination, and metastatic workup of the patients.

Cases complicated with leakage after closure of the stoma were managed conservatively for 1 week; if the leak did not decrease, we prepared the patient to another trial of closure after improving their general condition. Only one patient died immediately after the first surgery and was withdrawn from the study and replaced by the next one. Three patients from the ileostomy group died during the follow-up period before they had their stomas closed.

The following outcomes were considered for the analysis:

I – Outcomes related to the general complications of constructing a stoma, such as nutritional deficiency (e.g., trophic skin changes, muscle wasting, anemias, and vitamin deficiency), dehydration and electrolyte disturbance (e.g., hypokalaemia and hypocalcaemia)
II – Outcomes related to local complications of the stoma including prolapse, retraction, stenosis, necrosis, and

parastomal hernia, as well as peristomal dermatitis and frequent change of appliances.
III – Outcomes related to complications after closure of the stoma (difficult closure, leakage, wound infection, and postclosure diarrhea).
IV – Outcomes regarding the duration of hospital stay and mortality.

Statistics

Categorical variables were described using their absolute frequencies and were compared using the chi-squared test and the Fisher exact test when appropriate. The Kolmogorov-Smirnov (distribution-type) and the Levene (homogeneity of variances) tests were used to verify assumptions for use in parametric tests. To compare the means of the two groups, the independent sample *t*-test was used. The level of statistical significance was set at 5% ($p < 0.05$). A highly significant difference was present if $p \leq 0.001$.

Results

The present prospective study was conducted on 48 patients who underwent elective colorectal resection with covering stoma. They were 26 males and 22 females and their ages ranged from 32 to 69 years old, with an average age of 47.3 ± 11.3 years old. Patients were randomly divided into two equal groups: colostomy and ileostomy groups. There were no statistically significant differences between the studied groups regarding age, gender, body mass index (BMI), or comorbidities (►**Table 1**).

There was a statistically significant higher incidence of all nutritional deficiencies, dehydration, and electrolytes imbalance in the ileostomy group than in the colostomy group (►**Table 2**).

There was no statistically significant difference between the two groups regarding stomal prolapse, stenosis or necrosis, but there was a statistically significant increase in the incidence of stomal retraction in the colostomy group when compared with the ileostomy group. There was also no significant difference regarding parastomal hernia between the two groups, but there was a statistically documented increased risk of peristomal dermatitis and frequent change of appliances in the ileostomy group when compared with the colostomy group (►**Table 3**)

In relation to the stomal closure, there were no statistically significant differences between the two groups regarding difficulty in closure, leakage after closure, or postclosure diarrhea; however, there was an increased risk of wound infection after closure of colostomy when compared with ileostomy (►**Table 4**).

Table 1 Demographic characteristics of the patients in the two groups

Demographic characteristics	Groups		Test	
	Colostomy	Ileostomy	χ^2/t	*p-value*
	n = 24 (%)	*n* = 24(%)		
Age (years old)			−1.892	0.072
Mean ± SD	42.25 ± 11.46	51.42 ± 12.27		
Range	40–66	32–69		
Gender			0.335	0.562
Male	12 (50)	14 (58.3)		
Female	12 (50)	10 (41.7)		
BMI			1.275	0.216
Mean ± SD	28.09 ± 3.29	26.15 ± 4.12		
Range	20.4–32.89	19.09–33.24		
Smoking			05355	598-
No	14 (58.3)	16 (66.7)		
Yes	10 (41.7)	8 (33.3)		
Comorbidities			2.311	0.679
No	10 (41.7)	8 (33.3)		
Diabetes	6 (25)	4 (16.7)		
Hypertension	4 (16.7)	8 (33.3)		
Cardiac disease	4 (16.7)	2 (8.3)		
Renal insufficiency	0 (0)	2 (8.3)		

Abbreviations: BMI, body mass index; SD, standard deviation.
χ^2 Chi-squared test
t Independent sample *t*-test.

Table 2 Comparison between the two groups regarding stoma-related general complications

General outcomes	Groups		Test	
	Colostomy group	Ileostomy group	χ^2	*p-value*
	n = 24 (%)	*n* = 24 (%)		
• Nutritional deficiency				
1 - Skin trophic changes			Fisher	0.001*
Absent	22 (91.6%)	11 (45.8%)		
Present	2 (8.4%)	13 (54.2%)		
2 - Muscle wasting			Fisher	< 0.001**
Absent	23 (95.8%)	8 (33.3%)		
Present	1 (4.2%)	16 (66.7%)		
3 - Anemias			Fisher	< 0.001**
Absent	21 (87.5%)	7 (29.2%)		
Present	3 (12.5%)	17 (70.8%)		
4 - Vitamins deficiencies			Fisher	0.007*
Absent	19 (79.2%)	9 (37.5%)		
Present	5 (20.8%)	15 (62.5%)		
• Dehydration			Fisher	< 0.001**
Absent	24 (100%)	12 (50%)		
Present	0 (0%)	12 (50%)		
• Electrolytes disturbance				
1 - Hypokalemia			Fisher	< 0.001**
Absent	24 (100%)	10 (41.7%)		
Present	0 (0%)	14 (58.3%)		
2 - Hypocalcaemia			Fisher	0.003*
Absent	19 (79.2%)	8 (33.3%)		
Present	5 (20.8%)	16 (66.7%)		

χ^2 Chi-squared test.
* = significant difference.
** = high significant difference.

Regarding the total hospital stay, there was no statistically significant difference between the two groups and, although there were three cases of mortality in the ileostomy group versus none in the colostomy group, this difference did was not statistically significant (►**Table 5**).

Discussion

The most important surgical complication following rectal resection with intestinal anastomosis is symptomatic anastomotic leakage. Prophylactic proximal fecal diversion is practiced to decrease the incidence of anastomotic leakage and reoperation, which can be achieved by using either a loop transverse colostomy or a loop ileostomy[8–11] Some authors have advocated that ileostomy is best for temporary diversion due to its ease of construction and management.[1,12,13] Others support routine use of colostomy, claiming fewer complications from this procedure,[6,14,15] and others did not prefer one procedure over the other.[3,5,16]

In our study, 48 patients with elective low rectal resection and covering stoma were included in 2 groups, each consisting of 24 patients. The first group had patients with covering ileostomy and the second group had patients with covering transverse colostomy. The sample included 26 male and 22 female patients with age ranging from 32 to 69 years old. The statistics confirmed insignificant differences between the demographic characteristics of patients in the two groups, which proved adequate randomization and absence of bias.

We found that all types of nutritional deficiencies, dehydration, and hypokalaemia are more liable to occur in patients with ileostomy than in those with colostomy, and this makes sense due to the high output of the stoma and to the loss of the absorptive power of a good part of the gut. This is in line with what has been reported by other authors.[3,7,12]

Table 3 Comparison between the two groups regarding the local complications of the stoma

Local complications	Groups		Test	
	Colostomy	Ileostomy	χ^2	*p-value*
	n = 24 (%)	*n* = 24 (%)		
Prolapse			Fisher	0.666
Absent	22 (91.7%)	20 (83.3%)		
Present	2 (8.3%)	4 (16.7%)		
Retraction			Fisher	0.032*
Absent	16 (66.7%)	22 (91.7%)		
Present	8 (33.3%)	2 (8.3%)		
Stenosis			Fisher	0.415
Absent	19 (79.2%)	22 (91.7%)		
Present	5 (20.8%)	2 (8.3%)		
Necrosis			Fisher	0.489
Absent	22 (91.7%)	24 (100%)		
Present	2 (8.3%)	0 (0%)		
Parastomal hernia			Fisher	0.608
Absent	21 (87.5%)	23 (95.8%)		
Present	3 (12.5%)	1 (4.2%)		
Peristomal dermatitis				
Absent	22 (91.7%)	5 (20.8%)	Fisher	< 0.001**
Present	2 (8.3%)	19 (79.2%)		
No of appliances per week				
1–3	20 (83.3%)	3 (12.5%)	[Fisher	< 0.001**
> 3	4 (16.7%)	21 (87.5%)		

χ^2 Chi-squared test.
* = significant difference.
** = highly significant difference.

Table 4 Complications related to closure of the stoma in the two groups

Complications of stoma closure	Groups		Test	
	Colostomy	Ileostomy	χ^2	*p-value*
	n = 24 (%)	*n* = 21(%)		
Difficult closure			Fisher	0.421
Absent	19 g(79.2%)	19 (90.5%)		
Present	5 (20.8%)	2 (9.5%)		
Leakage			Fisher	0.611
Absent	21 (87.5%)	20 (95.2%)		
Present	3 (12.5%)	1 (4.8%)		
Wound infection			Fisher	0.032*
Absent	16 (66.7%)	19 (90.5%)		
Present	8 (33.3%)	2 (9.5%)		
Postclosure diarrhea			Fisher	0.415
Absent	22 (91.7%)	17 (80.9%)		
Present	2 (8.3%)	4 (19.1%)		

χ^2 Chi-squared test.
*Significant difference.

Table 5 Comparison between the two groups regarding total postoperative hospital stay and mortality

	Groups		Test	
	Colostomy	Ileostomy	T	*p-value*
	n = 24 (%)	*n* = 24(%)		
• **Total postoperative hospital stay (days)**			1.53	0.131
Mean ± SD	15.33 ± 2.66	16.42 ± 2.24		
Range	12–19	14–23		
• **Mortality**				0.234
Absent	24(100%)	21(87.5%)	Fisher	
Present	0 (0%)	3 (12.5%)	1.26	

Abbreviation : SD, standard deviation.
T Independent sample *t*-test.

In our study, we recorded comparable incidences of stomal prolapse, stenosis, necrosis, and parastomal hernia in the two groups, with no statistically significant differences. This is similar to what has been reported by some authors;[3,5,12] however, some auhtors[7,17] recorded a higher incidence of stomal prolapse in the colostomy group when compared with the ileostomy group. Also, there was a higher incidence of stomal retraction in our colostomy group than in the ileostomy group, in contrast with most of the other authors.[3,5,7,12,17]

Regarding peristomal dermatitis, we concluded a definite higher risk of skin irritation in the ileostomy group than in the colostomy group, and this can be explained by the higher output of the ileostomy with high enzymatic contents, which is in line with some studies,[3,6,18] while others found no significant difference between the two procedures;[1,5,7] however, surprisingly, Rullier et al.[19] reported a higher incidence of skin irritation in the colostomy group.

On the other hand, the number of appliances used per week was significantly much higher in our ileostomy group than in the colostomy group, and this can be attributed to the higher stomal output and to the presence of peristomal dermatitis, which might interfere with adequate fixation and sealing of the appliance with the skin, which is similar to what has been recorded by Ali in 2018.[3]

We reported a significantly higher incidence of wound infection after closure of colostomy than after ileostomy, but no statistically significant differences regarding other complications of closure of the stoma between the two groups, which is in line with what has been reported by most studies.[3,5,7,16,20] However, others[17,19] showed a lower risk of complications related to closure of ileostomy, and on the other hand,[6,14,15] preferred colostomy as a covering stoma due to its lower morbidity and safer closure. Gastinger et al.[6] explained the higher complication rate seen after closure of an ileostomy due to the fact that a segmental resection is usually required, whereas, provided that the posterior wall is intact, colostomy closure can be achieved simply by suturing the defect in the anterior wall.

Many studies[3,7,15,20] did not report any statistically significant differences in the total hospital stay between the two groups, and this is similar to our reports. Also, most studies[3,6,14,15,19,20] failed to prove any statistically significant difference in the mortality between the two procedures and, in the present study, although we had 3 mortalities in the ileostomy group versus none in the colostomy group, this did not reach statistical significance.

Conclusion and Recommendation

As a covering stoma, ileostomy has a much higher incidence of morbidities than colostomy; it also has a potential risk of mortality, so we recommend colostomy as the ideal method for defunctioning a distal colorectal anastomosis.

Conflict of Interests

The authors have no conflict of interests to declare.

References

1 Abudeeb H, Hammad A, Ugwu A, et al. Defunctioning stoma- a prognosticator for leaks in low rectal restorative cancer resection: A retrospective analysis of stoma database. Ann Med Surg (Lond) 2017;21:114–117
2 Trencheva K, Morrissey KP, Wells M, et al. Identifying important predictors for anastomotic leak after colon and rectal resection: prospective study on 616 patients. Ann Surg 2013;257(01): 108–113
3 Ali AM. Loop transverse colostomy versus loop ileostomy after low and ultralow anterior resection. International Surgery Journal 2018;5(05):1633–1639
4 Belalla D, Kacani N, Gjata A. Evaluation of protective stoma in rectal cancer surgery. Merit Research Journal of Medicine and Medical Sciences 2016;4(01):21–24
5 Bendary SH, Abd Elfatah T, Ramadan MK. Loop ileostomy versus transverse colostomy as a covering stoma after anterior resection for rectal cancer. International Surgery Journal 2019;6(12): 4216–4222
6 Gastinger I, Marusch F, Steinert R, Wolff S, Koeckerling F, Lippert HWorking Group 'Colon/Rectum Carcinoma' Protective defunctioning stoma in low anterior resection for rectal carcinoma. Br J Surg 2005;92(09):1137–1142
7 Gavriilidis P, Azoulay D, Taflampas P. Loop transverse colostomy versus loop ileostomy for defunctioning of colorectal anastomosis: a systematic review, updated conventional meta-analysis,

and cumulative meta-analysis. Surg Today 2019;49(02): 108–117
8 Ajani JA. In rectal carcinoma, colostomy or no colostomy: is this the question? J Clin Oncol 1993;11(01):193–194
9 Rullier E, Laurent C, Garrelon JL, Michel P, Saric J, Parneix M. Risk factors for anastomotic leakage after resection of rectal cancer. Br J Surg 1998;85(03):355–358
10 Bell SW, Walker KG, Rickard MJ, et al. Anastomotic leakage after curative anterior resection results in a higher prevalence of local recurrence. Br J Surg 2003;90(10):1261–1266
11 Kumar A, Daga R, Vijayaragavan P, et al. Anterior resection for rectal carcinoma - risk factors for anastomotic leaks and strictures. World J Gastroenterol 2011;17(11):1475–1479
12 Klink CD, Lioupis K, Binnebösel M, et al. Diversion stoma after colorectal surgery: loop colostomy or ileostomy? Int J Colorectal Dis 2011;26(04):431–436
13 Matthiessen P, Hallböök O, Rutegård J, Simert G, Sjödahl R. Defunctioning stoma reduces symptomatic anastomotic leakage after low anterior resection of the rectum for cancer: a randomized multicenter trial. Ann Surg 2007;246(02):207–214
14 Gooszen AW, Geelkerken RH, Hermans J, Lagaay MB, Gooszen HG. Temporary decompression after colorectal surgery: randomized comparison of loop ileostomy and loop colostomy. Br J Surg 1998; 85(01):76–79
15 Law WL, Chu KW, Choi HK. Randomized clinical trial comparing loop ileostomy and loop transverse colostomy for faecal diversion following total mesorectal excision. Br J Surg 2002;89(06): 704–708
16 Hocevar B, Gray M. Intestinal diversion (colostomy or ileostomy) in patients with severe bowel dysfunction following spinal cord injury. J Wound Ostomy Continence Nurs 2008;35(02):159–166
17 Rondelli F, Reboldi P, Rulli A, et al. Loop ileostomy versus loop colostomy for fecal diversion after colorectal or coloanal anastomosis: a meta-analysis. Int J Colorectal Dis 2009;24(05):479–488
18 Kaidar-Person O, Person B, Wexner SD. Complications of construction and closure of temporary loop ileostomy. J Am Coll Surg 2005;201(05):759–773
19 Rullier E, Le Toux N, Laurent C, Garrelon JL, Parneix M, Saric J. Loop ileostomy versus loop colostomy for defunctioning low anastomoses during rectal cancer surgery. World J Surg 2001;25(03): 274–277, discussion 277–278
20 Sakai Y, Nelson H, Larson D, Maidl L, Young-Fadok T, Ilstrup D. Temporary transverse colostomy vs loop ileostomy in diversion: a case-matched study. Arch Surg 2001;136(03):338–342

