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Original Article

Can rectal tube be used instead of ileostomy in patients undergoing rectal resection after neoadjuvant chemo-radiotherapy?

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Abstract

Aim: Neoadjuvant chemo-radiotherapy and total mesorectal excision have become the standard treatment for locally advanced middle and distal rectal cancers. These types of patients carry a serious risk of anastomosis leakage. While the commonly technique is diverting ileostomy; rectal tube placement, with lower morbidity, has also been used in recent years. The aim of this study was to compare the results of ileostomy and rectal tube administration following rectal resection after neoadjuvant therapy.

Material and Methods: We retrospectively reviewed the data from 25 patients with rectal cancer who received neoadjuvant chemo-radiotherapy between 2013 and 2019. Patients were evaluated in two groups: ileostomy and rectal tube. Demographic data, operative findings, pathological results, and follow-up information were evaluated.

Results: Twelve were in the rectal tube group and 13 were in the ileostomy group. There was no difference between the two groups in terms of tumor location in preoperative data. Patients with hepatic metastasis were found in the ileostomy group, while there were no such patients in the rectal tube group. The operation time (452±128 vs. 295±102 min, p=0.002) and blood loss (485±264 vs 105±80 ml, p=0.0001) were higher in the ileostomy group. The intraoperative complications of the patients were similar in the two groups, whereas the postoperative complications were higher in the ileostomy group (69%-25%, p=0.04). The mean follow-up period was 23.2±18.5 months. The total complication rate due to ileostomy was 20% and the stomata of 15% of the patients were not closed. The cosmetic scores of the patients were better in the rectal tube group (9.8±0.3 vs. 6.3±1.7, p=0.0001).

Conclusion: The results of the rectal tube technique were not worse than those of the ileostomy technique in rectal cancers receiving neoadjuvant therapy and this technique may be preferred in appropriate cases.

Keywords: Minimally invasive surgery; laparoscopic colorectal; colon cancer; low anterior; J pouch; colectomy; transanal; loop; diverting; NOSE

INTRODUCTION

Although neoadjuvant therapy and total mesorectal excision provide the advantage of recurrence and anal sphincter protection in reconstructive rectal surgery, anastomotic leakage is still a major problem. It is known that this serious complication causes morbidity at 20-30% and mortality at 7-12% (1). Fecal diversion and intraluminal pressure reduction have been considered as the major step to solve this problem. In this sense, the most commonly used method was diverting ileostomy. However, there are concerns about the implementation of complications related to the stoma itself and its closure. Therefore, the use of a rectal tube has come into question as an alternative. Rectal tube (2), which has functions such as drainage, reduction of endoluminal pressure, and promotion of gastrointestinal motility, has attained a place since it does not require additional surgery.

The aim of this study is to compare the effect of ileostomy and rectal tube treatments on the outcomes of patients with rectal cancer who received neoadjuvant treatment and underwent laparoscopic resection and reconstruction.

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MATERIAL and METHODS

Twenty-five patients who underwent neoadjuvant chemo-radiotherapy and underwent laparoscopic low anterior resection or total proctocolectomy between March 2013 and July 2019 were included in the study. After detailed information was given to the patients, they were asked about their operation preferences and a detailed consent form was obtained. Neoadjuvant chemo-radiotherapy was given to patients with lymph node positivity or wall invasion over T2 in the preoperative stage. Short-term treatment was planned for patients with liver metastasis and long-term treatment for patients without liver metastasis. Patients receiving short-term treatment were operated following a 1-week waiting period. And, surgery was planned for those receiving long-term treatment after a waiting period of 6-8 weeks. Twelve patients undergoing rectal tube operation and 13 patients undergoing diverting ileostomy were analyzed in two groups. Ileostomy was preferred primarily in patients with anastomosis insecurity and / or combined major surgery. Rectal tube was preferred primarily in cases of dilemma in ileostomy and in some cases requiring ileostomy. Specimen extraction was performed according to patient preference and technical suitability. The rectal tube (28 mm petzer tube) was placed proximal to the anastomosis through laparoscopic image control (3). Age, sex, body mass index (BMI), additional disease, operation history, ASA scores, operation time, amount of bleeding, incision size, peroperative and postoperative complications, length of hospital stay, specimen pathology, tumor size, extracted lymph node, positive lymph node, tumor stage, visual analog scale (VAS), cosmetic score, long - term complications, presence of recurrence and overall survival parameters of the patients were evaluated. Complications of the patients who underwent diverting ileostomy related to an ileostomy and their perioperative findings during closure were evaluated. The largest size stated in the pathological reports was taken as the tumor size. VAS scores of the patients, 10 being the highest pain score, 1 being the lowest pain score, were evaluated in the morning for 3 days in the postoperative period without taking analgesic support. The cosmetic score rating was performed as 10 being the best and 1 being the worst score. During the follow-up period, the patients were contacted by phone and information on their latest status, hernia and cosmetic score were obtained. Descriptive statistics were made for all data and reported mean values and percentages. Continuous variables were analyzed by unpaired t-test or Mann Whitney U test. Categorical variables were analyzed by Chi-Square Test and Fisher-Exact Test. Statistical significance was taken as $p<0.05$. Data were analyzed using SPSS version 16.0 and Microsoft Excel 2013.

RESULTS

Twenty of the patients (80%) included in the study were male and the mean age was 59.5±10.4 years. 12 (48%) of the patients with a mean body mass index (BMI) of 26.7±3.8 had at least one comorbidity. 5 patients (20%) had a history of previous abdominal surgery. 20 (80%) patients had rectal cancer, 1 (4%) had familial adenomatous polyposis, and 4 (16%) had rectal cancer and liver metastasis (Table 1).

A total of 25 laparoscopic surgical procedures; 20 (80%) were low anterior resection, 1 (4%) was total proctocolectomy J pouch-anal anastomosis and liver metastasectomy, 3 (12%) were low anterior resection and liver metastasectomy, and 1 (4%) was low anterior resection and major hepatectomy. The patient who underwent major hepatectomy was in the ileostomy group and underwent right hepatectomy. Mean operation time was 374±140 minutes and the intraoperative bleeding amount was 261±260 ml. Specimens were extracted through the natural hole in 15 (60%) patients, and through the suprapubic incision in 10 (40%) patients. The transanal route was used for NOSE surgery in all patients. Complications were observed in five patients in the peroperative period. 3 of these patients had intraabdominal bleeding. The bleeding site was in the sacral venous plexus in one patient and was stopped with compression. The other patient in the rectal tube group had bleeding from the epigastric artery from the trocar entry site, and the bleeding was stopped with cautery. The other patient had undergone right hepatectomy and bleeding from the liver parenchyma was stopped with Ligasure (medtronic-5 mm). In one patient, the resected colon segment was opened and some fecal intraperitoneal contamination occurred. One patient in the ileostomy group had positive air leak test after anastomosis and supportive sutures were placed. The operation was terminated when no leakage was seen in the air control test. Comparing the two groups, intraoperative complications were similar, whereas postoperative complications were more common in the ileostomy group (69% -25%, p= 0.04). There was no significant difference between the two groups in terms of postoperative early VAS scores (p=0.80) (Table 2).

Five patients (20%) had anastomotic leakage. Four of these patients were in the ileostomy group and one in the rectal tube group. Two patients in the ileostomy group required postoperative reoperation. These patients underwent end colostomy and drainage operations. Transanal abscess drainage was performed in one and the other patient was treated conservatively. The patient in the rectal tube group was also followed conservatively, and no additional surgical intervention was performed. Late anal stenosis was seen in one patient for each group. These patients were treated with anal dilatation.

Stoma complications were found in 4 patients (30%) in the ileostomy group. In one of them, the parastomal hernia was detected and repaired during stoma closure. One patient had dehydration and acute renal failure, and the stoma was closed at an early stage. One patient

had stoma prolapse and underwent revisional surgery. Pleural effusion and wound infection were seen in the last patient due to stoma closure. This patient recovered with medical treatment without any intervention. The stoma could not be closed in two patients (15%). One of them had colon resection with right hepatectomy and died in the 3rd postoperative month. The other was the patient who underwent low anterior resection and liver metastasectomy at postoperative 3rd month, and this patient passed away in the 7th month.

When the pathology results were examined, the pathologies of all patients were reported as adenocarcinomas. While preoperative pathology in one patient in each group was invasive adenocarcinomas, the invasive focus was not detected in resection material and evaluated as complete remission. The mean tumor size was 3.7±1.6 cm. The mean number of lymph nodes removed was 17.6±10.6, while the mean number of positive lymph nodes was 2.4±4.8. When tumor stages were examined, 5 (21%) were stage 4, 9 (42%) were stage 3, 8 (38%) were stage 2 and 1 (4%) was stage 1. The pathology results of the two groups are given in Table 3 comparatively.

While no mortality was seen in the early postoperative period, the total late mortality rate was 20%. The mean follow-up period was 23.2±18.5 months. Recurrence rates of our patients were 15% when evaluated for tumor patients. Of the patients for whom a recurrence was detected, 1 patient (4%) had liver metastasis, 1 (4%) had peritoneal metastasis and the other (4%) had an intra-abdominal recurrence.

Table 1. Preoperative parameters

Parameters		Ileostomy (n:13)	Rectal Tube (n:12)	P
Gender (Female/Male)		2 / 11	3 / 9	0.64
Age	Mean SD	60.0±10.1	59.0±10.7	0.36
	Median (Range)	60 (41-70)	60 (42-74)	
BMI	Mean SD	26.5±3.6 kg/m^2	26.9±3.9 kg/m^2	0.76
	Median (Range)	27 (20.8-32.5)	25.5(22.3-33.0)	
ASA	Mean SD	2.1±0.5	2.0±0.4	0.51
	Median (Range)	2 (1-3)	2 (1-3)	
Patients with co-morbidity		7 (53%)	5 (41%)	0.69
Diabetes mellitus		3 (23%)	2 (16%)	
Hypertension		4 (30%)	3 (25%)	
Chronic obtructive pulmonary disease		1 (7%)	1 (8%)	
Periferic vascular disease		1 (7%)	2 (16%)	
Hepatitis B virus		1 (7%)	0 (0%)	
Patients with prior abdominal surgery		4 (30%)	1 (8%)	0.32
Gynecologic operation		1	1	
Open inguinal hernia repair		1	0	
Opening ileostomy		1	0	
Subtotal gastrectomy		1	0	
Disease				
FAP + Rectal tumor + Liver metastases		1 (7%)	0 (0%)	1.00
Rectal tumor		8 (61%)	12 (100%)	**0.03**
Rectal tumor + Liver metastases		4 (30%)	0 (0%)	0.09

BMI: Body mass index

Table 2. Intraoperative and postoperative outcomes

Parameters	Ileostomy (n:13)	Rectal Tube (n:12)	P
Operation type			
LAR	8	12	**0.03**
LAR + Liver metastasectomy	3	0	0.22
LAR + Major hepatectomy	1	0	1.00
Total colectomy (J-pouch) + Liver metastasectomy	1	0	1.00
Extraction Type			
NOSE (TA/TV)	6 (6/0)	9 (9/0)	0.22
Suprapubic	7	3	
Duration of surgery			
Mean SD	452±128 minutes	295±102 minutes	**0.002**
Median (Range)	420 (240-720)	300 (180-480)	
Intraoperative bleeding			
Mean SD	485±264 ml.	105±80 ml.	**0.0001**
Median (Range)	400 (200-1000)	65 (30-300)	
Incision length			
Mean SD	8.0±2.2 cm	6.3±1.2 cm	0.25
Median (Range)	7.2 (6-12)	6 (5-8)	
Intraoperative complications	4 (30%)	1 (8%)	0.32
Fecal contamination	1	0	
Bleeding	2	1	
Air leak test (+)	1	0	
Postoperative complications	9 (69%)	3 (25%)	**0.04**
Intraabdominal complications			
Bleeding	1	0	
Abscess *,#	1	0	
Anastomotic leakage#	4	1	
Anastomotic stenosis	1	1	
Rectovaginal fistula	1	0	
Ileostomy prolapse	2	0	
Paralytic ileus	0	0	
Biliary fistula	1	0	
Extraabdominal complications			
Atelectasis	1	0	
Wound infection*	1	3	
Urinary infection	0	1	
VAS score (total)			
Mean SD	3.2±2.1	3.4±2.0	0.80
Median (Range)	3 (0-8)	3 (0-9)	
VAS score on day 1			
Mean SD	3.5±2.6	4.6±2.5	0.55
Median (Range	3.5 (0-8)	4.5 (0-9)	
VAS score on day 2			
Mean SD	3.8±1.7	3.1±1.1	0.29
Median (Range)	4.5 (1-6)	3 (2-5)	
VAS score on day 3			
Mean SD	2.5±1.5	2.6±1.4	0.86
Median (Range)	2.5 (0-5)	2 (1-5)	
Length of hospital stay			
Mean SD	15.6±11.6 days	9.8±7.5 days	0.15
Median (Range)	11 (5-42)	6.5 (5-27)	
Cosmetic score			
Mean SD	6.3±1.7	9.8±0.3	**0.0001**
Median (Range)	7 (4-8)	10 (9-10)	
Recurrence^	3 (25%)	0 (0%)	0.22
Duration of follow-up			
Mean SD	23.5±20.2 months	23.0±16.5 months	0.94
Median (Range)	14 (5-63)	17.5 (3-58)	
Stoma-free life	9/13 (69%)	0/12 (100%)	0.09

TA: transanal, TV: transvaginal
* Abdominal abscess nad wound infection in the same patients
# Anastomotic leakage and abdominal abscess in the same patient
^ Statistics were made among tumor patients

Table 3. Pathology of the malignancies

Parameters		Ileostomy (n:12)*	Rectal Tube (n:11)*	P
T				
T1		0	0	1.00
T2		0	1	0.47
T3		12	9	0.21
T4 (a-b)		0 (0-0)	1 (1-0)	0.47
N				
0		3	7	0.09
1 (a-b-c)		7 (5-2-0)	2 (1-1-0)	0.08
2 (a-b)		2 (1-1)	2 (0-2)	1.00
M				
0		7	11	**0.03**
1 (a-b)		5 (5-0)	0 (0-0)	**0.03**
Stage				
1		0	1	0.47
2 (a-b-c)		2 (2-0-0)	6 (6-0-0)	0.08
3 (a-b-c)		5 (0-4-1)	4 (0-2-2)	1.00
4 (a-b)		5 (5-0)	0 (0-0)	**0.03**
Tumor size				
	Mean SD	4.1±1.2	3.1±1.8	0.12
	Median (Range	4 (2.7-5.5)	3 (1-7.4)	
Removed lymph node (Total)				
	Mean SD	20.1±11.8	15.0±8.5	0.25
	Median (Range)	22 (7-50)	15 (3-36)	
Positive lymph node				
	Mean SD	3.1±6.1	1.6±2.8	0.46
	Median (Range)	1 (0-23)	0 (0-8)	

*One patient in each group had complete remission after neoadjuvant therapy

DISCUSSION

Neoadjuvant chemo-radiotherapy and total mesorectal excision in rectal tumors have become a standard treatment for locally advanced (T3–4 and / or N1–2) diseases (4). Although local control and sphincter-sparing surgery were provided in this standard treatment, a positive effect on survival has not been confirmed yet. Despite the current treatment algorithms, rectal cancers remain the most risky anastomosis field of colorectal surgery. Anastomotic leakages not only affect perioperative mortality and morbidity, but also long-term local recurrence and survival (1). Therefore, in order to reduce the risk and clinic presentation of anastomotic leakage, many methods including ileostomy, rectal tube, colostomy, supportive suturing, fibrin glue, and pelvic drainage have been tried (5). The frequently-used ileostomy technique has been shown to reduce the clinical presentation of anastomotic leakage and consequently reduce the need for reoperation. However, complications related to both stoma and stoma closure surgery create concerns about the application of this method. The search in this direction has led to the use of a rectal tube. Rectal tube; has become one of the preferred methods because it provides intraluminal pressure reduction, drainage; and promotes motility. The greatest concern for this technique is whether it has a protective for anastomotic leakage like ileostomy. In our study, no difference was found between the two groups in terms of anastomotic leakage. Similar studies in the literature did not find any difference between the two groups in terms of anastomotic leakage (1).

The mechanism of anastomotic leakage has not been fully elucidated yet, but intraluminal pressure is known to play an active role in this matter (6). An ileostomy is one of the most commonly used methods for reducing this pressure and diverting the fecal content. Studies have shown that ileostomy reduces the clinic presentation of anastomotic leakage (fecal peritonitis, sepsis), but does not change leakage rates (7). The aim is to reduce the need for reoperation by reducing the clinical evident leakage and to reduce associated mortality-morbidity. In our study, no difference was found between the two

groups in terms of the necessity for reoperation. Although the necessity for reoperation was not present in the rectal tube group (only one patient with leak), it was seen at 50% in the ileostomy group (two patients of four leaks). In a study of patients with anastomotic leakage, this rate was 46% (8). Additionally, in a study comparing patients who underwent rectal tube, ileostomy and who received no intervention; no difference was found between the rectal tube and ileostomy in terms of reoperations (1). In addition, in a study comparing rectal tube intervention with the non-intervention group; the necessity for reoperation in patients was minimized by rectal tube operation (82% -28%) (2).

It is known that ileostomy can increase the duration of the operation and the amount of bleeding. There are also studies showing that the amount of peroperative bleeding increases the risk of anastomotic leakage (9). In our study, both the operation time and the amount of peroperative bleeding were found to be low in the rectal tube group. However, considering the difference in duration and amount of bleeding between the two groups, it is not correct to attribute this to ileostomy alone. The presence of liver metastasectomy and total colectomy in the ileostomy group is considered as the main cause of this difference. However, it cannot be denied that ileostomy contributes to this difference. Studies comparing the two groups show us that ileostomy increases these two criteria (1). In addition, not all ileostomies can be closed. This leads to the disadvantage of living with a stoma. It was found in our study that 16% of the ileostomies of the patients could not be closed. This high rate in our study, which is reported as 6% in the literature (1), is thought to be caused by metastasectomies applied in a combined way. However, 2 of the 4 patients whose stoma was not closed were lost while living with a stoma due to distant metastasis and chemotherapy (at 3rd and 7th months).

Stoma prolapse is one of the most common complications after ostomy and was seen in 2 (15%) patients in our study. It is known that the rate in the literature is in the range of 2-22% [10]. In addition, there are many complications related with stoma such as a wound infection, retraction, stenosis, necrosis, parastomal hernia and ileus. In our study, the overall complication rate due to ileostomy was found to be 20%. This ratio is similarly reported in the literature as 19%. However, complications due to stoma closure were not added to this ratio (11). Morbidity and mortality rates associated with stoma closure have been reported as 0-19.8% vs 0-1.4%, respectively (12).

Postoperative pain scores and cosmetic scores have become the most important predictors of patient satisfaction with the minimization of surgical procedures. In our study, although there was no difference between VAS values between the two groups, the cosmetic scores were found to be better in the rectal tube group. Additionally, considering the physical, social and psychological problems imposed by the stoma on the patient (13), a better postoperative process was achieved with the rectal tube.

CONCLUSION

It has been observed that the results of the rectal tube technique were not worse than those of the ileostomy technique in rectal cancers receiving neoadjuvant therapy and this technique may be preferred in appropriate cases.

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REFERENCES

1. Kim MK, Won DY, Lee JK et al. Comparative study between transanal tube and loop ileostomy in low anterior resection for mid rectal cancer: a retrospective single center trial. Ann Surg Treat Res 2015;88:260-8.
2. Xiao L, Zhang WB, Jiang PC et al. Can transanal tube placement after anterior resection for rectal carcinoma reduce anastomotic leakage rate? A single-institution prospective randomized study. World J Surg 2011;35:1367-77.
3. Kayaalp C, Yagci MA, Soyer V. Laparoscopic and natural orifice transluminal restorative proctocolectomy: no abdominal incision for specimen extraction or ileostomy. Videosurgery Miniinv 2016;11:115-20.
4. Rule W, Meyer J. Current status of radiation therapy for the management of rectal cancer. Crit Rev Oncog 2012;17:331-43.
5. Yang CS, Choi GS, Park JS et al. Rectal tube drainage reduces major anastomotic leakage after minimally invasive rectal cancer surgery. Colorectal Dis 2016;18:445-52.
6. Hallbook O, Sjodahl R. Anastomotic leakage and functional outcome after anterior resection of the rectum. Br J Surg 1996;83:60-2.
7. Wong NY, Eu KW. A defunctioning ileostomy does not prevent clinical anastomotic leak after a low anterior resection: a prospective, comparative study. Dis Colon Rectum 2005;48:2076-9.
8. Shalaby M, Thabet W, Buonomo O et al. Transanal Tube Drainage as a Conservative Treatment for Anastomotic Leakage Following a Rectal Resection. Ann Coloproctol 2018;34:317-21.
9. Telem DA, Chin EH, Nguyen SQ et al. Risk factors for anastomotic leak following colorectal surgery: a case-control study. Arch Surg 2010;145:371-6.
10. Harris DA, Egbeare D, Jones S, et al. Complications and mortality following stoma formation. Ann R Coll Surg Engl 2005;87:427-31.
11. Rullier E, Le Toux N, Laurent C et al. Loop ileostomy versus loop colostomy for defunctioning low anastomoses during rectal cancer surgery. World J Surg 2001;25:274-7.

12. Tan WS, Tang CL, Shi L et al. Meta-analysis of defunctioning stomas in low anterior resection for rectal cancer. Br J Surg 2009;96:462-72.

13. Funahashi K, Suzuki T, Nagashima Y, et al. Risk factors for parastomal hernia in Japanese patients with permanent colostomy. Surg Today 2014;44:1465-9.