



# Is Ileostomy an Obligation Following Rectal Resection? The Role of Rectal Tube Instead of Ileostomy

## Rektal Rezeksiyon Sonrası İleostomi Zorunlu mudur? İleostomi Yerine Rektal Tüpün Rolü

İ Ersin GÜNDOĞAN<sup>1</sup>, İ Cüneyt KAYAALP<sup>2</sup>, İ Fatih SÜMER<sup>2</sup>

<sup>1</sup>University Health Sciences Turkey, Faculty of Medicine, Department of General Surgery, Kayseri, Turkey

<sup>2</sup>İnönü University Faculty of Medicine, Department of Gastrointestinal Surgery, Malatya, Turkey

### ABSTRACT

**Objective:** In laparoscopic distal colon surgery, diverting ileostomy is often used to improve the anastomosis leakage and eliminate the need for secondary surgery. However, complications related to the stoma and its closure have led to new searches. The rectal tube has started to be used as another method to reduce the anastomosis leakage by reducing intestinal pressure and providing drainage. In this study, we aimed to compare the effect of the rectal tube and diverting ileostomy on the outcomes of patients who underwent laparoscopic pelvic subperitoneal surgery.

**Methods:** Retrospective information was obtained from 66 patients who underwent laparoscopic pelvic subperitoneal surgery in our clinic between 2013 and 2019. The patients were evaluated in two groups: ileostomy and rectal tube. Demographic data, operation findings, pathological results, and follow-up information were evaluated.

**Results:** Fourty-one of 66 patients who underwent colorectal pelvic peritoneal surgery were in the rectal tube group and 25 were in the ileostomy group. The majority of the patients in the ileostomy group were males (22-88% vs 23-56%, p=0.007); however, there was no difference between the two groups in terms of age, body mass index, comorbidity, and the previous abdominal operation. In the rectal tube group, the number of patients who were diagnosed as having rectal tumors and consequently underwent low anterior resection was higher. In the ileostomy group, the operation time was longer (476±130 vs. 341±114 mins, p=0.0001) and amount of peroperative bleeding was higher (261±260 vs 128±98 mL, p=0.02).

### ÖZ

**Amaç:** Laparoskopik distal kolon cerrahisinde, sıklıkla saptırıcı ileostomi kullanılmaktadır. Bununla beraber rektal tüp intestinal basıncı azaltarak ve drenajı sağlayarak anastomoz kaçacağını azaltacak diğer bir yöntem olarak kullanıma girmiştir. Bu çalışmada amacımız laparoskopik distal kolon cerrahisi uyguladığımız hastalarda, rektal tüp ve saptırıcı ileostominin hasta sonuçlarına etkisini karşılaştırmaktır.

**Yöntemler:** Kliniğimizde 2013-2019 yılları arası laparoskopik distal kolon cerrahisi yapılmış 66 hasta; ileostomi ve rektal tüp olmak üzere iki grupta değerlendirildi. Demografik veriler, operasyon bulguları, patolojik sonuçlar ve takip bilgileri değerlendirildi.

**Bulgular:** Kırk bir hasta rektal tüp grubunda, 25 hasta ise ileostomi grubunda idi. Rektal tüp grubunda rektal tümör tanılı ve buna bağlı olarak da low anterior rezeksiyon yapılan hastalar daha fazla idi. İleostomi grubunda operasyon süresi daha uzundu (476±130 vs. 341±114 dk, p=0,0001) ve peroperatif kanama miktarı daha fazla idi (261±260 vs 128±98 mL, p=0,02). Postoperatif ikinci günkü ağrı skalası rektal tüp grubunda daha düşük idi (2,8±1,5 vs. 4,7±2,9, p=0,008). Bir ve üçüncü günlerdeki ağrı skalası puanları ise rektal tüp grubunda daha düşük olmasına rağmen, istatistiksel olarak iki grup arasında anlamlı fark yoktu. Hastaların kozmetik skorları rektal tüp grubunda daha iyiydi (9,3±0,9 vs 7,2±1,9, p=0,001).

**Sonuç:** Laparoskopik pelvik periton altı kolorektal cerrahide; rektal tüpün ileostomiye göre sonuçlarının daha kötü olmadığı, uygun olgularda tercih edilebileceği ve stoma ilişkili sorunları azaltabileceği gözlenmiştir.

**Address for Correspondence:** Ersin GÜNDOĞAN, University Health Sciences Turkey, Faculty of Medicine, Department of General Surgery, Kayseri, Turkey

**E-mail:** ersingundogan@hotmail.com **ORCID ID:** orcid.org/0000-0002-3046-9040

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Intraoperative and postoperative complications of the patients were similar in both groups. The pain scale on the postoperative second day was lower in the rectal tube group ( $2.8 \pm 1.5$  vs.  $4.7 \pm 2.9$ ,  $p=0.008$ ). Although the pain scales on day 1 and day 3 were lower in the rectal tube group, there was no statistically significant difference between the two groups. The oncological results were similar during the average follow-up period of  $28.3 \pm 18.5$  months. The cosmetic scores of the patients were better in the rectal tube group ( $9.3 \pm 0.9$  vs.  $7.2 \pm 1.9$ ,  $p=0.001$ ).

**Conclusion:** In laparoscopic pelvic subperitoneal colorectal surgeries; it has been observed that the results of the rectal tube are not worse than ileostomy, it can be preferred in appropriate cases and reduce stoma-related problems.

**Keywords:** Minimally invasive surgery, colon cancer, laparoscopy, low anterior, loop, diverting

**Anahtar Sözcükler:** Minimal invaziv cerrahi, laparoskopik kolorektal, laparoskopik, low anterior, loop, sapıtıcı

## Introduction

Anastomosis leakage is one of the most important causes of mortality and morbidity in reconstructive distal colon surgery. In patients with anastomosis leakage without peritonitis; conservative treatment is preferred by cleaning and draining the fistula cavity (1). Therefore, many methods have been tried, especially diverting ileostomy, to reduce the leakage by providing drainage. The complications of diverting ileostomy and the closure-related complications have led to the search for different methods to perform the drainage process. The rectal tube application (2), which has functions such as drainage, reduction of endoluminal pressure, and promotion of gastrointestinal motility, has found its use in this field with the fact that it does not require additional surgery.

This study aims to investigate the effect of ileostomy and rectal tube use on the outcomes of the patients undergoing laparoscopic pelvic subperitoneal surgery.

## Methods

This study was approved by İnönü University Ethical Committee (2019/447). Sixty-six patients who underwent laparoscopic low anterior resection and total proctocolectomy in our clinic between March 2013 and July 2019 were included in the study. After the patients were given detailed information, they were asked about their operation preferences and a detailed consent form was obtained from them. Forty-one patients who underwent rectal tubes and 25 patients who underwent a diverting ileostomy were analyzed in two groups. The selection of specimen extraction was made according to patient preference and technical compliance. After the operation was completed, the rectal tube (28 mm Petzer's tube) was placed proximal to anastomosis as controlled by laparoscopic image (3). The patients' age, gender, body mass index (BMI), additional disease, operation history, ASA scores, operation time, amount of bleeding, incision size, peroperative and postoperative complications, hospitalization time, piece pathology, tumor size, the number of removed lymph nodes, the number of positive

lymph nodes, tumor stage, visual analog scale (VAS) score, cosmetic score, long-term complication, presence of relapse and general survival parameters were examined. Complications of the patients undergoing diverting ileostomy and their perioperative findings during the closure were searched. The largest size specified in pathological reports was taken as the tumor size. The VAS scores of patients were examined with 10 being the highest pain score, and 1 being the lowest before they received any analgesic support in the first three postoperative days. The cosmetic status was scored as 10 being the best score and 1 being the worst. Patients were called by phone during the follow-up process and information about their recent status, hernia, and the cosmetic score was obtained. Statistical analyses were made for all the data and reported in means and percentages. Continuous variables were analyzed by unpaired t-test or Mann-Whitney U test. Categorical variables were analyzed with chi-square Test and Fisher-Exact Test. A p-value of  $<0.05$  was accepted statistically significant. The data were analyzed using SPSS version 16.0 and Microsoft Excel 2013.

## Results

Fourty-five (68%) of the patients included in the study were males and the mean age was  $56.1 \pm 13.4$ . The average BMI was  $26.5 \pm 3.9$  and 29 (44%) of the patients had comorbidity. Thirteen of the patients (19%) had a history of pre-existing abdominal surgery. Fourty-six of the patients (69%) had rectal cancer, 13 (19%) had familial adenomatosis polyposis and 7 (10%) had rectal cancer and liver metastasis (Table 1).

Of a total of 66 laparoscopic surgical procedures; 46 (69%) were low anterior resection, 13 (19%) were total proctocolectomy and pouch-anal anastomosis, 5 (7%) were low anterior resection and liver metastasectomy and 2 (3%) were low anterior resection and major hepatectomy. The J-pouch anal anastomosis was performed in 11 of the patients who underwent pouch-anal anastomosis and W-pouch anal anastomosis was performed in 2. One of the patients who underwent major hepatectomy was in the rectal tube group and underwent left hepatectomy, the other was in the ileostomy group and underwent right hepatectomy.

The mean duration of the operation was  $386\pm 132$  mins, and the mean amount of intraoperative bleeding was  $182\pm 193$  mL. Piece extraction was performed through the natural hole in 36 (54%) patients, and through a suprapubic incision in 30 (46%) patients. The transanal pathway was used in 32 (88%) patients in the group undergoing NOSE surgery, while the transvaginal pathway was used in 4 (12%) patients; and peroperative complications were observed in 8 patients. Five of these patients had internal abdominal bleeding. The bleeding area was in the sacral venous plexus in 2 patients and the bleeding was stopped with a tampon. One patient had bleeding while the splenic flexure was being lowered, which was stopped with cautery. The other 2 patients underwent major hepatectomy and the bleeding from liver parenchyma was stopped with the help of a ligature (Medtronic-5 mm). One patient had fecal transmission and was cleared while transvaginal extraction was performed. After anastomosis was performed in 2 patients, the air leakage test was found to be positive and support sutures were placed in these

areas. The operation was terminated when the control air test showed no leaks. When the two groups were compared; no difference was detected in terms of the operation time, blood loss, intra-, and post-operative complications. Intra- and extra-abdominal complications were similar. Although the VAS scores in the early postoperative period were found to be low in the rectal tube group, a significant difference in VAS values was determined only on the first day ( $p=0.008$ ) (Table 2).

Anastomosis leakage was observed in 3 patients in both groups. One patient in each of the two groups required postoperative reoperation. These patients underwent end colostomy and drainage. One patient in each of the two groups underwent percutaneous drainage due to intra-abdominal abscess. Three of the patients in the rectal tube group underwent dilatation in the late period due to anal stenosis. Two of the patients in the ileostomy group underwent late-stage anal dilatation due to anal stenosis and 1 of these patients underwent pull-through since the dilatation procedure was not successful.

**Table 1.** Preoperative parameters

Parameters	Rectal tube (n=41)	Ileostomy (n=25)	P
Gender (female/male)	18/23	3/22	0.007
Age			
Mean SD	57.3 $\pm$ 13.8	54.2 $\pm$ 12.6	0.36
Median (range)	60 (30-79)	56 (25-82)	
BMI			
Mean SD	26.6 $\pm$ 4.0 kg/m <sup>2</sup>	26.3 $\pm$ 3.7 kg/m <sup>2</sup>	0.76
Median (range)	25.6 (18.4-34.1)	26.7(20.1-32.9)	
ASA			
Mean SD	2.0 $\pm$ 0.6	1.9 $\pm$ 0.6	0.51
Median (range)	2 (1-3)	2 (1-3)	
Patients with co-morbidity	18 (44%)	11 (44%)	1.00
Diabetes mellitus	10 (24%)	5 (20%)	
Hypertension	13 (31%)	6 (24%)	
Chronic obstructive pulmonary disease	3 (7%)	1 (4%)	
Cardiac disease	1 (2%)	0 (0%)	
Chronic kidney disease	2 (4%)	0 (0%)	
Periferic vascular disease	5 (12%)	3 (12%)	
Patients with prior abdominal surgery	8 (19%)	5 (20%)	1.00
Gynecologic operation	4	1	
Open inguinal hernia repair	2	1	
Opening ileostomy	0	1	
Subtotal gastrectomy	0	1	
Open appendectomy	4	0	
Laparoscopic cholecystectomy	1	1	
Disease			
FAP	5 (12%)	8 (32%)	0.06
Rectal tumor	33 (80%)	13 (52%)	0.02
Rectal tumor + liver metastases	3 (7%)	4 (16%)	0.41
Neoadjuvant radiotherapy	12 (29%)	13 (52)	0.07

BMI: Body mass index, SD: Standart deviation, FAP:

**Table 2. Intraoperative and postoperative outcomes**

Parameters	Rectal tube (n=41)	Ileostomy (n=25)	P
Operation type			
LAR	33	13	0.02
LAR + liver metastasectomy	2	3	0.35
LAR + major hepatectomy	1	1	1.00
Total colectomy (J/W pouch)	5 (5/0)	8 (6/2)	0.06
Extraction type			
NOSE (TA/TV)	27 (23/4)	9 (9/0)	0.02
Suprapubic	14	16	
Duration of surgery			
Mean SD	341±114 minutes	476±130 minutes	0.0001
Median (range)	360 (180-600)	450 (240-720)	
Intraoperative bleeding			
Mean SD	128±98 mL	261±260 mL	0.02
Median (range)	100 (10-400)	200 (20-1000)	
Incision length			
Mean SD	7.4±2.0 cm	7.3±1.9 cm	0.90
Median (range)	6.7 (5-12)	7 (5-12)	
Intraoperative complications	4 (9%)	4 (16%)	0.46
Fecal contamination	0	1	
Bleeding	3	2	
Air leak test (+)	1	1	
Postoperative complications	16 (39%)	13 (52%)	0.32
Intraabdominal complications			
Bleeding	1	1	
Abscess#	2	2	
Anastomotic leakage#	3	3	
Anastomotic stenosis	3	2	
Rectovaginal fistula	3	1	
Ileostomy invagination	0	1	
Paralytic ileus	3	2	
Biliary fistula	0	1	
Extraabdominal complications			
Atelectasis	1	1	
Pleural effusion	0	1	
Urinary infection	2	0	
VAS score (total)			
Mean SD	3.1±2.0	4.0±2.9	0.15
Median (range)	3 (0-9)	4 (0-10)	
VAS score on day 1			
Mean SD	4.4±2.3	4.8±3.2	0.55
Median (range)	4 (2-9)	5 (1-10)	
VAS score on day 2			
Mean SD	2.8±1.5	4.7±2.9	0.008
Median (range)	3 (0-6)	5 (1-10)	
VAS score on day 3			
Mean SD	2.1±1.1	2.5±2.0	0.29
Median (range)	2 (0-4)	2 (0-7)	

Table 2. Continued

Parameters	Rectal tube (n=41)	Ileostomy (n=25)	P
Length of hospital stay			
Mean SD	9.5±7.2 days	12.6±9.4 days	0.13
Median (range)	7 (4-43)	9 (3-42)	
Cosmetic score			
Mean SD	9.3±0.9	7.2±1.9	0.001
Median (range)	10 (7-10)	7 (4-10)	
Recurrence <sup>^</sup>	3 (9%)	5 (23%)	0.23
Duration of follow-up			
Mean SD	30.0±12.0 months	25.7±22.2 months	0.31
Median (range)	15 (1.5-79)	18 (3-78)	
Stoma-free life	39/41 (95%)	20/25 (80%)	0.09

TA: Transanal, TV: Transvaginal, #Anastomotic leakage and abdominal abscess in the same two patients in both groups, SD: Standard deviation  
<sup>^</sup>Statistics were made among patients with tumor

Table 3. Pathology of the malignancies

Parameters	Rectal tube (n=33)	Ileostomy (n=21)	P
T			
T1	2	0	0.51
T2	3	3	0.66
T3	22	15	0.77
T4 (a-b)	6 (6-0)	3 (3-0)	0.72
N			
0	20	8	0.08
1 (a-b-c)	6 (4-1-1)	8 (6-2-0)	0.12
2 (a-b)	7 (0-7)	5 (2-3)	1.00
M			
0	27	15	0.50
1 (a-b)	6 (5-1)	6 (6-0)	0.50
Stage			
1	4	2	1.00
2 (a-b-c)	13 (12-1-0)	5 (4-1-0)	0.37
3 (a-b-c)	10 (1-4-5)	8 (1-4-3)	0.56
4 (a-b)	6 (5-1)	6 (6-0)	0.50
Tumor size			
Mean SD	4.3±1.7	4.2±2.0	0.84
Median (range)	3.8 (1.5-8.5)	4 (1-9)	
Removed lymph node (total)			
Mean SD	25.9±22.5	25.1±16.5	0.88
Median (range)	20 (3-125)	23 (0-59)	
Positive lymph node			
Mean SD	4.0±9.5	2.8±5.1	0.59
Median (range)	0 (0-42)	1 (0-23)	

SD: Standard deviation

In 4 patients in the ileostomy group (16%), stoma-related complications were detected. The parastomal hernia was detected in 2 of them and the stoma was repaired during closure. One patient had dehydration and acute renal failure, and the stoma was closed in the early period. One patient had stoma prolapse and underwent revision surgery. One patient (4%) had pleural effusion and wound infection due to stoma closure. This patient recovered with medical treatment without the need for intervention. In 2 patients (8%), the stoma could not be closed. One of them underwent colon resection with right hepatectomy and died in the postoperative 3<sup>rd</sup> month. The other underwent low anterior resection and liver metastasectomy in the postoperative 3<sup>rd</sup> month, and died in the 7<sup>th</sup> month.

When pathology results were examined, it was found that 54 (81%) of patients had malign tumors. Fifty-three (98%) of the tumors were adenocarcinomatous tumors and one was a neuroendocrine tumor. Preoperative polypectomy pathology was invasive adenocarcinomatous tumor in 3 patients, while the invasive focus was not detected in the resection material. Pathologies of the patients with benign tumors were reported as adenoma with dysplasia in 6 patients and adenomatous polyposis in 3 patients. Tumor size was 4.2±1.9 cm on average. The mean number of lymph nodes removed was 25.6±20.4, while the number of positive lymph nodes was 3.5±8.1. When tumor stages were examined, it was found that 12 (22%) were stage 4, 18 (33%) were stage 3, 18 (33%) were stage 2 and 6 (11%) were stage 1. The pathology results of the two groups are given in Table 3, comparatively.

While no mortality was seen in any patient in the early postoperative period, the total rate of mortality was 16%. The mean follow-up period of the patients was 28.3±18.5 months. The recurrence rate of our patients was 14% when evaluated specifically in patients with tumor. Two (3%) of the patients with recurrence had liver metastasis, 1 (1%) had lung metastasis and the other 5 (9%) had an intra-abdominal recurrence.



## Discussion

Anastomosis leakage is one of the most important complications affecting postoperative morbidity and mortality in low anterior resection surgery. The mechanism of anastomosis leakage has not yet been fully understood, but intraluminal pressure is known to play an active role in this (4). Ileostomy is among the most commonly used methods for reducing this pressure and diverting fecal content. Studies have shown that ileostomy reduces anastomosis leakage clinic (fecal peritonitis, sepsis), but does not change the leakage rates (5). However, the increase in morbidity caused by ileostomy itself or closure surgery creates hesitations in practice. Interventions such as pelvic drainage, cannula ileostomy, supportive sutures, and fibrin glue have also been reported to reduce anastomosis leakage (6-9). However, insignificant and conflicting results have led to a lack of consensus on this issue. Another of these techniques is the rectal tube (10). Reduction of intraluminal pressure and lack of necessity for additional surgery have led researchers to investigate the applicability of this method. Thanks to this method, which has been in use in our clinic since 2013, patients are saved from additional incisions and a life with a stoma. However, we have conflicting data on whether it is as effective as ileostomy, which is the main reason that has led us to this study.

Anastomosis leakage is seen at rates above 15% (11). It is known that this frequently-seen complication causes morbidity by 20-30% and mortality by 7-12%. It also increases local recurrence reducing long-term survival (12). For this reason, it is very important to control this complication as much as possible before it worsens the clinic picture and re-operation is needed. While our study did not find a difference between the two groups in terms of anastomosis leakage, the requirement for reoperation in these patients was found to be similar. Studies comparing the two groups similarly found no difference in the need for reoperation between the rectal tube and ileostomy (12). In addition, it has been seen that the need for reoperation in patients who do not use any drainage methods is quite minimized with the rectal tube (82%-28%) (2).

In addition to the ileostomy surgical procedure, it is known that it has the disadvantages of more bleeding and longer operation time. Some studies show that higher amount of bleeding during the operation and longer duration of the operation increase the risk of anastomosis leakage. On the other hand, other studies show opposite results that it is not related to anastomosis leakage (13,14). Studies comparing ileostomy and rectal tube show that ileostomy prolongs the duration of operation and increases the amount of peroperative bleeding (10,11). Our study, similarly, showed that the duration of operation was shorter and the amount of bleeding was lower in the rectal tube group. Besides, some of the stomas opened cannot be closed and the exposure to complications increases. The non-closure rate, which was determined as 8% in our study, was stated as 6% in the literature (12).

Ileostomy may lead to many complications such as wound infection, prolapse, retraction, stenosis, necrosis, parastomal hernia, and ileus. Therefore, the risk factors of anastomosis leakage for selective use of ileostomy and the method to be used in place

of this technique have been frequently investigated. In our study, the total complication rate due to ileostomy was determined as 20%. This rate is similarly given as 19% in the literature. However, complications related to stoma closure are not added to this ratio (15).

With the improvements in minimally invasive surgery; postoperative pain scores and cosmetic scores have become the most important markers affecting patient satisfaction. Although the VAS scores in the rectal tube group in our study were lower, it was seen that this difference became significant in the day 2 scores. In addition, cosmetic scores were found to be higher in the rectal tube group. The rectal tube vs ileostomy study on patients receiving neoadjuvant similarly found that the cosmetic score was lower in the rectal tube group (10). In this group of patients with high morbidity, it is clear that these criteria, which contribute to a comfortable postoperative process, are important.

## Conclusion

No drawbacks were found for rectal tubes to reduce the anastomosis leakage and the need for reoperation in laparoscopic pelvic subperitoneal surgery. Besides, rectal tubes increased postoperative patient comfort significantly and, even if not significant, increased the likelihood of stoma-free life proportionally. We think that it can be considered instead of diverting stoma in suitable patients.

## Ethics

**Ethics Committee Approval:** This study was approved by İnönü University Ethical Committee (2019/447).

**Peer-review:** Externally peer reviewed.

## Authorship Contributions

Surgical and Medical Practices: E.G., Concept: C.K., Design: E.G., C.K., Data Collection or Processing: E.G., F.S., Analysis or Interpretation: E.G., C.K., Literature Search: E.G., F.S., Writing: E.G.

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