



Comparison of Anastomosis Evaluation Techniques Before Ileostomy Closure in Rectal Cancer Patients

Rektal Kanser Hastalarında Ileostomi Kapatılması Öncesi Anastomoz Değerlendirme Tekniklerinin Karşılaştırılması

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ABSTRACT

Aim: Postoperative ileus, stricture, abscess, and sepsis can be prevented by ensuring that there is no deterioration in the integrity of the anastomosis before closure of the protective loop ileostomy for rectal cancer. The aim of this study is to investigate which technique is more appropriate to evaluate the anastomosis before ileostomy closure.

Materials and Methods: Between 2011 and 2019, patients who underwent elective low anterior resection for rectal cancer and had a concomitant protective loop ileostomy were reviewed retrospectively. The patients included in the study were divided into 2 groups as those whose anastomosis evaluation was performed with digital rectal examination (DRE) alone and those who underwent flexible endoscopy (FE) with DRE.

Results: Ninety-nine patients were included in the study. Sixty-one of the patients were male and 38 were female. The mean age of the patients was 59.36±11.47 years. In the preoperative period, DRE+FE was applied to 67 patients and only DRE to 32 patients. Complications were detected in 10 patients after ileostomy closure (stricture and ileus in 6 patients, anastomotic leakage in 3 patients, and surgical site infection in 1 patient). Of 89 patients without complications, 66 were in the DRE+FE group and 23 were in the DRE group (p<0.001).

Conclusion: In order to minimize the complications related to the anastomosis, it is recommended to evaluate together with both DRE and FE, although the appropriate examination in the evaluation of anastomosis is still not clear before the protective loop ileostomy is closed.

Keywords: Rectal cancer, ileostomy reversal, endoscopy, digital rectal examination

ÖZ

Amaç: Rektum kanseri nedeniyle açılan koruyucu loop ileostominin kapatılmasından önce anastomoz bütünlüğünde bozukluk olmadığından emin olunması sayesinde postoperatif ileus, striktür, abse ve sepsisten korunma sağlanabilmektedir. Bu çalışmanın amacı ileostomi kapatılmasından önce hangi tekniğin anastomozu değerlendirmede daha uygun olduğunun araştırılmasıdır.

Gereç ve Yöntem: 2011-2019 tarihleri arasında rektum kanseri nedeniyle elektif aşağı anterior rezeksiyon yapılmış ve eş zamanlı koruyucu loop ileostomi açılmış hastalar retrospektif olarak tarandı. Çalışmaya dahil edilen hastalar anastomoz değerlendirmesi sadece dijital rektal muayene (DRE) ile yapılanlar ve DRE ile birlikte fleksibl endoskopi (FE) yapılanlar olarak 2 gruba ayrıldı.

Bulgular: Çalışmaya 99 hasta dahil edildi. Hastaların 61'i erkek ve 38'i kadındı. Hastaların yaş ortalaması 59,36±11,47 idi. Preoperatif dönemde 67 hastaya DRE+FE, 32 hastaya sadece DRE yapılmıştı. İleostomi kapatılması sonrası 10 hastada komplikasyon geliştiği tespit edildi (6 hastada striktür ve ileus, 3 hastada anastomoz kaçağı ve 1 hastada cerrahi alan enfeksiyonu). Komplikasyon izlenmeyen 89 hastanın 66'sının DRE+FE grubunda olduğu ve 23'ünün DRE grubunda olduğu görüldü (p<0,001).

Sonuç: Anastomozla bağlı komplikasyonları minimize edebilmek için koruyucu loop ileostomi kapatılmadan önce anastomoz değerlendirmesinde uygun tetkik halen net olmamakla birlikte hem DRE hem de FE ile birlikte değerlendirilme yapılması önerilmektedir.

Anahtar Kelimeler: Rektum kanseri, ileostomi kapatılması, endoskopi, dijital rektal muayene

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INTRODUCTION

The risk of anastomotic leakage in patients with rectal cancer who underwent lower anterior resection (LAR) is between 5% and 25% and it may lead to serious complications such as abscess, fistula, and sepsis^{1,2}. It is also associated with a prolonged hospital stay, an increase in postoperative mortality, and an increased risk of local recurrence³⁻⁵. Opening a protective loop ileostomy after LAR is a widely used and evidence-based routine⁶. In this way, with the proximal fecal diversion provided, possible complications due to postoperative anastomotic leakage are tried to be prevented. Although anastomotic leakage cannot be completely prevented with a protective loop ileostomy, it greatly reduces the incidence and impact of a clinical leak, thus eliminating the need for re-surgical or interventional intervention^{7,8}.

Before closing the ileostomy, it should be ensured that there is no asymptomatic anastomotic leak or stricture. The most commonly used methods to evaluate anastomosis are digital rectal examination (DRE), rigid or flexible endoscopy (FE), and contrast enema radiography. However, there is no clear consensus on which method is the most appropriate for the evaluation of colorectal anastomosis^{9,10}. The necessity of contrast enema radiography in the routine evaluation of anastomotic integrity is controversial^{11,12}. In a prospective study that included a group of patients evaluated with DRE after contrast enema radiography, it was reported that DRE had a sensitivity of 98.4% in detecting anastomotic pathology¹³.

The aim of our study is to evaluate the differences between patients who had only DRE before closure of the protective loop ileostomy and those who had FE with DRE.

MATERIALS AND METHODS

Patients who underwent elective LAR due to rectal cancer in the general surgery clinics of University of Health Sciences Turkey, Gülhane Training and Research Hospital and Ankara University Faculty of Medicine between 2011 and 2019 and who had simultaneous protective loop ileostomy were screened retrospectively. Patient information was accessed via computer and file system. Those who had urgent surgery, who did not have the diagnosis of malignancy, whose DRE and/or FE findings and pathological diagnosis information could not be reached, those who were symptomatic at the stage of ileostomy closure, those whose anastomosis assessment (DRE/DRE+FE) was performed earlier than the 2-week period prior to ileostomy closure surgery were excluded from the study. The patients included in the study were divided into 2 groups, as those whose anastomosis evaluation was performed with DRE only and with DRE+FE.

Statistical Analysis

Statistical analysis was performed using Statistical Package for the Social Sciences version 22.00. The Kolmogorov-Smirnov and Levene tests were performed for homogeneity and normality analysis of the scaled data. Since it was a two-group study, the Pearson chi-square and Fisher's exact tests were used in the evaluation of categorical data. The Student's t-test was used for scaled parametric data, and the Mann-Whitney U test for scaled non-parametric data. Binary logistic regression test was employed in one-way analysis of variance. $P < 0.05$ was considered significant.

RESULTS

Ninety-nine patients were included in the study. 61.6% (n=61) of the patients were male and 38.4% (n=38) were female. The mean age of the patients was 59.36 ± 11.47 years. In the preoperative period, DRE+FE was applied to 67 patients and only DRE was applied to 32 patients. Forty-four patients were operated after neoadjuvant therapy. Complications developed in 10 (10.1%) patients after ileostomy closure. Anastomotic leakage was observed in 3 patients, stricture and ileus in 6 patients, and surgical site infection in 1 patient. The demographic and clinicopathological characteristics of the patients are shown in Table 1 in detail.

In the examination of relationship between postoperative complications and clinicopathological data, anastomosis complication was observed in 2 patients who received neoadjuvant therapy, while no complication developed in 8 patients ($p=0.017$). This shows us that neoadjuvant therapy is not a risk factor for the development of anastomotic complication. In the examination of relationship between perineural invasion (PNI) and anastomosis complication,

anastomosis complication was found in 7 of 85 patients without PNI and in 3 of 4 patients with PNI ($p=0.003$). The number of dissected lymph nodes was similar between the group with and without complications (17.52 ± 7.85 vs 17.80 ± 7.92). No significant correlation was found between the stage of rectal cancer and the development of anastomotic complications ($p=0.214$) (Table 2).

Considering the relationship between only DRE and DRE+FE and anastomosis complications, it was seen that 66 of the 89 patients without complications were in the DRE+FE group and 23 were in the DRE group ($p < 0.001$) (Table 3). A significant correlation was found between DRE+FE and the rate of postoperative anastomosis complications. This relationship is negative, it shows that the rate of postoperative anastomosis complications is statistically lower in patients who underwent DRE+FE (Odds ratio=0.039, 95% confidence interval: 0.005-0.323, $p=0.003$) (Table 4).

| Table 1. Demographic characteristics of the patients | |
|---|---------------------|
| Age, year, (mean±SD, distribution) | 59.36±11.47 (31-81) |
| Gender, n (%) | |
| Male | 61 (61.6%) |
| Female | 38 (38.4%) |
| Neoadjuvant therapy, n (%) | |
| No | 44 (44.3%) |
| Yes | 55 (55.6%) |
| Type of surgery, n (%) | |
| Laparoscopic | 57 (57.6%) |
| Open | 42 (42.4%) |
| Preoperative DRE vs DRE+FE, n (%) | |
| DRE | 32 (32.3%) |
| DRE+FE | 67 (67.7%) |
| Complication after anastomosis, n (%) | |
| No | 89 (89.9%) |
| Yes | 10 (10.1%) |
| Complication type, n (%) | |
| Anastomotic leak | 3 (3%) |
| Stricture, ileus | 6 (6.1%) |
| Surgical site infection | 1 (1%) |
| Management of complication, n (%) | |
| Percutaneous drainage | 2 (2%) |
| Dilation | 5 (5.1%) |
| Re-laparotomy | 2 (2%) |
| Conventional | 1 (1%) |
| LVI, n (%) | |
| No | 51 (51.5%) |
| Yes | 38 (48.5%) |
| PNI, n (%) | |
| No | 92 (92.6%) |
| Yes | 7 (7.1%) |
| Lymph node dissection, n (mean±SD, distribution) | 17.77±7.81 (6-53) |
| Lymph node metastasis, n (mean±SD, distribution) | 1.84±3.64 (0-24) |
| N Stage grade, n (%) | |
| N0 | 56 (56.6%) |
| N1 | 25 (25.3%) |
| N2 | 18 (18.2%) |
| T Stage grade, n (%) | |
| Tis | 16 (16.2%) |
| T1 | 6 (6.1%) |
| T2 | 28 (28.3%) |
| T3 | 47 (47.5%) |
| T4 | 2 (2%) |
| Stage, n (%) | |
| Stage 0 | 15 (15.2%) |
| Stage 1 | 27 (27.3%) |
| Stage 2 | 14 (14.1%) |
| Stage 3 | 43 (43.4%) |
| SD: Standard deviation, LVI: Lymphovascular invasion, PNI: Perineural invasion, DRE: Digital rectal examination, FE: Flexible endoscopy | |

DISCUSSION

In this study, the complication rate was found to be significantly lower in the group evaluated with DRE+FE before ileostomy closure, compared to the group evaluated with DRE alone.

Ostomies opened for diversion play an important role in temporarily protecting anastomoses and minimizing peritoneal sepsis. Optimizing the timing of temporary stoma closure and evaluating anastomotic integrity prior to stoma closure are associated with minimizing major complications. The most appropriate method to evaluate the integrity of the anastomosis before the closure of the protective loop ileostomy opened with the LAR still remains unclear. Karsten et al.¹⁴, in their retrospective study, showed that DRE and rigid sigmoidoscopy were sufficient to detect significant pathology. In a retrospective study comparing the use of FE and contrast enema in the evaluation of preoperative anastomotic integrity in rectal cancer patients, Lindner et al.¹⁰ found endoscopic evaluation to be superior to contrast enema. In a review from the same group, when endoscopic procedure and DRE versus contrast enema evaluation were compared, it was reported that DRE and endoscopic method were the best methods for evaluating anastomotic integrity in rectal cancer patients¹⁵.

When we examined the anastomosis complication relationships in our study, it was found that anastomotic complications were statistically significantly lower in the DRE+FE group. Complications were seen in 10 of our patients after anastomosis, and only DRE was performed in 9 of them before the ileostomy was closed. In the light of our findings, it was observed that postoperative complication rates decreased significantly thanks to FE performed together with DRE. Stricture and ileus were observed in 60% of patients who developed complications. Considering that most of the complications are only in the DRE group, it may be possible to prevent stricture and ileus that may occur in the early postoperative period and to prevent anastomotic separation by opening the fibrotic bands in the anastomosis line in the early period with FE.

When we assessed the relationship between neoadjuvant therapy and anastomosis complications in our study, it was observed that the rate of anastomosis complications was lower in patients who received neoadjuvant therapy (18.18% vs. 3.63%). Although there are studies showing that neoadjuvant therapy increases the risk of anastomotic leakage in patients who were operated with the diagnosis of rectal cancer, there are also studies claiming the opposite¹⁶⁻²⁰.

When the relationship between rectal cancer stage and complications after ileostomy closure was examined, it was observed that the complication rate was higher in stage 3 patients, but no statistically significant relationship was found between the stage and the complication rate. Different results

| Clinicopathological factors | Number of patients (%) | | p value |
|--|--------------------------------|--------------------------------|----------------------------|
| | Complication (-) (89 patients) | Complication (+) (10 patients) | |
| Age, year (mean±SD) | 59.46±11.10 | 58.50±15.09 | p=0.803 [†] |
| Gender, n | | | |
| Male | 56 | 5 | p=0.426 [†] |
| Female | 33 | 5 | |
| Neoadjuvant therapy, n | | | |
| No | 36 | 8 | p=0.017[†] |
| Yes | 53 | 2 | |
| Surgery type, n | | | |
| Laparoscopic | 52 | 5 | p=0.609 [†] |
| Open | 37 | 5 | |
| LVI, n | | | |
| No | 46 | 5 | p=0.919 [†] |
| Yes | 43 | 5 | |
| PNI, n | | | |
| No | 85 | 7 | p=0.003[†] |
| Yes | 4 | 3 | |
| Lymph node dissection, n (mean±SD) | 17.52±7.85 | 17.80±7.92 | p=0.914 [†] |
| Lymph node metastasis, n (median, distribution) | 0 (0-17) | 1.50 (0-24) | p=0.217 [§] |
| N Stage grade, n | | | |
| N0 | 52 | 4 | p=0.474 [†] |
| N1 | 22 | 3 | |
| N2 | 15 | 3 | |
| T Stage grade, n | | | |
| Tis | 16 | 0 | p=0.083 [†] |
| T1 | 6 | 0 | |
| T2 | 27 | 1 | |
| T3 | 38 | 9 | |
| T4 | 2 | 0 | |
| Stage, n | | | |
| Stage 0 | 15 | 0 | p=0.214 [†] |
| Stage 1 | 26 | 1 | |
| Stage 2 | 11 | 3 | |
| Stage 3 | 37 | 6 | |

SD: Standard deviation, LVI: Lymphovascular invasion, PNI: Perineural invasion, [†]χ² tests; [†]Student's t-test; [§]Mann-Whitney U test

| Anastomosis evaluation method | Number of patients, n | | p value |
|-------------------------------|-----------------------|------------------|-------------------------------|
| | Complication (-) | Complication (+) | |
| DRE | 23 | 9 | p<0.001[†] |
| DRE+FE | 66 | 1 | |

DRE: Digital rectal examination, FE: Flexible endoscopy, [†]χ² tests

| | One-way analysis of variance | | | |
|---------------------|------------------------------|---------------------|---------------------|--------------|
| | B | OR (95% CI) | Accuracy percentage | p value |
| Preoperative DRE+FE | -3.251 | 0.039 (0.005-0.323) | 89.9% | 0.003 |

DRE: Digital rectal examination, FE: Flexible endoscopy, OR: Odds ratio, CI: Confidence interval

have been reported in studies evaluating the relationship between tumor stage and anastomotic complication²¹.

Study Limitations

The limitations of our study are the retrospective design and the small number of patients.

CONCLUSION

There is no consensus on the clinical examination that should be performed to ensure the safety of the anastomosis before closing the ileostomy after diverting loop ileostomy surgery with LAR for rectal cancer. In the light of our current knowledge, the recommended examination before ileostomy closure is flexible or rigid rectoscopy with DRE. We recommend conducting large-scale prospective studies to reach clearer results.

Ethics

Ethics Committee Approval: The study was approved by the University of Health Sciences Turkey, Gülhane Training and Research Hospital of Local Ethics Committee (no: E-50687469-799, date: 22.12.2022).

Informed Consent: Retrospective study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

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