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RESEARCH ARTICLE

Is the End-to-End, Hand-Sewn Anastomosis for Diverting Ileostomy Reversal Less Safe than the Fold-Over Technique?

Saptırıcı İleostomiyi Kapatmak için Hangi Teknik Daha Güvenli: Ön Duvar Onarımı/Rezeksiyon Anastomoz?

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ABSTRACT

Aim: Although various techniques for diverting ileostomy reversal have been described, the best surgical technique for closure of loop ileostomy has not been determined yet. A diverting ileostomy reversal can be accomplished by a hand-sewn or stapled anastomosis after resection of a segment of the small bowel or with the fold-over technique. This study aimed to compare the outcomes of ileostomy reversal using the end-to-end, hand-sewn anastomosis and the fold-over technique.

Method: Patients whose ileostomies were closed at the same university hospital between January 2011 and September 2015 were analysed retrospectively. Only patients with hand-sewn anastomosis or fold-over technique were included in the study. Patients in both groups were compared for postoperative complications, requirement for reoperation, readmissions, length of hospital stay, and mortality.

Results: A total of 43 consecutive patients who underwent ileostomy closure between January 2011 and September 2015 were analyzed. The median age of the study cohort was 58 (24-84) years. Thirty-four patients (79%) were male. Twenty-one (49%) were operated for colorectal cancer while the others were operated because of benign diseases. Ileostomy closure with the fold-over technique was done in 15 patients and an end-to-end anastomosis in 22 patients. No significant differences were found among patients whose ileostomies were closed with fold-over technique and those who had resection with an end-to-end anastomosis in terms of duration of hospital stay, postoperative complications, requirement for reoperation, readmissions, and mortality.

Conclusion: Resection and hand-sewn anastomosis is as safe as the fold-over technique for closing a diverting ileostomy and may be preferable in terms of reducing surgery times when chosen as a primary closure method.

Keywords: Ileostomy, fold-over, resection, anastomosis

ÖZ

Amaç: Saptırıcı ileostomiyi kapatmak için birden fazla teknik tanımlanmıştır. Ostomi yeri rezeksiyonu ve anastomoz dışında ostomi ön duvarı onarımı da yapılabilir. Ancak ideal bir teknik net olarak belirlenememiştir. Bu çalışmada rezeksiyon ve el ile anastomoz yapılan hastalar ile ön duvar onarımı yapılan hastalarda cerrahinin sonuçları karşılaştırıldı.

Yöntem: Bu çalışma retrospektif olarak planlanmıştır. Bir üniversite hastanesinde Ocak 2011 ile Eylül 2015 arasında ileostomisi kapatılan hastaların hastane kayıtları retrospektif olarak incelendi. Çalışmaya rezeksiyon ve el ile anastomoz yapılan hastalar ile ön duvar onarımı tekniği ile ileostomisi kapatılan hastalar dahil edildi. İki grup arasındaki cerrahi sonrası mortalite, morbidite, reoperasyon ve hastanede kalış süreleri karşılaştırıldı.

Bulgular: Ocak 2011 ile Eylül 2015 arasında loop ileostomisi kapatılan 43 hastanın hastane kayıtları incelendi. Hastaların ortanca yaşı 58 (24-84) ve 34'ü (%79) erkekti. Yirmi bir hasta (%49) kolorektal kanser nedeni ile opere olmuştu. Diğer hastalar benign hastalıklar nedeni ile opere edilmiş idi. On beş hastada ön duvar onarımı tekniği kullanılarak ostomi kapatılmış iken rezeksiyon ve el ile anastomoz tekniği 22 hastada kullanılmıştı. Rezeksiyon ve el ile anastomoz yapılan ile ön duvar onarımı tekniği ile ileostomisi kapatılan hastalarda cerrahi sonrası mortalite, morbidite, reoperasyon ve hastanede kalış süresi açısından anlamlı fark saptanmamıştır.

Sonuç: Rezeksiyon ve el ile anastomoz tekniği ile saptırıcı ileostomiyi kapatmak ön duvar onarımı tekniği kadar güvenli ve baştan seçildiğinde operasyonda zaman kazanmak açısından tercih edilebilir bir yöntemdir.

Anahtar Kelimeler: İleostomi, ön duvar onarımı, rezeksiyon, anastomoz

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Introduction

Diverting ileostomy is a commonly used procedure after colorectal surgery to protect the questionable anastomosis. Ileostomy has mostly replaced colostomy to divert the gastrointestinal contents. Although dehydration is higher postoperatively, loop ileostomy is recommended since wound infection rate is lower and hospital stay is shorter during stoma reversal.[1,2] Ileostomy, at the same time, is technically easier as mobilisation is not necessary.

However, several questions are yet to be answered. The optimal time for closure is still a matter of debate.[3,4] Surgical tecnique regarding closure depends on surgeon preference, experience, and skill. While some surgeons prefer fold-over technique, others claim resection of the stoma and end-to-end anastomosis is safer. Laparoscopic closure is gaining popularity where an end-to-end anastomosis is done.[5] Ileostomy reversal is considered to be a simple and safe procedure; however, the overall morbidity following closure of a diverting ileostomy has been reported to be is 17.3%-33% and the mortality to be 0.4%.[6,7]

In this study, ileostomy closures were reviewed retrospectively. Initial intent for closure was primary repair after taking down the stoma. However, while all ileostomies were fixed to the underlying fascia and there after matured by inverting the open end of the bowel to the subcutaneous tissue, dissection was mostly technically challenging. Resection and end-to-end anastomosis was done when primary repair was not possible or considered unsatisfactory.

This study investigates the postoperative course of patients treated with fold-over technique and end-to-end anastomosis.

Materials and Methods

Patients

Patients whose ileostomies were closed in Marmara University Hospital, between January 2011 and September 2015 were analysed retrospectively. Only patients with hand-sewn anastomosis and fold-over technique were included in the study. Patients whose anastomoses were done with staplers were excluded. The initial intent while closing the ileostomy was repair with fold-over technique as a preference procedure in our center. Resection and end-to-end anastomosis was done when primary repair was not possible or considered unsatisfactory.

In those patients in whom the ileostomy closure was done with fold-over technique, bowel was dissected free from the initial ileostomy incision and after clearing the margins of the bowel, the defect was repaired in two layers. While the inner layer was closed with polyglactin 3/0 sutures, the second inverting sutures were placed with 3/0 silk sutures. Similarly end-to-end anastomosis was done in two layers with 3/0 polyglactin and silk sutures.

All patients recieved antibiotic prophylaxis with cephazoline (1 gr). Ileostomy incisions were either closed primarily, left open for secondary healing, or closed with a purse string suture depending on the surgeon's preference.

Postoperatively no nasogastric decompression was done and oral feeding with liquids was begun on the first postoperative day. After oral feeding, when patients had distention or required nasogastric decompression oral feeding was stopped and these patients were defined as having intestinal obstruction.

Patients whose ileostomies were closed with the fold-over technique and patients with an end-to-end anastomosis were divided into two groups and postoperative course investigated. Patients in both groups were compared for age, gender, chemotherapy, radiotherapy, ileostomy duration, index operation, comorbid disease, smoking, alcohol consumption, postoperative complications, requirement for reoperation, and readmissions. Postoperative stay in hospital and mortality were obtained from the medical records.

Statistical Analysis

Background clinical data were analysed using the t-test and Mann-Whitney U test for continuous data, and Fisher's exact test or the chi-squared test for categorical data. Data were analysed using SPSS for Windows, version 20. All tests were two-sided, and p values below 0.05 were considered statistically significant.

This study was carried on with respect to the principles of World Medical Association Declaration of Helsinki.

Results

A total of 43 consecutive patients who underwent ileostomy closure between January 2011 and September 2015 were analysed.

The median age of the study cohort was 58 (24-84). Thirty four patients (79%) were male. Twenty one (49%) were operated for colorectal cancer while the others were operated because of benign diseases. The median ostomy duration was 6 (2-36 months). Out of 43 patiens 6 (14%) were operated laparoscopically during the index operation.

Preoperative irrigation through the ileostomy was performed for all of the cohort study. However, preoperative colonoscopy for evaluate the bowel passage was done only for 12 patients. Ileostomy closure with the fold-over technique with sutures was done in 15 patients and an end-to-end anastomosis in 22. In six patients other techniques, mostly with staplers were performed and therefore excluded.

No significant differences were found among patients whose ileostomies were closed with fold-over technique and those

Table 1. Patients characteristics and outcomes

	Primary closure n=15	End-to-end anastomosis n=22	p value
Age (median) years	59 (31-82)	53 (26-84)	0.13
Gender			0.06
Male	14 (94%)	14 (63%)	
Female	1 (6%)	8 (37%)	
Cancer diagnosis	9 (60%)	10 (45%)	0.32
Adjuvant chemotherapy	1 (6%)	5 (22%)	0.37
Adjuvant radiotherapy	0 (0%)	4 (18%)	0.14
Ileostomy duration (months)	7 (2-34)	5 (2-29)	
Index operation laparoscopic surgery	2 (13%)	4 (18%)	0.9
Comorbid disease:			
DM	1 (6%)	5 (22%)	0.37
HT	4 (27%)	4 (18%)	0.7
Coronary artery disease	1 (6%)	1 (5%)	1.0
Renal failure	1 (6%)	0 (0%)	0.41
Smoking	7 (47%)	9 (41%)	0.71
Alcohol	1 (6%)	0 (0%)	0.41
Preoperative evaluation for passage			
Colonoscopy	3 (20%)	7 (32%)	0.34
Preoperative irrigation through in ileostomy	15 (100%)	22 (100%)	
Postoperative intestinal obstruction	6 (40%)	8 (36%)	0.82
Anastomosis leak	0 (0%)	0 (0%)	1.0
Postoperative stay in hospital (median, days)	4 (2-14)	4 (2-11)	1.0
Reoperation	1 (6%)	0 (0%)	0.41
Readmission	1 (6%)	1 (5%)	1.0
Mortality	1 (6%)	0 (0%)	0.41

who had resection with an end-to-end anastomosis in terms of duration of hospital stay, postoperative complications, requirement for reoperation, readmissions, and mortality (Table 1).

One patient in the fold-over technique group died due to aspiration pneumonia after having intestinal obstruction five days after the operation. The only reoperated patient was also in the fold-over technique group after unsuccesful conservative treatment for intestinal obstruction with nasogastric decompression. Other patients in both groups who had postoperative ileus were treated successfully either with stopping oral feeding or insertion of a nasogastric tube when needed.

Discussion

Diverting ileostomy is a commonly used procedure after colorectal surgery to protect the questionable anastomosis. However, ileostomy closure is often technically demanding and complications and mortality are not uncommon. Clinically most commonly encountered dreadful complications after closure are anastomotic leakage and delayed bowel function. Although anastomotic leakage is uncommon, delayed bowel function is commonly encountered and delays hospital discharge, increases cost, and causes patient dissatisfaction.

Although various techniques for ileostomy reversal have been described, a gold standard does not exist. A diverting ileostomy reversal can be accomplished by a hand-sewn or stapled anastomosis after resection of a segment of the small bowel[8] or with the fold-over technique. Stapled anastomosis has gained popularity for its simplicity and acceptable clinical outcomes,[9,10,11] but requires expensive extra equipment. Different techniques have not been adequately discussed in clinical practice and in the literature. This study tries to fill

this gap. This study shows that the fold-over technique and resection with an end-to-end anastomosis have similar short-term clinical outcomes for diverting ileostomy reversal.

Luglio et al.[12] noted that the fold-over technique was associated with a shorter operative time, a lower morbidity rate and a faster recovery outcomes compared to the end-to-end, hand-sewn anastomosis. They also suggest that the stapled technique may be preferable to the hand-sewn anastomosis when a bowel resection at the ileostomy site is necessary. However, Leung et al.[9] reported no significant differences in short-term outcomes between the hand-sewn or the stapled technique. Cheong et al.[13] compared the clinical outcomes between the fold-over technique and a stapled or a hand-sewn technique with bowel resection for ileostomy reversal after rectal cancer surgery and reported similar short-term clinical outcomes.

The optimal time for closure is still a matter of debate but in recent years studies have revealed that early closure is possible and feasable.[4] In this study, closure times were not investigated in the study and most commonly closure times were longer than the average waiting times in published papers. Median closure times were 7 and 5 months in the primary repair group and end-to-end anastomosis group respectively due to patient and hospital related factors.

Many surgeons assume that after careful dissection, fold-over technique is the optimal surgical technique because an end-to-end anastomosis is potentially more prone to complications including anastomotic leakage and stenosis. Surgeons assume that when primary repair is done, leakage is less likely and stenosis is unlikely as the intact healthy intestinal part will be able to distend to prevent obstruction and delayed bowel movement.

However, although this is a small study group, there were no differences among the two groups. Number of patients with delayed bowel movement, hospital discharge days, and readmissions were similar in patients whose ileostomies were closed either with primary suture or end-to-end anastomosis. There was one mortality in the primary repair group and the only reoperated patient was also in this group. There were no anastomotic leaks in either group.

In this retrospective study, operating times were not clearly defined in those patients treated with an anastomosis. While all patients were operated with a primary suture intent, it was not possible to define the time for dissection, primary suture, or anastomosis separately. Therefore it is not possible to draw a conclusion that if the operation was done with an anastomosis intent in the first place, operating times will be less. However, in those patient where a primary repair was done and considered unsatisfactory and a resection and anastomosis done, it can be assumed that operating times will be longer.

This study has some limitations that need to be acknowledged. The retrospective design of the study and small sample size prohibits major conclusions. Selection of the fold-over or the resection with end-to-end anastomosis technique was determined by the surgeon during the operation according to final situation of the bowel and causes a selection bias.

Never the less, this small study reveals that during ileostomy closure, resection and hand-sewn end-to-end anastomosis is not associated with increased postoperative complications. There were no anastomotic leaks and number of patients with delayed post operative bowel movements were the same in both groups. Hospital discharge times were similar. Moreover, the only reoperated patient and the single mortality was in the primary repair group.

During ileostomy closure resection and anastomosis has several advantages. After primary repair, inversion of the bowel may impair passage and sometimes this problem can be underestimated or can be improperly interpreted especially with less experienced surgeons. After considering primary repair unsatisfactory, the surgeon may proceed to resection and anastomosis which will increase operating times. Resection and an anastomosis looks like a better defined and standard procedure. Anastomosis with staplers should be further investigated.

Conclusion

Resection and an anastomosis with initial intent is a safe technique and looks like a better choice than fold-over technique to save time in diverting ileostomy reversal.

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Ethics

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects" (amended in October 2013), Informed Consent: Written informed consent was not obtained since patients data were analysed retrospectively without any additional intervention or invitation to the hospital.

Peer-review: Internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: Wafi Attaallah, Ahmet Özdemir Aktan, Concept: Wafi Attaallah, Ahmet Özdemir Aktan, Design: Wafi Attaallah, Ahmet Özdemir Aktan, Data Collection or Processing: Wafi Attaallah, Ahmet Özdemir Aktan, Analysis or Interpretation: Wafi Attaallah, Ahmet Özdemir Aktan, Literature Search: Wafi Attaallah, Ahmet Özdemir Aktan, Writing: Wafi Attaallah, Ahmet Özdemir Aktan.

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