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Transanal drainage tube reduces rate and severity of anastomotic leakage in patients with colorectal anastomosis: A case controlled study

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HIGHLIGHTS

- A transanal drainage tube as a mechanism to reduce anastomotic leakage is proposed.
- Transanal drainage tube reduces anastomotic leakage 3.6% vs. 13.6% (p = 0.007).
- Transanal drainage reduced the grade of complication (e.g., Dindo ≧ 3b: 20.0% vs. 92.9%; p = 0.006).

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ABSTRACT

Background and aims: The aim of this study was to investigate the clinical usefulness of the placement of a transanal drainage tube to prevent anastomotic leakage in colorectal anastomoses.
Material and methods: This single-center retrospective trial included all patients treated with surgery for benign or malign colorectal disease between January 2009 and December 2012. The transanal drainage tube was immediately placed after colorectal anastomosis until day five and was routinely used since 2010. Patients treated with a transanal drainage tube were compared with the control group. Statistical analysis was performed using Fisher's exact or Chi-square tests for group comparison and a linear regression model for multivariate analysis.
Results: This study included 242 patients (46% female; median age 63 years; range 18–93); 34% of the patients underwent a laparoscopic procedure, and 57% of the patients received a placement of a transanal drainage tube. Anastomotic leakage occurred in 19 patients (7.9%). Univariate analysis showed a higher rate of anastomotic leakage in patients with an ASA score 4 (p = 0.02) and a lower rate in patients with transanal drainage placement (3.6% vs. 13.6%; p = 0.007). The grading of the complication of anastomotic leakage was reduced with transanal drainage (e.g., Dindo ≧ 3b: 20.0% vs. 92.9%; p = 0.006), and the hospital stay was shortened (17.6 ± 12.5 vs. 22.1 ± 17.6 days; p = 0.02). Multivariate analysis revealed that transanal drainage was the only significant factor (HR = −2.90; −0.168 to −0.032; p = 0.007) affecting anastomotic leakage.
Conclusions: Placement of a transanal drainage tube in patients with colorectal anastomoses is a safe and simple technique to perform and reduces anastomotic leakage, the severity of the complication and hospital stay.

1. Introduction

Anastomotic leakage (AL) after colectomy is one of the major complications in colorectal surgery. The incidence of AL ranges from 2% to 4% with proximal anastomosis to 6%–12% with distal extraperitoneal anastomosis [1] and is associated with mortality

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rates of approximately 10% [2,3]. However, incidence and mortality up of to 30% [4,5] have been reported in rectal surgery. A combination of anatomical inaccessibility, less than optimal blood supply, tightly closed anal sphincter below an ultralow anastomosis and an infected pelvic hematoma are likely to be contributory factors. In addition, leakage after low anterior resection in patients with cancer may be associated with a higher local recurrence rate and a worse outcome [6,7]. Consequently, several preliminary studies have been designed to investigate the role of transanal devices in the prevention of leakage. This technique has been proven to be comparable in the prevention of anastomotic failure, together with benefits of less surgical injury, avoidance of a second surgery, and finally, lower morbidity [8–10].

The potential role of a transanal drainage tube (TDT) is supposed to be beneficial for the reduction of endoluminal pressure as well as fecal diversion, resulting in a protective effect on anastomotic healing. However, the majority of previous studies have been limited by a small sample size and use of a nonrandomized control group. In addition, the nonstandardized use of the technique, including the material used in the construction of the TDT, the shape of the tube, and the duration of its placement, has been reported. Moreover, inconsistent results were obtained in a retrospective study, which failed to prove the efficacy of the device [11]. There has only been one prospective randomized controlled study, which demonstrated a benefit for the TDT with regard to the reduction of anastomotic bleeding and AL [12]. Thus far, no study had shown an effect of a TDT on the severity of anastomotic leakage.

To further clarify the question of whether a TDT reduces the rate and severity of AL after colorectal anastomosis, we performed this retrospective study of prospectively collected data.

2. Material and methods

This retrospective study of prospectively collected data included all consecutive patients who were treated by surgery for benign or malign colorectal disease with colorectal anastomosis between January 2009 and December 2012 in our operative department. The study was performed according to the guidelines of the local ethic committee.

The following variables were analyzed: gender, age, mortality, ASA-score, hospital stay, surgical complications, medical complications, placement of TDT, malignancy, urgency of the procedure (emergency vs. semi-elective vs. elective), bowel preparation, operation technique (laparoscopic vs. open), abdominal drainage, endoscopic control of the anastomosis, diverting ileostomy, type of resection (anterior, low anterior, extended low anterior rectum resection), anastomotic technique (E/E vs. E/S vs. S/E vs. S/S), delayed anastomosis and anastomotic procedure (hand-sewn vs. stapled).

The following are criteria for the inclusion of patients in our study: colorectal anastomosis after resection of the sigmoid or rectum for benign or malign underlying disease >18 years. Exclusion criteria were underlying gynecological disease as a reason for colorectal resection, Hartmann reversal operation, left-sided hemicolectomy and abdominoperineal resection.

For the purpose of this study, 242 patients were divided into two groups: the transanal drainage group (TD) and non-transanal drainage group (NTD), and we investigated whether a TDT was or was not used during the operation.

2.1. Surgical technique

The TDT was established as a routine clinical practice in December 2009 at our department. A 28 Charrière natural rubber latex foley catheter (Telefex Medical™) was inserted transanally immediately after the air leak test of the performed colorectostomy. It was placed between five and ten centimeters proximal to the anastomosis with visual or palpatory control and fixed using a 2-0 Vicryl™ perineal suture.

Every anastomosis, which was performed during a second-look operation after initial damage control surgery, was defined as delayed anastomosis. Loop ileostomy was selected for nearly all lower colorectal anastomosis below the peritoneal reflection in oncological surgery and routinely after neoadjuvant radiotherapy for rectal cancer.

2.2. Anastomotic leakage

In the TD group, AL was defined as an extravasation observed by the radiologist in the routinely performed radiography on POD five with a contrast clyster. In the control group, AL was mostly (75%) confirmed using a CT scan, in cases where clinical signs, such as fever, severe abdominal pain, elevation of leukocytes and CRP or fecal delivery of the abdominal drain, occurred. In the CT scan, AL was proven in cases of air bubbles or edema with inflammatory reactions in the perianastomotic area.

We established a dehiscence score related to the size of the AL as the following: 1 = small dehiscence <10 mm; 2 = medium dehiscence >10 mm <semi-circular; and 3 ≥ semi-circular.

Surgical and medical postoperative complications were classified as grade one to five according to Dindo et al. [13].

The urgency of the procedure was categorized as an emergency (which indicated an immediate operation due to, e.g., free perforation with peritonitis), semi-elective (within seven days after admission due to, e.g., ineffective antibiotic treatment in diverticulitis) and elective surgery.

Oral bowel preparation with CleanPrep™ was performed when a loop ileostomy or intraoperative colonoscopy was planned. Rectal clysters were applied at the surgical ward before the patient was moved to the operation room in all other elective cases. No preparation was performed in the emergency procedures.

2.3. Statistical tests

All statistical analysis was performed using SPSS Version 22.0 (International Business Machines Corporation, Armonk, NY). Continuous data are provided as the mean and standard deviation or the median and range. Dichotomous variables are represented as percentages. For group comparisons, either Fisher's exact or Chi-square tests were performed. All statistical tests were performed two-sided, and p-values <0.05 were considered statistically significant. For the multivariate analysis, a linear regression analysis was performed using the backwards method.

3. Results

In this study, 242 patients (103 (42.6%) female with a mean age of 63.5 (SD 14.3) years) were analyzed for the development of anastomotic leakage with a median hospital stay of 15 days. The hospital mortality rate was 1.2% (n = 3, myocardial infarction, AL, large bowel perforation).

The comparative demographic data, performed surgical techniques, underlying disease and complications between the interventional TD and the NTD groups are illustrated in Table 1.

The TDT was removed after a mean of 4.9 (SD 1.2) days. In 3 patients (2.2%), it was removed before postoperative day four, which caused the patients discomfort or perianal pain.