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Failing to reverse a diverting stoma after lower anterior resection of rectal cancer

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Abstract

BACKGROUND: A diverting stoma is an accepted adjunct to low anterior resection (LAR) for rectal cancer. However, some patients do not undergo a subsequent procedure to have the stoma reversed. We aim to determine incidence and risk factors for nonclosure of the diverting stoma.

METHODS: This is a retrospective study of stage I to III rectal cancer patients at a single institution having LAR with curative intent and a diverting stoma.

RESULTS: We studied 162 patients. Prevalence of nonclosure of the temporary stoma was 14.5% within 13 months of the index surgery. On a multivariate linear regression model, nonclosure was associated with anastomotic leak (odds ratio 9.89, 2.31 to 43.93, $P < .001$) and age older than 65 (odds ratio 2.76, 1.08 to 7.48, $P < .036$).

CONCLUSIONS: Prevalence of nonclosure of a diverting stoma after LAR for rectal cancer is substantial (14.5%). Patients should be counselled regarding this risk with particular attention to potential risk factors.

Sphincter-preserving low anterior resection (LAR) is the preferred surgical treatment of rectal cancer.[1,2] A diverting stoma with LAR decreases morbidity from anastomotic leaks and may even reduce the risk of anastomotic leak as shown in a multicenter trial and systematic review.[3,4]

However, a stoma presents challenges for patients,[5,6] including adjusting diet and clothing, the potential impact on particular line of work, and problems with sexual activity.[5] Difficulty adjusting to a stoma may occur despite preoperative education and can impact the patient both physically and psychologically.[7] Patients with diverting stomas have reported persistent feelings of uncertainty and a mixture of anxiousness and expectation.[7]

Despite being created with the intention of being reversed subsequently, some patients never undergo closure of their "temporary" diverting stoma.[8] The prevalence of nonclosure of temporary stomas after colorectal resection is reported as 6% to 32%.[9–14] Previously reported risk factors for failing to reverse a temporary stoma include advanced age, anastomotic leak, metastatic disease, and adjuvant chemotherapy.[11–13]

The purpose of this study was to determine the prevalence of nonclosure of diverting stomas and to identify risk factors for failing of reversal.

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Methods

Study design

This is a retrospective chart review of all rectal cancer patients treated by 3 colorectal surgeons at a single academic institution from 2006 to 2012 using the St Paul's Hospital Colorectal Cancer Database. The study was approved by the ethics boards of St Paul's Hospital and the University of British Columbia.

Inclusion and exclusion criteria

We included patients with stage I to III rectal cancer who underwent LAR with diverting stoma with curative intent and who had a minimum of 13 months of postoperative follow-up. We excluded redo LAR for recurrent rectal cancer.

Definition of permanent and reversed stoma

Similar to the definition used in other studies, a temporary stoma was deemed "permanent" if a reversal procedure had not been performed or if one had not been scheduled within 12.5 months of index resection of the rectal cancer.[11] Patients who underwent stoma reversal or were placed on a surgical wait-list for a reversal procedure within 12.5 months of follow-up were deemed "reversed." Data collected from the reversed cohort were used as the control group in this study.

Data collection

Potential risk factors for nonclosure of a diverting stoma were selected from previous studies: gender, age, Charlson Comorbidity Index Score, preoperative TNM stage, change in preoperative bowel habit, abdominal surgical history, American Society of Anesthesiologist score, use of neoadjuvant radiotherapy, urgency of surgery (elective vs emergent), tumor location (distance from anal verge), total mesorectal excision (TME) vs subtotal TME, surgical technique (open vs laparoscopic vs laparoscopic conversion to open), method of anastomosis creation (stapled vs hand-sewn), height of anastomosis, evidence of postoperative anastomotic leak confirmed by computed tomographic scan, hypaque enema (or endoscopically), and use of adjuvant radiotherapy. Date of the index procedure and date of the stoma reversal procedure were collected to calculate the time interval between procedures.

Statistical analysis

Statistical analyses were performed using the R Project for Statistical Computing v 2.15.2 (Auckland, NZ). The Fisher exact test and Mann–Whitney *U* test were used for statistical univariate analyses of the potential risk factors. All variables with P less than .2 during univariate analysis were selected for multivariate analysis. Multivariate analysis of potential risk factors was carried out using a regression model.

Results

One hundred sixty-two patients were studied, of which 160 had a diverting ileostomy, whereas 2 had a diverting colostomy; 138 (85.4%) patients underwent reversal of their diverting stoma or were scheduled for such. The average time interval from creation of a diverting stoma to reversal of the stoma was 347 days (range 59 to 1,343 days); 24 (14.6%) patients failed to undergo a reversal procedure.

Reasons for nonreversal of the diverting stoma were anastomotic leak in 8 patients (4.9%), local recurrence of cancer 5 (3.0%), development of metastases 5 (3.0%), patient choice 1, incontinence 1, anastomotic stricture 1, medical comorbidities 1, and unknown 2.

Risk factors for nonclosure

Table 1 summarizes the univariate analysis of potential risk factors for nonclosure of a diverting stoma. Postoperative anastomotic leak ($P < .01$) and age older than 65 ($P < .04$) were found to be statistically significant risk factors for nonclosure. Age as a continuous variable or at other dichotomous levels was not found to be statistically significant. TME vs subtotal TME trended to significance ($P < .06$). All other variables were not statistically significant in the univariate analysis. Urgency of surgery (elective vs emergent) was not analyzed as only 1 patient in the cohort was operated on emergently.

In Table 2, multivariate analysis using a linear regression model demonstrated that anastomotic leak (odds ratio 9.89, 2.31 to 43.93, $P < .01$) and age older than 65 (2.76, 1.08 to 7.48, $P < .04$) are independent significant risk factors for failing to reverse a diverting stoma. TME vs subtotal TME trended again to significance (.34, .11 to 1.06, $P < .06$).

Comments

LAR with diverting stoma has reported nonclosure rates of 8% to 32%.[9,10] Our nonclosure rate of 14.6% falls within the midrange of this spectrum and confirms that a significant percentage of patients fail to undergo closure of their temporary stomas. The average time interval between index surgery and reversal procedure of the temporary stoma of 347 days in our study was much longer in comparison to published literature (average range 178 to 207 days[11–13]), indicating that the previously reported nonclosure rate persists to at least a year.

Anastomotic leak was found to be a significant risk factor for nonclosure of a diverting stoma. Within the reversed group, 5 patients had anastomotic leaks—4 were