

Anastomotic Leak Following High Anterior Resection and Diverticular Disease as a Risk Factor

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Abstract: We have noticed high rate of anastomotic failure following high anterior resection in particular patients with diverticular disease and those who had meso-rectal excision for cancer of the rectum. We assessed the effect of those factors on the rate of anastomotic leak following anterior resection. All patients who had anterior resection at Auckland Hospital from 1992-2003 were reviewed for factors that can have effect on anastomotic leak. The effect of gender, age, level of anastomosis, diverticular disease and mesorectal excision was analyzed. There were 160 anterior resections. Leak was seen in 14% of those who had high anastomosis (above the peritoneal reflection), 7.6% in patients with ultra-low anastomosis (less than 6 cm from the anal verge) and 4% in patients with anastomosis between 6-10 cm above the anal verge. Multivariate analysis showed diverticular disease and meso-rectal excision were the only independent risk factors for leak following high anterior resection (more than 6 cm above the anal verge). High anterior resection has the highest risk of anastomotic failure in patients with diverticular disease and those who had meso-rectal excision.

Key words: Anastomotic leak, high anterior resection, diverticular disease

INTRODUCTION

Anastomotic leak rates have increased since the introduction of total mesorectal excision for rectal cancer^[1]. Low rectal cancers that need low coloanal anastomosis has high clinical leak rates compared with other colorectal anastomosis^[2]. In general anastomotic leak happens in about 6% following total mesorectal excision^[3].

We noticed increased rate of anastomotic leak in patients who had high anterior resection for cancer of the recto-sigmoid junction or distal sigmoid colon and those who had elective sigmoid colectomy and anastomosis of the descending colon to the upper rectum for recurrent diverticulitis. We conducted this study to evaluate the effect of diverticular disease on rate of anastomotic leak.

MATERIALS AND METHODS

Auckland Hospital audit was searched for patients who had the procedure anterior resection to include all patients who had anterior resection for cancers of the distal sigmoid and rectum or elective surgery for diverticular disease that involves removal of sigmoid colon and those who had meso-rectal excision. Clinical records were reviewed for the operation notes, gender, level of the anastomosis, and indications of surgery, leak rates and presence of diverticular disease. Risk factors of

leak were analyzed by logistic regression analysis using SPSS 11.5.

RESULTS

Between 1992 and 2002, 160 patients (84 males, median age 64) had anterior resection, 63 had high level of anastomosis (10-15 cm above the anal verge). The anastomosis was either double stapled or hand-sewn depending on the preference of the surgeon. 45 had colorectal anastomosis about 6-10 cm above the anal verge (double stapled) for cancer of the recto-sigmoid junction.

Low anterior resection with double-stapled anastomosis (5 cm or less above the anal verge) was performed on 52 patients with a covering protective stoma. Of the 108 patients who had high anastomosis 31 had hand-sewn anastomosis, the rest had double stapled anastomosis.

Patients who had clinical suspicion of anastomotic leak underwent either CT scan or Gastrografen enema. The reported leak rates are those who were evident on radiological examination.

Leak was detected in 15 patients (9%), high resection was followed by 14% leak rate, low anastomosis has a leak rate of 7.6%, mid level anastomosis was associated with leak rate of 4%. Several variables were analysed including age, gender, type of the anastomosis (hand-sewn or

	All patients		High anastomosis	
	Numbers	P	Numbers	P
Gender	F:2/75 M: 13/85	0.006	F: 2/35 M: 9/73	0.3
Anastomosis Level	High: 11/108 Low: 4/52	0.6		
Type of anastomosis	Sewn: 2/30 Stapled: 13/130	0.6	2/30 13/ 78	0.2
Protective stoma	N0: 11/108 Yes: 4/52	0.6		
Diverticular disease	Yes: 9/41 No: 6/129	0.002	7/24 4/74	0.004
Inferior mesenteric artery ligation	High: 9/62 Low: 6/98	0.09	8/43 3/65	0.02

Table 1: Diverticular disease

Level of anastomosis	Leak rate		Diverticular Disease	P
	No Diverticulosis			
High (108)	81 (4)		27(7)	0.03
Low (52)	48 (3)		6 (1)	0.07

stapled), level of anastomosis, mesorectal excision and protective stoma. Factors that correlated with anastomotic leak included diverticular disease, mesorectal excision with ligation of the inferior mesenteric artery, very low anastomosis, and male gender. Multivariate analysis revealed that diverticular disease and meso-rectal excision are the only factors that correlate with leak with odds ratio of 4.46 (95% CI 2.42-14.25) and 1.84 (95%CI 1.5- 4.92) respectively.

Further analysis was performed on the patients who had high level of anastomosis, which showed that diverticular disease is the only independent risk factor for anastomotic leak.

DISCUSSION

This study has shown that diverticular disease as an important independent risk factor for anastomotic leak following anterior resection for cancer of the rectosigmoid region and following elective sigmoid resection for recurrent diverticulitis. Mesorectal excision, whether total or partial is confirmed as another independent risk factor. In patients with elective sigmoid colectomy, the sigmoid colon is removed. Usually there is residual diverticulosis in the left colon that is anastomosed to the rectum. We suspect that small diverticuli at the line of the anastomosis often not detected that represent a weakness at the anastomotic junction. It is not possible to assess the effect of the tissue quality in diverticular colon on the leak rate from this retrospective series. Technically the

operation usually involves division of the superior rectal artery and partial excision of the mesorectum; the degree of blood flow reduction to the rectum following this procedure is not well studied. Possibly the combination of poor rectal perfusion following superior rectal artery division and poor tissue quality in diverticular colon complement each other to increase the anastomotic failure rate. CT scan imaging of the pelvis radiologically confirmed all leak rates in this study, in agreement with experience elsewhere^[12].

Mesorectal excision is associated with increased anastomotic leak rate^[1]. Typically anastomotic leak rate is inversely related to the distance of anastomosis from the anal verge^[4,8,11,13], that is usually the case in recto sigmoid cancer patients. Various factors have been studied in relation to leak such as pelvic drainage^[5], various stapling devices^[6] and diverting stoma^[7]. Altered perfusion of the rectal stump has been documented following mesorectal excision and division of the superior rectal artery for cancers of the distal sigmoid and upper rectum by laser Doppler flow measurement and it has been found to affect the anastomotic failure rate^[9]. In this series of patients there was no preoperative radiotherapy or chemotherapy Enker et al found no increase of leak rate following pre-operative radiotherapy for rectal cancer^[10].

We are not aware of any study that addresses the effect of diverticular disease on leak rates following anterior resection. We recommend further evaluation of diverticular disease on colorectal anastomosis in general. Further studies are needed to assess the effect of meso-rectal excision on blood flow to the rectal stump and its impact on leak rates following different levels of anastomosis between the rectum and the colon.

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