

Research Article

The Incidence of Anastomotic Leak in Elective High Anterior Resection for Diverticular Disease vs. Neoplasia

Ankur Sidhu^{1*}, Kiran Narula², Eric Daniel¹, Marina H Wallace^{2,3}, Gregory Makin^{2,4}

¹Northern Health, 185 Cooper Street, Epping, Victoria, Australia

²Fiona Stanley and Fremantle Hospital Group, 11 Robin Warren Drive, Murdoch, Western Australia, Australia

³School of Medicine, University of Western Australia, Crawley WA, Australia

⁴St John of God Murdoch Hospital, 100 Murdoch Drive, Murdoch, Western Australia, Australia

***Corresponding Author:** Ankur Sidhu, Northern Hospital, 185 Cooper Street, Epping VIC 3076, Australia, E-mail: Sidhu.ankur@gmail.com

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Abstract

Background: There is a paucity of data comparing the incidence of anastomotic leak (AL) between resections for diverticular disease (DD) and neoplasia (NN). We compared the incidence of anastomotic leak in open or laparoscopic high anterior resections (HAR) between DD and NN.

Methodology: A retrospective review of prospectively collected data was performed on patients presenting to Fremantle Hospital, Fiona Stanley Hospital and St. John of God Hospital, Murdoch between 2007 and 2016 for an elective HAR. Data in relation to patient demographics, method of operation, morbidity,

mortality, length of stay and anastomotic leak was collected and analysed.

Results: A total of 534 patients were identified with 340 patients undergoing a high anterior resection for NN and 194 patients for DD. The incidence of anastomotic leak for the NN and DD groups were 4.7% (n=16) and 7.2% (n=14) respectively (p 0.244) with an overall incidence of 5.6% (n =30). Two patients in each group were treated with antibiotics; all others were returned to theatre for operative intervention. The median length of stay for patients in the NN group was 5 days compared to 6 days for the DD group (p=0.304).

In-hospital mortality for patients in the NN and DD groups were 0.03% (n=1) and 1.0% (n=2), respectively (p=0.300).

Conclusion: An elective high anterior resection for diverticular disease can be performed safely with acceptable rates of morbidity and mortality.

Keywords: Anastomotic Leak; Diverticular Disease; Neoplasia

1. Introduction

Diverticular disease (DD) is a common medical condition leading to hospital admissions and a significant cost to healthcare [1, 2]. The prevalence of DD is age dependent with 60% of the population developing diverticulosis by the age of 60 years [3]. Approximately 10-25% of these patients will develop diverticulitis and its associated complications [4]. Interval sigmoid resection has been suggested as means to prevent recurrent attacks of diverticulitis. Previous studies have suggested elective resection after two episodes of uncomplicated diverticulitis [5], however, this paradigm is being challenged by more recent studies [6]. Despite being a benign process, anterior resection for DD can be challenging. Complicated diverticular disease can be technically difficult thereby increasing morbidity in open or laparoscopic surgery. Anastomotic leak after anterior resection is one of the most detrimental complications causing significant morbidity and mortality for the patients [3]. It can lead to additional interventions, prolonged hospital stays, and can result in further operative intervention and death [7, 8]. Previous studies have quoted an anastomotic leak rate of 3-23% after anterior resection [9, 10]. There is a paucity of local data comparing the incidence of anastomotic leak between anterior resections for DD and neoplasia (NN) in the elective setting. In this study,

we aim to compare the incidence of anastomotic leak in open or laparoscopic high anterior resections for diverticular disease and neoplasia.

2. Methods

A retrospective search was carried out on two prospectively maintained databases for patients presenting to Fremantle Hospital, Fiona Stanley Hospital and St John of God Hospital, Murdoch for an elective high anterior resection between the period of August 2007 and August 2016. High anterior resection was defined as a colorectal anastomosis above the peritoneal reflection. All patients who underwent elective high anterior resection for the indication of DD or NN were included in this study. The exclusion criteria for this study were-acute or subacute presentation, covering or previous stoma, multiple anastomoses, cystectomy and or liver resection. The diagnosis of anastomotic leak was established on radiology or the requirement of a therapeutic intervention within 30 days of the operation. Anastomotic leaks were graded according to the classification proposed by the International Study Group of Rectal Cancer [11]. Data was collected from electronic medical records which included age, sex, BMI, ASA, method of operation i.e laparoscopic or open and conversion rate. Post-operative data collected included mortality rate, morbidity, length of stay and anastomotic leak rate.

2.1 Statistical analysis

Data calculations were carried out using Microsoft Excel for Mac 2016 and GraphPad Software, Inc. (<http://www.graphpad.com/quickcalc/>). Data collected from medical records were classified as binomial, categorical or continuous. Chi-square and Student's T-test were applied where appropriate. A p-value of <0.05 was considered statistically significant.

3. Results

Over the period of this study, 534 elective high anterior resections were identified. Out of 534 resections, 340 resections were performed for NN and 194 resections were performed for DD. The mean age of patients in NN cohort was 66 years and mean age of patients in DD cohort was 58 years. In the NN cohort, 41% of patients were female and 59% of patients were male and in the DD cohort, 50.5% of patients were female and 49.5% of patients were male. The mean ASA score was 2 in both groups (Table 1). The majority of operations were performed laparoscopically with 80% of the resections performed laparoscopically for NN compared to 84.5% of the resections performed for DD. The conversion to open surgery rate in was 2.9% in NN group and 2.4% in DD group. There was no statistically significant

difference in conversion rate between two groups (p-value=1.0).

The incidence of anastomotic leak for the NN and DD groups was 4.7% (n=16) and 7.2% (n=14), respectively (p-value=0.244). Two patients in each group had a Grade B leak. They were treated with antibiotics only. The rest were classified as a Grade C leak and were managed operatively in theatre. Overall incidence of anastomotic leak was 5.6% (n=30). Median length of stay in hospital was 5 days in the NN group and 6 days in the DD group (p-value=0.304). In-hospital mortality was 0.03% (n=1) and 1.0% (n=2) in the NN and DD groups, respectively (p-value=0.300) (Table 2).

	Diverticular Disease	Neoplasia	P-value
Age (years)	58	66	0.001
Sex n (%)	M-96 (49.4%)	M-200 (58.8%)	0.038
	F-98 (50.6%)	F-140 (41.2%)	
ASA score	I-30	I-44	0.140
	II-119	II-185	
	III-40	III-99	
	IV-2	IV-6	

n=number

Table 1: Patient characteristics.

	Diverticular Disease (n=194)	Neoplasia (n=340)	p-value
Conversion Rate n(%)	4 (2.4%)	8 (2.9%)	1.0
LOS (days)	7.4	6.9	0.304
Anastomotic Leak n(%)	14 (7.2%)	16 (4.7%)	0.244
Mortality n(%)	2 (1%)	1 (0.03%)	0.3

n=number

Table 2: Post-operative outcomes.

4. Discussion

The current guidelines for elective resection for diverticular disease are varied. The American Society of Colon and Rectal Surgeons (ASCRS) previously recommended elective sigmoid colectomy after one to two episodes of acute uncomplicated diverticulitis [12]. This recommendation has now changed to a more individualised approach. However, an RCT comparing surgery versus conservative management for recurrent and ongoing left sided diverticulitis showed that patients who had undergone elective sigmoidectomy had better quality of life scores than patients managed conservatively. The overall anastomotic leak rate for the study was 12% [13]. In juxtaposition, the various guidelines for resection of neoplasia show considerable equipoise [14, 15]. The comparison between NN and DD groups show that they were well matched in ASA score, laparoscopic approach and conversion rate. In our study, we found that patients undergoing anterior resection for DD were younger than patients in the NN group. This could either be related to the disease process or could be due to younger patients being offered and more agreeable to a resection for a benign condition.

Laparoscopic anterior resection for diverticular disease has previously been demonstrated to have acceptable morbidity and mortality [9, 16, 17]. Anastomotic leak post anterior resection is one of the most feared complications. The anastomotic leak rate in our study was acceptably low with 4.7% in the NN group and 7.2% in the DD group. Comparison of the two groups did not reach statistical significance suggesting that anterior resection for DD is equally as safe as for NN within the limitations of this study. The laparoscopic conversion to open rate for NN and DD resections in our study was 2.9% and 2.4%, respectively. These rates are similar to those reported by previous studies [18, 19]. The major consequence of conversion is purported to be the

increased morbidity and mortality rates as reported by some studies [20]. However, Shwandner et al. [21] illustrated that this was not the case in their series of 300 laparoscopic colorectal procedures. Other studies have also sub-analysed the conversion rates based on the complexity of diverticular disease to show that complicated diverticular disease had higher conversion rates than uncomplicated diverticular disease [22, 23].

The 30-day mortality rate in our series was 0.03% in the NN group and 1% in the DD group and (p-value=0.3). These rates are comparable to previous similar studies [18, 24]. The median length of stay was similar between the two groups, with 5 days in the NN group and 6 days in the DD group. A slightly higher length of stay in the DD group could be related to more technically difficult surgical dissection due to inflammation, fibrosis and adhesions from the disease process. These results were similar to those reported by Van Arendonk et al.[25] who looked at patients undergoing colectomy for diverticular disease, cancer or inflammatory bowel disease. A large study [26] using propensity score matching compared the post-operative outcomes following sigmoidectomy for DD and NN. This study concluded that elective sigmoidectomy for DD had a higher risk of infective complications whereas sigmoidectomy for NN had a higher risk for anastomotic leak. The weakness of this study lies in the variation of pre-operative work-up of patients and the operative techniques employed in performing sigmoidectomy. However, the strength of the study lies in the very large numbers analysed and therefore the conclusions of the study must be considered.

Our study had only moderate numbers over a 10-year period but the patients analysed were from a prospective database. Furthermore, all resections were performed by a single Colorectal unit thereby controlling for variation

in techniques. All surgeons performed a high inferior mesenteric vessel ligation and splenic flexure was mobilised routinely with an end-end endo-luminal stapled anastomosis performed. The weaknesses of our study include the lack of secondary outcomes being recorded such as unplanned admission to intensive care unit, surgical site infections and deep vein thromboses. Additionally, moderate numbers may have prevented establishing a statistically significant difference in outcomes measured in our study.

5. Conclusion

Within the limitations of the retrospective review, we conclude that anterior resection for diverticular disease is safe and can be performed with acceptable morbidity and mortality.

Conflict of Interest

None.

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