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Factors Influencing Anastomotic Leakage after Resection of Rectal Carcinoma

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ABSTRACT

Background: Anastomotic leaks are among the most dreaded complication after colorectal surgery. Anastomotic leak which occur in about 20% of patients, can be avoided by constructing anastomosis with well vascularized tissue without tension. Anastomotic leaks usually present between 4 and 7 days postoperatively
Aim: To find out various factors influencing anastomotic leakage after resection of Rectal Carcinoma.

Methods: This is a observational study conducted in general surgery ward medical college Kottayam in patients with carcinoma rectum who underwent Anterior Resection or Low Anterior Resection. Data from 84 patients was analyzed to identify factors that might have influenced anastomotic leak.

Results: Among 84 patients studied there were 48 males & 36 females with a median age of 60 yrs. Low Anterior Resection were performed in 28 patients and Anterior Resection was performed in 56 patients. 12 patients underwent neoadjuvant chemoradiotherapy. Diverting stoma was created in 8 patients. Four patients developed anastomotic leak in my study who required re-exploration. In my study the risk of leakage was found to be more when the anastomosis was nearer to the anal canal and in patient who had preoperative chemoradiotherapy.

Conclusion: Low anastomosis, distance of the tumour from anal verge and preoperative chemoradiotherapy were found to be risk factors associated with development and anastomotic leak. Diverting stoma is not mandatory in all patients undergoing Anterior Resection but can be considered in patients with multiple risk factors.

Keywords: Anastomotic leakage; Total mesorectal excision; circumferential resection margin; anterior resection; Low anterior resection

INTRODUCTION

As we enter the 21st century, rectal cancer continues to be a significant medical and social problem. Currently rectal cancer comprises nearly 30% of all colorectal cancer. Approximately 42000 patients are diagnosed with adenocarcinoma of the rectum each year in the United States and 85000 people succumb to this disease within the same period. During the past 3 decades, the incidence of colorectal cancer was at a low level in urban and rural population in India in comparison with the figures observed in developed countries of Europe & North America[1]. The age standardized incidence rate of rectal cancer during 2004 to 2006 ranged from 0.01 to 5 per 1,00,000 population with a male preponderance in most Indian registries[2]

Anastomotic leaks are among the most dreaded complication after colorectal surgery. Anastomotic

leak which occur in about 20% of patients, can be avoided by constructing anastomosis with well vascularized tissue without tension. Anastigmatic leaks usually present between 4 and 7 days postoperatively.

The definition of anastomotic leakage in this study is fever, tachycardia, tachypnoea associated with pus or fecal discharge from the drain, pelvic abscess, peritonitis, rectovaginal fistula, enterocutaneous fistula or discharge or pus per rectum. Radiologically demonstrated leakage without clinical symptoms is not included.

In this study, I am analysing the different variables associated with anastomotic leakage such as age, sex, comorbidity, smoking or alcohol abuse, tumour related bowel narrowing, complete bowel obstruction, preoperative radiotherapy, the distance of the tumour from the anal verge, operating time, type of anastomosis (stapled or hand sewn), presence of defunctioning stoma, pelvic drain, presence of intraoperative adverse events.

MATERIALS AND METHODS

Design - Observational Study

Setting - Department of General Surgery, Government Medical College,

Kottayam, Kerala, India

Study period - One year

Sample Size

n=84, we do not assume normality for our sample ,so we use binomial and chi square test. In chi square test probability value (p value) less than or equal to 0.05 was considered to be statistically significant. In binomial test, p value less than 0.05 means the proportions are significantly different. Mean, median, standard deviation etc. are formed for the continuous variable age with respect to complication (anastomotic leak)and radiation.

Inclusion Criteria

1. Age from 40-85 yrs.
2. Patient with operable rectal carcinoma with or without pre or planned postoperative radiotherapy.
3. Tumour site is within 15 cm from the anal verge as demonstrated by colonoscopy.
4. Emergency surgery.
5. Laparoscopic resection.

Exclusion Criteria

1. Patients with depression ,chronic pain disorder, insulin dependent diabetes mellitus
2. History of severe or repeated post operative pain & vomiting after previous minor surgery.
3. Age < 18 yrs.
4. Patients who did not receive standard anaesthesia or received intra operative additional steroids were also excluded.

Methodology

All cases of carcinoma rectum undergoing Anterior Resection in the General Surgery Department of Govt. Medical College, Kottayam during the period of the study.

Informed consent was obtained from all the patients included in the study.

Each patient's history was recorded to determine any pre-existing illness, admitting symptoms with duration, relevant personal & family history and predisposing factors as per the specified proforma.

Relevant examination and investigation findings were noted as per the proforma. Colonoscopy or sigmoidoscopy were performed in all the patients to localize the lesion & for tissue sampling. Chest x-rays were performed in all the patients to rule out lung secondaries. Contrast enhanced computed tomography was performed to determine the extent of the tumour, to assess lymph nodes & to detect liver secondaries. Routine preoperative blood investigations were done. All patients received mechanical bowel preparation with polyethylene glycol (PEG) solution a day before the planned procedure. Prophylactic antibiotics were administered at the time of induction. Antibiotics were continued for 5 days post operatively. The decision to perform handsewn Vs stapled anastomosis & the decision to add a proximal diverting stoma (either loop ileostomy or loop colostomy) were taken by the operating surgeon on a case to case basis. Drains were routinely left in the pelvis, near the anastomosis in all patients and were removed when the drainage was serous in nature and the amount was less than 50ml/day. Operative details and techniques are collected which

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included tumour site, type of surgery, duration of surgery, type of anastomosis as per the specified proforma. Patients were monitored during the postoperative period for any signs of anastomotic leakage. Follow up was done during the 4th & 10th week to assess any delayed anastomotic leakage. The results of the cases were carefully tabulated and analyzed.

RESULTS

We were able to obtain a total of 84 cases for this study. Out of this 36 were females and 48 were males.

The mean age of the patients in my study is 60 years

Out of 84 patients studied, the mean age of the patient is 60 years. (Table 1)

Among the 84 patients studied, 36 patients used to smoke (43%) and 28 patients used to drink alcohol (33%) and 48 patients didn't smoke (57%) & 56 patients didn't use alcohol (67%)

Among the 84 patients studied, 12 patients received neoadjuvant chemoradiotherapy (14%) and 72 patients didn't receive chemoradiotherapy. There is statistically significant association between radiation treatment and development of anastomotic leak in my study (P value =.012).(Table 2)

Among the 84 patients, 8 patients had site of tumour <5cm from the anal verge, 24 patients had the tumour between 5-10 cm from the anal verge & 52 patients had the tumour >10cm from the anal verge. There is statistically significant association between the site of tumour and anastomotic leakage (P value = 0.007) (Table 3)

Among the 84 patients studied, 56 patients underwent anterior resection and 28 patients underwent low anterior resection. Among the 84 patients studied, hand sewn technique was used in 4 patients , stapled anastomosis was done in rest of the patients.(Table4)

Among the 84 patients studied, defunctioning stoma was created in 8 patients, stoma was not created in 76 patients. There was no statistically significant association between the presence of defunctioning stoma and anastomotic leak.(Table 4)

DISCUSSION

Various patient related factors have been enumerated as predisposing factors for anastomotic leak. According to literature, male sex of the patients was considered as a risk factor for anastomotic leak. In a previous study conducted in753 patients, the number of leaks was found to be more in males[3]. But in my study no significant association was observed in the development of anastomotic leak between male & female patients.

Previous studies showed increased anastomotic leak in patients with diabetes mellitus, cardiac failure, poorly controlled hypertension etc[3,4]. This could be due to poor tissue perfusion and increased risk of infection. But in the present study no significant association was found between anastomotic leak and other co morbid conditions.

In prior study conducted by Kumar A et al, advance age was found to be a risk factor for anastomotic leak111. Various studies done by Liu Yang et al, C.M Teoh et al, Te Chang Yueh et al also showed increased anastomotic leak with advance age and low level of site of tumour[3,5,6]. In this study distance of the tumour from the anal verge, the position of the anastomosis, patient's age & preoperative chemoradiotherapy were found to be the risk factors associated with the development of anastomotic leak.

According to my study, distance of the tumour from the anal verge was found be associated with increased risk of anastomotic leak. This could be due to increased technical difficulty and ischemia of the distal end. So location of the tumour can be considered as the strongest determinant for anastomotic leak in patients with carcinoma rectum.

Although the use of protective stoma has not been shown to decrease the overall anastomotic leak, it has shown to reduce the rate of reoperation & post operative mortality in the event of leak. Also protective stoma is found to be suitable after sphincter saving resection for rectal cancer for anastomosis situated less than 5 cm from anal verge[5,7]. According to my study, diversion colostomy is not mandatory in all patients undergoing anterior resection but can be reserved for those patients with high risk for anastomotic leak.

CONCLUSION

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Anastomotic leak is the dreaded complication of anterior resection of rectal carcinoma and it is associated with high mortality.

In the present study

Low anastomosis, distance of the tumour from anal verge and preoperative radiotherapy were found to be risk factors associated with development of anastomotic leak.

Location of the tumour can be considered as the strongest determinant for anastomotic leak.

Other risk factors were not found to be significant in this study, may be due to small sample size.

Diverting stoma is not mandatory in all patients undergoing anterior resection, but can be considered in patients with multiple risk factors.

Further understanding of factors contributing to anastomotic leak not only can prevent both physical and psychological morbidities of patients but can also reduce the cost of prolonged hospital treatment.

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Table 1: Age Group

Age	Frequency	Percent
38	4	4.8
46	4	4.8
49	4	4.8
52	8	9.5
54	4	4.8
55	4	4.8
56	4	4.8
59	4	4.8
60	4	4.8
61	4	4.8
62	4	4.8

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64	4	4.8
66	4	4.8
67	8	9.5
68	4	4.8
70	8	9.5
71	4	4.8
73	4	4.8

Table 2: Smoking, Alcoholism & Radiation

	Frequency	Percent
SMOKING		
Yes	36	42.9
No	48	57.1
ALCOHOL		
Yes	28	33.3
No	56	66.7
RADIATION		
Yes	12	14.3
No	72	85.7

Table 3: Tumour Site

Tumour Site	Frequency	Percent
Less than five	8	9.5
Five to ten	24	28.6
More than ten	52	61.9

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Table 4: Type of Surgery, Anastomosis and Defunctioning Stoma

	Frequency	Percent
SURGERY		
AR	56	66.7
LAR	28	33.3
ANASTOMOSIS		
Hand sewn	4	4.8
Stapled	80	95.2
DEFUNCTIONING STOMA		
Yes	8	9.5
No	76	90.5

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