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Role of Proximal Diversion in Preventing Anastomotic Leakage in Emergency Colonic Surgery

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Abstract :
Background: *Emergency surgery for colorectal disease is associated with high rate of complications and poor outcome. Our study aims to assess the role of proximal diversion in preventing anastomotic leakage in patients undergoing emergency colonic anastomotic surgery.*
Methods: *In this Hospital based observational study, 40 patients undergoing emergency colonic anastomotic surgery at Assam Medical College and Hospital were included. The role of proximal diversion in preventing anastomotic leakage in emergency colorectal surgeries was studied.*
Results: *In our study, diversion enterostomy was done in 22 cases, of which anastomotic leak occurred in 1 case (4.54%). In the remaining 18 cases without proximal diversion, anastomotic leak occurred in 6 cases(33.33%). The difference was statistically significant in our study. (p=0.049)*
Conclusion*s: Presence of proximal stoma in patients undergoing colonic anastomosis was associated with low rate of anastomotic leakage in emergency colorectal surgeries.*
Keywords: *Colonic anastomoses, Proximal Diversion*

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I. Introduction

Intestinal anastomosis is a commonly performed surgical procedures worldwide. Surgeons while performing resection and anastomosis of the intestine, sometime may go for creating a stoma known as proximal diversions. Such surgeries with a diverting stoma have its own merits and demerits in comparison to surgeries without any diverting stoma in terms of post operative complications.

Emergency surgery for colorectal surgery is associated with high rate of complications and poor outcome. The unprepared bowel plays a big role in the anastomotic leak due to fecal contaminations.

Our study aims to compare emergency colonic anastomotic surgeries with proximal diversions and without proximal diversions in terms of anastomotic leakage. This study will eventually help in assessing which of the procedure is better in terms of lesser post-operative complications.

II. MATERIALS AND METHODS

This prospective hospital based observational study was carried out taking into consideration the post operative complications that occur following emergency colonic anastomotic surgeries in the premises of the Department of General Surgery, Assam Medical College and hospital, over a period of two years 1st June 2019 to 1st June 2021. On a total of 40 patients were taken into the study who underwent various intestinal anastomosis subject to certain inclusion and exclusion criteria.

Sample size:A total number of 40 patients were taken up for the study fulfilling the inclusion and exclusion criteria.

Inclusion criteria: All Patients above 18 years diagnosed with carcinoma colon presenting with intestinal obstruction in the emergency and all other causes of intestinal obstruction requiring resection and anastomosis including all benign and malignant cases.

Exclusion Criteria: - the patients not included in the study were those not giving consent for the study and the causes of intestinal obstruction not managed by resection and anastomosis.

Outcome parameters:

Primary outcome- Anastomotic leak

ETHICAL CLEARANCE: Ethical clearance was obtained from the Institutional Ethics Committee (H) of Assam Medical College, Dibrugarh prior to the commencement of the study. Written informed consent was taken from the participants.

Method:

The surgical procedure was according to the surgeon's discretion as the operative procedure varied for different diagnosis and also for different intraabdominal findings on laparotomy. Intestinal anastomosis was done as end to end or side to side according to the surgeon's preference, site, cause, and stage of the disease

Creation of an enterostomy: A proximal diverting stoma was created as per the routine conventional process by different surgeons in different conditions in every alternate benign and malignant cases in respective unit as per convenience. The site of the stoma was selected at a convenient site as decided by the surgeon. For these cases, routine post operative stoma care was provided, which involved patient education, stoma skin care, stoma bag application and follow up visits.

All patients with left sided colonic growth were decompressed intraoperatively by on table bowel lavage using a Ryles tube inserted through the appendicular lumen and irrigating with normal saline through a defect created at the site of anastomosis.

Post Operative Management: Each case was followed up in the ward with post operative monitoring of vitals, input, output, drain site soakage and drain output, evaluation of the surgical wound, post operative routine. Patients with proximal diversion were allowed oral feed post operative day 2 to 3 while patients without proximal diversion were allowed for oral feed on post operative day 5 to day 6 depending on return of bowel sound.

Presence of anastomotic leak: It was defined as defect in the anastomotic site leading to communication between intra luminal and extra luminal compartments, which was diagnosed clinically based on signs and symptoms like fever, tachycardia, diffuse peritonitis, pain abdomen and nature of drain output.2 In case of ambiguity, CT scan of the abdomen was planned to be used for diagnosis.

Patients with leak were treated by resuscitation, control of sepsis using appropriate antimicrobial therapy and supportive care. Then, a decision regarding whether to go for an intervention for the leak was taken.

Post operative intraperitoneal abscess was diagnosed by imaging modalities after clinical suspicions, raised from signs and symptoms like localised pain abdomen, tenderness, fever and tachycardia.

If a patient was discharged, he or she was called after one or two weeks for a check-up, depending on the case, and their thirty day post operative outcome was followed up as part of the study.

Analysis of Data

Data collected was entered and analysed using Microsoft Excel. Qualitative data was presented using percentage and proportions. Quantitative data was presented using mean and standard deviation. Fischer Exact Test was used to determine association in categorical variables. P-value<0.05 was taken to be statistically significant.

III. RESULTS AND OBSERVATIONS

The present study was done in the departmnt of surgery, Assam Medical College and Hospital, Dibrugarh on 40 patients who underwent colonic resection and anastomotic procedure. The results and obseration of the study are presented below:

TABLE 1: Anastomotic leakage in different age group:

AGE GROUP (in years)	TOTAL NUMBER OF PATIENTS	NUMBER OF PATIENTS IN WHOM LEAK OCCURED	PERCENTAGE
18-30	4	0	0
31-40	8	2	25
41-50	13	3	23.07
51-60	10	1	10
>60	5	1	20

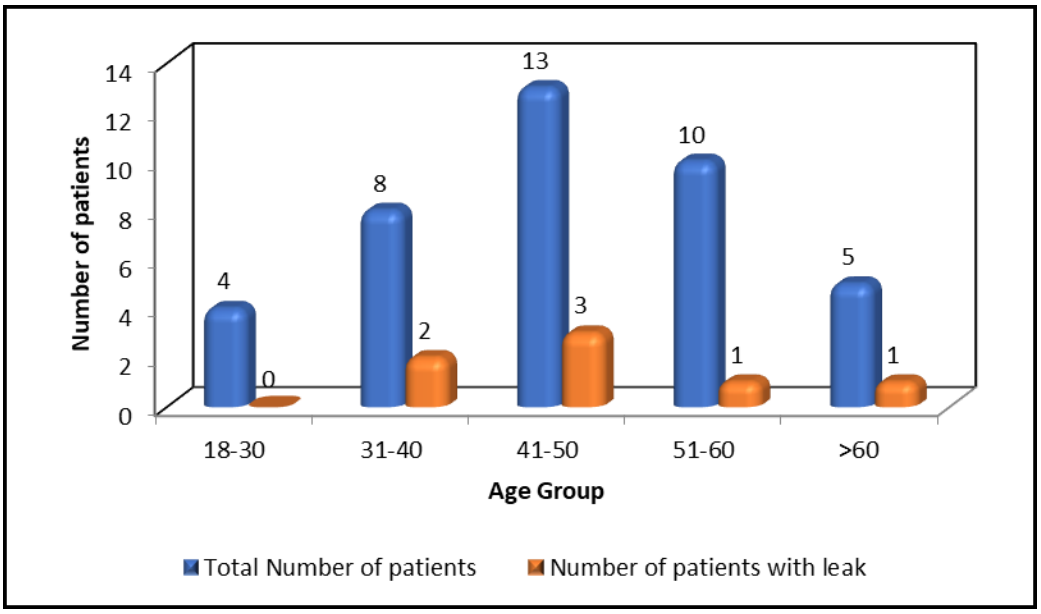

Fig 1: Distribution of anastomotic leakage in different age group

The above table shows the distribution of anastomotic leak among different age group. Highest anastomotic leak occurred in the age group of 41-50 years (23.33%) and lowest leak occurred in the age group of 18-30 years (7.41%). The mean age of patients with anastomotic leakage was 45.22±11.76 years.

TABLE 2: Distribution of anastomotic leakage according to gender:

Gender	Total number of patients	Number of patients with leak	Percentage	p-value
Male	21	4	19.05	0.887
Female	19	3	15.79	

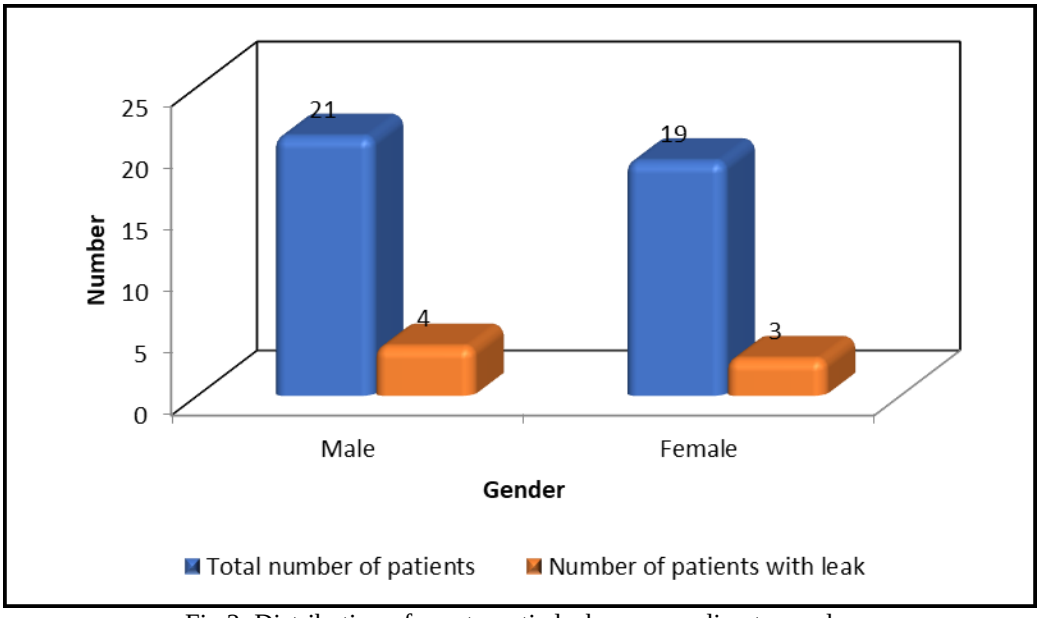

Fig 2: Distribution of anastomotic leakage according to gender

The above demographic data shows the number of male and female patients in our study. 4(19.05%) out of 21 males had anastomotic leakage. 3 out of 19 female (15.79%) had anastomotic leakage. The difference

was not statistically significant.

TABLE 3: Distribution of anastomotic leakage among patients with diversion enterostomy and without proximal diversion

Anastomotic leakage	Diversion enterostomy created				
	Yes	%	No	%	Total
Present	1	4.54	6	33.33	7
Absent	21	95.46	12	66.67	33
p-value	0.049				

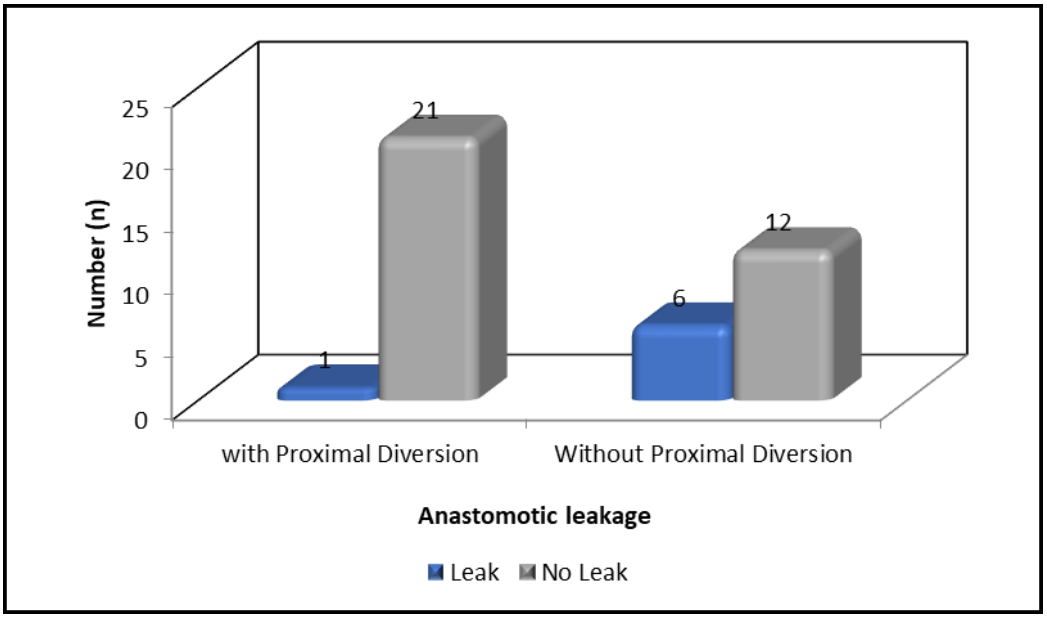

Fig 3: Distribution of anastomotic leakage among patients with diversion enterostomy and without proximal diversion

In our study, diversion enterostomy was done in 22 cases of which anastomotic leak occurred in 1 case(4.54%). In the remaining 18 cases without proximal diversion anastomotic leak occurred in 6cases(33.33%). The difference was statistically significant in our study(p=0.049)

TABLE 4: Management of Anastomotic Leak

Management	Number of Patients	Percentage Among 7(%)
Conservative	5	71.43
Re-exploration	2	28.57

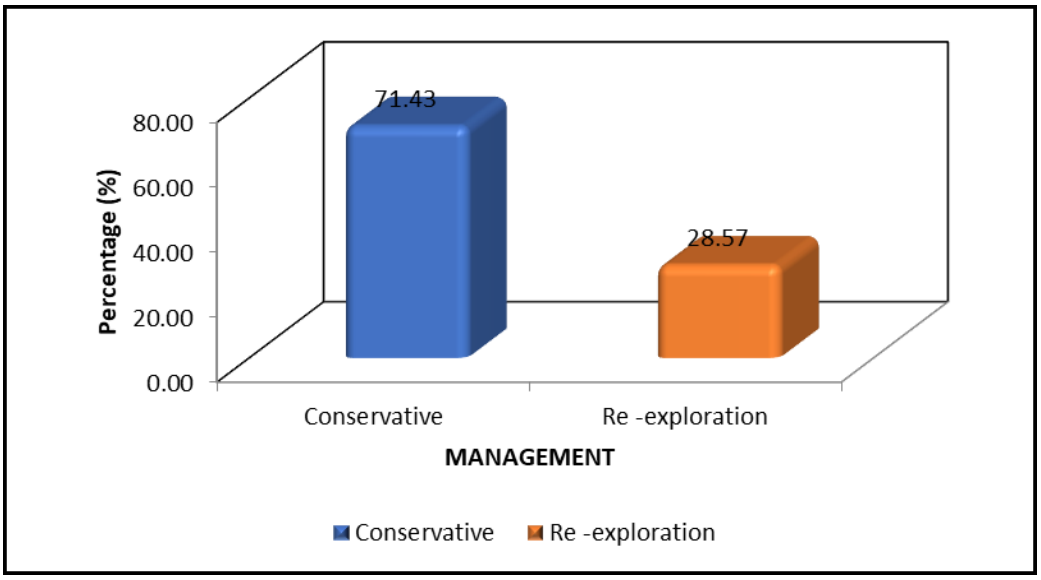

Fig 4: Management of anastomotic leak

In our study 7 patients (17.5%) out of 40 patients developed anastomotic leakage. Of them 5(71.43%) were managed conservatively. Among 2 patients who underwent re exploration, 1 patient had pervious proximal diversion he was managed by exploratory laparotomy with peritoneal toileting and placement of controlled drainage, while the other patient underwent exploratory laparotomy with a proximal diversion with placement of drain.

PHOTOGRAPHS

Fig 1: Diversion Ileostomy In A Case Of Anterior Resection

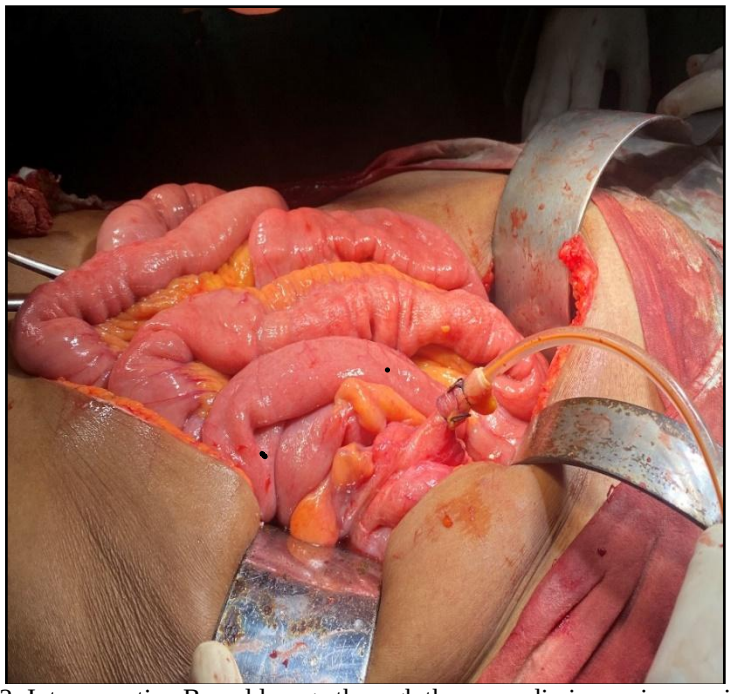

Fig 2: Intraoperative Bowel lavage through the appendix in carcinoma sigmoid colon

IV. Discussion

Colonic anastomosis is one of the most performed procedures in malignant and benign diseases in both emergency and elective set up. Various studies have been carried out on risk factors associated with anastomotic leakage in India and abroad.

In our study the anastomotic leakage was found to be 16.67%. Reviewing the various literature, we find that the anastomotic leakage may vary from 3% to 20%. Kube et al in their 2009 study on colon surgery on 28271 patients found the rate of anastomotic leakage in 844 patients which is 3%.[2] In Matthiessen et al in their 2007 study on 234 paients found the anastomotic leakage 45patients to be 19.2%.[3] Our study had similar finidings with the other studies.

The mean age of the patients underwent colonic anastomosis surgery was 45.18±11.58 years. Highest anastomotic leak occurred in the age group of 41 -50 years (23.07%) and lowest leak occurred in the age group of 18-30 years (0%). Frasson et al in their study on risk factors of anastomotic leakage after colonic resection mean age of leak in their study was 73 years.[4] Our study had similar finding with other contemporary studies.

In our study 21 patients were male and 19 patients were female. Anastomotic leak occurred in 4 males and 3 females. The difference in our study was not statistically significant. Park et al in their 2016 study found that anastomotic leak was more in male gender. In their study anastomotic leak was 233 male(80.3%) and 57 female(1.7%). It was statistically significant.[5]

In our study anastomotic leakage occurred in 7 out of 40 (17.5%). In our study 22 diversion enterostomy was done of which anastomotic leakage occurred in 1 case(4.54%). Whereas in the remaining 18 patients without proximal diversion undergoing emergency colonic anastomoses anastomotic leakage occurred in 6 patients(33.33%). It was statistically significant(p=0.049).

Matthiessen et al in their 2007 study on patients with defunctioning stoma, a symptomatic leakage occurred in 10.3% (12 of 116), compared with 28% (33 of 118).[3] R.J. Heald and R.J. Leicester in their 1980 study found that the existence of proximal colotomy makes little difference to the occurrence of a leak: 3 leaks occurred in 21 defunctioned anastomoses and 10 in 79 unprotected anastomoses.[6] An Indian study by Jatal et al however did not find any significant association between diverting stoma and anastomotic leakage.[7] However in our study the presence of a proximal diversion was significantly associated with lower rate of anastomotic leakage(p=0.049).

V. Conclusion

After analyzing the data in our study, we can corroborate that in emergency colorectal surgeries, the presence of a diverting stoma is associated with a decreased rate of anastomotic leak in comparison to patients undergoing colonic anastomosis without a protective stoma. It was also noted that complications associated with anastomotic leak in patients with a diverting stoma was lower.

Anastomotic leakage is a dreaded complication of colonic anastomosis. A lot of factors have been

implicated in the pathophysiology of anastomosis leakage. In our study defunctioning stoma is found to be a protective factor in colonic anastomosis. It is also commonly observed that presence of diverting stoma also reduces the complications of anastomotic leak should a leak occur. Although our study is limited by time and a small sample size it can pave a path for further evaluation on the factors associated with anastomosis.

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