Original Research Paper

Surgery

"A CLINICAL STUDY OF BOWEL RESECTION ANASTOMOSIS"

Dr. S. Sabira	Assistant Professor, Dept. Of General Surgery, Kurnool Medical College, Kurnool,
Dr. M. Krishna Naik*	Professor, Dept. Of General Surgery, Kurnool Medical College, Kurnool *Corresponding Author

ABSTRACT In this prospective analysis, we have made an attempt to study the incidence of Intestinal Resection and Anastomosis in our practice, its various etiologies and factors determining healing of an anastomosis. The various techniques used in the sutured bowel anastomosis among our surgeons were compared to determine which is best and has the least anastomotic leak, along with identifying the most ideal suture material for these techniques in 50 patients undergoing bowel resections and anastomosis for various causes at Government General Hospital, Kurnool.

KEYWORDS : Intestinal resection, Anastomosis, Anastomotic leaks, Ideal suture

INTRODUCTION

Intestinal anastomosis restores bowel continuity after removal of a pathological condition affecting the bowel. A disastrous complication of intestinal anastomosis is anastomotic leak resulting in peritonitis, which is associated with high morbidity and mortality. Proper surgical technique and adherence to fundamental principles is imperative to ensure successful outcome after intestinal anastomosis.[1]

The main ones relate to the creation of a tension-free join with good apposition of the bowel edges in the presence of an excellent blood supply. The importance of surgical technique is underscored by the wide variations of anastomotic leakage rates among surgeons and it is only by attention to many details that safety is achieved in such surgery.[2]

METHODOLOGY

This prospective study involved a total of 50 patients undergoing intestinal resection and anastomosis for various causes in the Department of General surgery at Government General Hospital, Kurnool, between August 2013 and July 2015.

AIMS & OBJECTIVES

1. To study the various etiologies and factors which determine the healing of Gastrointestinal tract after resection - anastomosis
2. To analyse the various suture methods (sutures/staples) used for anastomosis at different anatomical locations and thus determine the most ideal suture material for these techniques.

Inclusion criteria for selection of cases :

• All patients undergoing intestinal resections for various causes requiring an anastomosis for distal continuity of bowel.

Exclusion criteria :

• All Gastro-intestinal anastomosis. [ex. Gastro-jejunostomy, Gastro duodenostomy] and biliary- enteric/ pancreatico-enteric anastomosis.
• Patients with malignancy who have undergone pre-operative radiotherapy/ chemotherapy.

RESULTS :

The total number of cases considered in this study was 50. (32 males, 18 females; M:F ratio 1.7:1). Majority of the patients (19 cases, 38%) were in the 31-45 yrs age group.

Intestinal obstruction (adhesions with intestinal gangrene) was the leading cause in 36 % of patients who underwent resection anastomosis followed by malignancy (24%), TB abdomen, str. hernia, typhoid, and ischemia in 8% each, as depicted below :

Table-1: Etiologies of resection & anatomosis

Etiologies of resection & anastomosis	Percentage
Malignancy	24
Intestinal obstruction	36
Abdominal Kochs	8

Str. Hernia	8
Typhoid	8
IBD	1
Ischemia	8
Trauma	4
Diverticular	4

Out of 50 patients, 37 (74%) were operated on an emergency basis and the remaining 13 (26%) were operated on an elective basis with preoperative bowel preparation3 and correction of nutritional status / haemotologic deficiencies, if present.

Table-2 : Surgeries and Leaks

	Total	Leaks
Emergency	37 (74%)	13 (33%)
Elective	13 (26%)	0

Remarkably none of the prepared elective resection anastomosis leaked and thus the leaks observed in this series were only in the emergency laparotomy group. Out of the 37 patients who underwent emergency surgery, 13 (33%) patients developed postoperative anastomotic leaks.

Graph 1: Surgeries and leaks
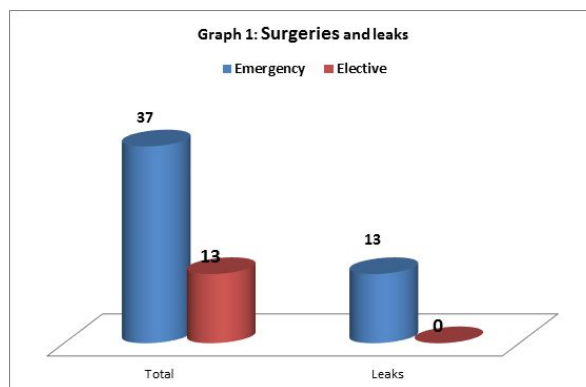
In the present study out of 50 patients, 40(80%) had either single or multiple risk factors and 10(20%) had no risk factors. The risk factors observed have been categorized in the following chart.

Table -3 : Relevance of leaks to risk factors

Risk factors	Patients N=50	Percentage
Anaemia	28	10 (35%)
Hypo proteinaemia	19	7 (36.8%)
Peritonitis	17	10 (58%)
Uraemia	5	4 (57%)
Old age	7	8 (40%)
Septicaemia	20	2 (40%)

Table-4: Bowel anastomoses and leaks

	No. of cases				Leaks
Small bowel (22)	20	2 layers	I+C	4	2
			Both C	8	3
			Both I	8	2
	2	1 layer	C	2	0
Large bowel (6)	4	2 layer	Both C	2	0
			Both I	2	2
	2	1 layer	I	2	1
Small and large bowel (22)	22	2 layers	C+C	11	2
			I+I	11	1

- Among the 22 patients who underwent small bowel anastomoses, 7(31.8%) anastomoses leaked.
- Among the 6 patients who underwent large bowel anastomosis, 3(50%) anastomosis leaked.
- Among the 22 patients who underwent anastomosis between small and large bowel, 3(13.6%) anastomoses leaked.

Table -5 : Suture Materials Used

The following is the breakup of suture materials used for anastomoses done in different anatomical locations of the intestine :

	No. Of cases	No.of cases with leaks
Small bowel anastomoses(22)		
• Vicryl and silk	12	5 leaks
• Vicryl alone	10	2 leaks
Large bowel anastomoses (6)		
• Vicryl and silk	2	1 leak
• Silk alone	4	1 leak
• Vicryl alone	2	1 leak
Small and Large bowel anastomoses (22)		
• Vicryl alone	8	1 leak
• Vicryl and silk	12	2 leaks

Total in- patient mortality = 6 (12%).

- Total anastomotic leaks = 13 (26%), out of which 4 (30.7%) cases recovered after re-laparotomy and no complications were observed, 4 (30.7%) cases were managed conservatively.
- Thus mortality in leak group was 5 (83%). Mortality in non-leak group was 1(17%), due to myocardial ischemia.

Table -6 : Mortality

Mortality		No. of cases
Leak group (13)	Conservative	4
	Re-laparotomy	4
	Death	5
Non leak group	Death	1

Figure-1: Ileotransverse anastomosis

Figure-2 : Rectosigmoid anastomosis

Figure-3 : End to end anastomosis

DISCUSSION

In the present era, even with better understanding of the impact of local and systemic factors on anastomotic healing, dehiscence and leakage remains a frequent and serious problem associated with high morbidity and mortality.

Large bowel anastomoses with interrupted sutures had a higher leak rate in our study. No difference in the rates of anastomotic leak was observed with the different techniques used in anastomoses for small bowel and between small and large bowel.

In the colonic anastomoses, 2 cases which leaked were seen in anastomoses by interrupted sutures (either single / 2- layered). Between small and large bowel anastomoses, there was leak in only 3 cases- all were observed in 2-layered anastomosis.

Baviskar et al[4] in their study showed 3% incidence of leaks among the single layer anastomoses group, and 32% incidence of leaks among the 2-layer (I+C) group. This is almost comparable to our study, which had no leaks in the single layer anastamoses group. Our study also had the highest incidence (50%) of leak rates among 2- layer anastomoses group (I+C).

- Of all the varying combinations of suture materials used, minimal rate of leak was observed when Vicryl alone was used in either small / large bowel. Hence, the preferred suture material in our study was Vicryl.
- Due to cost factor and non-affordability, none of the cases were anastomosed using staple devices.
- In general there should be no difference in the rates of leak with different anatomical locations, but in this study there were more leaks in the small bowel because it was in relation to them being the majority of the cases.
- Colonic anastomoses leaked no frequent than the small bowel. Proximal Fecal diversion techniques were not done in this study.
- Anastomotic leaks were an independent predictor of mortality. Anastomotic leaks were more in the elderly. There was no effect of gender, obesity & diabetes on anastomotic healing[5].
- 28 patients (46%) had anaemia (Hb < 8gm%), among which a majority of them were females. However only 7 patients developed leaks and preoperative transfusion of packed cells was advocated only in 13 patients among which all the 7 were a part.
- As a majority of these anaemic patients did not develop leak its significance in anastomotic healing is doubted
- Multivariate analysis showed 6 predictive variables for the occurrence of anastomotic leaks in our setup:

1. Serum Albumin levels < 3.0 g/L
2. Use of Corticosteroids
3. Bacterial Peritonitis
4. Malignancy
5. COPD
6. Perioperative Blood Transfusion of more than 2 packed RBC.

CONCLUSIONS

- Our results suggest that although anastomotic technique is the single most important determinant of outcome, a number of other systemic risk factors also affect healing after a bowel anastomosis.
- Any bowel anastomosis will heal provided there is adequate blood supply to the 2 cut mucosal edges and the ends are sutured without undue tension.

REFERENCES

1. Romanes GJ. Thorax & Abdomen. In: Cunningham's Manual of Practical Anatomy. Vol

   II. 15th Ed. Oxford University Press; 1986.

2.   Graham MF et al: The alimentary canal. In wound healing: biochemical and clinical aspects. Philadelphia, WB Saunders, 1992, pg 433

3.   Randomized clinical trial of mechanical bowel preparation versus no preparation before elective left-sided colorectal surgery.Bucher P, et al:.Br J Surg. 2005 Apr; 92(4):409-14.103

4.   P.K . Baviskar et al: Comparision of single layer versus double layer continous anastomotic technique for small bowel resection and anastomosis: a prospective randomized trial. Comparative study. Indian medical gazette. Dec 2014;453

5.   Niyaz Ahmed et al: A comparative study between single vs double layered bowel anastomosis in a tertiary care hospital: International Journal of Current Research and Academic Review ISSN: 2347-3215 Volume 3 Number 5 (May-2015) pp. 355-360