SINGLE VS DOUBLE LAYERED INTESTINA ANASTOMOSIS

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ABSTRACT

Objective: To compare the effectiveness of single layer and double layer techniques for intestinal anastomosis in terms of anastomotic leaks.

Material and Methods: This study was conducted in Surgical Department Khalifa Gul Nawaz Teaching Hospital / DHQ Hospital Bannu. The duration of study was 02 years i.e from Jan 2010 to December 2011. A total of 119 patients in each group were included in the study to compare the effectiveness of single layer (Group A) and double layer (Group B) techniques for intestinal anastomosis in terms of anastomotic leaks.

Results: The mean ages of patients in group A and B were 36.8 years $\pm$ 10.2 and 37.1 years $\pm$ 25SD respectively. In group A, Ileostomy closure was done in 75 (63.03%) and ileocolic anastomosis was done in 44 (36.97%) patients. In group B, ileostomy closure was performed in 80 (67.23%) patients and ileocolic anastomosis was done in 39 (32.77%) patients. The duration of hospital stay in group A was 6.7 days and group B was 7 days. In group A, the intestinal anastomotic leak was observed in 6 (5.04%) patients and in group B, it was noted in 18 (15.12%) patients.

Conclusion: Single-layer intestinal anastomosis is superior to double layer anastomosis in efficacy.

Key words: Single layer intestinal anastomosis; Double layer intestinal anastomosis; Intestinal anastomosis leak.

INTRODUCTION

The word anastomosis comes from Greek word "anastomo" which means to furnish with a mouth. Stedman medical dictionary defines anastomosis as an operative union of two hollow or tubular structures.[1] When a segment on the gastrointestinal tract is resected for benign or malignant indications and gastrointestinal continuity needs to be restored, an intestinal anastomosis becomes necessary. Intestinal anastomosis can be performed in a variety of ways. Anastomosis may be done by sewing with hand or with the help of stapling devices. Stapling devices are expensive and not available in emergency situation in our set up.[2] Different techniques of intestinal anastomosis are sutured (single/ double layered), stapled, compression rings and tissue glue etc. [3]

An anastomotic leak is probably the most dreadful complication of intestinal surgery. Although patient specific factors like age, state of nutrition and coexisting disease like renal failure, jaundice, malignancy, as well as local factors like vascularity, sepsis and suture technique are likely to play an important role in the development of an anastomotic disruption, a leak is often perceived as a technical failure of the operation and the surgeon.[2]

The study of anastomotic leak is very important to surgeon because morbidity, mortality and hospital stay increase many fold after anastomotic disruption.[5] Controversy regarding single layer versus double layer anastomosis goes as back as 1883, when Senn advocated a two layer technique for closure and Halsted favored a one layer extramucosal closure.[8] The objection against double layer intestinal anastomosis is that in most of the cases it fails to oppose clean serosal surfaces and it results in large amount of ischemic tissue within suture line which increases the chances of leakage. Further excessive inversion leads to narrowing of lumen.[9] Also two layer intestinal anastomosis increases the inflammatory response in the early stages of healing due to the ischemia of the inverted tissue, while single-layer anastomosis results in a larger lumen with less damage to the tissue edges.[10] On the other hand single layer anastomosis technique is argued to be superior for being constructed in shorter time and at lower cost but in terms of safety it is similar to double layer technique.[2] However a meta analysis of randomized control trials has found no evidence that two-layer intestinal anastomosis leads to fewer postoperative leaks than single layer. Considering duration of the anastomosis procedure and medical expenses, single-layer intestinal anastomosis appears to represent the optimal choice for most surgical situations.[11]

The problem of the anastomotic leakage leading to fistula formation is disastrous and in developing country like Pakistan, the management of such patient is an economic burden, both for the patient and for the hospital.[7]

OBJECTIVE

To compare the effectiveness of single layer and double layer techniques for intestinal anastomosis in terms of anastomotic leaks.

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MATERIALS AND METHODS

This randomized control trial study was done on 238 patients in the department of Surgery Khalifa Gul Nawaz Teaching /DHQ Hospital Bannu from Jan 2010 to December 2011. The patients were admitted through OPD. Patients Inclusion criteria in the study were; need and indication for ileostomy closure and ileocolic anastomosis. Informed and written consent was taken from all patients.

History, clinical examination and routine pre-op investigations (FBC, Blood urea/Sugar, serum creatinine, serum electrolytes, urine R/E, ECG) and distal loopogram were done and the name of patient was put on the next elective Operation theater (OT) list. The patients were randomly allocated into two groups by lottery method. Patient in group A underwent single layer anastomosis and patients in group B underwent double layer anastomosis.

In both groups injection Ceftriaxone 1gm and infusion Metronidazole 500ml were given pre-op and all aseptic measures were observed. All surgeries were performed by consultants. N/G tube was kept for 24 hours and proper post op care was given.

Post operatively patients were assessed for signs of leakage; two times a day and information about the anastomosis were recorded on pre designed proforma up to the 6th post operative day. The patients were discharged on 6th post operative day if indicated. Patients of peritonitis, diabetic mellitus, uremic and malignancy, steroid users and who went into hypotension or cardiac arrest during anesthesia were excluded from the study.

RESULTS

There were 83 (69.7%) males and 36 (30.3%) females in Group A and 79 (66.4%) males and 40 (33.6%) females in group B. The male to female ratio in group A and B was 2.3:1 and 1.9:1 respectively.

The youngest patient in group A was 14 years young boy while the oldest was 60 years old man. while the youngest patient in group B was a 13 years old girl and the oldest patient was 60 years old male. The mean ages of group A and B patients were 36.8 years and 37.1 years. In group A, ileostomy closure was done in 75 (63.03%) and ileocolic anastomosis was done in 44 (36.97%) patients. in group B, ileostomy closure was performed in 80 (67.23%) patients and ileocolic anastomosis was done in 39 (32.77%) patients.The duration of hospital stay in group A was 6.7 days and group b was 7.0 days. (Table 6)

In group A with single layer intestinal anastomosis, the intestinal anastomotic leak was observed in 4 (3.36%) patients and in group B with double layer intestinal anastomosis, it was noted in 18 (15.12%) patients. (Table 7)

TABLE 3: AGE OF THE PATIENTS

Group	Mean + SD	P value
Group A	36.8 + 10.2	0.9036
Group B	37.1 + 25.0	

TABLE 4: DURATION OF HOSPITAL STAY (DAYS)

Group	Mean + SD	P value
Group A	6.7 + 0.7	0.0011
Group B	7.0 + 0.7	

TABLE 5: INTESTINAL ANASTOMOSIS LEAKAGE

Intestinal Leakage	Group A	Group B	P value
Yes	6 (5.04%)	18 (15.12%)	0.0164
No	113 (94.96%)	101 (84.88%)	

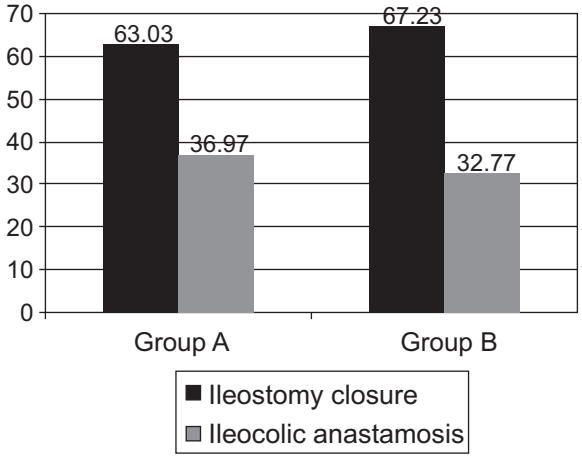

FIGURE 1: PROCEEDURES DONE IN PATIENTS WITH INTESTINAL ANASTAMOSIS –GROUP A & B

The mortality rate in group A was recorded in 6 (5.04%) patients and in group B, it was in 10 (8.40%) patients. (Table 8)

DISCUSSION

Throughout medical history there have been efforts to develop an ideal method of performing intestinal anastomosis surgery. Despite improvements in suture materials and mechanical aids, intestinal anastomosis continue to be complicated by dehiscence and stricture formation.[16]

The male to female ratio was 2.3:1 and 1.9:1 in

group A and B. Other local studies have shown almost same ratio in the groups of single and double layer intestinal anastomosis which were 2.5:1 & 2:1,[9] and 2.25: 1 & 2.38:1 respectively.[5] One of the local studies done on single layer intestinal anastomosis has showed male to female ratio as 2.9:1.[17]

The mean ages of patients in group A and B were 36.8 years and 37.1 years respectively in our study. In our study ileostomy closure was done in 73 (63.03%) and 80 (67.23%) patients in group A and B respectively while ileocolic anastomosis was done in 44 (36.97%) and 39 (32.77%) patients in group A and B respectively. In one of the local studies the entero-enteric anastomosis was done in 30 (70.1%) cases, ileocolic anastomosis in 10 (20.8%) patients and colon to colon anastomosis was performed in 3 (6.3%) patients.[9] Another study has shown ileostomy closure of 30%, colostomy closure 18% and ileocolic anastomosis 5%.[3] Rajput MJ et al[18] in their study performed 37 (51.38%) ilio-ileal anastomosis and ileocolic anastomosis in 9 (12.5%)

The mean duration of hospital stay in our study was less in group A i.e. 6.7 days when compared to group B i.e. 7.0 Days. The average duration of hospital stay observed by Khan RAA et al[2] was 7 days in patients with single layer and 9 days in patients with two layers intestinal anastomosis while it was noted in another local study as 8.2 (mean) days in single layer anastomosis and 10.5 (mean) days in double layer anastomosis.[9]

Experimentally one layer technique has been proven superior to two layer method with respect to luminal reduction, tissue strangulation and strength of anastomosis on the fifth post operative day.[19,20,21,22] Mucosal continuity and muscle realignment on histological examination occurs more rapidly with single layer method. The intestinal anastomosis leakage rate was less in single layer as compared to double layer in our study. The leakage rate was observed in 6(5.04%) cases with single layer and in 18(15.12%) patients with double layer intestinal anastomosis.

In some studies the anastomosis leakage rate was more in single layer than double layer anastomosis. These include; Irvin et al[23] showed anastomosis leak in 5(17%) cases out of 29 and 5(16%) cases out of 31 in single and double layer intestinal anastomosis respectively; Goligher et al[24] noted anastomosis leakage in 31 (45%) patients out of 69 and 17 (26%) out of 66 in single and double layer intestinal anastomosis respectively.

In our study mortality rate was high in group B than group A. The mortality rate observed in our study was 6 (5.04%) patients in group A and 10 (8.40%) patients in group B. Similar results have been noted by the other local studies. The mortality rate observed by Khan et al[3] was in 2 (2%) cases in single layer intestinal anastomosis. Ayub et al[9] noted 0% and 4.1% mortality in group A and B respectively. Samiullah[5] et al noted 0% and 3.27% mortality in single layer and double layer intestinal anastomosis respectively. Aslam et al[7] reported 0% in single layer and 3.8% in double layer intestinal anastomosis.

CONCLUSIONS

From the results of this study it is concluded that:

- Single layer intestinal anastomosis will have less chances of anastomotic leakage as compared to double layer.

- The morbidity and mortality of single layer intestinal anastomosis were less than the double layer intestinal anastomosis and hence we can say that single layer intestinal anastomosis is superior to double layer intestinal anastomosis.

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