

Extramucosal Single Layer Versus Double Layer Continuous Intestinal Anastomosis - A Comparative Study

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ABSTRACT

The resection and anastomosis of the small gut is very important surgical procedure which is being done in number of conditions. The purpose of study is to compare single interrupted extramucosal layer anastomosis with conventional continuous double layer anastomosis regarding efficacy and safety. The single layer anastomosis has certainly benefit that less time is consumed and even less foreign material as suture is used. This study was conducted in surgical unit 1, DHQ/ University hospital Gujranwala. A total number of 70 patients were included in this study from 1st February 2013 to 31st January 2014. These patients underwent in emergency and elective resection and anastomosis of small gut. Majority of these patients were in the age group of 35-50 yrs. The most common cause of resection and anastomosis was intestinal obstruction with gangrene. Sixty five patients required resection and anastomosis and five patients operated for ileostomy reversal. Single layer anastomosis has better results as compared to double layer anastomosis of small intestine.

Keywords: Intestinal anastomosis, extramucosal single layer, double layer

INTRODUCTION

Historically Travers, Lembert and Lambert laid down the principals of intestinal anastomosis more than 100 years ago. Since then a little development has been done in this connection. The introduction of new device stapling gun has given a new dimension to the intestinal surgery with the advantage of doing anastomosis even where hand sewn anastomosis are very difficult like lower rectum and anal canal. This technique helped in sphincter saving surgery. The conventional methods single layer and double layer anastomosis always remained a controversial issue. Continuous double layer anastomosis has been remained standard for a long time. However several reports have advocated that use of single layer method of anastomosis has more advantages over double layer in terms of shorter time, low cost and lower rate of complications. Now many surgeons use a single layer interrupted anastomosis technique due to reduction in ischemia and narrowing of lumen as compared to double layer technique.

The purpose of this study is to make a comparison (efficacy and safety wise) of single layer intestinal anastomosis using non absorbable suture material against conventional double layer anastomosis. The single layer anastomosis will decrease surgery time and minimize incorporation of foreign body (sutures).

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MATERIALS AND METHODS

We include seventy patients in our study who underwent resection and anastomosis of small intestine in our unit between 1st February to 31st January. All those patients who required resection and anastomosis during this period were included in this study. We divided these patients in two groups randomly without any bias. All the details regarding these patients were recorded on a predesigned proforma. Double layer continuous layer anastomosis were done by using 3/0 vicryl suture and for extra mucosal layer the same suture was also used. Strict postoperative monitoring of these patients regarding temperature, pulse, blood pressure, intake and output charts, distension of abdomen, bowel sounds, signs of peritonitis and external and internal fistula formation was done. All these observations were tabulated and analyzed.

RESULTS

All the patients were taken up for either single layer or double layer anastomosis according to protocol. The majority of the patients belonged to age group 35-50 years and 0-10 years as shown in table 1. Males predominate females in the most of age groups. Thirty four (48.6%) patients presented with abdominal pain followed by distension in 21(30%), constipation in 9(12.9%) and vomiting in 6(8.5%) cases shown in table 2. Distension of abdomen is the most consistent sign in 58% of cases, followed by tenderness in 30% cases (Table 3). Among the seventy patients who underwent resection and anastomosis 40 patients had intestinal obstruction,

22 patients had perforation and 8 had carcinoma (Table 4). It was observed that bowel activity returned earlier in those who underwent single layer anastomosis resulting into early oral feeding thus avoiding complications related to delayed oral nutrition. Tests of significance revealed significant difference in favour of single layer (Table 5). In these seventy cases, 20 cases showed wound infection Out of these 20 cases, 8 cases were of single and 12 of double layer technique. Out of 70 cases, 10 patients had postoperative anastomotic leak (Table 6). Out of these 10 patients 7 were of double layer and 3 were of single layer anastomosis. The test of significance revealed significant difference in favour of single layer.

Table 1: Age and sex distribution of the cases

| Age (years) | Male | Female | Total |
|-------------|---------|---------|-------------|
| 0-10 | 3 | 2 | 5(7.14%) |
| 10-20 | 4 | 3 | 7(10%) |
| 20-30 | 2 | 1 | 3(4.28%) |
| 30-40 | 8 | 6 | 14(20%) |
| 40 -50 | 10 | 8 | 18(25.71%) |
| 50-60 | 9 | 6 | 15((21.42%) |
| 60-70 | 5 | 2 | 7(10%) |
| > 70 | 1 | 0 | 1(1.42%) |
| Total | 42(60%) | 28(40%) | 70 |

Table 2: Clinical presentation

| Symptoms | No of cases (%) |
|----------------|-----------------|
| Abdominal pain | 34 (48%) |
| Distension | 21 (30%) |
| Constipation | 9 (12.9%) |
| Vomiting | 6 (8.5%) |

Table 3: Distribution of signs

| Signs | No of cases |
|------------------|-------------|
| Tenderness | 28 (40%) |
| Distension | 30 (42.85%) |
| Bowel sounds | 18 (25.71%) |
| Empty per rectum | 25 (35.71%) |

Table 4: Indications for resection and anastomosis

| Indications | Resection and anastomosis |
|------------------------|---------------------------|
| Intestinal obstruction | 40 |
| Perforation | 22 |
| Malignancy | 8 |
| Total | 70 |

DISCUSSION

In this study 70 patients underwent resection and anastomosis at DHQ/University teaching hospital Gujranwala from 1st February 2013 to 31st January 2014. Two groups were randomly formed for single and double layer anastomosis. Thirtyfive patients underwent single layer anastomosis and thirty five patients underwent double layer anastomosis. Male

to female ratio was 1.5:1. There was even distribution of cases at all ages. Pain and distension of abdomen was present in almost 78% cases followed by constipation in 12.9% of cases and vomiting in 8.5% cases. Agrawal *et al* reported distension in 96% cases¹. Silen *et al* reported 52% incidence of vomiting¹³. Tenderness as a clinical sign was found in 50% cases. Lasalle D lefall *et al* reported tenderness in 82% cases⁷. Intestinal obstruction (congenital malformations, intussusceptions, and volvulus) leading to gangrene was a major indication for resection and anastomosis in 57% cases, followed by perforation in 31.5% cases, carcinoma in 11.5%. McEntee *et al* in 1987 observed obstruction in 34% cases, perforation in 18% cases and malignancy in 26% cases⁹. Nelson Ellis *et al* in 1962 noted obstruction in 36% cases and 30% cases showed malignancy¹⁰. High percentage of intestinal obstruction leading to gangrene is due to late referral of patients from primary or secondary care centers. Postoperatively, bowel sounds was heard early in single layer group which allow early start of oral feeding. In a study by Jennings *et al*, they demonstrated distinct advantage of single layer method over double layer, like increased blood flow, bursting strength, tensile strength, decreased collagen resorption, decreased inflammation and decreased anastomotic leak⁵. Further, mucosal continuity was restored earlier in single layer anastomosis, as early as seven days. In a study by Jon Bursh *et al* in 2000, 132 patients were studied which concluded that a single layer anastomosis can be constructed in significantly less time and with similar rate of complications compared to double layer anastomotic technique, with less cost⁶. In our study, wound infection was the most common complication (single layer 20% and double layer 39%). Goligher *et al* in 1970, observed wound infection of 51% and 37% in double layer and single layer methods respectively³. In the present study the low infection rate is may be due to better antibiotic cover and improved operation theater, ward conditions and better post operative care. More time taken to construct anastomosis and excess soiling of the wounds with fecal contents may be responsible for higher incidence of wound infection in double layer group. The post operative complication of anastomotic leak was higher in double layer group (20%) as compared to single layer group (8%) with significant statistical difference. It was observed that though the two layers method adds protective layer, it induces more inflammation due to extra suture material and ischaemia of the inverted layer. The inflammatory reaction results into a weaker anastomosis due to excess breaking down of collagen. High incidence of fistulation in double layer

group can be explained due to impairment of blood flow to the anastomotic suture line as proved by Raphael Chung *et al* in 1987¹¹. Double layer technique, causes considerable thickness of intestinal wall which projects into the lumen creating an obstacle to the passage of feces. This may increase the tension over the sutures and lead to their separation⁴. Satoru Shikata *et al* in 2006 clarified that two layer anastomosis offers no definitive advantage over single layer in terms of post operative leak¹². In a study by Maurya SD *et al* in 1984, incidence of anastomotic leakage was lower in the single layer group⁸. Meta-analysis of final and other outcomes like mortality could not be studied in view of limited number of cases included in the present study. The total number of cases included in this study might not have been sufficient to identify small differences between the two techniques, but our investigations and clinical experience seem to show single layer to be superior to double layer anastomosis.

CONCLUSION

This study clear cut showed that the single layer technique has almost better results than double layer technique and thus it has become our procedure of choice for intestinal anastomosis.

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