
ORIGINAL ARTICLE

Comparison of Single Layer Interrupted Extramucosal Anastomosis with Double Layer Continuous Anastomosis Among Patients with Benign Small Intestinal Pathology

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ABSTRACT

Objective: To compare outcome of single layer interrupted extramucosal anastomosis with double layer continuous anastomosis among patients with benign small intestinal pathology such as perforation, tuberculosis, trauma or typhoid.

Methodology: This prospective randomized controlled trial was conducted at Surgical floor LGH/PGMI. The study was completed in six months using non-probability consecutive sampling. Two hundred patients with benign intestinal pathology requiring intestinal anastomosis were divided in two groups, 100 patients in each group were taken in group A patients were managed with single layer extramucosal interrupted anastomosis and in group B patients were treated with underwent double layer continuous anastomosis. Variable like leakage was described by frequency distribution table, Chi-square test was applied as a test for significance & p-value ≤ 0.05 was considered significant.

Results: Five (5%) patients in group A had leakage detected on seventh day, while 15 (15%) patients in group B had leakage detected on seventh day. No leakage was seen among 95 (95%) and 85 (85%) patient in group A and B, respectively. ($p = 0.018$)

Conclusions: Less leakage occurred with single layer anastomosis as compared with double layer anastomosis. Hence we recommend that single layer anastomosis should be adopted for patients with benign intestinal intestinal pathologies.

Key Words: Single layer interrupted anastomosis; double layer continuous anastomosis; leakage; intestinal pathologies

INTRODUCTION

Anastomotic leak is a dreadful complication to encounter after resection and anastomosis. It results in sepsis and enteric fistula formation and leads to reoperation and possibly stoma formation in form of ileostomy. ⁽¹⁾ The breakdown of suture line or inappropriate anastomosis may result in hemorrhage, leakage, stenosis, diverticula formation and ultimately fecal fistula with serious septic complication leading to MODs & death. ⁽²⁾ The prevalence of intraperitoneal anastomotic leak varies in the literature between 0.5% and 30%, but is generally between 2% and 5%. ⁽³⁾

There are several methods of intestinal anastomosis like open methods of intestinal anastomosis are done either using single layer or double layer of anastomosis via interrupted or continuous sutures. ⁽⁴⁾ Single layer technique is considered superior to double layer technique with respect to luminal reduction, tissue strangulation

and strength of anastomosis. On histological examination mucosal continuity and muscle re-alignment occurs more rapidly with single layer technique. Single layer repair is better choice than double layer repair in case of enteric perforation. ⁽⁵⁾

The two layers technique still maintains its popularity with most surgeons. However the common objections to this technique are, excessive inversion of tissues leading to ischemia and narrowing of lumen, suture through all coats may result in stitch abscess with subsequent leakage and disturbed alignment leading to delayed healing. ⁽⁶⁾ The two layers anastomosis was objected that it does not follow the basic principles of bowel anastomosis. It was observed that it is tightly drawn and often continuous suture do not always produce a water tight seal, thus causing ischemic strangulation and narrowing at the site of anastomosis. ^(7, 8)

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In a study the outcome of single layer anastomosis was compared to double layer anastomosis. The anastomosis leakage occurred in 3.1% patients in single-layer group and 1.5% in the two-layer group.⁽⁹⁾ In another study leakage rates with single layer anastomosis was 6% as compared to that in double layer anastomosis which was 12%.⁽¹⁰⁾

In our setup, a double layer anastomosis is preferred over single layer. Due to existing controversies among various authors this study was designed to compare the outcome of single layer interrupted extramucosal anastomosis with double layer continuous anastomosis among patients with benign small intestinal pathology like perforation, tuberculosis or trauma. We hypothesized that there is difference in terms of frequency of anastomosis leakage between single layers interrupted extramucosal anastomosis as compared to double layer continuous anastomosis of small intestine.

After the results of this study we may offer our patients a better technique associated with early return to normal function.

MATERIAL AND METHODS

Study Design: Randomized controlled trial

Settings: Department of Surgery, Lahore General Hospital, Lahore

Duration of Study: Study was completed in six months.

Sample Size: Sample size was 200 cases, (100 in each group) calculated with 80 % power of test, 5% level of significance and taking expected percentage of anastomosis leakage i.e. 3% in single layer anastomosis versus 11.3% in double layer anastomosis of small intestine.

Study groups: Group A contained 100 patients in this group received single layer anastomosis and Group B: 100 patient in this group received double layer anastomosis

Sampling Technique: Non Probability purposive consecutive sampling

SAMPLE SELECTION

Inclusion criteria: In this study we took patients of either gender having age from 20-45 years who requiring resection and anastomosis of intestine for benign diseases like intestinal tuberculosis and typhoid perforation. Patients came for reversal of ileostomy stomas were also included.

Exclusion criteria: Patients requiring anastomosis of rectum or gastroesophageal anastomosis, patients requiring emergency

intestinal surgery, patient in whom the either technique could not be performed due to technical problems like gut edema or scaring and patients with malignancy were excluded from this study.

Data Collection: Two hundred patients presenting in emergency department of Lahore General Hospital Lahore, fulfilling inclusion criteria were included in study. Demographic information including age and sex was recorded. Informed consent was taken. The study was approved by the ethical committee of the hospital. The patients were divided in two equal groups randomly by lottery method. 100 patients in group A received single layer anastomosis while in group B, the patients received double layer anastomosis. The procedure was performed by a surgeon who had at least 5 year post fellowship experience of performing anastomosis. The patients were then evaluated for the outcome parameters i.e. anastomosis leakage (as per operational definition). Patient were discharged when oral free and passing flatus and stool. In case of anastomosis leakage, redo exploratory laparotomy was done and remedy was done with ileostomy formation.

Data Analysis: The data was analyzed using SPSS version 20. Qualitative variables include sex (male/ female), and anastomosis leakage (yes/no) were described as frequency distribution tables. The quantitative variable included age (in years) and was presented as mean \pm S.D. For comparison, chi-square test was applied. P-value equal to or less than 0.05 was taken as significant.

RESULTS

In this study the mean age of the patients in group A was 33.40 ± 6.07 years [range 20 – 45]. There were 17 patients of age range of 20 – 25 years, 15 patients of age range of 26 – 30 years, 23 (23%) patients of age range of 31 – 35 years, 31 (31%) patients of age range of 36 – 40 years and 14 (14 %) patient of age range of 41 – 45 years. In group A, there were 63 (63%) male patients and 37 (37%) patients were female. In group B, 58(58%) patients were male and 42 (42%) patients were female.

In group A, there were 5 (5%) patients in whom anastomosis leakage was observed within 7 days of surgery, while rest of 95 (95%) patients did not develop anastomosis leakage. In group B, anastomosis leakage was observed in 15 (15 %) patients and rest of rest of 85 (85 %) patients did not develop anastomosis leakage. Using Chi-

square test it was concluded that anastomosis leakage was statistically lower in Group A and compare to Group B (5% vs. 15%), p-value 0.018.

Table 1: Comparison of demographical variables in both study groups

		Group A		Group B	
		No. of patients	Percentage	No. of patients	Percentage
Gender	Male	63	63	58	58
	Female	37	37	42	42
Age (years)	20 – 25	17	17	21	21
	26 – 30	15	15	18	18
	31 – 35	23	23	21	21
	36 – 40	31	31	24	24
	41 – 45	14	14	16	16
	Mean ± SD	33.40 ± 6.07		32.94±5.28	
	Range	20 – 45		20 – 45	

Table 2: Comparison of anastomosis leakage in both study groups

		Study groups		p-value (Chi-square)
		Group A	Group B	
Anastomosis leakage	Yes	5 (5%)	15 (15%)	0.018 (significant)
	No	95 (95%)	85 (85%)	
Total		100 (100%)	100 (100%)	

DISCUSSION

The results of our study favored single layer interrupted extramucosal intestinal anastomosis with a leakage rate of 5% with single layer extramucosal anastomosis versus 15% with double layer continuous; $p < 0.05$). In literature, various other studies are also available which have compared the two techniques. A study by Samiullah, et al. was conducted in Saidu group of teaching hospital Swat (NWFP) from Feb 2001 to Dec 2002.⁽¹¹⁾ The frequency of anastomotic leakage in single layer extramucosal anastomosis was 1.9% while the leakage rate in double layer technique was 13.1%.⁽¹¹⁾ Mirza SM, et al conducted a study in Surgical Unit III of Jinnah Hospital, Allama Iqbal Medical College, Lahore, over a period of two years from October 1, 1999 to September 30, 2001. Study comprised of two Groups (A and B) with 100 consecutive patients fulfilling the inclusion criteria and comparable variables. Single-layer interrupted serosubmucosal anastomosis constructed by one group of senior surgeons (Group A) was compared with two-layer continuous anastomosis performed by another team of senior surgeons (Group B). The safety of two techniques of anastomosis was analyzed comparing the outcome in terms of morbidity and

mortality. Overall anastomotic failure rate was 5%. The rate of leakage in Group A was 2% compared to 8% in Group B ($p < 0.05$). They concluded single-layer interrupted serosubmucosal anastomosis shows a low incidence of anastomotic leakage and a significant avoidance of septic complications.⁽¹²⁾

Another study concluded that single-layer interrupted serosubmucosal anastomosis is a safe technique and can be easily learned by relatively inexperienced surgeons.⁽¹³⁾

However, the results of study by Burch JM, et al. did not conclude any added advantage of single layer extramucosal anastomosis. They reported only 3.1% of those presented with leakage in the single-layer group and 1.5% in the two-layer group.⁽¹⁴⁾ Ayub M, et al. conducted a study to compare the outcome of single layer and double layer anastomosis. They found that leakage rate in extramucosal anastomosis was 4.7% and in double layer anastomosis was 8.3%.⁽¹⁵⁾

Khan RAA, et al concluded that rate of leakage was almost double (12%) in double layer anastomosis as compared to single layer anastomosis (6%).⁽¹⁰⁾ So we are in concordance to many above cited statistics which proved

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anastomosis leakage was lower in single layer as compare to double layer.

This study has certain limitations like it was not double blind study, as it was not possible because both the techniques were different from each other. Moreover, this was carried out in a single setup with a limited population size.

CONCLUSION

This study concludes that leakage is less likely with extramucosal interrupted anastomosis and compared to double layer anastomosis. So, it is recommended that patients with benign intestinal pathologies requiring resection anastomosis should be treated with single layer extramucosal anastomosis.

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