

Comparison of Outcome between Stapled verses Hand Sewn Intestinal Anastomosis

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ABSTRACT

Aim: To compare the outcome in term of anastomosis leakage of hand sewn technique (two layer anastomosis) and stapler technique in intestinal anastomosis.

Setting: Study was conducted in departments of surgery at Jinnah Hospital and General Hospital Lahore.

Duration of study: Study was conducted in a period of six months from 17 -12-2009 to 17 - 06- 2010.

Study design: Quasi experimental

Methods: Seventy patients were divided in two groups of 35 patients each. In group A, hand sewn anastomosis while in group B, stapled anastomosis was performed. The patients were followed up for 14 days for the anastomosis leakage. Chi-square test was applied to know if there was any statistical significance. P-value <0.05 was considered as significant.

Results: In our study, anastomotic leakage occurred in 3 (8.6%) patients of group A and in one (2.9%) patients of group B (p=0.303). =

Conclusion: Statistically there is no significant difference between two groups in terms of leakage. However, stapled anastomosis holds better overall outcome as compared to hand sewn anastomosis.

Keywords: Anastomotic leakage; hand sewn anastomosis; stapled anastomosis

INTRODUCTION

Intestinal obstruction, peritonitis from a perforated bowel, abdominal trauma and diseases of bowel are common surgical problems throughout the world. These problems usually must be treated operatively hence it is frequently necessary to join two section of bowel together. Accurate approximations of this bowel without tension and with a good blood supply to both of the structures being joined are obviously fundamental¹.

The basic principles of intestinal anastomosis were established more than 100 year ago by Travers, Lembert and Halsted², and have since undergone little modification. An insecure intestinal anastomosis is an unacceptable iatrogenic hazard^{3,4}. The breakdown of suture line or inappropriate anastomosis may result into hemorrhage, leakage, stenosis, diverticular formation and ultimately fecal fistula with serious septic complication leading to death.⁵ The prevalence of intraperitoneal anastomotic leak varies in the literature between 0.5% and 30%, but is generally between 2% and 5%⁶. The sound healing of process of anastomosis depends mainly on anastomosis technique, which is most important determinant.

Numerous techniques have been used to fashion anastomosis. These techniques can be

divided into 2 categories, hand sewn or stapled anastomosis. Hand sewn techniques include single layer interrupted or various double layer techniques. Development of stapling instruments has added new trends to intestinal surgery.⁵ Comparison of stapled with hand sewn anastomosis found no difference between the two methods^{7,8}. Unsurprisingly hand suturing techniques were shown to display a longer learning curve than stapling⁹. One aspect of intestinal suturing technique that has remained controversial is the use of either one or two layers of sutures for anastomosis⁵.

The dimensions of intestinal surgery were revolutionized with the recent emergence of stapling instruments for intestinal anastomosis. This technique is claimed to be ideal for tissue apposition at anastomotic site because it provoke a minimal tissue inflammation and provide immediate strength during weakest phase of healing^{10,11}.

So far, a number of clinical trials, meta-analyses and systematic reviews have been performed on the comparisons of hand sewn and stapled techniques for intestinal anastomosis. The results of different studies have revealed many advantages of stapler technique in terms of anastomosis leak (leakage rate in hand sewn group was 22%¹² and that in stapler technique was 2.8%). less infection rate (5.9 % versus 4.3% for hand sewn and stapler technique respectively) and less operation time (the mean difference of -7.9 minutes in favor of stapler technique)^{9,13}. Another meta-analysis showed that

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stapled anastomosis was associated with significantly fewer anastomotic leakage compared with hand sewn (0.014% for Stapled technique and 6.5% for hand sewn technique)⁷.

In most of the developing countries including Pakistan, the studies that have compared the stapler technique and hand sewn techniques are lacking. Therefore, I conducted this study to compare the efficacy of both techniques, to find a comparatively better technique which would be more acceptable and reduce the frequency of anastomosis leak. As stapler technique of intestinal anatomists is not very uncommon now a day and is said to hold better results. So, I want to study this technique in a local setup.

MATERIALS AND METHODS

This randomized controlled trial was conducted in the Departments of Surgery, Jinnah Hospital and General Hospital Lahore during a period of 6 months. The calculated sample size with 3% of margin of error, 80% power of test and taking expected percentage of anastomosis leakage i.e. 22% in hand sewn technique (Group A) and 2.8 % in stapler technique (Group B) will be forty cases in each group. In group A 40 patients will have intestinal anastomosis by hand sewn technique while in group B 40 patients will have intestinal anastomosis by stapler technique. Sampling technique was non probability purposive sampling. Male and female patients between 20-45 years of age requiring resection and anastomosis for benign diseases like intestinal tuberculosis and typhoid enteric, perforation who came for reversal of ileostomy stomas were included in the study. Patients requiring anastomosis of rectum, gastrointestinal anastomosis, emergency intestinal surgery and in whom the either technique could not be performed due to technical problems like gut edema or scaring were excluded from the study.

Seventy patients requiring intestinal anastomosis and fulfilling inclusion criteria were registered through "in patient" department of Surgery, Jinnah Hospital and General Hospital Lahore. Patients were explained about the disease, treatment, surgical procedure and its complications and informed consent was taken. Included patients were randomly allocated in two groups: group A and group B. Thirty five patients in Group A received intestinal anastomosis with hand sewn technique (Single layered extra-mucosal anastomosis) and thirty five patients in group B received anastomosis with stapler technique. The Single layered extra-mucosal anastomosis were constructed using interrupted 3/0 vicryl. Anastomosis with stapler technique was performed with stapler gun (CEEA)

containing titanium pins. The patients were assessed for 14 days after surgery for outcome (anastomosis leakage yes/no) by physical examination of wound and radiological testing with contrast medium. The evaluation criteria for both techniques was anastomosis leakage (present or absent). All information was collected by a proforma attached herewith.

The collected information were entered in SPSS version 10.00 and arranged through it. The variables analyzed included demographic age (20 to 45), sex (male or female) and anastomosis leakage (yes or no). Descriptive statistics including mean and standard deviation of numerical values like age were evaluated. Genders (male or female) were presented as frequency and percentage.

The qualitative variables (anastomosis leakage) were presented as frequency and percentage and were compared using chi-square test in both groups. p-value of 0.05 or less was considered significant.

RESULTS

Seventy patients requiring intestinal anastomosis were including in the study. The patients were divided in two groups: Group A (35 patients received hand sewn anastomosis) and group B (35 patients received stapler anastomosis). The mean age of the patients in group A was 36.20±4.94 years [range 20 - 45]. There were 4 (11.4%) patients of age range of 20 – 30 years, 25(71.4%) patients of age range of 31- 40 years and 6(14.2 %) patient of age range of 41 – 45 years. In group B, the mean age of the patients was 34.74±8.6 years [range 20–41]. There were 6 (17.1%) patients of age range of 20-30 years, 26(74.3%) patients of age range of 31-40 years and 3 (8.6%) patient of age range of 41–45 years. (Table 1)

Table 1: Distribution of patients by age (n=70)

Age in years	Group A	Group B
20 – 30	4(11.4%)	6(17.1%)
31- 40	25(71.4%)	26(74.3%)
41 – 50	6(14.2%)	3(8.6%)
Mean + SD	36.20±4.94	34.74±4.18
Range	20 – 45	20 – 41

In group A, there were 24 (68.6%) male patients and 11 (31.4%) patients were female. In group B, 26(74.3%) patients were male and 9 (25.7%) patients were female. In group A, there were 3 (8.6%) patients in whom anastomosis leakage was observed within 14 days of surgery, while rest of 32 (91.4%) patients did not develop anastomosis leakage. In group B, anastomosis leakage was observed in 1 (2.9 %) patients and rest of rest of 34 (97.8 %) patients did not develop anastomosis leakage. The two groups were also compared with each other for any

significant difference. Chi-square test was applied. Calculated p-value was 0.303 and hence not significant ($p > 0.05$) (Table 2).

Table 2: Distribution of patients by anastomosis leakage (n=70)

Variable	Group A			Group B		
	Yes	No	Total	Yes	No	Total
Anastomosis leakage						
No.	3	32	35	1	34	50
%age	8.6	91.4	100	2.9	97.8	100

P value 0.303 (Not significant)

DISCUSSION

This randomized controlled trial compared the outcome of hand sewn anastomosis with stapled anastomosis in 70 patients who presented in Department of General Surgery at Jinnah Hospital and General Hospital Lahore. The results were in favor of stapled anastomosis which showed lesser rates of leakage i.e., 2.9% in stapled group versus 8.6% in hand sewn anastomosis group ($p > 0.05$). In literature, there have been described many clinical trials which have compared the outcome of the hand sewn anastomosis with stapled anastomosis.

In 1993, a randomized multicenter trial studied 440 patients who had either hand-sewn or stapled anastomosis after ileocolic resection for cancer¹³. The patients were assessed both clinically and by imaging for the presence of a leak (consisting of a contrast enema at about 10 days after the operation). The overall leakage rate in the hand-sewn group was 8.3%, which compared unfavorably with the 2.8% rate in the stapled group. A possible explanation for the higherrate in the hand-sewn group might have been surgical inexperience with the variety of suture techniques used in the study (end-to-end and end-to-side with either continuous or interrupted sutures).

In a study from the West of Scotland and Highland Anastomosis Study Group that included data on 732 patients at 5 centers, the rate of radiologically proven leakage was significantly higher in the sutured group (14.4% versus 5.2%); however, no difference was seen with respect to clinical leaks, morbidity, or postoperative mortality¹⁴. A 1998 meta-analysis comparing the hand-sewn and stapled techniques of intestinal anastomosis addressed 13 trials published from 1980 to 1995¹⁵. For colorectal anastomoses, no significant differences were seen in mortality, total leakage rate, clinical leakage rate, radiologic leakage rate, tumor recurrence rate, or incidence of wound sepsis. Strictures and technical problems, however, were more common in the stapled group. A subsequent meta-analysis that reviewed data from 955 patients with ileocolic anastomoses reported a significant reduction in the

overall leakage rate and the clinical leakage rate when stapling was employed. Even when the anastomosis had to heal under adverse conditions (e.g., carcinomatosis, malnutrition, previous chemotherapy or radiation therapy, bowel obstruction, anemia, or leukopenia), no significant differences have been demonstrated between stapled and hand-sewn anastomosis.

Stapling has, however, been shown to shorten operating time, especially for low pelvic anastomosis. Cancer recurrence rates at the site of the anastomosis have been reported to be higher or lower depending on the technique used. Certainly, suture materials engender a more pronounced cellular proliferative response than titanium staples do, particularly with full-thickness sutures as opposed to seromuscular ones, and malignant cells have been shown to adhere to suture materials^{16,17,18}.

Hassanen A, et al, also performed a clinical trial on 39 patients, who received either stapled or hand sewn anastomosis. Out of these 39 patients, 18 patients (46.2%) with stapled anastomosis and 21 patients (53.82%) with hand-sewn anastomosis. They were 30 males (76.9%) and 9 females (23.1%), with a mean age of 46.7 ± 11.3 years. There were 3 patients (16.6%) of anastomotic leak in the stapled group versus 8 patients (38%) in the hand sewn group ($P < 0.05$). They also favored the stapled anastomosis over the hand sewn anastomosis.

CONCLUSION

Although, there is no statistically significant difference in leakage between two methods (stapled anastomosis versus hand sewn anastomosis) in terms of anastomosis leakage, stapled anastomosis technique is better than hand sewn technique. So, stapled anastomosis technique can be used safely to perform intestinal anastomosis without adding risk of leakage.

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