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## A prospective comparative study of post-operative complications of hand sewn versus stapled anastomosis in elective GI surgeries

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### Abstract

**Background:** Anastomotic leak and wound infection are the two feared complications of any bowel anastomosis. In this study a comparison between hand suturing and surgical stapling in patients undergoing elective gastrointestinal surgeries with regard to post-operative complications namely anastomotic leak and wound infection.

**Methods:** A prospective study was conducted in 40 patients undergoing elective resection and anastomosis over a period of 1 year. Post-operatively patients were followed up for post-operative complications namely anastomotic leak and wound infection. Follow up for 30 days post-operative was done.

**Results:** In total forty patients were studied out of which twenty patients underwent hand sewn and twenty patients underwent stapler anastomosis. There was anastomotic leak in 1 case of gastrojejunostomy in hand sewn group. No leak was observed in stapled anastomosis group.

Wound infection was observed in 5 cases. 4 cases were in hand sewn group and 1 in stapled group. There was no mortality in either group post-operatively. A sub-group analysis was also done.

**Conclusion:** There was no significant difference in the incidence of post-operative complications namely anastomotic leak and wound infection with respect to hand sewn and staples techniques. Therefore both hand sewn and stapled anastomosis technique can be safely practiced.

**Keywords:** anastomosis, leak, resection, anastomosis, stapled, hand-sewn

### Introduction

The most feared complication of any bowel anastomosis remains to be anastomotic leak even in current surgical practice. A successful anastomosis aims at accurate union of two viable bowel ends with complete avoidance of tension <sup>[1]</sup>. Hand suturing with improved suture materials remains the method of choice by most of the surgeons, however stapling technique has emerged as an alternative method of anastomosis. The widespread application of stapling devices has helped revolutionize the technical aspects of surgery. Several retrospective reviews have reported variable results. Of the few prospective randomized trials comparing surgical stapling and manual suturing techniques, majority have focused on large bowel surgery and use of circular stapling instruments. A meta-analysis comparing stapled and hand-sewn anastomosis in colorectal surgery included did not find any significant difference in the incidence of anastomotic leak between two techniques <sup>[2]</sup>. Whereas a high incidence of stricture rate and intraoperative problems in the stapled group in comparison to hand-sewn colorectal anastomosis was found. In recent times, improved mechanical stapling is versatile so much so that many surgeons consider <sup>[3]</sup>. Another systematic review compared hand-sewn and stapled techniques of ileocolic anastomosis finding a significantly lower leak rate in stapled anastomosis <sup>[4]</sup>. In general benefits of stapling instruments include minimal tissue manipulation and trauma, lesser bleeding and edema at the anastomosis, quicker return of gastrointestinal function and a more rapid patient recovery.

In this study, we compare hand suturing with surgical stapling in patients undergoing elective bowel surgery.

### Objectives

To assess the complications namely anastomotic leak and wound infection in hand sewn anastomosis versus stapled anastomosis in patients undergoing elective gastrointestinal surgeries.

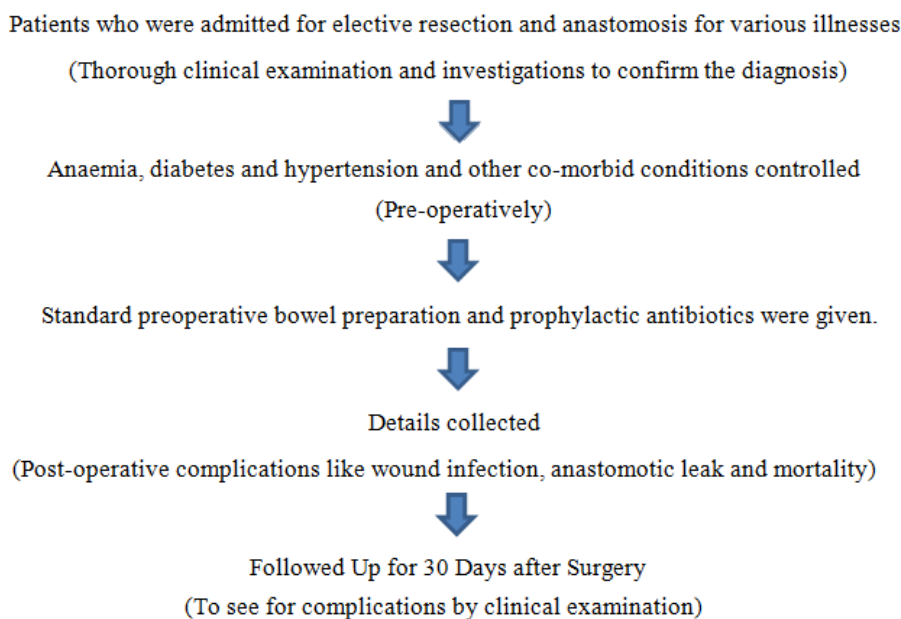
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## Methodology

This study was conducted over a period of 12 months in the Department of General Surgery at St Martha's Hospital Tertiary Hospital, India. Adult male/female patients (between the ages of 18 and 70 years) undergoing elective surgery requiring a gastric, small, or large bowel anastomosis formed the study population.

Patients undergoing emergency setting anastomosis, pregnant women, and patients with carcinomas, coagulopathies or on anti-coagulant therapies, anemic (Hemoglobin < 8 g/dl) and hypoalbuminemic patients were excluded from the study.

## Method of data collection



The data so obtained was subjected to independent samples t-test statistics and chi-square tests using SPSSv.18.0 and R environment ver.3.2.2.

## Results

This study was a prospective study done to compare the outcome of hand sewn versus stapled anastomosis in patients undergoing GI surgeries in The Department of General Surgery from June 2017-May 2018 at St. Martha's hospital, Bangalore. In this study, out of 40 cases of resection and anastomosis studied, 20 patients underwent hand sewn and 20 patients underwent stapler anastomosis. Patient distribution are mentioned as per age (chart 1), gender (chart 2), types of anastomosis (chart 3), etiology (chart 4). Hand sewn anastomosis was done in two layer using 3-0 vicryl and 3-0 silk. Stapler anastomosis done using liner cutting, liner stapler. There were mainly 2 groups- hand sewn and stapled group with 20 patients in each. There were 22 in ileocolic group 14 cases in GJ group, 2 in JJ group and Oesophagogastric anastomosis.

There was anastomotic leak in 1 case of gastrojejunostomy in hand sewn group. No leak was observed in stapled anastomosis group.

Wound infection was observed in 5 cases. 4 cases were in hand

sewn group and 1 in stapled group.

There was no mortality in either group post-operatively.

## Sub-group analysis

There were 4 groups observed in our study namely Oesophagogastric group, Gastrojejunostomy group, Jejunojunostomy group and Ileocolic group.

- The Oesophago-gastrostomy group consisted of 2 patients with 1 in each group i.e., hand sewn and stapled. There were no complications in both cases.
- The Gastrojejunostomy group consists of 14 patients with 7 in hand sewn and 7 in stapler anastomosis group. There was one case of anastomotic leak in hand sewn group and none in stapled group. There were 2 cases of wound infection in hand sewn group and 1 case of wound infection in stapled group. There was no mortality in either group.
- The Jejunojunostomy group consists of 2 patients with 1 in each group i.e. hand sewn and stapled. There were no complications.
- The Ileocolic group had 22 patients with 11 in each group. No leak in both groups. Two case in hand sewn group had wound infection and none in stapled group. There was no mortality in both the groups.

**Table 1:** Age distribution

Age in years	Hand sewn anastomosis	Stapler anastomosis	Total
18-20	0 (0%)	1 (5%)	1 (2.5%)
20-30	2 (10%)	4 (20%)	6 (15%)
31-40	2 (10%)	3 (15%)	5 (12.5%)
41-50	6 (30%)	8 (40%)	14 (35%)
51-60	6 (30%)	4 (20%)	10 (25%)
61-70	4 (20%)	0 (0%)	4 (10%)
Total	20 (100%)	20 (100%)	40 (100%)
Mean $\pm$ SD	48.30 $\pm$ 11.27	41.95 $\pm$ 11.51	45.13 $\pm$ 11.69

**Table 2:** Gender distribution

Gender	Hand sewn anastomosis	Stapler anastomosis	Total
Female	8 (40%)	5 (25%)	13 (32.5%)
Male	12 (60%)	15 (75%)	27 (67.5%)
Total	20 (100%)	20 (100%)	40 (100%)

**Table 3:** Types of anastomosis

Types of anastomosis	Hand sewn	Stapled
Oesophago-gastrostomy	1 (5%)	1 (5%)
Gastrojejunostomy	7 (35%)	7 (35%)
Jejunojunostomy	1 (5%)	1 (5%)
Ileocolic	11 (55%)	11 (55%)

**Table 4:** Etiology

Etiology	No. of patients (%)
Cicatrizizing duodenal ulcer	27
Ileal stricture	10
Ileal TB	10
Obstructed paraumbilical hernia	10
Adhesion bands	15
Gastric outlet obstruction	10
Jejunal stricture	7
Intussusception	5
Corrosive acid poisoning	3
Meckels diverticulum	3

**Table 5:** Comparison of anastomotic leak in two groups

Leak	Hand sewn anastomosis	Stapler anastomosis	Total
No absent	19 (95%)	20 (100%)	39 (97.5%)
Yes present	1 (5%)	0 (0%)	1 (2.5%)
Total	20 (100%)	20 (100%)	40 (100%)

**Table 6:** Comparison of mortality

Mortality	Hand sewn anastomosis	Stapler anastomosis	Total
No	20 (100%)	20 (100%)	40 (100%)
Yes	0 (0%)	0 (0%)	0 (0%)
Total	20 (100%)	20 (100%)	40 (100%)

## Discussion

In this study we compared the outcome of hand sewn anastomosis with stapled anastomosis in 40 patients who presented in Department of General Surgery at St Martha's Hospital, Bangalore. The results were analyzed and compared with other studies published in literature. One case of anastomosis leak was observed in hand sewn category of GJ, though statistically it was not significant when both groups were compared. There were 5 cases of wound infection, 4 in hand sewn groups and 1 in stapled group. Regarding the mortality there were no deaths observed. There were no other complications.

A study done by Afsar Ali Bhatti *et al.* concluded that there is no statistical difference between hand sewn and stapler anastomosis regarding the leak. In their series they had a leak of 2.9% in stapler and 8.6% in hand sewn anastomosis [5], whereas in our study it was 5% in hand sewn group and 0% in stapled group.

Hassanen *et al.* in their clinical trials of 39 patients found leak in 16.6% in stapler group and 38% in hand sewn favouring stapler anastomosis [6].

In another study from the West of Scotland and Highland Anastomosis Study Group, there was no difference in the

clinical leaks [7].

## Sub-group analysis

In this study there was anastomotic leak in 1 case of hand sewn anastomosis in gastrojejunostomy group, which is statistically not significant. It was managed conservatively.

There were no leaks in other groups in both hand sewn and stapler anastomosis.

There were 2 cases of wound infection in hand sewn and 1 case in gastrojejunostomy group. There were 2 cases of wound infection in ileocolic group in hand sewn category.

J.D. Uschal *et al.* in their meta-analysis of 50 articles found no significant difference in the leak in hand sewn and stapler anastomosis in Oesophagogastric anastomosis.

In other studies of Quan Wang *et al.* [8] also found no significant difference in both hand sewn and stapler group in anastomosis.

Our study is in accordance with study done by Suzana Angélica *et al.* [9] in 2008 which showed no difference in incidence of anastomotic leak between the two groups.

A systematic review and meta-analysis of 17 studies comparing hand sewing and stapling in ileocolic, colocolonic and colorectal anastomosis was done by MacRae & McLeod [10] in 1998. They concluded that although intraoperative technical problems were more common in those that were stapled, no evidence of differences between the two groups was found in the other variables, and they considered the two techniques to be equally effective.

## Conclusion

This study suggested that there was no significant difference in the incidence of post-operative complications namely anastomotic leak and wound infection with respect to hand sewn and staples techniques. Therefore both hand sewn and stapled anastomosis technique can be safely practiced. The choice of technique depends upon surgeon and also availability of facility.

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