

# STAPLED VERSUS HANDSEWN INTESTINAL ANASTOMOSIS IN EMERGENCY SURGERY

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## Abstract

The major problem following bowel anastomoses is the anastomotic failure leading to leakage peritonitis, fistula, abscess, sepsis, necrosis, stricture etc. adding to the morbidity and mortality. (e.g., 22% mortality in patients with a leak vs. 7.2% mortality in those without leak). The present study compares the complication rates of sutured and stapled anastomotic techniques in an emergency setting of a tertiary care institute in Kerala.

The study evaluates the complications (leak /intra-abdominal abscess) of both stapled and hand-sewn techniques of intestinal anastomosis in emergency setting. The study is conducted in a tertiary care centre in Kerala and the data is collected from the medical records and emergency register. A total of 112 cases that meet the inclusion and exclusion criteria are included during the period from 2017 to 2021

Among the 61 patients who had undergone hand sewn anastomosis 7 (11.5%) had anastomotic leak and 54 (88.5%) patients had no leak. Among the 51 patients underwent stapled anastomosis, 6 (11.8%) had anastomotic leak and 45 (88.2%) patients developed no leak. This data is statistically analyzed using Chi Squared test and found that there is no significant difference between the occurrence of anastomotic leak between the two study groups irrespective of whether the anastomosis is hand sewn or stapled.

The average time taken for surgery in the hand sewn group is about 192.1 minutes and in stapled group is 162.5 minutes. This difference in the average duration of surgery is analyzed statistically and it showed that the difference in of the duration of surgery is statistically significant.

In conclusion; there is no significant difference between the complication rates of both type of anastomosis is identified in the emergency setting. But there is a clear advantage of less operating time for stapled anastomosis..

**Keywords:** Anastomosis, Emergency, Intestinal, Stapled, Handsewn.

## Introduction

Advancements in science had reflected in the surgical field as the advancement in instruments and techniques. The surgical procedures had become simple, fast and effective with the help of the new inventions and technologies. In the early 1970s after the introduction of stapling instruments, one of the main questions open to the operating surgeon is whether to choose a sutured or stapled anastomosis. This concern has been investigated extensively with mixed results, and remain disputable till now.

The major problem following bowel anastomoses

is the anastomotic failure leading to leakage peritonitis, fistula, abscess, sepsis, necrosis, stricture etc. adding to the morbidity and mortality. (e.g., 22% mortality in patients with a leak vs. 7.2% mortality in those without leak) <sup>1</sup>. Various factors contribute to these complications includes suturing technique, suture material, presence of concurrent sepsis, vascular compromise and so on.

The present study compares the complication rates of sutured and stapled anastomotic techniques in an emergency setting of a tertiary care institute in Kerala.

## Patients and methods

The study evaluates the complications (leak /intra-abdominal abscess) of stapled and hand sewn intestinal anastomosis in emergency setting. The study is conducted in a tertiary care centre in Kerala during the period from January 2017 to December 2021. The data is collected from the medical records and emergency register using a pre-approved proforma. Patient's data, operative findings, duration of anastomosis and incidence of anastomotic leak were collected from admission till discharge and entered in the master chart in both groups. Each case was analysed with respect to duration required and post-operative complications like anastomotic leak in stapled and hand sewn intestinal anastomosis. After drawing the results from the statistical test, results were analyzed and compared with other comparative studies. In the present se-

ries, a total of 112 cases that meet the inclusion and exclusion criteria are included.

## Results

In the study total 112 patients were enrolled, in which 51 were in stapled anastomosis group and 61 were in hand sewn anastomosis group. Maximum number of patients in Stapled and Hand sewn anastomosis group were in the age group of 50 -59. In stapled anastomosis group there were 14 females (27.45%) and in Hand sewn anastomosis group had 16 females (26.22)%. The maximum number of anastomosis performed were ileo-ileal anastomosis that is 63, of which 23 were stapled type and 40 were hand sewn type and the least performed was colo-rectal anastomoses.

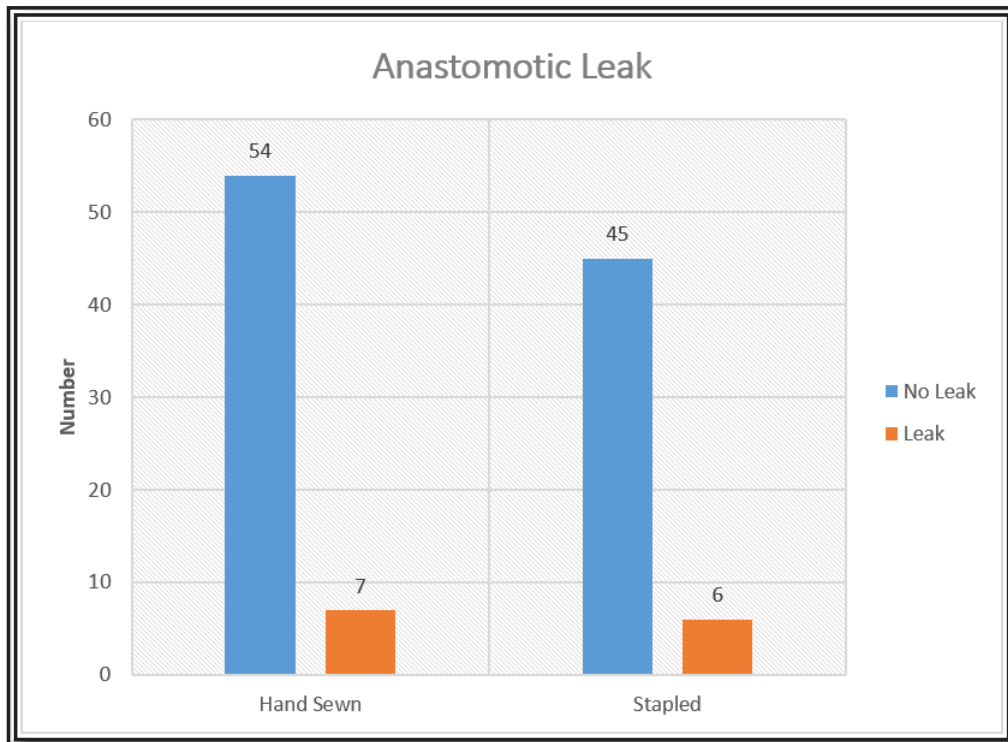
**Table (1)** Primary and secondary outcomes

Site of Anastomosis	Stapled	Hand sewn
Colo colic	3	3
Colo rectal	3	1
Gastro jejunal	6	3
Ileo ileal	23	40
Ileo transverse	11	5
Jejuno jejunal	3	4
Jejuno transverse	2	5
Grand Total	51	61

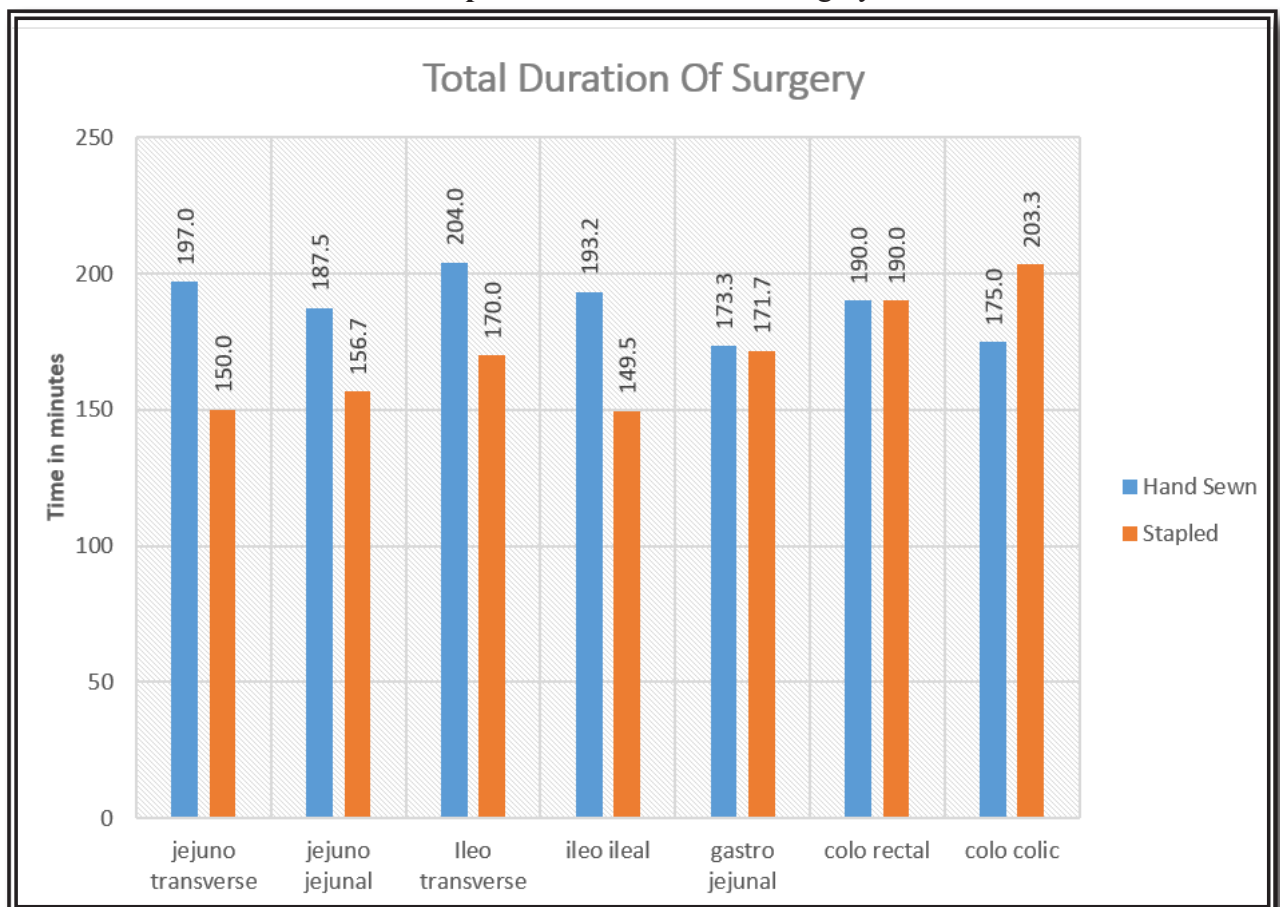
Among the 61 patients who had undergone hand sewn anastomosis 7 (11.5%) had anastomotic leak and 54 (88.5%) patients had no leak. Among the 51 patients underwent stapled anastomosis, 6 (11.8%) had anastomotic leak and 45 (88.2%) patients developed no leak. This data is statistically analyzed using Chi Squared test and found that there is no significant difference between the occurrence of anastomotic leak between the two study groups irrespective of whether the anastomosis is hand sewn or stapled, with a p value of 0.96 ( $p > 0.05$ ).

The average time taken for surgery in the hand sewn group is about 192.1 minutes and in stapled group is 162.5 minutes. This difference in the average duration of surgery is analyzed statistically using unpaired t test which gave a t value of 6.97 and a critical value of 1.98. It shows that the difference in of the duration of surgery is statistically significant with a p value  $< 0.0001$ .

**Graph 1: Anastomotic leak rates**



**Graph 2: Total Duration of Surgery**



**Discussion**

Advancements in science had reflected in the surgical field as the advancement in instruments and techniques. The surgical procedures had become simple, fast and effective with the help of the new inventions and technologies. Introduction of staplers in the early 1970s for the anastomosis in gastro intestinal tract also belongs to such an innovation that made complex anastomotic procedures, relatively simple. Today one of the main choices open to the gastrointestinal surgeon is whether to create a sutured or stapled anastomosis. Previous studies comparing stapled and hand sewn colorectal anastomosis have been equivocal. This study is a humble effort to compare both the staple group and the hand sewn group undergoing emergency gastro intestinal surgeries in a single institute. This study evaluates the complications (leak /intra-abdominal abscess) of stapled and hand sewn intestinal anastomosis in the emergency setting. The study is conducted in a tertiary care centre in Kerala and the data is collected from the medical records and emergency register using a pre-approved proforma. A total of 112 cases that meet the inclusion and exclusion criteria are included

during the period from 2017 to 2021. The mean age in Stapled anastomosis group was 46 years and in Hand sewn anastomosis group was 46.50 years. Maximum number of patients in Stapled and in Hand sewn anastomosis group were in the age group of 50 -59 years. The average age group in international studies is 62.50 and 63.30 years respectively <sup>2</sup>. Though in the present study the analysis and conclusions are made by including all cases irrespective of the site of the anastomosis, maximum performed procedure was ileo-ileal anastomosis that is 63, of which 23 were stapled type and 40 were hand sewn type and minimum was colo-rectal anastomoses that is 4, of which 3 were stapled type and 1 was hand sewn type. On comparing the complication rates between the two groups, among the 51 patients in stapled group 6 patients had anastomotic leak and among the 61 patients in hand sewn group 7 patients had developed leak (p= 0.96).The result is comparable to the study conducted by Jameson L Chassin et.al <sup>2</sup> and by Farrah JP et. al <sup>3</sup>.

Group	Present study	Jameson L Chassin et.al	Farrah JP et. al
Stapled	11.76% (6/51)	2.7% (13/472)	15% (20/133)
Hand sewn	11.47% (7/61)	3% (9/296)	6% (6/100)

And also a prospective randomized study by Catena, F et.al <sup>4</sup> give comparable results. The average time needed for a stapled anastomosis by a trained hand is 3 minutes <sup>2</sup>. But in our study we took the total duration of surgery into consideration to see whether there is any significant difference in the total duration of surgery between the two groups. Statistical analysis of the present study shows significant difference in the mean duration of surgery, that is 192.1 mins in hand sewn group and 162.5 mins in the stapled group with a p<0.0001. The average duration of surgery is significantly less in stapled group when compared to hand sewn surgery. The results are comparable with the study conducted by Jason P Farah et al. <sup>3</sup> and Catena, F et.al <sup>4</sup>.

There are many other factors which affect the

healing of bowel anastomosis. That includes both patient factors and technical factors. Patient factors include age, chronic use of steroids, smoking, alcohol abuse, co morbidities like diabetes mellitus and technical factors includes the surgeon's preferences, experience, accurate apposition, distal obstruction, fecal contamination, peritonitis, hematoma formation etc. Analysis of all these factors in relation to anastomotic leak is beyond the scope of the present study.

**Conclusion**

The study had two groups, stapled anastomosis group and hand sewn anastomosis group, comprising 51 and 61 patients respectively in each group. Each group was evaluated and compared with respect to duration of the surgical procedure,

anastomotic leak rate. Based on the results obtained in the present study, following conclusions can be drawn:

1. There is no significant difference between the complication rates of both type of anastomosis is identified in the emergency setting.
2. There is a clear advantage of less operating time for stapled anastomosis

### **Authership & conflict of interest**

This is to verify authership of this article and there

is no conflict of interest in any way.

### **Limitations**

1. The study was confined to a single institution, though a large number of patients need be to be studied to get a substantial conclusion.
2. The selection of cases by the individual surgeons and her's/his experience might have affected the results.

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