



A COMPARATIVE STUDY OF STAPLERS VERSUS HAND SEWN ANASTOMOSIS IN INTESTINAL SURGERIES

Surgery

Dr. Uvaish Parmar	Resident DNB General Surgery, Apollo Hospital International Limited, Gandhinagar, Gujarat
Dr. Manjulata Anchalia	Head Of Department Of General Surgery, Apollo Hospital International Limited Gandhinagar, Gujarat
Dr. Chirag Desai	Consultant Surgical Gastroenterology, Apollo Hospital International Limited, Gandhinagar, Gujarat
Dr Lakshman Khiria	Consultant Surgical Gastroenterology, Apollo Hospital International Limited, Gandhinagar, Gujarat

ABSTRACT

INTRODUCTION: Intestinal anastomosis is a surgical procedure to establish communication between two separated portions of the intestine. This procedure restores intestinal continuity after removal of a pathological condition affecting the bowel. Intestinal anastomosis can be performed by a hand-sewn technique using absorbable or non-absorbable sutures, mechanical stapling devices. Sutured anastomosis (hand-sewn technique) is the commonly used method. The newer stapling devices for intestinal anastomosis has provided an alternative option to perform rapid anastomosis. Various studies have contradictory results in terms of duration of procedure, post operative recovery and anastomotic leak. There are insufficient evidence to demonstrate superiority of either technique and more studies are needed to demonstrate the superiority of either technique. **AIM:** To study and compare the effectiveness of staplers vs hand sewn anastomosis in Intestinal surgeries. **MATERIAL AND METHODS:** A comparative observational study Consists of patients presenting with need of bowel resection and anastomosis inclusion criteria at Apollo Hospital Gandhinagar, Gujarat. The patients who are admitted for elective as well as emergency resection & anastomosis of small and large intestines for various illnesses are selected after thorough clinical examination and investigations to confirm the diagnosis co- morbid conditions. Details were recorded in the proforma prepared. **RESULTS:** 62.5% complications in comorbid subjects and 37.5% complications in non comorbid subjects. The mean of anastomotic time for hand sewn group was 27.8 minutes whereas for the stapler group it was 9.0 minutes mins. With respect to return of bowel sounds, mean time was 46.32 hours in the hand sewn group and 35 hours in the stapler group Mean day of hospitalization was 8.16 days in hand sewn and 7.8 days in stapler technique. mean time taken for resumption of oral feeds the was 66.96 hours in hand sewn group and was 59.52 hours in stapler group. hand sewn group had total five complications(20%), whereas stapler group had three complications(12%) Both the groups did not have any mortality. The mean cost of hand sewn anastomosis is 717.4 Rs which is significantly less than mean cost of stapled anastomosis which is 33,754 Rs. **CONCLUSION:** Stapler anastomosis significantly reduces operative time and time taken for return of normal bowel sounds. Because of the shortened total operating time in the stapled anastomosis. There is increased risk of overall complications in patients having co-morbidities in both hand sewn and stapled anastomosis. Mechanical staplers are far more costly than suture materials. Stapling technique can be used safely and effectively

KEYWORDS

Bowel Anastomosis, Hand Sewn, Stapled Anastomosis, Stapler, Intestinal Surgeries

INTRODUCTION

Intestinal anastomosis is a surgical process to establish communication between two separated parts of the intestine. In this procedure restoration of intestinal continuity after removal of a pathological condition affecting the bowel is achieved.. Intestinal anastomosis is a very common procedure done in the surgical practice, when resections are carried out for benign or malignant lesions of the gastrointestinal tract. Common indications of intestinal resection anastomosis includes : Small bowel obstruction due to adhesions, intussusceptions, malignancy of the intestine, traumatic perforation, volvulus, ulcerative colitis and crohn's disease ,etc.² Contraindications for intestinal anastomosis includes: Sever sepsis, fecal contamination, poor nutritional status, unhealthy bowel condition and disseminated malignancy.³ The main types of intestinal anastomosis includes : End to end anastomosis, end to side anastomosis and side to side anastomosis.¹ Locations of intestinal anastomosis includes: Jejunojejunal, jejunoileal, ileoileal, ileocecal, ileocolic, ileorectal, Colocolic and Colorectal anastomosis.³ Intestinal anastomosis can be performed by a hand-sewn technique using absorbable or non-absorbable sutures, mechanical stapling devices. Sutured anastomosis (hand-sewn technique) is the commonly used method. The newer stapling devices for intestinal anastomosis has provided an alternative option to perform rapid anastomosis.¹ The choice of anastomotic technique is influenced by diameter of the bowel ends, accessibility, edema and site of anastomosis, equipment, contamination and underlying pathology.¹ Common types of Staplers used in intestinal anastomosis includes: linear stapler, linear cutter Stapler, endoscopic linear cutter Stapler and the circular Stapler.⁴ Various studies comparing hand sewn and stapled bowel anastomosis have different results in terms of postoperative recovery, anastomotic leak and cost of operation. There are insufficient evidence to demonstrate superiority of either technique and more studies are needed to demonstrate the

superiority of either technique. Present study is aimed to observe hand sewn and stapled anastomosis of small and large intestines in terms of operative time, postoperative recovery, postoperative complications and cost in my institute.

AIM AND OBJECTIVES

To study and compare the effectiveness of staplers vs hand sewn anastomosis in Intestinal surgeries.

Primary objectives

To compare staplers versus hand sewn anastomosis in Intestinal surgeries in respect to the following parameters:

- Time taken for the Anastomosis,
- Time taken for the bowel sounds to return,
- Resumption of oral feeds,
- Postoperative hospital stay,
- Incidence of complications particularly,
 - Anastomotic bleed,
 - Anastomotic leak,
 - Anastomotic stricture.
- Cost of anastomosis.

MATERIALS AND METHODS-

Study setting- Apollo hospitals international Gandhinagar

Study population - Consists of patients presenting with need of bowel resection and anastomosis in inclusion criteria at Apollo Hospital Gandhinagar.

Duration- OCT 2019-JUNE 2021

Study design - A COMPARATIVE OBSERVATIONAL STUDY

Study sample- Inclusion criteria

- 1) All patients requiring elective as well as emergency bowel surgeries who undergo bowel anastomosis for various benign and malignant conditions.
- 2) All patients in the age group 18 to 80 years undergoing intestinal resection and anastomosis.

Exclusion criteria

- 1) Age less than 18 years and more than 80 years
- 2) Patients undergoing radiotherapy
- 3) Patients of coagulopathy & patients on anti-coagulation therapy
- 4) Patients with peritonitis
- 5) Surgeries including oesophageal, gastric, pancreatic and biliary anastomosis

Methodology:

The patients who are admitted for elective as well as emergency resection & anastomosis of small and large intestines for various illnesses are selected after thorough clinical examination and investigations to confirm the diagnosis co-morbid conditions.

The cases were operated by different surgeons. The decision to use hand sewn technique or staples was left to the discretion of the operating surgeon. In the hand sewn group the techniques was based on the operating surgeon's preference.

Type of hand sewn suturing used in this study

- Continuous /interrupted
- Double layer
- End to end or side to side or End to Side (or any combination).

A two layer method utilized anastomosis. The first layer is a continuous all layer (full thickness) suture using Polyglactin suture. The second layer is a continuous seromuscular suture using silk

Types of staplers used in this study

- (1) Circular end to end anastomosis stapler (EEA),
- (2) Linear cutter (side to side) stapler (GIA),
- (3) Transverse anastomosis stapler (TA),

The various observations like time taken for the procedure, time taken for the bowel sounds to return, resumption of oral feeds, post-operative complications like anastomotic leak and mortality are recorded. The patients are assessed till discharge from the hospital. The reports are compared between the stapler and hand sewn anastomosis and also compared with other studies.

TABLE-1 RETURN OF NORMAL BOWEL SOUNDS

GROUP	RETURN OF NORMAL BOWEL SOUNDS (HOURS)	SD
HANDSEWN	46.32	13.58
STAPLED	35	7.03
P VALUE	0.0006	

TABLE-2 ASSOCIATION OF COMPLICATIONS AND SITE OF ANASTOMOSIS

Location of anastomosis	Total numbers of patients			Numbers of Complications	
	Hand sewn	stapled	Hand sewn	Stapled	
Small bowel- Small bowel	13	11	2	0	
Small bowel- Large bowel	6	4	0	0	
Large bowel- Large bowel	6	10	3	3	

TABLE-3 COMPLICATIONS AFTER ANASTOMOSIS

Complication	Hand Sewn	Stapled	Total
ANASTOMOTIC LEAK	2	1	3
ANASTOMOTIC BLEED	1	0	1
ANASTOMOTIC STRICTURE	0	1	1
WOUND INFECTION	2	1	3
TOTAL	5	3	8
P VALUE	P = 0.5104		

DISCUSSION

DEMOGRAPHIC PROFILE

In the present study, hand sewn and stapler groups were found comparable on the basis of age, gender, presence or absence of co-morbid condition, weight, hemoglobin, serum proteins, and pathology (malignant or benign). Seo SH et al⁵, in a study comparing hand sewn and stapled anastomosis showed a similarity in the age and gender distribution between two groups. Similar pattern of age and gender distribution was also noted in the study by Hassanen A et al⁶, comparing hand sewn and stapled anastomosis of the large bowel. In this study, the mean age of patient who had hand sewn anastomosis was 56.8 years and those who underwent stapler anastomosis was 55.08 years whereas in the Scher study the average of the patient was 54.6 years in hand sewn and was 58.6 years in stapler. In study of Reiling B et al⁷, the mean age of hand sewn was 55.1 years and stapler was 56.8 years which was higher in both the groups.

CO-MORBIDITIES AND PATHOLOGICAL CONDITION

According to the presence or absence of co-morbid conditions both the groups were similar. In the Hand sewn group, 53% of the patients had some or the other co-morbid condition whereas in the Stapler group, 56% of the patients had presence of a co-morbid condition. Number of patients with co-morbid condition in this study is higher than the study done by Prabhat B et al⁸. There were total 8 patient showed complication from which 5 patients were having comorbidity. (62.5% complications in comorbid subjects and 37.5% complications in non comorbid subjects.) In this study there is total of 36 benign cases (19 in the hand sewn group and 17 in the stapler group). Rest of the cases where malignant (14 cases). Khan AQ et al⁹, Liu B et al¹⁰ have taken only malignant cases. In our study we took all the cases which underwent elective and emergency intestinal anastomosis irrespective of the type of pathology (Benign or Malignant). In the Hand sewn group 24% of patients were operated for malignant condition and 76% were operated for benign condition. In the stapler group 32% were operated for malignant condition whereas the remaining 68% were operated for benign condition. There were 5 complications in benign cases and 3 complications in malignant cases.

MEAN ANASTOMOTIC TIME

The mean of anastomotic time for hand sewn group was 27.8 minutes whereas for the stapler group it was 9.0 minutes with a p value of <0.001 which was statistically significant. Which is similar to the study done by Subhakar B et al¹. In the stapler group 88 % of anastomosis was done within 10-15 mins which included loading the stapler gun, alignment of the tissues and firing of the gun. In some of the patients in stapler group the anastomosis time was slightly longer (between 20 – 30 mins) due to the added time required to set up the circular stapler. The total mean anastomotic time were significantly shorter in stapler group. Another studies done by Himabindu Bangaruet al¹¹, and Hollender et al¹² found to have a shorter total operative time in stapled anastomosis. stapling instruments afforded significantly quicker operations.

RETURN OF NORMAL BOWEL SOUNDS

With respect to return of bowel sounds, mean time was 46.32 hours in the hand sewn group and 35 hours in the stapler group with a p value of 0.0011. It was statistically significant, which differed from study done by Scher KS et al¹³ showing sutured technique better than the stapler method. A study of bhanurekha R et al¹⁴ concurred with our study whereas Shubhakar B et al¹ didn't find any significance.

RESUMPTION OF ORAL FEED

In this study, mean time taken for resumption of oral feeds was 66.96 hours in hand sewn group and was 59.52 hours in stapler group with p value of 0.117 which concurred with studies of Himabindu Bangaruet al¹⁵ and Shubhakar B et al¹, whereas A study of Scher KS et al¹³ showed there is no difference between both groups which was 3.7 days in hand sewn and 3.8 days in stapler method.

POST OPERATIVE HOSPITAL STAY

Mean day of hospitalization was 8.16 days in hand sewn and 7.8 days in stapler technique with p value of 0.490, which is insignificant difference. A study of Reiling RB et al⁷ showed no difference in hospitalization of both techniques but, Bhanurekha R et al¹⁴ detected significant less time for postoperative hospitalization in stapled group

POST OPERATIVE COMPLICATIONS

In this study, Hand sewn group had 2 anastomotic leaks (8%) when compared to stapler group had only 1 (4%) but was statistically not significant. Regarding other complications like anastomotic leak.

anastomotic bleeding, anastomotic stricture and wound infection, hand sewn group had total five complications(20%), whereas stapler group had three complications(12%) Both the groups did not have any mortality. Large bowel-Large bowel anastomosis having highest numbers of complications in both hand sewn and stapled group where small bowel-large anastomosis is not showing any complication. As per the study done by Afsar Ali Bhatti et al¹⁵, they have 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. Abhilash N et al¹⁷ in their study of 40 patients found no significant difference in the leak in hand sewn and stapler anastomosis. This result does not correlate with other studies by Docherty et al¹⁶ and Hassanen et al⁶ favoured stapled anastomosis with significantly less complications.

COST OF ANASTOMOSIS

The mean cost of hand sewn anastomosis is 717.4 Rs which is significantly less than mean cost of stapled anastomosis which is 33,754 Rs. which favours study done by Reiling RB et al⁷. These results do not match with the results of study done by Schineis C et al¹⁸. In their study they found that Operations with stapled anastomoses saved 183 € in operation costs and 496 € in overall hospital costs

CONCLUSION

In present study while comparing the outcome of hand-sewn and Stapler technique in small and large intestinal anastomosis it was found that: Stapler anastomosis significantly reduces operative time and time taken for return of normal bowel sounds. Because of the shortened total operating time in the stapled anastomosis, staplers may be advantageous in patients whose general condition is poor and who would not tolerate prolonged anesthesia. There is no significant difference in time taken for resumption of oral feed and total postoperative hospital stay. There is increased risk of overall complications in patients having co-morbidities in both hand sewn and stapled anastomosis. The incidence of postoperative anastomotic leak and bleeding is higher in hand sewn method but incidence of anastomotic stricture is there in stapled anastomosis.

Mechanical staplers are far more costly than suture materials, thus stapled anastomosis is less commonly practiced and hand sewn anastomosis is still practiced. Stapling technique can be used safely and effectively as a part of modern Surgeon's armory and one should be equally expert with stapler gun as with needle holder and suture. Surgeons therefore can select the technique of their choice.

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