

Original Research Article

A retrospective comparative study on stapler verses hand sewn technique in gastrointestinal anastomosis of twenty-five cases each

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ABSTRACT

Background: In gastrointestinal surgery after resection of bowel loops, anastomosis of the bowel loops forms the main part of the surgery. The evolution of mechanical sutures by stapler devices is a technological advancement which helps anastomosis of bowel loops with less tissue injury and decreased time duration of procedure. Objective of current study was to compare the hand sewn anastomosis with stapler anastomosis in various types of elective gastrointestinal surgeries.

Methods: A retrospective comparative study was conducted in department of general surgery at New Civil Hospital, Surat. The study included 50 patients of either gender and different age groups.

Results: Out of 50 patients, 7 patients had Benign Gastric Outlet Obstruction (GOO), 18 patients had Post corrosive esophageal stricture, 5 patients had obstruction, 6 patients had post ileostomy status, 5 patients had carcinoma of ascending colon, 1 patient had carcinoma of caecum, 4 patients had ileo-caecal growth, 3 patients had carcinoma of descending colon, and 1 patient had sigmoid colon growth. In stapler anastomosis group Mean Total operative time was (156.20±45.21) mins whereas in handsewn anastomosis group Mean Total operative time was (188.40±48.32) mins with p value of 0.019.

Conclusions: In this study, one distinct advantage of staplers was the consistent reduction in operating time. However, no significant difference was found between the stapler and hand-sewn groups with respect to other parameters such as restoration of intestinal function, postoperative hospital stay, and postoperative complications like leakage, fistula or stricture formation.

Keywords: Gastrointestinal anastomosis, Hand sewn technique, Stapler method, Abdominal surgery

INTRODUCTION

In gastrointestinal surgery after the resection of bowel loops, anastomosis of the bowel loops forms the foremost part of the surgery. The Seromuscular suture technique is the support of the gastrointestinal surgery which is designated by Lembert in 1826. Single layer extra mucosal anastomosis is more frequently used currently which was defined by Matheson of Aberdeen for the reason that of the capability to produce less tissue necrosis or luminal narrowing which has substituted catgut and silk

nowadays.^{1,2} The progression of mechanical sutures by stapler devices is a technological advancement which assistances anastomosis of bowel loops with fewer tissue injury and decreased time duration of procedure.³ It also decreases the anastomotic leak complication. Stapler technique is now commonly used by many of the surgeons. It is more useful than the hand sewn anastomosis for safety, easily accessibility, shorter duration of procedure and efficiency. Many surgeons have doubt regarding the stapler, how it is used in critical sites for anastomosis. Precise approximation without tension and with a good

blood supply is essential for suturing or stapling.⁴ Anastomotic procedure is one of the key factors determining surgical success. Hand sewn and stapled sutures comprise the major anastomotic methods in clinical practice of GI surgeries.⁵ Staplers were originally developed to address the perceived problem of patency in anastomoses in particular. So far, no defined indications have been defined and most surgeons apply both techniques in clinical practice.^{6,7} There has been a lack of studies comparing superiority in general surgeries between stapled and hand-sewn anastomosis. This retrospective study compares the hand sewn anastomosis with stapler anastomosis in various types of elective gastrointestinal surgeries.

Aim and objectives

Aim and objectives of current study were to compare time taken for performing anastomosis, to compare total operative time in surgeries having multiple anastomosis, to compare duration of hospital stay, to compare duration of abstinence from oral feeding after anastomosis based on clinical recovery, to compare complications like anastomotic leakage, stricture, fistula, pain etc.

METHODS

This is a retrospective comparative study conducted in department of general surgery at New Civil Hospital, Surat during September 2020 to August 2021. The study included 50 patients of either gender and different age groups. Patients selected for this study included those who were admitted with various clinical problems requiring anastomosis of gastro-intestinal tract. By using purposive sampling technique 25 cases were taken of patients who had undergone Handsewn GI anastomosis and another 25 cases were taken of patients with Stapler GI anastomosis in consecutive manner according to inclusion criteria.

Inclusion and exclusion criteria

Inclusion criterion for current study was; >18 years of age. Exclusion criteria for current study were; <18 years of age, patients undergoing radiotherapy and pregnant women. The written informed consent was obtained from patients for the participation in the study. Case details were collected from case-papers available at the record section of NCH, Surat. Out of that, 25 cases were taken of patients who had undergone Handsewn GI anastomosis and another 25 cases were taken of patients with Stapler GI anastomosis in consecutive manner according to inclusion criteria. Detailed history was documented in which Gastrointestinal anastomosis was done. A predesigned proforma which included: Age, gender, pre-operative blood investigations, operative findings, method of anastomosis, anastomotic time, total operating time, duration of abstinence from oral feeding after anastomosis based on clinical recovery, hospital stay after surgery, complications like anastomotic leakage, stricture, fistula, pain and mortality was made for all patients. Preoperative

preparation was done in all patients which include bowel preparation, deep venous thrombosis prophylaxis and intravenous third generation cephalosporine with metronidazole at time of induction of anesthesia. All cases of anastomosis were done by a senior surgeon as per standard procedures in both handsewn and stapler group.

Data collection and analysis

Data were entered in Microsoft Excel sheet and statistically analyzed using Chi-square and t test, a p value of less than 0.05 was considered significant.

RESULTS

Out of 50 patients, 7 patients had benign gastric outlet obstruction (GOO), 18 patients had post corrosive esophageal stricture, 5 patients had obstruction, 6 patients had post ileostomy status, 5 patients had carcinoma of ascending colon, 1 patient had carcinoma of caecum, 4 patients had ileo-caecal growth, 3 patients had carcinoma of descending colon, and 1 patient had sigmoid colon growth. Among the study participants, total 31 were males and 19 were females. Majority of study participants (44%) were belonged to 41-50 years of age group followed by 26% patients were belonged to 21-30 years of age group. Total operative time of various patients included in this study.

Table 1: Demographic details of study participants (n=50).

Age group (years)	Male (%)	Female (%)
21-30	9 (18)	4 (8)
31-40	4 (8)	3 (6)
41-50	17 (34)	5 (10)
>50	1 (2)	7 (14)

Table 2: Total operative time of various patients (n=50).

Total operative time (minutes)	Type of anastomosis	
	Stapler	Hand Sewn
<120	5	2
120-180	12	12
>180	8	11

Out of 50 surgeries, 7 surgeries (14%) were completed before 120 mins (2 hours) which include 5 surgeries using stapler anastomosis and 2 surgeries by handsewn anastomosis, 24 surgeries (48%) lasts between 120 mins to 180 mins (2-3 hours) which include 12 surgeries using stapler anastomosis and 12 surgeries by handsewn anastomosis, and remaining 19 surgeries (38%) last for more than 180 mins (3 hours) which include 8 surgeries using stapler anastomosis and 11 surgeries by handsewn anastomosis (Table 2). In stapler anastomosis group Mean Time taken to perform anastomosis was (11.80±2.44) mins whereas in handsewn anastomosis group Mean Time taken to perform anastomosis was (17.80±2.53) mins with p

value of 0.001. There is significant difference in time taken to perform anastomosis between two groups. Stapler anastomosis take less time as compared to hand sewn anastomosis (Independent $t=-8.514$, $p<0.05$, 95% CI-7.417 to -4.583) (Table 3).

Table 3: Comparison between in two methods time taken performing anastomosis (n=50).

Type of anastomosis	Total time for anastomosis		T value (p value)
	Mean	SD	
Stapler	11.80	2.44	-8.51 (0.001)
Hand Sewn	17.80	2.53	

Table 4: Anastomotic leak after surgery in patients (n=50).

Type of anastomosis	Leakage		X ² value (p value)
	Yes	No	
Stapler	2	23	0.758 (0.384)
Hand Sewn	4	21	

Out of 50 patients, 20 patients (40%) resumed oral feeding on 3rd post-operative day which includes 11 patients from stapler anastomosis group and 9 patients from Handsewn anastomosis group, 12 patients (24%) resumed oral feeding on 4th post-operative day which includes 5 patients from stapler anastomosis group and 7 patients from Handsewn anastomosis group, and remaining 18 patients (36%) resumed oral feeding on 5th post-operative day which includes 9 patients from stapler anastomosis group and 9 patients from Handsewn anastomosis group (Figure 1).

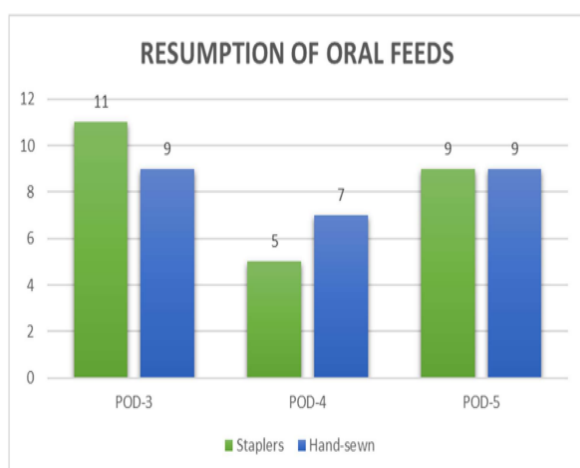


Figure 1: Comparison of resumption of oral feeds after surgery (n=50).

There is no significant difference in leakage after surgery between two groups (Table 4). Out of 50 patients, 4 patients (8%) died due to complications of surgery. Out of these 4 patients, one died on POD-10, another on POD-14,

one on POD-21 and one on POD-25. Rest 46 patients were discharged from the hospital (Figure 2).

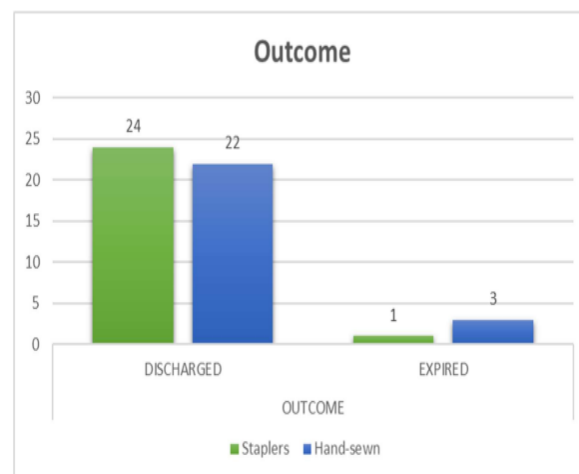


Figure 2: Comparison of outcome of two different gastrointestinal anastomosis methods (n=50).

DISCUSSION

In this study, stapler and hand sewn groups were compared on the basis of time to perform anastomosis, Total operative time, Resumption of oral feeds after surgery, hospital stay after surgery, post-operative complications like anastomotic leak, stricture, fistula and final outcome of the patients after surgery. In stapler anastomosis group Mean time taken to perform anastomosis was (11.80±2.44) mins whereas in handsewn anastomosis group Mean Time taken to perform anastomosis was (17.80±2.53) mins with p value of 0.001. (Independent $t=-8.514$, $p<0.05$, 95% CI -7.417 to -4.583). And this is similar to Rushin et al and Damesha et al study that shown a significant reduction in the anastomotic times in the stapled group and also Similar to Hori et al study conducted in Japan which demonstrated that the anastomosis time is less in stapler group (14 mins) than in hand sewn group (25 mins).⁸⁻¹⁰ In current research, stapler anastomosis group mean abstinence from oral feed was (3.92±0.909) days whereas in handsewn anastomosis group Mean abstinence from oral feed was (4.00±0.866) days with p value of 0.751. (Independent $t=-0.319$, $p>0.05$, 95% CI -0.585 to 0.425). Scher et al found that recovery of intestinal function did not differ significantly between the two anastomotic methods: patients with stapled anastomoses required an average of 3.8 days before resumption of oral feeding as compared with 3.7 days when the procedure was done with suture technique. This is also similar to Rushin et al and Damesha et al studies which showed there is no difference between both groups with p value >0.05 .⁸⁻¹² In this study, there is no significant difference in leakage after surgery between two groups (Chi square=0.758, df=1, $p=0.667$). which is similar to Meta-analysis study done by Lustosa and review of Cochrane which demonstrated clinical leak of 7.1% in stapled group and 6.33% in hand-sewn group which was also not significant.^{13,14} In present study, study there is no

significant difference in outcome after surgery in terms of mortality between two groups (Chi square=1.087, df=1, p=0.609). Liu et al from china done meta-analysis which also had no significant difference in the incidence of postoperative mortality (RR=1.52, 95%CI: 0.97-2.40; p=0.07).¹⁵ Similar is observed in both the studies of West of Scotland and Highland groups and the meta-analysis of 1998, that there was no difference in mortality. This is contrary to the Banurekha et al study which showed Significantly decreased mortality observed in stapler anastomosis compared to hand sewn anastomosis.¹⁶

Limitations

Limitation of current study was this study was done in a hospital including a subset of population but not in the general population, so the results obtained from the study cannot be applied to the general population. Small sample size was also one of the limitations of current study.

CONCLUSION

To gain wider acceptance, an innovative technique should be efficient and speedy with no compromise in safety. In this study, one distinct advantage of staplers was the consistent reduction in operating time. However, no significant difference was found between the stapler and hand-sewn groups with respect to other parameters such as restoration of intestinal function, postoperative hospital stay, and postoperative complications like leakage, fistula or stricture formation. Due to reduction in operating time, staplers may be advantageous in patients whose general condition is poor and who would not tolerate prolonged anesthesia. Hand-sewn anastomosis can be very difficult when access is severely limited especially in low anterior resection; mechanical stapling devices have an added advantage in these situations. Although stapling devices may be valuable in certain situations, one should not forget the art of conventional suturing and the maxim that holds good even in contemporary times.

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