

## Original Research Article

DOI: <http://dx.doi.org/10.18203/2349-2902.isj20172789>

# Hand sewn versus stapler anastomosis in elective gastro intestinal surgeries

Banurekha R.\*, Sadasivam S., Sathyamoorthy K.

Department of Surgery, Government Dharmapuri Medical College and Hospital, Dharmapuri, Tamil Nadu, India

Received: 30 April 2017

Accepted: 25 May 2017

**\*Correspondence:**

Dr. Banurekha R.,  
E-mail: docbanurekha@rediffmail.com

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

## ABSTRACT

**Background:** The technique for intestinal anastomosis in elective gastrointestinal surgeries depends on site, bowel calibre and underlying disease. The decision to choose hand sewn or stapler anastomosis depends on surgical experience and preference. The objective of this study was to study the outcome of hand sewn anastomosis compared with stapler anastomosis in elective gastrointestinal surgeries.

**Methods:** Retrospective comparative study was conducted in surgical wards of a tertiary referral hospital from July'2013 to June'2016. Data analysed with independent samples T-test to compare mean values between methods and Chi-square tests used to compare proportion of the two values.

**Results:** Significant difference in duration of procedure, return of bowel sounds, starting of oral feeds, hospitalization days, return to work noted in stapler anastomosis compared with hand sewn anastomosis in subtotal gastrectomy and gastrojejunostomy. No difference in appearance of bowel sounds in right hemicolectomy and other resection and anastomoses group, no difference in return to work in right hemicolectomy group, no difference in starting of oral feeds in low anterior resection group. Other parameters were statistically significant in right hemicolectomy, low anterior resection and other resection and anastomosis groups. No significant difference observed in anastomotic leak between hand sewn and stapler methods. There was no mortality in stapler group.

**Conclusions:** Stapler method significantly reduces duration of surgery, has early recovery with less mortality. Stapling is quick to perform in inaccessible situations like low colorectal anastomosis. Stapler anastomosis can be used safely and effectively in elective gastrointestinal surgeries.

**Keywords:** Anastomosis, Hand sewn, Stapler

## INTRODUCTION

In gastrointestinal surgery after resection of bowel loops, anastomosis of the bowel loops forms the main part of surgery. Seromuscular suture technique is the main stay of the gastrointestinal surgery which is described by Lembert in 1826. Single layer extra mucosal anastomosis is more commonly used nowadays which was described by Matheson of Aberdeen because of the capacity to produce less tissue necrosis or luminal narrowing which has replaced catgut and silk nowadays.<sup>1</sup> 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. It also decreases the anastomotic leak complication.<sup>2</sup> 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. Accurate approximation without tension and with a good blood supply is essential for

suturing or stapling.<sup>3-5</sup> This retrospective study compares the hand sewn anastomosis with stapler anastomosis in various types of elective gastrointestinal surgeries.

## METHODS

### Case selection

This retrospective comparative study was conducted in the department of surgery at government Dharmapuri medical college hospital, Dharmapuri, Tamil Nadu, India on review of the case records of 50 consecutive patients of elective gastro intestinal surgeries during the period from July 2013 to June 2016 after approval from ethical committee.

### Mode of evaluation

Among the 50 patients recruited in the study, 28 of them who had undergone hand sewn anastomosis by single layer or double layer comprised the hand sewn group and 22 of them who had undergone anastomosis by stapler technique comprised the stapler group. Anastomosis was done by side to side or end to end depending on accessibility, anastomotic site and the need for surgery. Vicryl and Silk were the suture materials used for hand sewn anastomosis and the GI stapler device consisting of linear, cutting and circular types were used for stapler anastomosis. The following parameters namely operating time, time of return of bowel sounds, day of starting oral feeds, duration of hospital stays in days, duration of return to work in months, anastomotic leak and mortality

were studied and the outcome of hand sewn anastomosis compared with stapler anastomosis in elective gastrointestinal surgeries.

### Inclusion criteria

Elective gastrointestinal surgeries requiring anastomosis in patients more than 12 years of age during the study period.

### Exclusion criteria

- Children less than 12 years of age
- Emergency gastrointestinal surgeries.

### Statistical analysis

The observations were analysed statistically by independent samples T-test to compare mean values between methods and Chi-square tests used to compare proportion of the two values.

## RESULTS

The parameters namely duration of procedure, return of bowel sounds, starting of oral feeds, hospitalization in days, return to work in months in hand sewn anastomosis compared with stapler anastomosis in the four groups of gastrointestinal surgeries namely subtotal gastrectomy and gastrojejunostomy, right hemicolectomy, low anterior resection and other resection and anastomosis of gastrointestinal tract. The results are given in Table 1.

**Table 1: Comparison of various parameters in gastrointestinal surgeries by hand sewn or stapler anastomosis.**

Subtotal gastrectomy and gastrojejunostomy group										
Parameter	Duration of procedure		Return of bowel sounds		Day of starting oral feeds		Hospitalization in days		Return to work in months	
	Hand sewn	Stapler	Hand sewn	Stapler	Hand sewn	Stapler	Hand sewn	Stapler	Hand sewn	Stapler
N	7	8	7	8	7	8	7	8	6	8
Mean	2.71	1.93	2.86	2.13	3.14	2.25	10.14	8.0	5.67	4.13
SD	0.393	0.563	0.378	0.354	0.378	0.463	0.690	0.756	0.516	0.641
P value	0.012		0.006		0.004		0.001		0.003	
Right hemicolectomy group										
	Hand sewn	Stapler	Hand sewn	Stapler	Hand sewn	Stapler	Hand sewn	Stapler	Hand sewn	Stapler
	6	4	6	4	6	4	6	4	5	4
Mean	3.0	2.0	3.17	2.25	4.0	2.5	10.17	8.0	4.6	4.25
SD	0.633	0	0.983	0.5	0.632	0.577	1.602	0.816	2.608	0.5
P value	0.018		0.132		0.014		0.020		0.161	
Low anterior resection group										
	Hand sewn	Stapler	Hand sewn	Stapler	Hand sewn	Stapler	Hand sewn	Stapler	Hand sewn	Stapler
	6	3	6	3	6	3	6	3	5	3
Mean	2.54	1.91	3.0	2.33	3.33	3.0	8.67	7.5	5.82	4.17
SD	0.542	0.204	0.426	0.516	0.651	1.095	0.778	0.548	0.603	0.753

P value	0.021		0.013		0.264		0.008		0.001	
<b>Other resection and anastomoses group</b>										
	Hand sewn	Stapler								
N	9	6	9	6	9	6	9	6	9	6
Mean	3.0	2.25	3.0	2.5	3.56	3.0	9.56	8.17	5.11	3.83
SD	0.433	0.758	0.707	0.548	0.527	0	0.726	0.408	0.601	0.753
P value	0.04		0.17		0.031		0.002		0.007	

**Table 2: Comparison of anastomotic leak, mortality in hand sewn and stapler anastomosis in gastrointestinal surgeries.**

Parameter	Anastomosis						P-value	
	Hand sewn		Stapler		Total			
	N	%	N	%	N	%		
Anastomotic leak	Absent	20	71.4	19	86.4	39	100.0	
	Present	8	28.6	3	13.6	11	100.0	
Mortality	No	25	89.3	22	100	47	100.0	
	Yes	3	10.7	0	0	3	100.0	

Of the total of 50 patients about 11 patient had anastomotic leak, 8 patients received hand sewn anastomosis and 3 patients got stapler anastomosis, Mortality was seen in 3 patients who had undergone hand sewn anastomosis, no patient died in stapler anastomosis. The results are given in Table 2.

## DISCUSSION

Surgical stapling was first introduced by Hürtl, in 1908; but their use has grown since the introduction of new disposable instruments in the past 35 years. Various studies have comparable results in terms of duration of procedure, anastomotic leak and mortality.<sup>6</sup> Matos systematically reviewed nine studies involving 1233 patients (622 stapled and 611 hand-sewn) and found that the leaks were 13% versus 13.4%. Clinically it was 6.3% versus 7.1% and radiologically it was 7.8% versus 7.2%. There was insufficient evidence to demonstrate superiority of either technique. The decision over which technique to use must be judged on the basis of previous experience, clinical, and available radiological resources. The routine use of stapling instruments for infraperitoneal colorectal anastomosis could not be recommended because of a higher incidence of strictures, even though the operation having less time to perform and anastomotic leakage occurred less often. Based on this data, there was a controversy between the surgeons in practicing hand sewn or stapler anastomosis.<sup>7</sup> The parameters namely age, duration of procedure, return of bowel sounds, starting of oral feeds, hospitalization in days, return to work in months, anastomotic leak and mortality in hand sewn anastomosis compared with stapler anastomosis; in the four groups of gastrointestinal surgeries namely subtotal gastrectomy and gastrojejunostomy, right hemicolectomy, low anterior

resection and other resection and anastomosis of intestines.

### Age

In this study, the mean age of patient who had hand sewn anastomosis was 51 years and those who underwent stapler anastomosis was 49 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.<sup>8</sup> In Reiling study the mean age of hand sewn was 55.1 years and stapler was 56.8 years which was higher in both the groups.<sup>9</sup>

### Duration of procedure

In present study, the mean duration time of subtotal gastrectomy and gastrojejunostomy in hand sewn was 2.12 hours but in case of stapler it was 2 hours with p value of 0.12. Scher study showed no difference in duration of procedure in subtotal gastrectomy. It was 156 minutes in hand sewn and 157 minutes in stapler.<sup>8</sup> The Reiling study also showed no difference whereas Rushin study showed a statically significant difference in favour of stapler group.<sup>9,10</sup>

In this study mean duration of time of right hemicolectomy was 3 hours in hand sewn in contrast to 2 hours in stapler with a statistically significant p value of 0.018 which differed with Scher study and Reiling study whereas Rushin study and Damesha study concurred significantly on mean duration of operating time of right hemicolectomy.<sup>1,8-10</sup> In this study mean duration of time of low anterior resection was 2.54 hours in hand sewn but in the stapler it was 1.92 hours with p value of 0.021. Adloff study showed no significant difference in time duration between these techniques which was 180 minutes in hand sewn and 176 minutes for stapler.<sup>11</sup> In

Scher study it was 186 minutes in hand sewn and 209 minutes in stapler technique with a longer time in stapler method.<sup>8</sup> In our study the mean duration of time in resection and anastomosis group was 3 hours in hand sewn but in case of stapler it was 2.25 hours with p value of 0.04.<sup>8</sup>

#### **Return of bowel sounds and oral feeding**

In this study mean time to return of bowel sounds in subtotal gastrectomy and gastrojejunostomy was 2.86 days in hand sewn and 2.13 days in stapler method with p value of 0.004 and the mean duration of starting oral feeding is 3.14 days in hand sewn method but 2.25 days in stapler group with p value of 0.006 which differed from Scher study showing sutured technique better than the stapler method. Rushin study concurred with our study whereas Damesha study didn't find any significance. In our study in right hemicolectomy the mean time to return of bowel sound was 3 days in hand sewn and in stapler it was 2 days with p value of 0.132.

The mean time to take oral feeding was 4 days in hand sewn group and was 2.5 days in stapler group with p value of 0.014 which concurred with Rushin and Damesha study whereas Scher study showed there is no difference between both groups which was 3.7 days in hand sewn and 3.8 days in stapler method. In our study mean time of bowel sound heard in the low anterior resection group was 3 days in hand sewn and 2.33 days in stapler method with p value of 0.013. The mean day to start oral feeding was 3.33 days in hand sewn and 3 days in stapler technique with p value of 0.264.<sup>8</sup> Scher study and Adloff study showed no significant difference between both techniques in low anterior resection. In our study in resection and anastomosis group the mean time of return of bowel sound was 3 days in hand sewn but in stapler it was 2.5 days with p value of 0.031.<sup>8,11</sup>

#### **Hospitalization in days**

Mean day of hospitalization in subtotal gastrectomy and gastrojejunostomy was 10 days in hand sewn and 8 days in stapler technique with p value of 0.003 whereas Reiling, Scher, Rushin and Damesha study detected no significant differences in their study.<sup>1,8-10</sup> In present study in right hemicolectomy the mean hospitalization days was 10.17 in hand sewn and was 8.1 days in stapler method with p value of 0.020 which concurred with Reiling and Scher study whereas Damesha study showed insignificant differences. In low anterior resection, the mean day of hospitalization was 8.07 days in hand sewn and 7.5 days in stapler method with p value of 0.008.<sup>1,8,10</sup>

Adloff study showed no difference in hospitalization of both techniques but Scher study detected insignificant differences.<sup>8,11</sup> In our study in resection and anastomosis group the mean duration of hospitalization was 9.5 days in hand sewn and 8.17 days in stapler method with p value of 0.002.

#### **Return to work in months**

In this study on subtotal gastrectomy and gastrojejunostomy the mean duration of return to work is 5.67 months in hand sewn and was 4.13 months in stapler method with p value of 0.003 which is statistically significant and concurring with Scher and Reiling study. In right hemicolectomy group the mean duration of return to work was 4.6 months in hand sewn and 4.25 months in stapler method with p value of 0.161. In the low anterior resection group the mean duration of return to work was 5.82 months in hand sewn and was 4.12 month in stapler group with p value of 0.001 which concurs with Scher and Reiling study.<sup>8,10</sup> In this study on resection and anastomosis the mean duration of return to work was 5.11 months in hand sewn anastomosis and was 3.83 month in stapler anastomosis with p value of 0.007

#### **Anastomotic leak**

In present study 11 patients had anastomotic leak, 8 (16%) patients received hand sewn anastomosis and 3 (6%) patients had stapler anastomosis with a p value of 0.074. In Scher study anastomotic leak was 2.1% in hand sewn anastomosis and 2.9% in stapled anastomosis and there was no significant difference in both techniques.<sup>8</sup> Reiling, Rushin, Damesha, and Adloff also concluded there was no significant difference of anastomotic leak in both techniques.<sup>1,9-11</sup>

#### **Mortality**

Mortality was seen in 3 (6%) patients who had undergone hand sewn anastomosis whereas none died in stapler anastomosis.

#### **CONCLUSION**

The stapler anastomosis had statistically significant less operating time, significant early recovery of bowel sounds except for low anterior resection and other resection and anastomosis group, significant early starting of oral feeds, decreased hospitalization days, early return to normal day to day activity. Significantly decreased mortality was observed in stapler anastomosis compared to hand sewn anastomosis. The stapling techniques are quicker to perform, particularly in inaccessible situations like low colorectal anastomosis. With recent advances in modern stapler devices the stapler anastomosis can be used safely and effectively in gastrointestinal surgeries and one should be equally adept with a stapler gun as with a needle holder and suture.

**Funding:** No funding sources

**Conflict of interest:** None declared

**Ethical approval:** The study was approved by the institutional ethics committee

## REFERENCES

1. Damesha N, Lubana PS, Jain DK, Mathur R. A comparative study of Sutured and Stapled Anastomosis in Gastrointestinal operations. *Int J Surg.* 2008;15(2).
2. Santo MA, Takeda FR, Sallum RAA. Staplers in digestive surgery. Technological advancement in surgeon's own hands. *Anq Gasteroenterol.* 2011;48(1):1-2.
3. Bangaru H, Veitla RMR, Pigilam M, Kunwargiri GK. Comparative study between Staplers and Conventional (Hand-Sewn) anastomosis in gastrointestinal surgery. *Indian J Surg.* 2012;74(6):462-7.
4. Bhandari S, babu NM, Gojanur G, Reddy CK, Comparative study of bowel anastomosis- Hand sewn versus stapler. *IOSR Journal of Dental and Medical Sciences. (IOSR-JDMS).* 2016;15(12):37-42.
5. Kirk RM, Winslet M. Essential General Surgical Operations. Edinburgh: Churchill Livingstone; 2001.
6. Britton J. Intestinal Anastomosis. In: Souba WW, Fink MP, Jurkovich GJ, Kaiser LR et al. ACS Surgery principles and practices. 6<sup>th</sup> ed. New York: Web MD Professional Publishing; 2007:870-881.
7. Lustosa SA, Matos D, Atallah AN. Stapled versus handsewn methods for colorectal anastomosis surgery. *Cochrane Database Syst Rev.* 2001;3:CD003144.
8. Scher KS, Scott-Conner C, Ong WT. A comparison of stapled and sutured anastomoses in gastric operations. *Surg Gynecol Obstet.* 1982;154:548-52.
9. Thakor RB, Kansal SS, Salecha PA. A comparative study of Hand suture verses Stapler anastomosis Gastrointestinal surgeries. *National J Med Res.* 2014;14(4):354-6.
10. Reiling RB, Reiling WA, Bernie WA, Huffer AB, Perkins NC, Elliot DW. Prospective controlled study of gastrointestinal stapled anastomoses. *Am J Surg.* 1980;139:147-52.
11. Adloff M, Arnaud JP, Bechary S. Stapled versus sutured colorectal anastomosis. *Arch Surg.* 1980;115:1436-8.

**Cite this article as:** Banurekha R, Sadasivam S, Sathyamoorthy K. Hand sewn versus stapler anastomosis in elective gastro intestinal surgeries. *Int Surg J* 2017;4:2316-20.