

Stapled Versus Hand-Sewn Anastomosis in colorectal Cancer Surgery: A comparative study

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Abstract

Introduction: There is a doubt about the leakage after colorectal anastomosis despite various intestinal anastomotic techniques. More risk is noticed in distal rectal anastomosis after cancer surgery it poses more risk due to poor colonic vascularity and reduced remaining tissue to nourish the anastomotic site. In terms of sphincter saving, thereby improving quality of life these surgical staplers has provided some procedural advantages and sense of security to surgeons as well as to patients. However, efficacy over conventional hand-sewn technique is better observed based on the outcome measures of these devices because their cost play role in treatment plan. Our study results might help surgeons to counsel the patients regarding the feasibility in usage of stapler.

Objectives: To find out whether stapled anastomosis is safer than hand-sewn anastomosis in colon and rectal cancer surgery.

Methods: The prospective observational study was undertaken in the department of general surgery, Kasturba Medical College & hospital during Oct 2015 to July 2017. Total 66 patients were selected. 34 patients underwent 'Stapled' and 32 underwent 'Hand-sewn' anastomosis. The outcome variables were 'time required for anastomoses', 'postoperative hospital stay' and early and late 'complications' in postoperative and follow-up period. **Result and observation:** The age, sex, co-morbidities did not show any statistical difference between two groups as in the hospital stay ($p=.297$). The time required for anastomosis showed strongly significant difference (19.61 min and 35.87 min; $p=.000$) in favor of stapling group. The anastomotic Leakage ($p=.608$), fever ($p=.670$) were less in stapled group though they lack statistical power. All others showed almost similar results.

Conclusion:

Considering user perspective, time requirement stapling technique appear to be safer and superior to hand-sewn technique though it demands statistical strengthening on large scale study.

Key words: Colorectal cancer, Hand-sewn, Stapled.

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I. Introduction

In spite of diagnostic accuracy, improved surgical techniques, anesthetic care, antibiotic prophylaxis which have contributed to better results in intestinal surgery, surgeons still are not free from doubt about the leakage after colorectal anastomosis. In the last decades, advances in intestinal stapler devices have led to an increased frequency of stapled bowel anastomosis for a variety of proposed beneficial reasons like 1) better blood supply, 2) reduced tissue manipulation, 3) minimum tissue trauma and edema, 4) uniformity of sutures, 5) adequate or perhaps wider lumen at the site of anastomosis than double-layered suturing and 6) the ease and rapidity of anastomosis. These factors are observed to save anastomotic time and facilitate sound healing of the anastomosis. Various studies compared stapled to hand sewn technique which showed variable results. In spite of continuing debate stapling is now the preferred method of anastomosis of colon and rectum by most colorectal surgeons. Due to financial constraints associated with staples many patients were unable to undergo. It will be helpful to counsel the patient in favor of stapling technique if results of our study proves safety and superiority over hand sewn anastomosis.

II. Materials And Methods

Study design: The study was a 'prospective observational study'.

Place of study: Department of general surgery of Kasturba Medical College and hospital.

Period of study: From October 2015 to July 2017, the period Of MS final part apprenticeship.

Study population: Patients with colorectal disease admitted and operated within the study period under department of general surgery in Kasturba medical college and hospital, Manipal.

Sample and sampling: The sampled patients were operated, postoperatively managed and followed-up depending sequentially on date of admission.

Categorization of patients into *stapled* (n=34) and *hand-sewn*

(n=32) groups was also done on similar sequence. Institutional ethical committee clearance was obtained.

Inclusion criteria: 1) Patients undergoing curative resection followed by anastomosis due to colorectal cancer irrespective of age and sex.

2) Lower limit of lesion >3 cm from anal verge for carcinoma rectum.

Exclusion criteria: 1) Patients with widespread loco-regional and distant metastasis.

2) Patients with poor pre-operative sphincter function with sphincter invasion low rectal tumors with inability to achieve safe distal margin.

3) Patients requiring emergency surgery.

4) Patients with complicated comorbidities such as IHD or CKD or CHF or CVA.

III. Method Of Data Collection

Data collection was done during patient management in hospital and follow-up visit. Data was recorded on preformed data collection sheet.

Follow up information is ascertained from medical records with records with a minimal follow up period of 3 months.

All the procedures were performed by random surgeons in the department of general surgery.

In addition to particulars of the patients the recorded nominal and ordinal data were age, sex, nutritional status and comorbidities like anemia, diabetes and hypertension.

Nutritional status was categorized on serum albumin level i.e. Poor with <3 gm/dl, average with 3 - 3.5 gm/dl and good with >3.5 gm/dl. Anemia was assessed and recorded as present or absent on the demarcation line of 10 gm/dl. Data of histopathological diagnosis was categorized as carcinoma right colon, carcinoma left colon and rectal carcinoma. The anastomotic sites were ileocolic, colorectal and coloanal and the stomal sites were ileostomy and colostomy. Data was interpreted in terms of time required for anastomosis, postoperative hospital stay and postoperative early and late complications.

Statistical analysis

Data will be analyzed using IBM SPSS advanced statistical version 12.0.

Numerical data will be expressed as mean and standard deviation or median and range as appropriate.

Qualitative data will be expressed as frequency and percentage

Chi square test will be used to examine the relation between qualitative variables.

For quantitative data comparison between two groups will be done using Mann-Whitney test (non parametric test).

A p value of <0.05 will be considered significant.

IV. Results And Discussion

There is no statistical difference between two groups in terms of age, sex, comorbidities as in case of hospital stay (p=.297). The time required for anastomosis showed strongly significant difference (19.61 min and 35.87 min; p=.000) in favor of stapling group. The anastomotic leakage (p=.608), fever (p=.670) were less in stapled group but lack statistical power. All others showed almost similar results.

Total of 128 cases were collected

Out of which 32 cases presented with obstruction and 17 cases with distant and loco regional spread and complicated

Comorbidities noted in 13 patients.

After exclusion criteria 66 cases were included in the study.

Stapled group -34 and hand sewn group -32

Table 1: Comparison of 'time required for anastomosis' (Minutes) and 'post-operative hospital stay' (days) between Stapled and hand-sewn groups.

Table 2: Comparison of postoperative 'early complications' between stapled and hand-sewn group

Table 3: Comparison of postoperative 'late complications' between stapled and hand-sewn groups:

V. Discussion

This study of 66 patients (stapled-34, hand-sewn-32) showed multivariate analysis of both categorical and metric data to identify the safer anastomotic technique.

Most of the patients are in the 51-60 age group.

Mean age 51.68 VS 58.9 of patients showed no statistical difference p value-.67 in both the stapled and hand sewn groups.

Sex distribution showed more female in stapled group (52.9% vs 46.8%) and more male (53% vs 47%) in hand sewn group. Gender wise there is no statistically significant difference (p value-.622). Co-morbidities were studied but showed no significant affection noted. Use of neo-adjuvant (2/34 vs 0/32) and adjuvant therapy (22/34 vs 20/32) were studied no significant affection noted. In stapled and hand-sewn group, patients of carcinoma rectum were 3 and 23 (9.3% & 67.6%), carcinoma right colon 20 and 4 (62.5% & 11.76%) and carcinoma left colon 9 and 7 (28.1% & 20.5%) respectively. Regarding anastomosis, 4 patients (11.76%) underwent ileo-colic, 2 (5.88%) colo-colic 18 (52.94%) colo-rectal and 10 (29.41%) underwent colo-anal anastomosis in stapled group. On the contrary, in hand-sewn group, 20 (62.5%) underwent ileo-colic, 5 (15.62%) colocolic, 7 (21.87%) colo-rectal and 0 patients underwent colo-anal anastomosis.

For sampling technique more carcinoma-rectum patients (23/34 vs 3/32) underwent anterior resection with stapled anastomosis. More carcinoma-right colon patients (20/32 vs 4/34) underwent hemicolectomy with hand-sewn anastomosis. Stapler use was far more in the distal rectal operations than hand sewn group. No of hemicolectomies were more in the hand sewn group than stapler group.

There was a statistically significant (p=.000) reduced 'time required' for stapled (mean-19.6 min) compared to hand-sewn (mean-35.8 min) anastomosis. Time required for anastomosis undergoing stapled anastomosis is less as compared to study of Fingerhut et al and more as compared to studies of Jawharlalsingha et al, Sarker et al and Subhakarbandary et al.

Hospital stay showed no statistically significant outcome data in study. Mean duration of hospital stay in patients undergoing stapled and hand sewn anastomosis in our study is less as compared to study of Jawharlalsingha et al, Didolkar et al 15 and Fingerhut et al. In stapled group, it was 11.59 days and in hand-sewn group it was 12.69 days.

Fever appeared in 18.8% (9/48) of stapled and 19.2% (10/52) of hand-sewn anastomotic patients in Jawharlalsingha 2013 study. Our study showed 8/34 (23.5) and 9/32 (28.1) in respective groups. Clinical anastomotic leakage (2.9% vs 6.2%), were less in stapled than hand-sewn group they lack statistical power. Ileus (6.25% vs 14.7%) and wound infection (21.9% vs 23.5%) were less in hand-sewn group than stapled group they lack statistical power. Almost equal number (21.9% and 23.5%) of patients had wound infection which was much more than that of Lustosa 19 (4.3% vs 5.9%). Anastomotic stenosis found in this study was 0 (0/34) and

3.12 (1/32) in stapled and hand-sewn technique respectively. No patient of stapled group developed recurrence and 1 patient in hand-sewn group developed local recurrence at stenosis site. Local recurrence was found 0(0/34) and 3.12% (1/32) respectively within this short follow-up period. Pelvic pain (8.88% vs 6.25%) and specific mortality (2.94% vs 6.25%) were noted. Late complications are less compared to the Cochrane review, Jawharlalsingha et al but more standardized and randomized control trial is required to strengthen the comment.

VI. Tables

Table.1

	Anastomotic technique	N	mean	Std. deviation	Std. error	P value
Time required for anastomosis(min)	Stapled	34	19.61	2.535	.435	.000
	Hand sewn	32	35.87	4.878	.862	
Post op hospital stay(days)	Stapled	34	11.59	4.068	.698	0.297
	Hand sewn	32	12.69	4.410	.780	

Table .2

Early complications		Stapled		Hand sewn		Chi square value	P value
		frequency	percent	frequency	percent		
fever	Absent	26	76.5	23	71.9	.182	.670
	present	8	23.5	9	28.1		
Ileus /obstruction	Absent	29	85.3	30	93.8		.428
	present	5	14.7	2	6.25		
SSI	Absent	26	76.5	25	78.1	.26	.873
	present	8	23.5	7	21.9		
Anastomotic leak	Absent	33	97.1	30	93.8		.608
	present	1	2.9	2	6.2		

Table .3

Late-complications		stapled		Hand sewn		Chi-square value	P value
		freq	percent	freq	percent		
Pelvic pain	Absent	31	91.17	30	93.75		1.0
	present	3	8.82	2	6.25		
<u>A. stenosis</u>	Absent	34	100	31	96.87		
	present	0	0	1	3.125		
Death	Absent	33	97.05	30	93.75		.608
	present	1	2.94	2	6.25		

VII. Conclusion

- From our study it is observed that stapled anastomosis for colorectal cancer offers following advantages over hand sewn anastomosis :
 - ✓ Lesser time required for anastomosis
 - ✓ Lesser post-operative hospital stay
 - ✓ Lesser post-operative complication/morbidity

To conclude stapled anastomosis is superior to hand-sewn anastomosis in terms of time required for anastomosis and in user perspective, it is superior to hand-sewn technique in colorectal surgery.

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