ORIGINAL ARTICLE

A COMPARATIVE STUDY OF HAND SUTURE VERSES STAPLER ANASTOMOSIS GASTROINTESTINAL SURGERIES

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ABSTRACT

Background: Conventional hand suture technique of intestinal anastomosis has been in vogue for decades. Staplers which were developed to simplify surgery began to have significant impact. The present study was conducted with an objective to compare Hand suture verses stapler anastomosis in small intestine surgeries conducted in our institute.

Methodology: This comparative study was carried out in the Department of Surgery at Government Medical College, Surat from July 2010 to November 2012 between two groups (conventional suture method-Group A and stapling technique- Group B) of patients who underwent gastrointestinal surgery. All patients were carefully monitored with the following parameters: Total duration of operative procedure, appearance of bowel sounds, resumption of oral feeding, postoperative hospitalization, postoperative complications, return to work and mortality.

Results: Total duration of operative procedure, appearance of bowel sounds, resumption of oral feeding are significantly lower in stapler group compared to hand suture technique. Postoperative hospitalization was lower in stapler group compared to hand suture technique but the association was not significant.

Conclusion: Staplers can expedite surgery. They have better access to difficult—to—reach areas. Thus staplers can be beneficial though one should not forget the art of conventional suturing.

Keywords: Hand suture, intestinal anastomosis, Staplers

INTRODUCTION

Intestinal Anastomosis dates back to 1000 B.C., the era of Sushruta "The Great Indian Surgeon" he described the use of black ants during the suturing of intestinal anastomosis.[1] Lembert then described his seromuscular suture technique in 1826 which became the mainstay of gastrointestinal anastomosis in the second half of the century. Currently the single layer extramucosal anastomosis is popular, as advocated by Matheson of Aberdeen, as it probably causes the least tissue necrosis or luminal narrowing.[2] The evolution of mechanical sutures by means of stapler use has become a real technological advancement , as it has represented the concept of a new product with the combination of new functions that have resulted in improvements and effective gains of quality or productivity in the handicraft suture process that has been done by surgeons for centuries.[3] Surgical stapling devices were first introduced by Hültl in 1908; however, they did not gain popularity because instruments were cumbersome and unreliable. The development of reliable, disposable instruments over the past 30 years has changed surgical practice dramatically. With modern devices, technical failures are rare, the staple lines are of more consistent quality, and anastomosis in difficult locations are easier to construct.[4] The effect of minimizing the operative trauma has certainly been the main attribute in the use of staplers. The present study was conducted with an objective to compare Hand suture verses stapler anastomosis in small intestine surgeries conducted in our institute.

MATERIALS AND METHODS

This comparative study was carried out in the Department of Surgery at Government Medical College, Surat from July 2010 to November 2012 between two groups of patients who underwent gastrointestinal surgery. This study included 50 pa-

tients; 25 of them were treated by the conventional suture method (group A) and other group B included 25 patients in whom anastomosis was done by stapling technique. The patients were randomly allotted to control or study group.

Both elective and emergency cases are included in study. Those patients who underwent elective surgery benefited from bowel preparation that included mechanical cleaning (polyethylene glycol solution). No mechanical bowel preparation was used for patients with emergency. Throughout the study period, the preoperative treatment, including nutrition (if needed blood transfusion), intravenous prophylactic antibiotics (ceftriaxone 1gm and metronidazole 500mg) were same for all patients. The preoperative blood tests were recorded one day before surgery in elective patients and pre operative in emergency. The radiological investigation included X-rays, Ultrasound, CT scan and if needed colonoscopy was done for elective patients. In emergency cases X-ray & ultrasound were done.

In group A (hand-suture anastomosis), the conventional suture technique used was either two-layer anastomosis or a single-layered one. Two layered anastomosis typically consist of an inner layer of continuous or interrupted absorbable sutures and an outer layer of interrupted absorbable or non absorbable sutures. Single layered anastomosis consists of one layer of interrupted or continuous absorbable sutures. For suturing we have used vicryl 3-0 round body suture for inner layer and silk 3-0 round body suture for outer layer. In the Group B, side-to-side or end-to-end technique was employed depending on the need, site and access, using GIA instruments.

All patients were monitored with the following parameters: Total duration of operative procedure, appearance of bowel sounds, resumption of oral feeding, postoperative hospitalization, postoperative complications, return to work and mortality.

The Unpaired t-test was used to compare the results of both group to find the p-values. A p-value <0.05 was considered as statistically significant.

RESULTS

Group A comprised of 19 men and 6 women between the ages of 30 and 70 years (mean age: 53.4 years) while in Group B comprised 19 men and 6 women between the ages of 20 and 70 years (mean age: 44.24 years). To find out the utility of hand sutures versus stapler method, we further divided the procedure performed in group A and group B into three categories: Gastro-jejunostomy, End to end anastomosis, Right-hemicolectomy.

The results of comparison of two groups in different procedure performed were as shown in table 1.

Tables1: Comparison of two groups with various surgical parameters

Variables	Gastro-jejunostomy		End to end anastomosis		Right-hemicolectomy	
	Group A	Group B	Group A	Group B	Group A	Group B
Mean operative time (minutes)	158.6	140.8	154.6	138.8	148.8	124.8
Appearance of bowel sounds (hrs)	57.2	40.8	54	46.8	57.2	48.8
Resumption of oral feeds (days)	4.5	4.4	4.8	4.9	5	4.8
Post-operative hospital stay (days)	11.5	10.75	12.2	10.6	12.3	11.6
Intra-operative blood loss (ml)	167	131	184	254	254	176

Table 2: Association among two groups with various surgical parameters

Variables	Gastro-jejunostomy*	End to end anastomosis*	Right-hemicolectomy*
Mean operative time (minutes)	< 0.05	< 0.05	< 0.05
Appearance of bowel sounds (hrs)	< 0.05	< 0.05	< 0.05
Resumption of oral feeds (days)	< 0.05	< 0.05	< 0.05
Post-operative hospital stay (days)	>0.05	>0.05	>0.05

T test applied between group A and group B to calculate statistical significance (p value)

DISCUSSION

In the present study, among the gastrojejunostomy cases the association between mean operative time among group A and group B was statistically significant ($p<0.05$). Scher et al.[5] in his study did not found any statistically significant difference among the two techniques. Reiling et al.[6] confirmed the insignificant difference while Damesha N et al.[2] found a statistically significant difference between the two procedures.

In the present study, among the right hemicolectomy cases, the association between mean operative time among group A and group B was statistically significant ($p<0.05$). Scher et al.[5] and Reiling

et al[6] both found insignificant differences in their study (p>0.05) while Damesha N et al.[2] found a significant difference between the two procedures.

In the present study, among the gastrojejunostomy cases, there was comparatively early appearance of bowel sounds with stapler (40.8 hours) as compared to suture method (51.6 hours) which is statistically significant (p<0.05). Resumption of oral feeding was also similar in both groups (p>0.05). In the study of Scher et al.[5], the patients required a mean of 4.4 days after a sutured gastrojejunostomy before resumption of oral feeding compared with 6 days when staples were used, showing earlier oral feeding with suture technique. Damesha N et al.[2] didn't find any significance in appearance of bowel sounds & resumption of oral feeds in both groups.

In the present study, among the right hemicolectomy cases, we found a statistically significantly earlier appearance of bowel sounds between the two groups (p>0.05). Scher et al.[5] found that recovery of intestinal function did not differ significantly between the two anastomotic methods. Damesha N et al.[2] found that recovery of intestinal function and resumption of oral feeds was earlier in stapler anastomosis.

In the present study among the gastrojejunostomy cases, postoperative hospital stay among the two groups did not show a significant difference. Scher et al.[5], Reiling et al.[6] and Damesha N et al.[2] also found an insignificant difference between the two anastomotic methods. In the present study among the right hemicolectomy cases, postoperative hospital stay did not show a significant difference among the two groups. Scher et al.[5], Reiling et al.[6] and Damesha N et al.[2] also found an insignificant difference between the two anastomotic methods.

In the present study, complications occurred in 9 of the 25 patients (36%) with suture technique and in 7 of 25 patients (28%) with stapler technique. Two of 25 cases had leakage (16%) with external fistula in the group with suture technique as compared to one case with stapler technique. Out of 25 cases 7 patients develop wound infection superficial to the fascia in the group A, while this occurred in 6 out of 25 cases in the group B; no statistically significant difference was found (p>0.05).

Scher et al.[5] found that one leak occurred in the 36 patients who underwent stapled gastric resection, a leak rate of only 2.7%. Four of 36 patients had superficial wound infection developed after stapled gastric resection while wound infection was noted in only one of the 44 patients who underwent resection with the suture technique. Scher et al.[5] found an anastomotic leakage rate of 2.9% when staplers were used and 2.1% when sutures were used in ileocolonic anastomosis, showing no statistical significance (p>0.05). Reiling et al.[6] Adloff et al.[7] and Damesha N et al.[2] also confirmed in their studies that technique-related complications are not significantly different.

CONCLUSION

Stapling has become a recognized alternative to manual suturing in anastomosis but it's appropriate place in clinical practice remains to be defined as the final selection of anastomosis technique is likely to be multifactor, taking in to consideration speed, ease of construction, personal preference, cost and training of staff in both methods. Staples are only one method, albeit a convenient one, to establish intestinal continuity keeping in mind the general principles of anastomosis is maintained. Staplers have made anastomosis safe and reliable but in a expeditious manner.

Although this is a small study, more detailed study is required for establishing cost effectiveness of stapler over the time tested old hand suture technique. Stapler technique should be used as another armoury in surgeon basket rather than a replacement off needle holder and suture.

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