International Surgery Journal
Mohamed MA et al. Int Surg J. 2018 Jun;5(6):2054-2058
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20182054

Original Research Article

Stapler versus handswen in small intestinal anastomosis

Mohamed Abdelhady Mohamed*, Mohamed Leithy Ahmed, Mahmoud Gamal Eldin Hagag, Mohammed Nazeeh Shaker Nassar

Department of General Surgery, Faculty of Medicine, Menoufia teaching hospital, Menoufia, Egypt

Received: 03 May 2018
Accepted: 08 May 2018

***Correspondence:**
Dr. Mohamed Abdelhady Mohamed,
E-mail: mohamed5955534@gmail.com

ABSTRACT

Background: Intestinal anastomosis dates back to 1000, B.C but it accompanied with high rates of failure, sepsis, wound infection and mortality until the development of suture materials. Lembert described his seromuscular suture technique in 1826. Surgical Stapler was first introduced by Hultl in 1908. The development of modern devices over the past 30 years changes the surgical practice dramatically. The objective of present study is to compare the outcome between Stapler and handswen anastomosis in the small intestine.
Methods: This study is a randome controlled study carried on 40 patients divided into two equal groups, 20 patients were treated by handswen suture method (group A) and the other 20 patients operated by stapling technique (group B).
Results: In both elective and emergent cases as regard patient operative time, postoperative passing flatus, begin of oral intake, hospital stay duration and postoperative complications it was lower in Stapler (group B) comparing to handswen (group A) and P-value was statistically significant (P<0.05). In emergent cases postoperative leakage is equal in both handswen (group A) and Stapler (group B) and P-value was non-significant (P>0.05).
Conclusions: In both elective and emergent cases the duration of operation, postoperative passing flatus, return of bowel sound, hospitalization days and postoperative complications including (intraoperative bleeding, prolonged ileus >4 days, patient stenosis and wound infection) in Stapler anastomosis it was lower comparing to handswen anastomosis and P-value was statistically significant (P<0.05). No significant difference in postoperative leakage between handswen anastomosis and Stapler anastomosis in emergency cases (P>0.05).

Keywords: Handswen, Small intestinal anastomosis, Staplers

INTRODUCTION

At the present time methods for restoring gastrointestinal continuity after resection fall into one of two broad general categories: Stapler (ST) or handswen (HS).[1]

Many factors can affect small intestinal resection and anastomosis and can adjust the type and methods of anastomosis.[2] Common indications of small intestinal resection anastomosis includes: Small bowel obstruction, intussusception, carcinoma of the small intestine, traumatic perforation, ulcerative colitis and crohn`s disease.[3] Contraindications for intestinal anastomosis includes: Sever sepsis, fecal contamination, poor neutritional status, unhealthy bowel condition and disseminated malignancy.[3]

Adjustable risk factors for anastmotic leak includes: Malneutrition, smoking, steroid use, surgery duration, type of anastmotic technique, intravenous fluids and blood transfusion.[2] Non-adjustable risk factors for anastmotic leak includes: Advanced malignancy, diabetes

mellitus, and emergency surgery.[2] Technical consideration for reducing anastmotic leak includes: Suture reinforcement, usage of fibrin glue, bioabsorbable staple line reinforcement, buttressing anastomosis with native tissue and intralumunal device.[4] The main types of small intestinal anastomosis includes: End to end anastomosis, end to side anastomosis, side to side anastomosis and oblique anastomosis.[5] Location of small intestinal anastomosis includes: Esophagojejunal anastomosis, gastrojejunal anastomosis, jejunojejunal anastomosis, jejunoileal anastomosis, ileoileal anastomosis, ileocecal anastomosis, ileocolic anastomosis and ileorectal anastomosis.[5]

Common types of Staplers used in small intestinal anastomosis includes: Disposable linear cutter Stapler, disposable endoscopic linear cutter Stapler and the disposable circular Stapler.[6] The key to a successful anastomosis is the accurate union of two viable ends with complete avoidance of tension. Thus, the most important factors in creation of bowel anastomosis are: Meticulous technique, good blood supply and no tension.[7]

The choice of anastmotic technique may be influenced by: Diameter of the bowel ends, oedema, accessibility, site of anastomosis, contamination, underlying pathology and available time and equipment.[7]

METHODS

This study is a randomized controlled study carried out in Menoufia teaching hospital and Aswan teaching hospital start from December 2015 to December 2017 between two groups of patients who underwent small intestinal anastomosis surgeries.

This random study includes 40 patients 20 of them were treated by handswen suture method (group A) and other (group B) include 20 patients in whom small intestinal anastomosis was done by stapling technique. All the patients were monitored to the following parametries: Total operative time, passing flatus, begin of oral intake, hospital stay duration, post-operative complications and operation cost.

Inclusion criteria

- Both elective and emergent cases are included in this study.

Exclusion criteria

- Children less than 12 years of age, immunosuppressed patients with: diabetes mellitus, hepatic failure, renal failure and patient receiving immunosuppressive drugs.

Pre-operative preparation includes nutrition (if needed blood transfusion), intravenous prophylactic antibiotics and radiological investigations.

Intra-operative monitoring

- Total operative time and complications that may occur intra operatively.

In recovery stage monitoring for the following: passing flatus, begin of oral intake, hospital stay duration and post-operative complications. All the cases were observed for the operative and post-operative period and data is recorded and the data was collected retrospectively.

Statistical analysis

Data is analysed and T.test applied between handswen (group A) and Stapler (group B) to calculate statistical significant (P-Value)

- $P>0.05$: Non-significant
- $P<0.05$: Significant
- $P<0.01$: Highly significant

Different types of handswen suturing used in this study

- Contineous or interrupted.
- Single layer or double layer.
- End to end or side to side (or any combination).
- Extramucosal or full thickness sutures.
- Sutitable size and type of suture materials.

Types of staplers used in this study

Disposable linear cutter s Stapler

- It is applicable for transection, resection and the creation of anastomosis.
- It is suitable for small intestinal resection and anastomosis in open surgeries.

Disposable endoscopic linear cutter Stapler

- It is suitable for open or endoscopic surgery.
- It is applicable for transection, resection and creation of anastomosis specially in difficult unreachable sites.

Disposable circular Stapler

- It can cut off the inside tissues with an annular knife.
- It can greatly save operation time and reduce bleeding.
- It can used easily specially in the anastomosis of the small intestine to the esophagus, stomach or rectum.

One of our cases of stapled small intestinal anastomosis

Male patient 55 years old presented by strangulated umblical hernia (Figure 1). Preoperative preparation is done. No operative blood transfusion is needed. Liear

cutter Stapler is used for resection and anastomosis of small intestine (Figure 2).

Figure 1: Shape of unviable part of small intestine in strangulated umblical hernia.

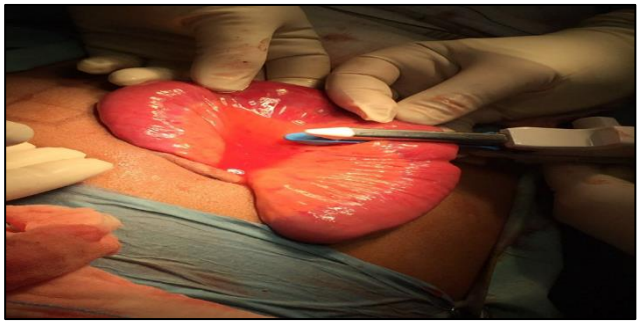

Figure 2: Application of linear cutter Stapler for resection and anastomosis of unviable part of the small intestine.

Application of linear cutter Stapler for creation of intestinal anastomosis end to end (Figure 3) and side to side (Figure 4).

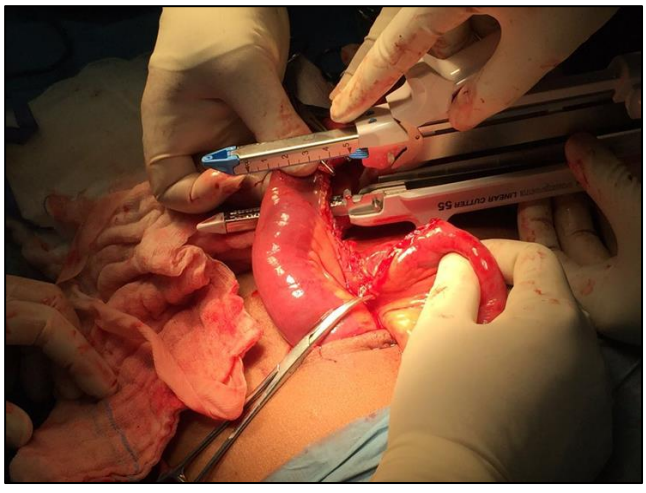

Figure 3: Application of linear cutter Stapler for end to end resection anastomosis of the small intestine.

Patient operative time was 70 minutes, passing flatus after 40 hours, begin oral intake after 60 hours, duration of hospital stay was 7 days and the patient discharged without postoperative complications.

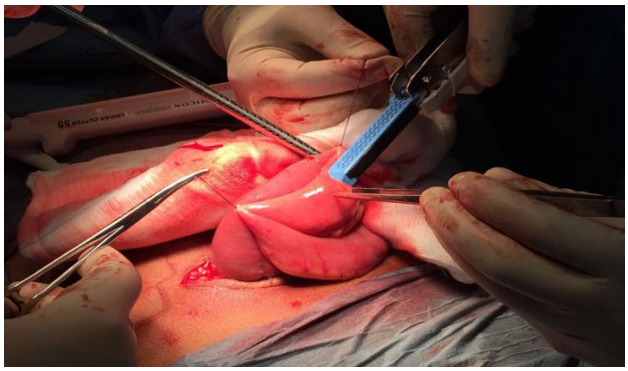

Figure 4: One limb of the linear cutter Stapler introduced through a window in the small intestine to create side to side anastomosis.

RESULTS

Demographic data

The handswen group consists of 20 patients 11 male and 9 female and the Stapler group consists of 20 patients 10 male and 10 female patients, there were no significant difference between the two group in the gender. The age in the handswen group ranged from 15-65 years and in the Stapler, group ranged from 13-67 years there were no significant difference between the two groups in the age.

The outcome of this comparative study between handswen (group A) and Stapler (group B) in anastomosis of the small intestine was as follows: (Table 1).

Table 1: Comparison of handswen (group A) and Stapler (group B) in cases of small intestinal anastomosis showing the various surgical parametries.

Variables	Handswen Group A	Stapler Group B	P -value
Patient operative time (mean of time by minutes)	140	110	<0,05 significant
Post-operative passing flatus (mean of time by hours)	55	40	<0,05 significant
Begin of oral intake (mean of time by hours)	110	80	<0,05 significant
Post-operative hospital stay (mean of time by days)	11	9.7	<0,05 significant

Patient operative time

Duration of the operation was counted from the time of incision to closure. In handswen (group A) it ranged between 100-180 minutes while in Stapler (group B) it ranged between 90-140 minutes. In Stapler (group B) there is shorter operative time comparing to handswen (group A) and P-value is significant (P<0.05) (Figure 5).

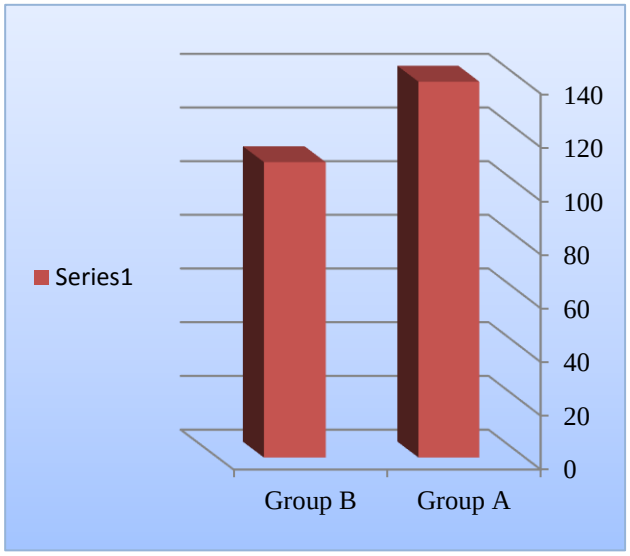

Figure 5: Comparison of handswen (Group A) and Stapler (Group B) as regard to patient operative time (minutes) in small intestinal resection anastomosis.

Postoperative passing flatus

Assessed from the time of the operation to the time of passing flatus. In handswen (group A) it ranged between 40-90 hours while in Stapler (group B) it ranged between 35-60 hours.

In Stapler (group B) there is shorter time for postoperative passing flatus comparing to handswen (group A) and P-value is significant (P<0.05).

Begin of oral intake

In handswen (group A) it ranged from 90-130 hours while in Stapler (group B) it ranged from 70-105 hours. In Stapler (group B) there is shorter time to begin oral intake postoperatively comparing to handswen (group A) and P-value is significant (P<0.05).

Postoperative hospital stay

Assessed from day of the operation to the day of discharge. In handswen (group A) it ranged from 8-15 days while in Stapler (group B) it ranged from 7-11 days. In Stapler (group B) there is shorter time for postoperative hospital stay comparing to handswen (group A) and P-value is significant (P<0.05).

Postoperative complications

It includes: Intraoperative bleeding, prolonged ileus >4 days, anastmotic stenosis and wound infection. In Stapler (group B) there is decreased postoperative complications comparing to handswen (group A) and P value is significant (P<0.05) (Figure 6).

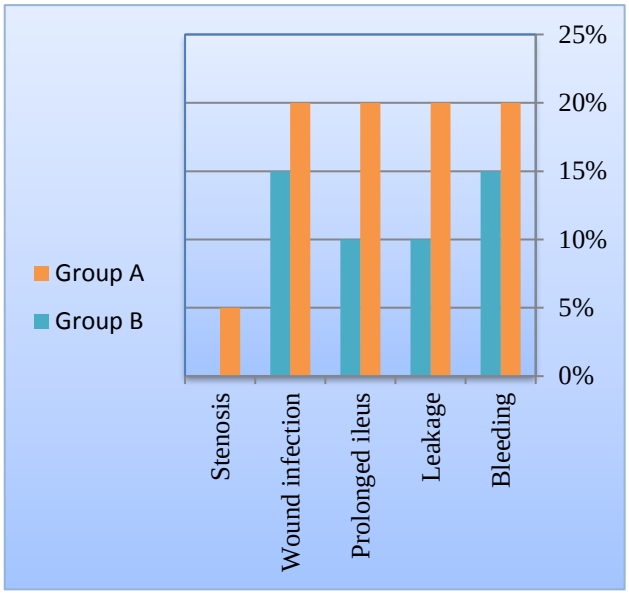

Figure 6: Comparison of handswen (Group A) and Stapler (Group B) as regard to post-operative complications in cases of small intestinal resection anastomosis.

Postoperative leakage in emergent cases

In handswen (group A) the postoperative leakage in emergent cases is 20% and in Stapler (group B) it is 20%. There is no significant difference between the two groups as regard to postoperative leakage in emergent cases and P-value is non-significant (P>0.05).

As regard the cost

Stapler (group B) is too much costly comparing to handswen (group A) specially in patients' needs multiple sites of small intestinal resection anastomosis and P-value is significant (P<0.05).

DISCUSSION

In this study we compare the handswen anastomosis and Stapler anastomosis of the small intestine in both elective and emergent cases.

As regard patient operative time, postoperative passing flatus, begin of oral intake, duration of hospital stay and postoperative complications. It was lower in Stapler (group B) comparing to handswen (group A) and P-value was statistically significant (P<0.05) It agree with Rushin et al, study he found statistically significant P-value in

operative time, appearance of bowel sounds, resumption of oral feed and postoperative hospital stay.[8] In this study we compare the postoperative complications including (Intraoperative bleeding, prolonged ileus >4days, patient stenosis and wound infection). In Stapler (group B) it was lower comparing to handswen (group A) and P value was statistically significant (P <0.05) it agrees with Banurekha et al. study.

Banurekha et al. stated that Stapler method significantly reduces duration of surgery, has early recovery with less mortality. Stapling is quick to perform. Stapler anastomosis can be used safely and effectively in elective gastro intestinal surgeris.[9] In this study we compare the handswen (group A) and Stapler (group B) as regard the postoperative leakage in emergent cases and there is no significant diffreance between the two groups and P value was statistuically non-significance (P>0,05) this also agree with Robert et al, study.

Robert et al. stated that vasopressor usage and blood transfusion appear to put the patient at higher risk for anastmotic failure, as doses the utilization of damage control techniques. The aim of Robert et al, study was to evaluate (HS) and (ST) in emergency general surgery (EGS) patients undergoing emergent operations. The study was sponsored by the American Association for Surgery of Trauma Multi-Institutional Studies Committee. Patients undergoing urgent bowel resection for EGS pathology were prospectively enrolled from July22, 2013 to December 31, 2015. The current study illustrates an apparent bias among acute care surgeons to perform (HS) techniques in higher risk patients.

He found that the risk of anastmotic failure was equivalent when comparing handswen (HS) and Stapler (ST) anastomosis in emergent cases.[10]

CONCLUSION

In our present study in comparing the outcome of handswen suturing and Stapler technique in small intestinal anastomosis we found the following: In Stapler anastomosis there is decreased operative time, early postoperative passing flatus, early postoperative begin of oral intake, early discharge from the hospital and decreased postoperative complications in comparison to hand swen anastomosis. Handswen anastomosis is better applied in the following conditions: Disparity in the lumen, sever laceration of the edge, sever contamination and sepsis. In emergent cases the risk of anastmotic leak was equivalent when comparing Stapler anastomosis and hand swen anastomosis. The cost of Stapler anastomosis was higher than handswen anastmosis. We recommend the use of stapler anastomosis whenever possible.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Jason PF, Cynthia WL, Mallory S. Stapler versus handswen in emergency general surgery. Acute Care Surg. 2013;74:1178-94.
2. Benjamin RP, Reducing gastrointestinal anastmotic rates. Open Acc Surg. 2016;9:5-14.
3. Vikram K, Kurt ER, Kalayarasan R, Mohta A, Pranavi AR. Intestinal anastomosis, practice, essentials, background, indication. Drugs and Diseases: Clinical Proce. 2018.
4. Kim IY, Kim BR, Kim YW, Applying reinforcing sutures to stapled colorectal anastomosis after low anterior resection for rectal cancer. Eur J Surg Oncol. 2015;41:808-9.
5. Whitelaw DE, Richard N, Darll MB. Kirks in surgery. Small bowel and operations for obesity. Churchill Liningstone. 2013;11:185-90.
6. Bradley C, Jeffery RP, Mark E. Atlas of Surgical Techniques for The Upper Gastrointestinal Tract and Small Bowel. Small bowel resection and anastomosis. Saunders Elsevier. 2010;23:253-254
7. Frances G. Bowel anastomosis; the theory, the practice and the evidence base. World J Gastrointestinal Surg. 2012;4(9):208-13.
8. Rushin BT, Sandeep S, Priyank A. A comparative study of hand suture verses stapler anastomosis gastrointestinal surgeries. Nat J Med Res. 2014;4(4):354-6.
9. Banurekha R, Sadasivam S, Sathyamoorthy K. Hand sewn versus stapler anastomosis in elective gastro intestinal surgeries. Int Surg J. 2017;4:2316-20.
10. Robert JF, David S, Scott HP, Prestone R. Stapled versus handswen a prospective emergency surgery study. J Trauma Med Res. 2017;82(3)435-43.

Cite this article as: Mohamed MA, Ahmed LM, Hagag MGE, Nassar MNS. Stapler versus handswen in small intestinal anastomosis. Int Surg J 2018;5:2054-8.