Comparison study stapled versus Hand sewn method for small bowel anastomosis surgery

Waleed Faris anoon
M.CH.B F.I.C.M.S
Raheem Khudhair Khaddim
M.B.CH.B F.A.C.M.S
Ahmed abdshnein Kadhem
M.B.CH.B F.I.C.M.S

Abstract

Intestinal anastomosis is one of the most commonly performed procedure it is required to re-establish gastrointestinal continuity after surgical resection , traumatic disruption or bypass procedure.

Since the second half of the 20th century , mechanical suture (stapler) has been in use and became a popular method in bowel anastomosis.

Our study involved the comparing of the postoperative outcome between hand sewn anastomosis(HS) and stapled anastomosis(SA) for patients with trauma cases in emergency and elective cases .mainly in the view of duration of operation , postoperative hospitalization time , fistula formation rate , morbidity and mortality .

There were no significant differences between SA group and HS group in operative indication or other parameters.

In both emergency and elective intestinal surgery comparable results can be achieved using mechanical and manual anastomosis with the same outcome and no significant differences found only in the duration of the operation.

Introduction

Intestinal anastomoses is one of the most commonly performed procedure , it is required to re-establish gastrointestinal continuity after surgical resection , traumatic disruption or bypass procedure/

Since the second half of the 20th century , mechanical suture [stapler] has been in used and become a popular method in bowel anastomoses (west of Scotland and highland anastomoses group).

The ideal suture material is one that causes minimal inflammation and tissue reaction while providing maximum strength during the lag phase of wound healing .

Both continuous and interrupted sutures are commonly used in fashioning intestinal anastomoses . No randomized trial have addressed the question of whether interrupted sutures have a significant advantage over continuous in a single layer anastomoses , however retrospective review , have not revealed any such advantage.(7)

Double layer anastomoses were long believed to be essential for safe healing of the wound , however sub sequent pathological analysis of the anastomoses revealed microscopic areas of necrosis and sloughing of the tissue incorporated in the inner layer as a result of strangulation (11).

Advances in intestinal stapling devices have led to increase frequency of stapled anastomoses (16).

There are variety of proposed benefit s from a stapled technique , better blood supply , reduced tissue manipulation , less edema , uniformity of suture adequate , wider lumen at the site of anastomoses and without increasing incidence of postoperative complications such as anastomotic leak , prolong ileus or stricture .

Both time and cost of operation might be reduced due to reduction in the duration of anastomoses(17).

Consistently safe method of anastomoses is still ideal , the achievement of which would not only lower the incidence of dangerous complication

but possibly avoid the need for a de functioning ileostomy .

Stapler have been used in many kind of anastomoses ,a recent systemic review has shown that both technique hand sewn versus stapled anastomoses are effective and the choice may be based on preference[18].

Aim of the study

1-To compare the outcome after stapler anastomoses and hand sewn in small bowel surgery

2-To determine the safely an effectiveness of stapler anastomoses in term of morbidity and site specific complication , mainly , fistula ,wound infection , and anastomotic leak.

3-To define the patient selection criteria for performing stapler anastomoses .

Patient and method

The subject of this study were(100) patient who underwent intestinal surgery with anastomoses at our hospital.

The patients were divided into two groups.

1-stapled group , consisting of 50 subjects with 50 anastomoses .

2-Hand sewn group consisting of 50 patients with 50 anastomoses.

All patients under went investigations according to their pathological conditions as cbc , renal function test , liver function test , CXR, U/S, CT-scan, of the abdomen , and ECG .

Those patients presented as emergency , investigated by base line investigation including , PVC, bl. group, radiograph of the head , chest and abdomen , for stable patients .

Technique

Those patients in emergency surgery had the following criteria, including , absence of faecal contamination , absence of shock, blood transfusion less than six units , time less than six hours , absence of major vascular injury and absence of multiple organs failure.

Operative technique:

Involved opening the abdomen through midline laparotomy , the diseased segment of the small bowel then resected and anastomoses done by.

1-stapled anastomoses ;A-End to End anastomoses;(E.E.A).

B-side to side anastomoses.

C-End to side anastomoses.

2-Hand sewn anastomoses;. Done between the two edge in double layers, first layer is continuous using 3/0 absorbable suture material , the second layer interrupted hand sewn suture using 3/0 absorbable suture material.

All patients received antibiotics include , metronidazole 500 mg and cefotaxime 1g three time daily (tds).patients were discharged when they started eating regular diet and having normal bowel habits.

Results

We classified our patients in to two groups;.

1-stapled anastomotic group(S.A.group).

2-Hand sewn anastomotic group(H.S.group).

Regarding the causes of injuries, no statistical significant differences was noted between the two groups(S.A and H.A group).and it had no effect on the outcome and the method of study because , the P. value 0.79 , table No. 1 .

table No. (1) Shows emergency cases

Causes	SA%	HS%	Total	P value
Bullet	7(53.9)	6(46.1)	13(32.5)	P>0.05
Shell	10(45.5)	12(54.5)	22(55)	P>0.05
Stab	3(60)	2(40)	5(12.5)	P>0.05
Total	20(50)	20(50)	40(100)	P>0.05

Regarding the tumor cases which consisted of 18% of the samples , no

Statistical significant difference was noted between the two groups, and thus it had no effect on the method and the outcome of the study because the P value 0.70 , table NO.2 .

table No. (1) Shows emergency cases

	SA%	HS%	Total	P value
Jejunum	4(80)	3(60)	7(46.5)	P>0.05

	6(120)	5(100)	11(54.5)	P>0.05
Total	10(50)	8(50)	18(100)	P>0.05

Regarding the other different conditions which consist of 42% of samples , no statistical differences was noted between the two groups and thus had no effect on the method and outcome of the study , because the P value 0.05 , tableNO.3.

Disease	SA%	HS%	Total	P.value
Typhoid ileitis	8(40)	12(60)	20(50)	P>0.05
Mesenteric vascular occlusion	8(57.2)	6(42.8)	14(35)	p>0.05
Chron's disease	1(33.3)	2(66.7)	3(7.5)	p>0.05
Intussusceptions	2(66.7)	1(33.3)	3(7.5)	p>0.05
Meckel's diverticulum	1(50)	1(50)	2(5)	p>0.05
Total	20(47.7)	22(52.3)	40(100)	p>0.05

Regarding the site of anastomoses , according to the table NO. 4 , no statistical significant difference was noted between the two groups , P value 0.87 .

Anastomosis	SA%	HS%	Total	P value
Jejunal	22(52.4)	20(47.6)	42(42)	P> 0.05
Ileal	25(49.9)	26(50.1)	51(51)	P> 0.05
Duod-jejunal	3(42.8)	4(57.2)	7	P> 0.05
Total	50(50)	50(50)	100(100)	P> 0.05

Regarding postoperative general complications , no statistical significant difference was noted between the two groups, P value 0.07 , table NO.5

General	SA%	HS%	Total	P value
DVT	2(33.3)	3(66.7)	5(23.8)	p>0.05
Chest	4(50)	4(50)	8(38.1)	p>0.05
UTI	3(66.7)	2(33.3)	5(23.8)	p>0.05
Mortality	1(33.3)	2(66.7)	3(14.3)	p>0.05
Total	10(50)	11(50)	21(100)	p>0.05

Regarding postoperative local complications, no statistical significant difference between the two groups, P value 0.08 .table no. 6

Table NO. (6) Shows postoperative complication (Local)

Local	SA%	HS%	Total	P value
Wound Infection	2(33.3)	4(66.7)	6(26.3)	P>0.05
Fistula	2(40)	3(60)	5(21.7)	P>0.05
Stricture	0(0)	1(100)	1(4.3)	P>0.05
Haemorrhage	2(40)	3(60)	5(21.7)	P>0.05
Intra-abd. Col.	2(100)	0(0)	2(8.7)	P>0.05
Dehiscence	0(0)	1(100)	1(4.3)	P>0.05
Re-operation	1(33.3)	2(66.7)	3(13)	P>0.05
Total	9(39.1)	14(60.9)	23(100)	P>0.05

Regarding postoperative hospital stay , no statistical significant difference between the two groups was found P value 0.70 , table no. 7.

table no. 7.

Anastomosis Duration(min)	Studied Groups SA% HS%	NO. 50	Mean (min) 6.43 20.96	Standard Diviation (SD) 1.07 1.55	P.value 0 000
		50			
	Total	100			
Hospital stay day	Sa% HS%	50 50	5.90 days 8.25	0.81 1.65	0.6
	Total	100			

Regarding the anastomotic duration, there is significant difference was found between the two groups P value 0.000 . table no. 7

Disccussion

In our study the mean age of the patients was with S.A.group=43years , while for H.S group=45 years , the difference in the age distribution and outcome of surgery between the two groups is not significant P.value=0.72 , and this is similar to the study by schier .et.al.

The data related to specific mortality shows no significant statistical difference, this result is similar to BROWN DC.2003 studt.

The development of strictures in our study , there was no significant statistical difference , which to other studies as KAFIE F,Waxman k. 1997.

The mean time taken to perform anastomoses in SA group is=6.43 min. while in HS group is=26.9 min. P value=0.000 .

It means that there is significant statistical difference in favor of SA group which closely similar to (BRUNDAGE SI , JURKOVICH , and DIDOLKAR MS , REOD W-P) study[18,25].

The time taken to perform anastomoses , important , because it influences the total length of operative procedure , especially in those with concomitant diseases or those with emergency operation.

The cost of stapler devices is more expensive , but in comparison with other factors including the length and rapidity of the operative procedure, reduce tissue manipulation , minimum edema , uniformity of suture, adequate lumen, and the price of sutures used and cost of complication related to the method employed , make the mechanical stapling devices widely used for gastro- intestinal surgery .(OLSEN GB and KHOUR G.A 1994-1999)[6,8,37].

Conclusion

1-The outcome measures , mortality, overall anastomotic dehiscence , hemorrhage , re-operation and hospital stay show no significant difference between the hand sewn and stapler anastomoses.

2-There is significant difference only in the length of the operation and the duration of anastomoses when using the stapler devices .Stapler operation shorter than hand sewn.

3-So the mechanical stapling method devices considered another method with the classical hand sewn ,used in small bowel anastomoses, especially in patients with concomitant diseases or those with difficult operation that needed short time and rapid surgical intervention.

References

1- Dr.Tariq AP and Misha'aan. MB': comparsion study stapled versus hand sewn Method for large bowel anastomosis surgery ; Teaching Baghdad Hospital 2009.

2- Semm N:Enteroraphy : its history , technic and present ststus . JAMA 21:215,1893.

3- Hastings JC , Van Winkle W , Baker E, et al : Effects of suture materials on healing of wound of the stomach and colon . surgery . Gynecolobstet. 140;701,1975.

4- Mundag C , McGinn FP :A comparison of polyglycolic Acid and catgut sutures in Vat small and large bowel. Anastomosis .Br. Surg 63:870,1976.

5- Irvin T, Goligher J , Johnston D: Arandomized prospective clinical trial of single layer and two layer inverting intestinal anastomosis . Br Jsurg 60:457,1973.

6- Olsen GB , letwin E, Williams HTG : clinical experience with the Use of a single layer intestimal anastomosis , Can J. surg 56; 771-1994.

7- Sarin S , lightwood RGs continuous single layer GIT anastomosis : a prospective audit Br J Surg . 76:493,1989.
8- Khoury GA, Waxman Bp: small bowel anastomosis : I . The healing process and suture anastomosis , areview. Br. Jsurg 70:61. 1999 .
9- Smich CR , coke let GR , Adams JT . Vascularity of G.I.T Staple lines demonstrated with silicon rubber injection Am.J. Surg . 142:563-566.1981.
10- Diidolkar MS. Reed WP. Elias EG, Schnapr LA Brown SD, chaudharg SM. A prospective randomized study of sutured versus stapled bowel anastomosis in patients with cancer. Cancer 57:456-460.1986.
11- Mator SD compression intestinal anastomosis with AKA Russian instrument : analysis of clinical , radiological and endoscopic results . 32:64. 1996.
12- Scher KS, Sco H. conner c, ong WT .A comparison of stapled gastric operations. Surg Gyencol obstet : 154.548-552-1997.
13- Moreno. Gonzalea E; vara – Tvor back R. Stapled versus manual anastomosis in G.T.T surgery . Lanyen becks Arch chir ; 372-99-103-1987.
14- Delicio matos department of public health state university of health saopaulo Brazil "Comparative studying small bowel surgery " randomized trial . IntJ small bowel . Dis ; 7:25-30-1994.
15- Lipska MA , Bisse HIP, parry, BR, Merrie AEH Anastomosis leakage after upper G.I.T anastomsis are at high risk . ANZ Journal of surgery 75:520.505:2006.
16- Weil PH, Seherz H. comparsion of stapled and Han sutured gastrectomies . Arch surg; 116:14-16-2000 .
17- Steichen FM, Ravitch MM. History of mechanical devices and instrument for suturing . Currprobl. Surg; 19:1-52-1982.
18- Brundage SI, Grossman DC JurKovich GJ, Tong Tc, Mack CD. Maier Rv. Stapled versus sutured gastrointestinal anastomsis in trauma patient , j trauma. 1999; 47:500.507
19- Beart Jr, Mc Ginn , Gartell PC, Clifford PC, Brunton FI, stapler or sutures to small and large bewel anastomsis : prospective randomized trial Br J surg ; 72:603-605.1985.
20- Finger hat A, Elhadad A. Hay JM , Lacaine F , flamant Y. intraperitoneal colorectal anastomsis : hand sewn versus circular staples . A controlled clinical trial . Surgery 1994;116:484-90.
21- Brown DC 2003:small intestine . In: SLATTER DH (Ed.) : Text book of small bowel surgery . 3rd . ed. Saunders Philadelphia , PP. 660.661
22- Witzkc JD, Kraatz JJ , Morken JM , et al , Stapled versus hand sewn anastomsis in patients with small bowel injury : a changing perspective . J Trauma. 2000; 49:660-665 .
23- Weat of Scotland and Hghland Anastomsis study group suturing or stapling in gastrointestinal surgery : A prospective randomized study . Br J Surg. 1991; 78:337-341.
24- Kafic F, Tominaga GT , Yoong B, Waxman K, Factors related to outcome in blunt intestinal injuries requiring operation. Am surg. 1997; 63:889-892..
25- SEME voloss SA, Duncharme NG., HackeTT RP 2002: clinical assessment and outcome of three techniques for JeJunal resection and anastomosis in Humans and horses: 59 cases (1989.2000). J Am vet Med Assoc 220:215-218.
26- Naresh Damesha et al. Sutured and stapled anastomsis in gastrointestinal operation ISSN: 1528-8242,2008.
27- Anselmi Salivini P, Crozzoli L, Maneti F, Papotti R, Sallusti . M, et al . Comparsion of mechanical and manual anastomosis in emergency gastric and small bowel resection . G chir 1991; 12:81-3.
28- LiHK, MP, Markgraf R. continuous single layer technique in turnable and non turnable gastrointestinal anastomsis . A prospective observational study of emergency and elective operations . Zentralbi chir 2002; 127: 992-6 .
29- He DL UND CS : Surgery of the small intestine : general principles and techniques . In: FOSSUM TW (Ed): 2nd . ed- Mosby , st , Louis . PP369-398.2002 .