

Comparative Study of Different Anastomotic Technique- Single Layer Extra Mucosal Versus Conventional Double Layer Anastomosis in Elective and Emergency Laparotomy

Dr Rakesh Tawar, Dr Vikram Singh Mujalde, Dr Sandeep Thakre

Abstract: The present study was conducted to compare the efficacy of Two hand sewn techniques of gut anastomosis (i.e. single and double layer). This prospective study was conducted in department of Surgery, JA Group of Hospitals, G.R.M.C Gwalior. 80 patients requiring intestinal anastomosis were included in this study from October 2011 to October 2012. In this study 43 single layer extramucosal and 37 conventional double layered anastomosis were observed and Comparison was made in terms of time required for anastomosis, anastomotic leak and other complications, and the cost incurred.

Single layer anastomosis was performed with a continuous 2-0 polyglycolic acid suture & two layer anastomosis was constructed using 2-0 silk lembert suture for the outer layer & a continuous 2-0 polyglycolic acid suture for inner layer. 80 patients were subjected to intestinal anastomosis either single or double layer in emergency or electively by senior surgeon (Registrar or consultant). In 43 cases single layer anastomosis was done (18 emergency + 25 elective). In 37 cases double layer anastomosis was done (14 in emergency + 23 elective). In our study single layer anastomosis took 16-22 minutes whereas double anastomosis took 26-36 minutes. The average postoperative stay in hospital was 11.45 days for single layer and 13.45 days for double layer.

The study shows that there was low incidence of anastomotic failure and septic complications in single layer as compared with the double conventional methods of gut anastomosis. Hence the single layer anastomosis is safe and cost effective.

Key words: interrupted single layer, anastomosis, gastrointestinal.

I. Introduction

Anastomotic integrity is an important determinant of immediate outcome in gastrointestinal surgery and anastomotic technique is an important factor in healing. The controversy regarding single layer anastomosis goes back as the period of halsted. [1]The advantage of a single layer over a two layer technique are essentially those of rapid and reliable healing because of minimal interference with vascularity and more accurate apposition of the divided bowel segment and minimally disturb to the gut lumen.[2] [3] In the early 19th century through the experimental work of Travers [5] and Lembert [4], double-layered intestinal anastomosis was first performed. With the inner layer of anastomosis, the risk of leakage was reduced and better mucosal approximation was achieved. They advocated careful approximation of the serosal surfaces of the bowel and devised a method of suturing to accomplish this. Since then the technique has remained more or less the same except for the use of different suture material for the inner layer.

The single-layered interrupted anastomosis was first described by Hautefeuille [6] in 1976.

The utility of any technique for intestinal anastomosis depends mainly on its ability to heal without a leakage. This complication has catastrophic consequences on patients' health as well as cost of care. Other predictors of intestinal failure such as diabetes, steroids, method, blood loss, and nutrition have not been so significant in the outcome when technique of anastomosis is concerned.

The present study assessed the efficacy and safety of the single layered anastomosis against the double-layered anastomosis after intestinal resection, mainly in terms of anastomotic leak, time required to construct the anastomosis, cost incurred, and length of hospital stay.

II. Material And Method

This prospective study was conducted in department of Surgery, JA Group of Hospitals, G.R.M.C Gwalior. Eighty patients requiring intestinal anastomosis were included in this study from October 2011 to October 2012.

All the patients above the age of 12 years, requiring intestinal anastomosis on emergency or electively, were included in the study. Patient with risk factors like diabetes, h/o steroid intake, severe anaemia, were excluded from the study. The patients were alternatively allotted single-layered intestinal anastomosis group and

double-layered group. Informed written consent was obtained and the procedure and its outcome were well explained. All the anastomosis were performed by the senior consultant surgeon.

In this study 43 single layer extramucosal and 37 conventional double layered anastomosis were observed and compared on the basis of time taken to perform the procedure, duration of hospital stay and complications.

Methods:

Single layer anastomosis was performed with a continuous 2-0 polyglycolic acid suture and double layer was performed using 2-0 silk lembert sutures for the outer layer and a continuous 2-0 polyglycolic acid suture for the inner layer. The time considered for anastomosis began with the placement of the first stitch and ended with the cutting of the last stitch.

Anastomotic leak was defined as fecal discharge in the drain or from the wound or a visible disruption of the suture line during re-exploration. Intra-abdominal abscess without visible discharge was seen in patients as fever, persistent abdominal pain, tachycardia, and raised leucocyte count and was confirmed on ultrasound of the abdomen. Each group was compared for anastomatic leaks, intra abdominal abscess, duration of stay, and rapidity to perform.

III. Result

fourty-three patients had a single-layered anastomosis, whereas 37 had a double-layered anastomosis. Maximum no. of cases in the study were include young of age less than 30 years and most of the patients were males in both single and double layer anastomosis. The largest no. of cases for which resection anastomosis was done were of enterostomy (45%) (Table 1).

**Table No. 1
Diseases for which resection Anastomosis was done**

Diseases	Single layer		Double layer	
	No.	%	No.	%
Enterostomy	22	27.5	13	16.25
Multiple Perforation (Small intestine)	04	5	4	5
Volvulus	01	1.25	0	0
Intestinal Obstruction	7	8.75	7	8.75
Gastric outlet Obstruction	0	0	4	5
Multiple structure	0	0	2	2.5
Obstructed hernia	2	2.5	2	2.5
Trauma	5	6.25	3	3.75
Mesentric cyst	0	0	1	1.25
Intussuption	2	2.5	1	1.25

**Table No. 2
Operative Procedure Done**

Operation Done	Single layer		Double layer	
	No.	%	No.	%
End to End Colocolic Anastomosis	7	8.75	2	2.25
End to end ileocolic Anastomosis	1	1.25	2	2.25
End to Side ileocolic Anastomosis	6	7.5	9	11.25
End to End ileoileal Anastomosis	22	27.5	14	17.5
Side to Side ileoileal Anastomosis	0	0	1	1.25
End to end Jejuno ileal Anastomosis	1	1.25	0	0
End to End jejuno jejunal Anastomosis	6	7.5	5	6.25
End to End Gastro jejunostomy	0	0	2	2.25
Side to Side Gastro jejunostomy	0	0	2	2.25

The most common site of repair for both the groups was ileoileal followed by ileocolic (Table 2).

**Table No. 3
Average Time Taken for Anastomosis**

Technique	Time Mean±SD	p value
Single Layer	19.51±3.62	<0.0001
Double Layer	31.45±5.54	

The mean time required for single-layered anastomosis was significantly lesser (19.5 min) than for double-layered (31.45 min). (Table 3).

Table No. 4
Average Postoperative days in Hospital
Apart from cases in which Death Occured

	Single Layer	Double Layer	P value
Post operative days (mean±SD)	11.48±2.10	13.45±4.90	0.019 (sig)

Duration of stay in hospital was significantly more in double layer anastomosis. One death occurred in both groups.

Table No. 5
Postoperative complication

Post Operative Complication	Single Layer n=43		Double Layer n=37		P value
	Cases	%	Cases	%	
Fecal Discharge (Clinical Evidence of Anastomotic Dehiscence)	3	6.9	5	13.5	0.328
Main Wound Infection	12	27.9	13	35.1	0.49
Delayed Bowel Motility	9	20.9	14	37.8	0.09
Pelvic Collection	2	4.6	6	16.2	0.088

Although the percentage of complications was more in double layer as compared to single layer but it was not statistically significant.

IV. Discussion

Average time for intestinal anastomosis in single layer was 19.51 minutes and in double layer is 31.45 minutes. Hence, the mean time saved by creating the single-layered anastomosis was 10 min, which may seem relatively insignificant. But the time documented in constructing single-layered anastomosis has been 8–10 min and in contrast double-layered method has been no less than 20–25 min, which seemed significant. Samiullah et al. [7] and Khan et al. [8] also experienced the same significant difference between the timings of the anastomosis.

Average post operative stay was 11.48 days in single layer and 13.45 days in double layer. Although the percentage of complications was more in double layer as compared to single layer but it was not statistically significant and to the literature available. This is further proved by the meta-analysis done by Shikata et al. [9] which is the largest series available in literature presently. It analysed 670 participants showing that the combined risk ratio using DerSimonian-Laird methods was 0.91 (95 % CI 0.49–1.69), and indicated no significant difference between the anastomotic leaks for both the groups.

V. Conclusion

Single layer is apparently superior to double layer because:- Single layer extramucosal technique is technically simpler so can be easily performed, Post operative morbidity is less in single layer and less time consuming than double layer. Average post operative stay was 11.48 days in single layer and 13.45 days in double layer. So duration of stay in double layer is more than single layer (p=0.09).

References

- [1]. Shaukat mahmood mirza, Kamran Khalid and faisal hanif. Single layer serosubmucosal intestinal anastomosis- an equilly safe alternative. JCPSP 2002;12(10):583.
- [2]. Khoury GA, Waxman BP. Large bowel anastomosis: Br.J Surg 1983; 70:61
- [3]. Carty NJ, Keating J, Campel J, Karanjia N. prospective audit of an extramucosal technique for intestinal anastomosis. Br.J Surg. 1991;78:1439.
- [4]. Lembert A. Memoire sur l'enteroraphie avec la description d'un procede nouveau pour pratiquer cette operation chirurgicale. Rep Gen Anat Physiol Path. 1826;2:100.
- [5]. Travers B. Enquiry into the process of nature in repairing injuries of the intestine. London: Longman, Rees, Orme, Brown, and Green; 1812.
- [6]. Hautefeuille P. Reflexions sur les sutures digetives: a propos de 570 sutures accomplies depuis 5 ans au surjet monoplan de monobrin. Chirurgie. 1976;102:153–165.
- [7]. Samiullah IM, Zada N. Comparison of single layer interrupted intestinal anastomosis with double layer intestinal anastomosis. J Postgrad Med Inst. 2003;17(2):263–266.
- [8]. Khan RAA, Hameed F, Ahmed B, Dilawaiz M, Akram M. Intestinal anastomosis: comparative evaluation for safety, cost effectiveness, morbidity and complication of single versus double layer. Professional Med J. 2010;17(2):232–234.
- [9]. Shikata S, Yamagishi H, Taji Y, Shimada T, Noguchi Y. Single versus two-layer intestinal anastomosis: a meta-analysis of randomized controlled trials. BMC Surg. 2006;6:2. doi: 10.1186/1471-2482-6-2.