



A COMPARATIVE STUDY OF SINGLE LAYER EXTRA MUCOSAL VERSUS CONVENTIONAL DOUBLE LAYER INTESTINAL ANASTOMOSIS

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ABSTRACT

BACKGROUND: Gastrointestinal anastomosis has been a part of research since decades and is one of the essential skills in the surgeon's armamentarium. The hand-sewn bowel anastomosis may be performed as a single layer suturing technique or double-layer technique of anastomosis. The most scientific way to conclude the superiority of one method over others is evidence-based medicine. Hence, we conducted a retrospective study in our institute to compare single-layer interrupted extra mucosal intestinal anastomosis with a double-layer conventional method of intestinal anastomosis.

METHODS: The present study is a retrospective, comparative study conducted on 53 patients, who underwent intestinal anastomosis, over a period of 2 years from August 2019 to August 2021. Patients were allotted into two groups. Those who underwent single-layer anastomosis were grouped under Group A, and those who experienced double-layer anastomosis were grouped under Group B. Outcome parameters were analysed in terms of time taken to perform anastomoses, duration of hospital stay, cost-effectiveness and complications like anastomotic leak.

RESULTS: The mean age in group A was 41.4 years, and in group B was 41.25 years. Both males and females were equally affected. The ileal stricture was diagnosed in the maximum number of patients, i.e. 12 (23.07%) cases; hence, resection of ileum and ileo-ileal anastomosis was performed in the maximum number of cases. In group A mean duration to perform single-layer anastomosis was 19.04 minutes and 28.8 minutes in Group B. The mean difference between two groups was 9.76 minutes, and the P-value was <0.001, which is highly significant. An overall complication in the form of anastomotic leak was noted in 7 patients (13.4%), 2 (3.8%) case in Group A and 5 (9.6%) in Group B and the difference was statistically significant. The mean duration of hospital stay in Group A was 7.32 days and Group B was 7.92 days (difference was statistically insignificant).

CONCLUSION: Single layer interrupted extra mucosal intestinal anastomosis is a better procedure when compared to continuous double layer conventional method of intestinal anastomosis as it takes less time for construction, cost effective and has low risk of developing complications.

KEYWORDS : Single-layered, double-layered, anastomosis, extra-mucosal, anastomotic leak.

BACKGROUND

Gastrointestinal anastomosis has been a part of research since decades and is one of the key skills in surgeon's armamentarium. It may be done with the help of stapling devices, by using single layer suturing technique or double layer technique of anastomosis. The most scientific way to conclude the superiority of one method over others is evidence-based medicine. Hence, we have conducted a retrospective study in our institute, to compare single layer interrupted extra mucosal intestinal anastomosis with continuous double layer conventional method of intestinal anastomosis.

METHODS

The present study is a retrospective, comparative study conducted on 53 patients who had an indication for intestinal anastomosis (emergent or elective) and attended to Department of General Surgery, GMC & GGH, Kadapa, over a period of 2 years from August 2019 to August 2021. Patients were allotted into two groups. Those who underwent single-layer anastomosis were grouped under Group A and those who underwent double-layer anastomosis were grouped under Group B. Outcome parameters were analysed in terms of time taken to perform anastomoses, duration of hospital stay and complications like anastomotic leak.

Inclusion Criteria

1. Patient's age > 18 years.
2. Those who gave consent to be included in the study.
3. Patients who underwent hand-sewn intestinal resection and anastomosis.

4. Patients with both elective and emergency resection.

Exclusion Criteria

1. Patients with comorbid conditions like cardiac failure, hypertension, diabetes mellitus, anaemia (<10 gm/dl), coagulopathy, hypoalbuminemia, chronic Kidney Disease, liver disease.
2. Patients who have an intestinal anastomosis with proximal defunctioning enterostomy.
3. Patients requiring oesophageal, gastric, biliary, rectal and anal anastomosis.
4. Those who did not give consent for study.
5. Paediatric age group.
6. Those who underwent stapler anastomosis.

RESULTS

Age And Gender Distribution:

Table -1: Age Distribution

Age Groups (Years)	Group A (Single Layer) n (%)	Group B (Double Layer) n(%)
20-30	4	3
31-40	8	6
41-50	7	8
51-60	9	8
TOTAL	28	25
MEAN AGE	41.4	41.25

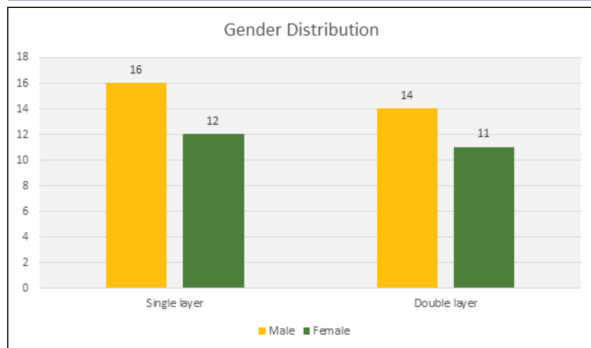


Chart-1: Gender Distribution

Indication For Surgery:

Both elective and emergency surgeries were included in the study. Fourteen cases (26.92%) were operated under emergency. Out of 15 cases in each group, 4 were operated under emergency and 11 were operated electively. The cases included in the study predominantly had diseases of the small bowel, most common being benign stricture followed by strangulated hernia, so majority of the cases had to undergo entero-enterostomy in both the groups, accounting to 53.33%. Other indications were, multiple perforations, hepatic flexure tumours, carcinoma ascending colon, caecal mass (GIST), SMA syndrome, appendicular carcinoid, ileo-caecal tuberculosis, caecal perforation, abdomen injury with hollow viscus perforation, sigmoid volvulus.

Anastomotic Site:

Table-2: Anastomotic Site & Indication For Anastomosis.

Anastomotic site	Group A (Single Layer)		Group B (Double Layer)		Total
	Indication	No. (%)	Indication	No. (%)	
Entero-Enteric	Ileal stricture (8)	15 (53.57%)	Ileal stricture (3)	8 (53.33%)	16
	Strangulated hernia (6)		Strangulated hernia (3)		
	SMA syndrome (1)		Ileal perforation (2)		
Entero-Colic	Caecal GIST (2)	9 (32.14%)	Caecal GIST (1)	6 (40%)	11
	Caecal perforation (2)		Caecal perforation (1)		
	IC tuberculosis (2)		IC tuberculosis (2)		
	Hepatic flexure tumour (2)		Hepatic flexure tumour (1)		
	Appendicular carcinoid (1)		Ca. ascending colon (1)		
Colo-Colic	Sigmoid volvulus (2)	4 (14.28%)	Sigmoid volvulus (1)	1 (6.67%)	3
	Penetrating injury abdomen (2)				
Total		28		25	53

Type Of Anastomosis:

All the cases included under study underwent end-end anastomosis and there were no cases of end-side or side-side anastomosis.

Mean Suture Material Used:

In single layer anastomosis, only 2-0 polyglactin round body suture material was used where as in double layer

anastomosis both 2-0 polyglactin and 2-0 silk round body were used. Mean amount of 2-0 polyglactin used in single layer anastomosis was 1.12. In double layer continuous anastomosis, a mean number of 1.90 of polyglactin 2-0 round body and 1 silk 2-0 round body in each case with mean equal to 1 were used. So, the number of suture material used were more in double layer continuous anastomosis.

Duration Of Anastomosis:

In this comparative study, in group A (single layer) the minimum time required to perform anastomosis was 15 minutes observed in 2 patient, followed by 16-20 minutes in 20 patients, maximum time was 25 minutes observed in 6 patients and no anastomosis took more than 25 minutes.

In group B (double layer) the minimum time required to perform anastomosis was 22 minutes in 2 patient and maximum time was 34 minutes in 2 patient, rest 21 were done in between 26 to 30 minutes and no anastomosis required beyond 35 minutes.

Mean Duration Of Anastomosis In Two Groups:

Table-3: Mean Duration Of Anastomosis

Groups	Mean ± SD	Mean difference	P value
Group-A (Single Layer)	19.04 ± 1.60	10.16	0.000
Group-B (Double Layer)	28.8 ± 2.02		

As the P value is < 0.001 the association is highly significant.

Post-operative Complications:

Overall complication in the form of anastomotic leak was noted in 4 (13.3%) patients, 1 (6.67%) belongs to group A and the rest 3 (20%) belongs to group B with P < .005, implying that incidence of anastomotic leak is significantly more common in double layer anastomosis. One patient each from both the groups developed surgical site infection and recovered well. All cases were recovered well on conservative management.

Hospital Stay

In our study, the mean duration of hospital stay in the single layer group was 7.32 days whereas in the double layer group, it was 7.92 days. The difference was statistically insignificant.

DISCUSSION

In present study, mean age in group A (single layer) was 41.4 years and in group B (double layer) 41.25 years. There is no significant age difference between the two groups which was similar to Ayub M & Gangat's study where the mean age in group A (single layer) was 41.4 years and in group B (double layer) 41.25 years.

Table-4: Comparison Of Site Of Repair

Site of anastomosis	Present study		Garude K ² .		Lohit Sai. K ³	
	Single layer	Double layer	Single layer	Double layer	Single layer	Double layer
Entero-Enteric	16 (53.33%)	14 (53.33%)	63%	64%	85.72%	60%
Entero-Colic	8 (33.34%)	10 (40%)	20%	22%	7.14%	33.33%
Colo-Colic	4 (13.33%)	1 (6.67%)	17%	14%	7.14%	6.67%

In Khan RAA⁴ series, the mean duration required to perform an anastomosis procedure was 20 minutes for single layer and 35 minutes for double layer. In Jon M. Burch⁵ series, duration required to perform a single layer anastomosis was 20.8 minutes and 30.7 minutes for double layer. In our study, the mean duration required to construct a single layer anastomosis was 19.04 minutes and 28.80 minutes for double layered anastomosis implying that single layer anastomosis requires less time to perform.

In 2014 to 2016 Bhargava G S, et al⁶ also concluded from their study, that single layer extra-mucosal anastomosis is cost effective and time saving procedure as compared to double layer method.

Table-5: Comparison Of Mean Of Suture Material Used:

Groups	Mean number and Type of suture material used			
	Present study	DandiP ⁷	DR. K. S. Gokulnath Premchand et al ⁸	Garude Kirti ²
Group A (Single layer)	1.12 (Polyglactin)	1 (Silk)	1 (Silk)	1 (Polypropylene)
Group B (Double layer)	2.90 (1.90 Polyglactin + 1 silk)	2 (Silk)	2 (1 Polyglactin + 1 Silk)	2.5 (1 Polyglactin + 1.5 Silk)

It has been observed from all the above studies that single layer anastomosis requires less suture material when compared to double layer technique. Which implies, single layer anastomosis is cost effective.

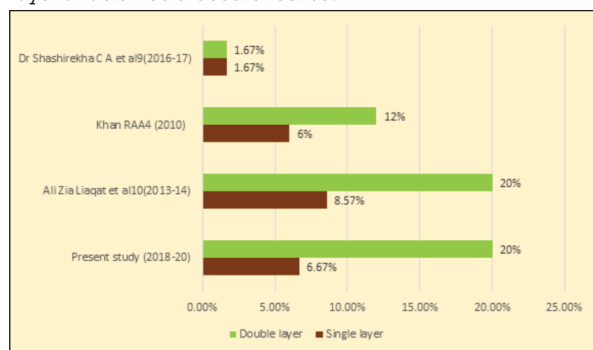


Chart-2: Comparison Of Percentage Of Anastomotic Leak.

CONCLUSION

Based on the results obtained in the present study following conclusions can be drawn:

Duration required to perform and incidence of anastomotic leak were significantly lesser in single layer intestinal anastomosis when compared to double layer. Single layer intestinal anastomosis is a cost-effective procedure. There is no significant difference between the two procedures in terms of duration of hospital stay.

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