

A COMPARATIVE STUDY OF SINGLE LAYER EXTRAMUCOSAL VERSES

CONVENTIONAL DOUBLE LAYERED INTESTINAL ANASTAMOSIS

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ABSTRACT

BACKGROUND: 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:** Retrospective, Comparative study on 53 patients, who underwent intestinal anastomosis, from August 2019 to July 2022. Patients were allotted into two groups. single-layer anastomosis were grouped under Group A, and double-layer anastomosis were grouped under Group B. Outcomes were analyzed in terms of time taken for anastomoses, hospital stays, cost-effectiveness and complications. **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 seen in 12 (23.07%) cases; and 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%) including both A and B group; 2 (3.8%) cases 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.

Introduction:

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 3 years from August 2019 to July 2022. Patients were allotted into two groups. Those who underwent single-layer anastomosis was

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 stays 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, anemia (<10 gm/dl), coagulopathy, hypoalbuminemia, chronic kidney disease, liver disease.
2. Patients who have an intestinal anastomosis with proximal defunctioning enterostomy.
3. Patients requiring esophageal, gastric, biliary, rectal and anal anastomosis.
4. Those who did not give consent for study.
5. Pediatric age group.
6. Those who underwent stapler anastomosis.

RESULTS

Age And Gender Distribution:

Out of 53 patients, age between 20 to 30 years include 7 patients, age between 31 to 40 years include 14 Patients, age between 41 to 50 include 15 patients and above 50 years includes 17 patients. Out of these 30 are male and females are 13 in number.

Table -1: Age Distribution

| Age Groups (Years) | GroupA (Single Layer)n(%) | GroupB (Double Layer)n (%) |
|--------------------|---------------------------|----------------------------|
| 20-30 | 4 | 3 |
| 31-40 | 8 | 6 |
| 41-50 | 7 | 8 |
| 51-60 | 9 | 8 |
| TOTAL | 28 | 25 |

Table - 2: Sex Distribution

| Gender | Male | Female |
|--------------------------|------|--------|
| Single Layer Anastomosis | 16 | 12 |
| Doble layer Anastomosis | 14 | 11 |
| Total | 30 | 23 |

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 tumors, carcinoma ascending colon, caecal mass (GIST), SMA

syndrome, appendicular carcinoid, ileo-caecal tuberculosis, caecal perforation, abdomen injury with hallow viscus perforation, sigmoidvolvulus.

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.

Table-3: 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 | Ileal stricture (3) | 8 (53.33%) | 16 |
| | Strangulated hernia (6) | (53.57%) | 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 TB (2) | | IC TB (2) | | |
| | Hepatic Flexure tumour (2) | | Hepatic Flexure tumour (1) | | |
| | Appendicular carcinoid (1) | | Ca. ascending colon (1) | | |
| Colo - Colic | Sigmoid volvulus (2) | 4 | Sigmoid volvulus (1) | 1 (6.67%) | 3 |
| | Penetrating injury abdomen (2) | (14.28%) | | | |
| Total | | 28 | | 25 | 53 |

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 patients 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.

Table-4 Mean Duration Of Anastomosis In Two Groups

| 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**Table-5: Comparison Of Site Of Repair**

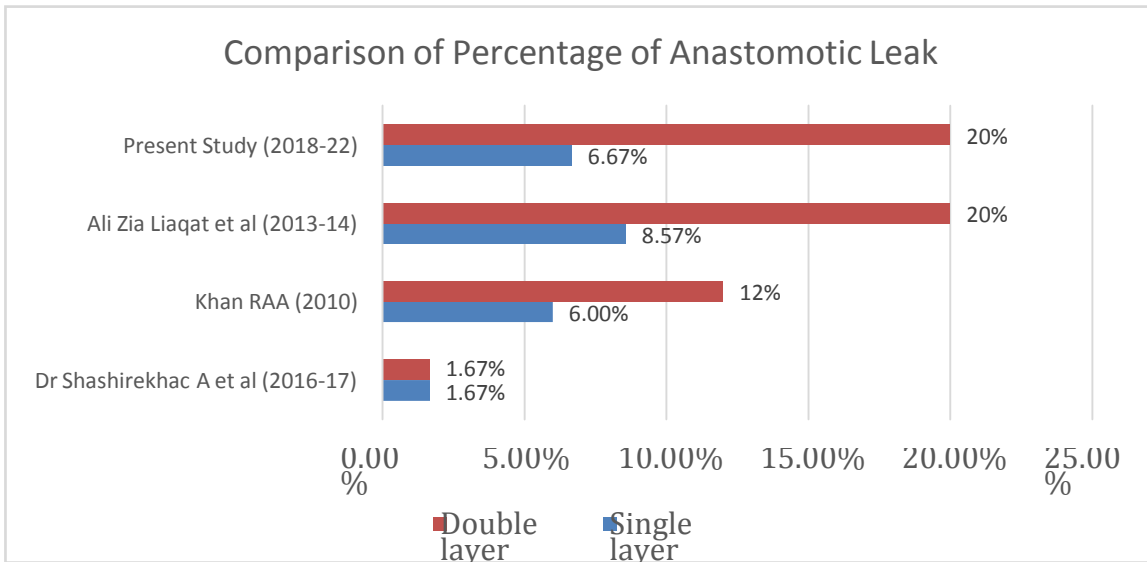
| Site of anastomosis | Present study | | Garude K2. | | Lohit Sai. K3 | |
|---------------------|---------------|--------------|--------------|--------------|---------------|--------------|
| | Single layer | Double layer | Single layer | Double layer | Single layer | Double layer |
| Entero-Enteric | 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 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 &Gangatstudy where the mean age in group A (single layer) was 41.4 years and in group B (double layer) 41.25 years.

In Khan RAA 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-6: Comparison Of Mean Of Suture Material Used:

| Groups | Mean number and Type of suture material used | | | |
|------------------------|----------------------------------------------|-------------------|-------------------------------------|------------------------|
| | Present study | DandiP.7 | DR. K. S. GokulnathPremchand et al8 | Garude Kirti2 |
| Group A (Single layer) | 2-0Polyglactin | 1-Silk | 1-Silk | 1Polypropylene |
| Group B (Double layer) | 2-0Polyglactin +1 silk | 2 layered 1- Silk | 1 Polyglactin + 1 Silk | 1-Polyglactin+ 1.5Silk |

GRAPH NO 1: - 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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