

## A Comparative Study between Single versus Double Layered Bowel Anastomosis in a Tertiary Care Hospital

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### ABSTRACT

**Background:** Intestinal anastomosis is a frequently performed procedure equally in elective and emergency cases and therefore, it is authoritative for surgeons and residents to be acquainted with the art of bowel anastomosis. The technique of anastomosis is dependent upon the site, situation of the bowel and the fundamental disease etiology, and the general complaint of the subject. As per a recent Cochrane review comparing the effectiveness of single layer and double layer gastrointestinal anastomosis

**Materials and Methods:** The present prospective, randomized comparative study was conducted in the general surgical department of the Hospital for a period of 2 years. Subjects requiring intestinal resection were evaluated for eligibility to the ward. All subjects received same antibiotics postoperatively like Injection Ceftriaxone and Metronidazole including a standard postoperative care. Subjects were followed up for two weeks after surgery. Any instant or late complications were noted. All the data thus obtained was arranged in a tabulated form and analyzed using SPSS software. Probability value of less than 0.05 was considered as significant.

**Results:** There were total 100 subjects included in the study, out of which 50 were managed by Single layered and 50 by Double layered technique. The mean age of the subjects was 37.53+/-4.22years. The mean duration of nasogastric tube in situ was 1.92±0.80 and 2.35 ± 1.03 days respectively in single

and double layer technique. The return of bowel sound postoperatively was 2.45±1.13 days in single layer and 3.2 ± 1.36 days in double layer technique. There was a significant difference in both the groups. There was 1 case of anastomotic leak with double layered technique. Abdominal abscess was seen in 2 cases each.

**Conclusion:** The hospital stay duration, operating time was comparatively lesser with single layer technique. It was also cost effective and easy to perform.

**Keywords:** Anastomosis, Nasogastric, Double Layer, Complications.


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### INTRODUCTION

Intestinal anastomosis is a frequently performed procedure equally in elective and emergency cases and therefore, it is authoritative for surgeons and residents to be acquainted with the art of bowel anastomosis. The technique of anastomosis is dependent upon the site, situation of the bowel and the fundamental disease etiology, and the general complaint of the subject.<sup>1</sup> Individual's surgical skill and preference is yet another important conclusive factor. Various techniques have been introduced but, the hand sewn suturing method remains the chief technique for intestinal anastomosis due to the availability and affordability of the material and knowledge with the procedure. Factually, two-layer anastomosis has been the conservative method for majority of surgical circumstances. But, it is boring,

time-consuming and carries a potential risk of anastomotic strictures formation. Presently, single layer continuous anastomosis with the use of monofilament suture has been advised by majority of surgeons because of reports that describe its cost-effectiveness, efficiency and also there is no elevation in leakage rates compared to double-layer method.<sup>2</sup> Though, despite of the large amount of researches performed on both the single and double layered techniques, it is not clear as to which technique is better in regards of safety and efficacy. As per a recent Cochrane review comparing the effectiveness of single layer and double layer gastrointestinal anastomosis.<sup>3</sup> It suggested that trials need to be performed amongst sufficient number of patients to come to a satisfactory conclusion.

## MATERIALS AND METHODS

The present prospective, randomized comparative study was conducted in the general surgical department of the Hospital for a period of 2 years. Subjects requiring intestinal resection were evaluated for eligibility to the ward. Subjects enrolled in the study underwent physical tests, routine blood examinations and imaging as appropriate for their condition. Patients between 18-65 years were enrolled in the study. Patients who underwent gastric and rectal anastomosis were not enrolled in the study. Patients with massive small intestinal resection or immunocompromised status were also excluded from the study. The study was approved by the institutional ethical board and a written consent was obtained from them in their vernacular language. Subjects were randomly allocated to underwent single layered extramucosal intestinal anastomosis assigned into Group-A or double layered intestinal anastomosis assigned into Group-B by using a sealed opaque envelope that indicated the technique to be used. Primary

outcome measurements include the average time that was needed for anastomosis amongst all the patients, frequency of postoperative complications and duration of hospital stay. Secondary outcome variables included the postoperative return of the bowel function and time of nasogastric tube for which it was kept in situ. All the subjects were operated postoperatively by the same surgical staff. Intraoperative outcomes, hemodynamics and any related complications, were noted. Time taken for the anastomosis was taken from the initiation with the placement of first suture till the ending including the cutting of the extra suture material from the last stitch of the anastomosis. All subjects received same antibiotics postoperatively like Injection Ceftriaxone and Metronidazole including a standard postoperative care. Subjects were followed up for two weeks after surgery. Any instant or late complications were noted. All the data thus obtained was arranged in a tabulated form and analyzed using SPSS software. Probability value of less than 0.05 was considered as significant.

**Table 1: Postoperative and intraoperative variables amongst both groups**

Variable	Single layered	Double layered	P value
Mean time taken for Anastomosis (mins)	15.13±2.30	24.40 ± 2.28	<0.05
Duration of nasogastric tube kept in situ (Days)	1.92±0.80	2.35 ± 1.03	<0.05
Return of bowel sounds on postoperative day	2.45±1.13	3.2 ± 1.36	<0.05
Day of first postoperative bowel movement	4.18±1.24	4.85 ± 1.65	>0.05
Complications recorded	05	10	<0.05
Mean duration of hospital stay (Days)	5.91±1.44	7.30 ± 1.88	<0.05

**Table 2: The complications encountered in the study**

Complications	Single layered	Double layered	P value
Anastomotic leak	0	1	<0.05
Abdominal abscess	2	2	<0.05
Pelvic collection	1	2	<0.05
Persistent vomiting	1	3	>0.05
Abdominal distension	1	2	>0.05
Total	5	10	<0.05

## RESULTS

There were total 100 subjects included in the study, out of which 50 were managed by Single layered and 50 by Double layered technique. The mean age of the subjects was 37.53+/-4.22years. Table 1 illustrates the postoperative and intraoperative variables amongst the study. The mean time taken for anastomosis was 15.13±2.30 in single layer technique and 24.40 ± 2.28 in double layer technique. There was a significant difference between the groups. The mean duration of nasogastric tube in situ was 1.92±0.80 and 2.35 ± 1.03 days respectively in single and double layer technique. The return of bowel sound postoperatively was 2.45±1.13 days in single layer and 3.2 ± 1.36 days in double layer technique. There was a significant difference in both the groups. The day of first postoperative bowel movement showed no significant difference between the groups. The complications recorded were 5 in single layer and 10 in double layer technique showing a significant difference amongst the groups. The mean duration of hospital stay in single layer technique was 5.91±1.44 days and in double layer technique was 7.30 ± 1.88 days indicating a significant difference.

Table 2 shows the complications encountered in the study. There was 1 case of anastomotic leak with double layered technique. Abdominal abscess was seen in 2 cases each. Persistent vomiting was observed in 3 cases with double layered anastomosis. Abdominal distention was seen in 1 case of single layered and 2 cases of double layered technique. There was a significant difference in the complications rate amongst both the groups.

## DISCUSSION

The most significant factors in the formation of a bowel anastomosis include careful technique, gentle tissue management, adequate positioning of the ends of bowel, ample blood supply and absence of any tension or obstruction at the distal.<sup>1</sup> As seen in the randomized trials, no differences were observed in the rates of leakage, hospital stay, and general morbidity between stapled and hand suturing.<sup>4</sup> Interrupted sutures have also shown no added advantage over the continuous sutures; whereas, evidence has come from retrospective studies only.<sup>5</sup> The conventional suturing for the anastomosis could be done either in double layer or single layer. The double layered

anastomosis was developed in the early 19<sup>th</sup> century by researcher Travers B during his experimental study.<sup>6</sup> Hautefeuille P in the year 1976, first provided a detailed account for the one-layer continuous anastomosis method.<sup>7</sup> In the present study, the mean time taken for anastomosis was  $15.13 \pm 2.30$  in single layer technique and  $24.40 \pm 2.28$  in double layer technique. There was a significant difference between the groups. The mean duration of nasogastric tube in situ was  $1.92 \pm 0.80$  and  $2.35 \pm 1.03$  days respectively in single and double layer technique. The return of bowel sound postoperatively was  $2.45 \pm 1.13$  days in single layer and  $3.2 \pm 1.36$  days in double layer technique. There was a significant difference in both the groups. The day of first postoperative bowel movement showed no significant difference between the groups. The complications recorded were 5 in single layer and 10 in double layer technique showing a significant difference amongst the groups. The mean duration of hospital stay in single layer technique was  $5.91 \pm 1.44$  days and in double layer technique was  $7.30 \pm 1.88$  days indicating a significant difference. On the contrary, both the continuous or interrupted sutures can be performed for single layer anastomosis. The mean age of subjects in another similar study was approximately 44 years.<sup>8</sup> Past studies showed significantly lower duration of anastomosis in case of single layered anastomosis.<sup>9,10</sup> To achieve a two-layer anastomosis, more tedious circumferential clearing of the mesentery, appendices and omentum are needed before initiating the anastomosis. While in case of the single-layer technique, little or no circumferential clearing is needed. Thus, time needed for the preparation of the bowel for anastomosis is reduced for one-layer technique.<sup>8</sup> The total shorter operative time is seen in cases of single-layer technique might be of importance amongst subjects with haemodynamic instabilities that were operated in emergency cases. Furthermore, this technique can be easily taught and learned and flexible.<sup>11</sup>

As per the studies by Burch JM et al., and Ceraldi CM et al., no statistically significant changes were observed in the incidence of anastomotic leaks or cases of abdominal abscess when compared between the two techniques.<sup>8,12</sup>

In a prospective trial amongst 553 single-layer interrupted sero submucosal anastomoses, the frequency of leakage was 0.2% that was similar to the study.<sup>13</sup> The study needs to be conducted amongst larger sample size so as to come to a favorable conclusion. The present study was conducted amongst a small sample size.

## CONCLUSION

All the intraoperative and postoperative variable of single layered technique was comparatively better than double layered technique. The hospital stay duration, operating time was comparatively lesser with single layer technique. It was also cost effective and easy to perform.

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