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General Surgery

COMPARATIVE STUDY ON SURGICAL OUTCOMES IN SINGLE LAYERED ANASTOMOSIS Vs DOUBLE LAYERED INTESTINAL ANASTOMOSIS OF SMALL INTESTINE

Dr N Ravishankar Professor Of Surgery

Dr Sushma H R* Resident– General Surgery *Corresponding Author

ABSTRACT

Introduction: Most common procedures both in elective and emergency surgeries is intestinal anastomosis. It is necessary for surgeons and residents to be familiar with and master the skill of safe bowel anastomosis. The general condition of the patient, condition of the bowel, site of anastomosis and aetiology of underlying disease helps decide the technique of anastomosis. Inspite of many evolved techniques the hand sewn technique remains the mainstay for anastomosis due to the availability, affordability of suture material and familiarity with the procedure. Suitability of a technique for intestinal anastomosis is the ability to heal without leakage. This study is to demonstrate that single layer continuous anastomosis and two layer technique have similar terms of safety.

Objectives of study:

Primary objective: To compare the frequency of post-operative complications in single layer anastomosis and double layer anastomosis of small intestine.

Secondary objective: 1. To determine the efficacy and length of stay in hospital post-operatively of single layer small intestinal anastomosis as compared to double layered intestinal anastomosis done at JSS Hospital, Mysore.

2. To compare the time taken and cost of procedure in both single and double layered intestinal anastomosis.

Methodology:

Study Design: Prospective interventional study

Study place: JSS hospital, Mysore.

Study Duration: One and half year

Sample size: Estimated as 35 in each group considering effect size of 0.6 based on this study SD1 = 1.43, SD2= 1.89 and to measure atleast 1 day difference of mean in length of stay in the hospital post-operatively with 5% alpha error and 20% beta error and 80% power (One sided hypothesis) i.e.; We are clear from previous literature than single layer anastomosis has lower length of stay compared to double layered anastomosis.

Sampling technique and study population

Study populations are all cases admitted in general surgery for Resection and anastomosis.

Results: The average length of stay in the hospital after a single layer anastomosis was 8.81 ±2.09 days, and the average length of stay after the double layer anastomosis was 11.43± 4.62 days.

In the present study it was observed that, in the patients who underwent single layer anastomosis 92.1% did not have any complications and in cases who underwent double layer anastomosis 78.4% did not have any complications.

The duration of operating time in double layer anastomosis was statistically significantly higher than that for the cases who underwent single layer anastomosis.

In the present study it was observed that, majority of the cases had resumption of bowl movements with in 5 post-operative days.

Conclusion: Given the reduced surgical time, comparable complication rates, and shorter hospital stay duration for single layered extra-mucosal continuous anastomosis versus the traditional two layer approach, our study concludes that the former is equally safe and possibly more cost effective. As a result, the single layer method may be considered for everyday surgical practise.

KEYWORDS :

AIMS AND OBJECTIVES OF THE STUDY

PRIMARY OBJECTIVE:

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SECONDARY OBJECTIVE:

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MATERIALS AND METHODS

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Study populations are all cases admitted in general surgery for Resection and anastomosis.

The following determinants were taken into consideration in formulating the risk factors in our patients.

- Age
- Systemic diseases like diabetes mellitus, severe anaemia, hypertension etc
- Duration of post operative stay in hospital wards.
- Aetiology of underlying disease
- Hemodynamic state of patient

Inclusion Criteria

1. All emergency and electively operated patients admitted in Department of General surgery at JSS hospital who undergo resection and anastomosis for small intestine
2. All patients aged 12-65years.
3. Haemoglobin of >8g/dl

Exclusion

1. Hemodynamically unstable patient.
2. Resection and anastomosis of large intestines.

Study setting and Method of collection of data:

This study is conducted at department of general surgery in JSS medical college, Mysore a tertiary care teaching institute and hospital, the target population is patient undergoing emergency/elective resection and anastomosis of small intestine admitted in general surgery.

The data of patients who underwent resection and anastomosis was noted on a proforma. a detailed history and clinical examination was conducted basic investigation like RBS, CBC, Serum electrolytes,

Urea, Creatinine, ECG, serology and blood grouping and cross matching would be done.

In elective group patients beside preoperative evaluation as done in emergency laparotomy correction of any comorbidities condition like anaemia, diabetes, hypertension, respiratory infection was done before the procedure.

Patients were followed throughout the post-operative period in the hospital.

- Post operative distribution of complication are
- Wound related complication like wound infection, wound gaping, burst abdomen.
- Post-operative fever.
- Post operative obstruction
- Respiratory complication like atelectasis, tracheobronchitis, pneumonia, pleural effusion, ARDS, pulmonary embolism.

Study Assessments of end points–
Intra-operatively:

- Operative time
- Incidence of intra-operative complications
- Post-operatively:
- Length of stay in hospital post-operatively
- Post-op anastomotic leak, fistula formation, post-op obstruction.
- Abdominal distension
- Return of bowel movements
- Incidence of return to OT
- Persistent vomiting

Study Treatment If Any:
Single layer or double layer bowel anastomosis can be done following resection. Double layer anastomosis is done using silk lembert 3-0 sutures wfor outer layer and continuous polyglycolicj acid 3-0 for inner wlayer while single layer anastomosis is done using continuous 3-0 polypropylene sutures.

Statistical Analysis
Data Entry was done using Microsoft excel 2013 and analysis done using SPSS V 16. Qualitative data was expressed in frequencies and percentages and Quantitative data in mean and standard deviation. Non parametric statistics i.e. Chi square test was used to find the significant association between the two qualitative variables. Independent t test was used to find the statistical significance between quantitative variables. Bar diagrams and pie chart were used to represent the data. p value of <0.05 was consideredg statistically significant.

RESULTS

Fig 1- Single and Double bowel Anastomosis

	Frequency	Percentage
Single	38	50.7%
Double	37	49.3%
Total	75	100%

In the present study, there were 54.6% of male and 45.33% of female. Both the groups stand comparable in terms of gender and no significant difference was observed across the groups in terms of gender.

	Single	Double
ACUTE INTESTINAL OBSTRUCTION	16	11
SUBACUTE INTESTINAL OBSTRUCTION	4	5
STRANGULATED HERNIA	2	12
MESENTERIC ISCHEMIA	6	5
SMALL BOWEL PERFORATION PERITONITIS	6	2
SMALL BOWEL GIST	3	2

Fig 2- Etiology

In the present study, 94.7% of the cases were stable in the group who underwent single layer anastomosis and 75.7% in cases who underwent double layered anastomosis. Ionotropic support was need in 18.9% of the patients who underwent double layered anastomosis and 5.3% in cases who underwent single layeredd anastomosis. There was dno statistically-significantg difference-across the groups- in terms of haemodynamic stability.

The average duration of post-operative hospital stay in cases who underwent single layer anastomosis was 8.81 ± 2.09 days and in cases who underwent double layer anastomosis was 11.43 ±4.62. the duration of stay in cases who underwent double layer anastomosis was significantly higher when compared to those who underwent single layer anastomosis.

In cases who underwent single layer anastomosis, wound infection was seen in 7.9% of the cases and other complications observed were post-operative fever, post-operative obstruction.

In cases who underwent double layer anastomosis the most common complication observed were anastomotic leak, post operative fever, abdominal distension and wound infections.

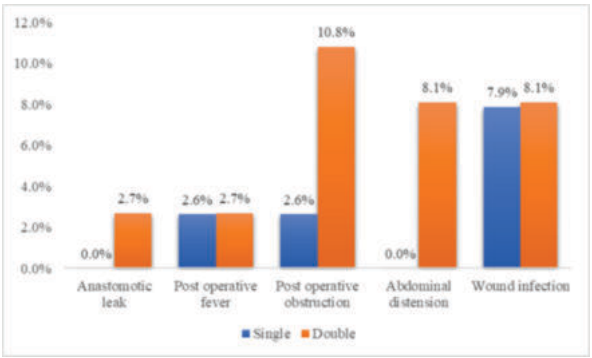

Fig 3- Post operative complications

In the present study it was observed that, in the patients who underwent single layer anastomosis 92.1% did not have any complications and in cases who underwent double layer anastomosis 78.4% did not have any complications. In cases who underwent double layer anastomosis, 2 cases needed mechanical ventilation and desaturation, one case each had thromboembolism, pleural effusion, and PTB.

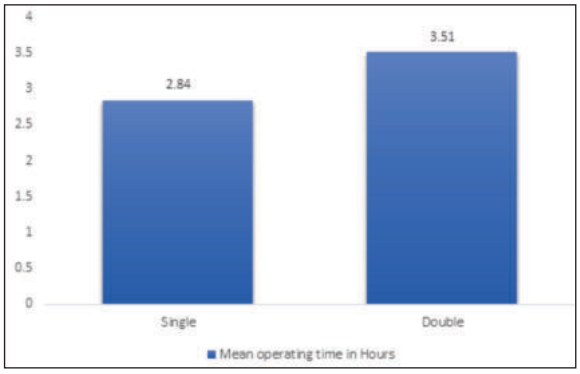

Fig 4-Operative time in hours

Fig 5- Outcome Return of Bowel movement

	Single		Double		Total	
	N	%	N	%	N	%
<5	36	94.7%	20	57.1%	56	74.7%
6 – 10	2	5.3%	16	45.7%	18	24%
11 – 15	0	0%	1	2.9%	1	1.3%
Total	38	100%	37	100%	75	100%
Mean ± SD	3.50 ± 1.08		5.54 ± 2.20		4.50 ± 2.0	
t test =5.11, p=0.0001*, statistically significant						

In the present study it was observed that, majority of the cases had resumption of bowl movements with in 5 post-operative days.

DISCUSSION

The anastomosis procedure is determined by the anastomosis site, the condition of the intestine, the underlying disease aetiology, and the patient's overall health. Another significant deciding factor is surgical expertise and preference. Because of the availability and cost of suture materials as well as familiarity with the process, the hand sewn suturing technique remains the mainstay for intestinal anastomosis. [25]

This present study, titled "comparative study on surgical outcomes in

single layered anastomosis vs double layered intestinal anastomosis of small intestine" was conducted among 70 patients with 35 in each group, with the following objectives.

Socio demographic characteristics:
In the present study, the overall average age of the participants was 51.17 ± 17.08 years, the mean age of the participants in the-group who underwent single layered anastomosis was 48.55 ±16.88 and the group who underwent double layered anastomosis it was 53.86 ± 17.09.here both the groups stand comparable in terms of age as no statistically significant difference was observed across the groups.

Gender:
In the present study, there were 54.6% of male and 45.33% of female. Both the groups stand comparable in terms of gender and no difference was observed across the groups based on gender.

Comorbidities:
In the present study, comorbidities like HTN was present in 24.3% of the patients, DM in 13.5% of the cases, rest of the comorbidities observed among the study population was CKD, hypothyroidism, hyperthyroidism, COPD, TB, HCV, HIV, Seizure.

Haemodynamic stability:
In the present study, 94.7% of the cases were stable in the group who underwent single layer anastomosis and 75.7% in cases who underwent double layered anastomosis. Ionotropic support was need in 18.9% of the patients who underwent 2 layered anastomosis and 5.3% in cases who underwent single layered anastomosis. There was no difference significant statistically across the groups in terms of haemodynamic stability.

Post-operative complications:
The rate of anastomotic leakage is the final test sfor the safety and sefficacy of an intestinal anastomosis procedure. They're diagnosed using a contrast enema or a computed tomography scan, either clinically or radiographically. [49]

In cases who underwent double layer anastomosis the complications observed were anastomotic leak, post operative fever, abdominal distension and wound infections.

Mean operating duration:
The mean operating time in cases who underwent single layer anastomosis was 2.84 ± 0.61 hours and in cases who underwent double layer anastomosis it was 3.51 ± 0.84 hrs. the duration of operating time in double layer anastomosis was statistically significantly higher than that for the cases who underwent single layer anastomosis.

Hospital stay:
The average duration of post-operative stay in the hospital in cases who underwent single layer anastomosis was 8.81 ± 2.09 days and in cases who underwent 2 layer anastomosis was 11.43 ±4.62. The duration of stay in cases who underwent double layer anastomosis was significantly higher when compared to those who underwent single layer anastomosis.

In cases who underwent single layer anastomosis, wound infection was seen in 7.9% of the cases and other complications observed were post-operative fever, post-operative obstruction.

Resumption of bowel movements:
The overall mean duration required for the return of bowel movements was observed to be 4.50 ± 2.0 days, and in cases who underwent single layer anastomosis it was 3.50 ± 1.08 days and in cases who underwent double layer anastomosis it was 5.54 ± 2.20 days.

The submucosal vascular plexus may be disrupted with the 2 layer approach and there may be excessive inversion and inflammation of tissue resulting in luminal narrowing. Single layer anastomosis results in the least amount of damage to submucosal vascular plexus, the least chances of luminal narrowing, including the strongest submucosal layer and accurate tissue apposition.[69]

Continuous sutures are thought to have greater serosal apposition and blood flow than interrupted Sutures. In our study, the single layer group had a faster postoperative restoration of bowel function than the double layer group, which is consistent with earlier findings.

Summary

- The average- age of the participants in the both the groups stand comparable as not statistically significant.
- The average length of stay in the hospital after a single layer anastomosis was 8.81, and the average length of stay after the double layer anastomosis was 11.43.
- In patients who underwent single layer anastomosis 92.1% did not have any complications and in cases who underwent double layer anastomosis 78.4% did not have any complications.
- The duration of operating time in double layer anastomosis was statistically significantly higher than that for the cases who underwent single layer anastomosis.
- In the present study it was observed that, majority of the cases had resumption of bowl movements with in 5 post-operative days.
- In cases who underwent double layer anastomosis the most common complication observed were anastomotic leak, post operative fever, abdominal distension and wound infections.

CONCLUSION

Given the reduced surgical time, comparable .complication rates, and shorter hospital stay duration, for single layered extra-mucosal continuous anastomosis versus the traditional two layer approach, our study concludes that the former is equally .safe and possibly more cost effective. As a result, the single ,layer method may be considered for everyday surgical. practise.

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