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ORIGINAL ARTICLE

Comparison of side-to-end with end-to-end Anastomosis technique for colorectal anastomosis

ANILA AHMED[1], RIZWAN KHAN[2], MARIA SHAIKH[3], FARAH SHAH[4], SOBIA MAJEED[5]
[1]Trainee in General Surgery Jinnah Postgraduate Medical Center (JPMC), Karachi
[2]Consultant Surgeon Jinnah Postgraduate Medical Center (JPMC), Karachi
[3,4]Trainee in General Surgery Jinnah Postgraduate Medical Center (JPMC), Karachi
[5]Trainee in General Surgery Abbasi Shaheed Hospital North Nazimabad, Karachi
Correspondence to: Dr. Rizwan Khan; Email: drrizwankhan179@gmail.com, Cell: +92 302 2797727

ABSTRACT

Objective: To compared the functional and anatomic outcomes of end-to-end anastpmosis (EEA) technique with side-to-end anastomosis (SEA) technique for colorectal anastomosis.

Methods: A randomized clinical trail was conducted in Jinnah Postgraduate Medical Center (JPMC), Karachi. We recruited 60 patients who were planned for colorectal surgery from January 2020 to January 2021. Patients having histology proven adenocarcinoma of rectum of sigmoid colon, with normal sphincter function were included. Patients were randomly attributed into two groups in 1:1 ratio. The primary endpoint was to determine immediate post-operative complications, and assessment of intestinal function (using Lower anterior resection syndrome (LARS) score) at one-month follow-up.

Results: There was no statistical difference in anatomic and functional outcomes in SEA and EEA groups, mean operative time was 168±43 minutes in SEA group versus 159±38 minutes in EEA group. Anastomosis leakage was diagnosed in 1 (3.3%) patients in SEA group versus in 2 (6.7%) patients in EEA group (p-value 0.55). Redo-procedure was needed in 1 (3.3%) patients in SEA group versus in 2 (6.7%) patients in EEA group (p-value 0.55). At one-month follow-up, major LARS was diagnosed in 03 (10.0%) patients in EEA group, while minor LARS was diagnosed in 5 (16.7%) patients in SEA group versus in 4 (13.3%) patients in EEA group (p-value 0.52).

Conclusion: Both side to end anastomosis and end to end anastomosis are comparable in-terms of functional and anatomic outcomes. So the operating surgeons can adopt any of these techniques for colorectal anastomosis.

Keywords: side-to-end anastomosis, end-to-end anastomosis, lower anterior resection syndrome, colorectal anastomosis.

INTRODUCTION

Better availability of surgical instruments, improvements in knowledge regarding anatomy of colo-rectum, and experience of surgeons have made is possible for surgeons to preserve intestinal continuity after surgical removal of colorectal carcinoma.[1, 2]. However, the selection of optimal technique of colorectal anastomosis is not an easy job, because consequences of anastomosis on quality of life (QoL) must be taken into consideration while selecting the technique of anastomosis.[3]

Lower anterior resection syndrome (LARS) is a common complication after anastomosis, LARS consist of variety of symptoms such as frequent and urgent bowel movements, frequent flatulence and constipation.[4, 5] Up-to 60 to 90% patients after colorectal anastomosis and 20 to 30% patients after sigmoidectomy develop these symptoms, resulting in significant differences in QoL.[6, 7]

To overcome anastomotic complications a variety of techniques have been developed. End-to-end anastomosis (EEA) has been the main stay for colorectal anastomosis. Recently, side-to-end anastomosis (SEA) have been proposed to overcome the complications associated with anastomosis, it provides the advantages of CJP pouch thereby resulting in lower stool frequency and better evacuation.[8] Studies have compared different techniques of anastomosis to determine the ideal technique that is associated with minimum complications rate.[8-10] In this study, we compared the outcomes of EEA technique with SEA technique for colorectal anastomosis.

METHODS

A randomized clinical trial was conducted in Jinnah Postgraduate Medical Center (JPMC), Karachi. We recruited 60 patients who were planned for colorectal surgery from January 2020 to January 2021. Patients having histology proven adenocarcinoma of rectum of sigmoid colon, with normal sphincter function were included. Patients having sphincter involvement, planned for laparotomy or colostomy were excluded. We followed the study protocols declared by Helsinki declaration and clinical practice guidelines. Approval from hospital IRB was obtained.

All patients regardless of previous chemotherapy or radiotherapy treatment were included. All procedures were performed by consultant general surgeon. The extent of meso-rectal resection was based on oncologic principles. Circular stapling device was used for anastomosis. For SAE, the blind end of neo-rectum was left atleast 4 cm long. In group A patients, SEA was performed, while in group B; EEA was performed.

Patients were randomly attributed into two groups in 1:1 ratio, using the computer generated random numbers.

The primary endpoint was to determine immediate post-operative complications, and assessment of intestinal function (using LARS score) at one-month follow-up.

Data was analyzed using SPSS v25. Chi-square test was applied to compare anatomic and functional outcomes between the groups. While age and operative time were compared using independent sample t-test. P-value ≤0.05 was taken as significant.

RESULTS

Mean age of studied patients was 28.6±5.31 years in SEA group versus 27.1±5.57 years in EEA group (p-value 0.29). Majority of patients were male, there were 21 (71%) male in SEA group versus 23 (76.7%) in EEA group (p-value 0.56). Location of tumor was low mid rectum in majority of patients, there were 12 (40%) patients in SEA and 14 (46.7%) patients in EEA group, while in 10 (33.3%) patients in SEA group and in 9 (30%) patients in EEA group the tumor location was high rectum (p-value 0.87). Majority of patients were having stage III tumors. The detailed information is provided in table 1.

Table 1. Baseline Patient Characteristics.

	SEA (N=30)	EEA (N=30)	P-value
Age (Years)	28.6±5.31	27.1±5.57	0.29
Sex			
Male	21 (70.0%)	23 (76.7%)	0.56
Female	9 (30.0%)	7 (23.3%)	
ASA			
I-II	7 (23.3%)	10 (33.3%)	0.39
III-IV	23 (76.7%)	20 (66.7%)	
Location of Tumor (cm)			
High Rectum	10 (33.3%)	09 (30.0%)	
Low mid rectum	12 (40.0%)	14 (46.7%)	0.87
Sigmoid	08 (26.7%)	07 (23.3%)	
Stage of Tumor			
I	01 (3.3 %)	02 (6.7 %)	
II (A & B)	06 (20.0 %)	05 (16.7 %)	
III (A to C)	19 (63.3 %)	18 (60.0 %)	0.90
IV	04 (13.3 %)	05 (16.7 %)	

Table 2. Data of Anatomic and Functional Outcomes.

	SEA (N=30)	EEA (N=30)	p-value
Operative Time	168±43	159±38	0.39
Type of Procedure			
High anterior resection	19 (63.3%)	17 (56.6%)	
Low anterior resection	6 (20%)	7 (23.3%)	0.90
Sigmoidectomy	7 (23.3%)	6 (20%)	
Anastomotic Leakage	1 (3.3%)	2 (6.7%)	0.55
Bleeding	2 (6.7%)	2 (6.7%)	1.0
Redo-procedure	1 (3.3%)	2 (6.7%)	0.55
Clavien-Dindo classification			
I	2 (6.7%)	3 (10.0%)	
II	2 (6.7%)	1 (3.3%)	
IIIa	0	0	0.76
IIIb	0	0	
IV	0	0	
V	0	0	
Functional Outcomes			
No LARS (score 0-20)	22 (73.3%)	25 (83.3%)	
Minor LARS (21-29)	05 (16.7%)	04 (13.3%)	0.52
Major LARS (30-42)	03 (10.0%)	01 (3.3%)	

There was no statistical difference in anatomic and functional outcomes in SEA and EEA groups, mean operative time was 168±43 minutes in SEA group versus 159±38 minutes in EEA group. Anastomosis leakage was diagnosed in 1 (3.3%) patients in SEA group versus in 2 (6.7%) patients in EEA group (p-value 0.55). Redo-procedure was needed in 1 (3.3%) patients in SEA group versus in 2 (6.7%) patients in EEA group (p-value 0.55). patients in both groups developed only grade I and II complications. At one-month follow-up, major LARS was diagnosed in 03 (10.0%) patients in EEA group, while minor LARS was diagnosed in 5 (16.7%) patients in SEA group versus in 4 (13.3%) patients in EEA group (p-value 0.52). detailed data is described in Table 2.

DISCUSSION

The increasing interest in sphincter sparing colorectal procedures has resulted in increased prevalence of surgical complications such as LARS.[11, 12] Studies have explored different factors of LARS and have reported reduction in neoractal volume, reduced anorectal tone and loss of anorectal inhibitory reflux are key responsible factors.[13, 14] So the main focus of new techniques in anorectal surgeries is to increase the neorectal area. Lazorthes et al. developed colonic J-pouch technique to lower the incidence of LARS and to achieve better functional outcomes. However, pouch construction is very time consuming and requires surgical expertise. SEA is easy to perform and hypothetically overcome many of the problems of luminal discrepancy.[15] despite a huge volume of researches on functional outcomes of restorative colorectal procedures the use of SEA has not been widely discussed. In present study, we compared the surgical and functional outcomes of SEA with straight EEA technique. We did not found any major difference in clinical and functional outcomes of both of these procedures.

A recent study by Planellas et al. compared the SEA with EEA and found no significant difference in 1 month and 12 months functional outcomes between the groups. The complications rate was also comparable between the groups, but they reported higher frequency of re-interventions in SAE group.[16]

A meta-analysis by Hüttner et al. compared the anatomic and functional outcomes of different techniques of colorectal anastomosis after low rectal resection, they reported and SAE and J-pouch techniques are better than that of EEA technique up-to 12 months of follow-up period.[9] In long term follow-up, there was no significant difference between the groups.[17, 18]

Another recent trial by Marti et al. compared the three different techniques of anastomosis including SEA, straight and J-pouch, they reported that the outcomes of all these are similar and surgeons can adopt any procedure on their own preference.[8] Some other trials have also reported similar results.[19, 20]

The limitations of present study are small sample size and we followed the patients only for 12 months. Functional outcomes can be better assessed it the patients were followed for longer follow-up such as 12 months or more. There is still a need to conduct larger studies with longer follow-up periods to determine the ideal technique of colorectal anastomosis in patients undergoing restorative colonic resections.

CONCLUSION

Both side to end anastomosis and end to end anastomosis are comparable in-terms of functional and anatomic outcomes. So the operating surgeons can adopt any of these techniques for colorectal anastomosis.

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