

## Comparison of single layer continuous extra mucosal technique versus interrupted technique for sutures of anastomoses in gut: A randomized control trial

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### ABSTRACT

**Objective:** To compare the results of single layer continuous extra mucosal technique versus interrupted technique for sutures in anastomoses of gut.

**Study Design:** A randomized Control Trial.

**Place and Duration:** Study was conducted in DHQ Hospital, Sahiwal from 10th January 2017 to 20th January 2018.

**Methodology:** Patients were allocated into two groups randomly. Group 1 comprised of patients undergoing single layer continuous technique for anastomotic sutures while group 2 included the patients having surgery with single layer interrupted extra mucosal technique for gut anastomosis. The time required to construct an anastomosis, duration of hospital stay, demographic data, post-operative complications were documented.

**Results:** The mean Anastomosis time of group A and group B was 12.15±1.40 minutes and 20.98±1.38 minutes respectively. The mean Duration of postoperative hospital stay of group A and group B was 6.40±1.32 days and 6.36±0.66 respectively. Dehiscence of anastomosis was observed as 6.7% and 13.3% for group A and B respectively. Infection of surgical wound was noted as 16.7% and 20% for group A and B respectively. Mortality was occurred in 3.3% and 6.7% for group A and B respectively. The differences were statistically insignificant.

**Conclusion:** Single layer continuous extra mucosal technique for the suturing of gut anastomosis proves to be safe, time conserving as compared to single layer interrupted technique.

**Keywords:** Anastomosis, Extra mucosal technique, Sutures, Gut, Single layer, Submucosa.

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### INTRODUCTION

The anastomoses in the gut recover through the same mechanism as the wound healing<sup>1</sup>. Submucosa, being the toughest layer of gut wall, implies the best method of anastomoses to be apposing and approximating the submucosa of gut wall<sup>2</sup>. One of the frequently performed surgeries in elective and emergency situations is the formation of intestinal anastomosis. The leaking and disrupting of the anastomoses lead to post-operative morbidity and mortality<sup>3</sup>. The basic

standards of formation of gut anastomoses were settled centuries ago and have been revolutionized<sup>4</sup>. Various methods have been used to make intestinal anastomoses. Customary techniques include sutures and staples. While non-conventional techniques comprise of tissue glue, compression rings, and laser welding<sup>5</sup>. There are various factors which influence the healing of anastomoses including blood supply, tension at suture line, surgical technique, and cleanliness of gut at the time of surgery. These factors must be kept in mind along with proper apposition of submucosa of gut wall in order to get improved outcomes<sup>6,7</sup>. Single layer extra mucosal anastomosis was brought in by Norman Matheson. It has been established as superior to two layers technique in regards to tenacity of anastomoses and luminal reduction tissue strangulation<sup>8</sup>. Hautefeuille was the first person to describe single layer continuous anastomoses as a revolutionary technique. It is well understood that "extra mucosal single layer anastomoses" could be performed by either of two methods i.e. Interrupted or continuous technique<sup>9</sup>. The better of two is yet to be established<sup>10</sup>. It was hypothesized that both techniques of anastomoses are same with regards to anatomic dehiscence. On the other hand, single layer continuous extra mucosal method of anastomoses is rapid and cheaper. This study has been performed to determine and compare the above-mentioned techniques of formation of single layer extra

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mucosal anastomoses in small intestine. The objective of this study is to compare the results of single layer continuous extra mucosal technique versus interrupted technique for sutures in anastomoses of gut.

### METHODOLOGY

This randomized control trial was performed in DHQ Hospital, Sahiwal from 1<sup>st</sup> January 2017 to 1<sup>st</sup> January 2018. Patients were included in the study belonging to both genders of age more than 14 years needing small intestine anastomoses. Patients were allocated in either of two groups following randomization. Non probability consecutive sampling was used. Group 1 belonged to single layer continuous extra mucosal anastomosis while group 2 belonged to single layer interrupted extra mucosal anastomosis. Written Informed consent was obtained from the participants of study. The admission of patients was done from either OPD or emergency. The age of patients was more than 14 years and they were subjected to small intestine anastomosis (jejunum and ileum). The exclusion criteria included the patients having hollow organ injury, contaminated peritoneal cavity, uremia, diabetes mellitus, steroids therapy or any malignancy. Complete history was taken and clinical examination was performed. Routine lab investigations and required specific tests were done. For preoperative prophylaxis, antibiotics were given to patients.

A registered qualified surgeon operated all the patients. Various procedures were performed including ileostomy closure, primary end to end anastomosis, ileo-ileal and jejunal anastomoses. For emergency cases, laparotomy was done through midline incision whereas for elective cases, in ileostomy closure, peristomal elliptical incision was made. The anastomoses were made by "single layer extra mucosal technique" either interrupted or continuous method by the use of vicryl 3/0 75 mm sutures. The stitches were made at equal distance 5mm apart. The time periods of stitching were calculated from initiating the first stitch till the last stitch of anastomosis. The estimation of cost was done on the basis of actual price of vicryl 3/0. For continuous suture, one whole length vicryl 3/0 was used whereas for interrupted suture, two of the vicryl sutures were needed. Patients were kept NPO till five days after surgery. The leakage or anastomotic dehiscence was diagnosed clinically. Numbers of days were starting from operation day till the discharge day was defined as post-operative hospital stay. A printed performa was used to collect and record the data that included patient's demographics, anastomoses time, operative findings, and wound infection. Intervention in this study was performed by consultant surgeon having minimum of five years experience.

**Data Analysis:** Data analysis was done through computer generated software known as SPSS 16. Mean and SD were calculated for numerical values. Frequency and percentages were calculated for qualitative data. Tests of significance student t test and chi square test were used where needed. P-value of less than 0.05 was considered as significant.

### RESULTS

Sixty patients were enrolled in this study, considering two groups i.e. group A and group B. Thirty patients were included in group A and thirty patients were included in group B. The mean age of group A patients was 30.03±3.36 years. There were 20 (66.7%) males and 10 (33.3%) females. Area of anastomosis was observed as jejunum 13 (43.3%) and Ileum 17 (56.7%) patients. Reason for anastomosis was noted as Ileostomy closure 20 (66.7%) and traumatic jejunum& ileum 10 (33.3%) patients. While, the mean age of group B patients was 32.13±2.93 years. Area of anastomosis was observed as jejunum 9 (30%) and Ileum 21 (70%). Reason for anastomosis was noted as Ileostomy closure 22 (73.3%) and traumatic jejunum& ileum 8 (26.7%). The difference was statistically insignificant except age (p=0.013). (Table-I).

**Table-I: Frequency of area and reason of gut Anastomosis (N=60)**

Variables	Group A n=30	Group B n=30	p-value
<b>Area of Anastomosis</b>			
Jejunum	13 (43.3%)	9 (30%)	0.284
Ileum	17 (56.7%)	21 (70%)	
<b>Reason for anastomosis</b>			
Ileostomy closure	20 (66.7%)	22 (73.3%)	0.573
Traumatic jejunum & ileum	10 (33.3%)	8 (26.7%)	

The mean Anastomosis time of group A and group B was 12.15±1.40 minutes and 20.98±1.38 minutes respectively. The difference was statistically significant at (p=0.000). The mean Duration of postoperative hospital stay of group A and group B was 6.40±1.32 days and 6.36±0.66 respectively. The difference was statistically insignificant (p=0.903). (Table II).

Dehiscence of anastomosis was observed as 6.7% (n=2) and 13.3% (n=4) for group A and B respectively. Infection of surgical wound was noted as 16.7% (n=5) and 20% (n=6) for group A and B respectively.

**Table-II: Comparison of anastomosis time and hospital stay between Group A and Group B (N=60)**

Variables	Group A n=30	Group B n=30	p-value
Anastomosis time (minutes)	12.15±1.40	20.98±1.38	0.000
Duration of postoperative hospital stay (days)	6.40±1.32	6.36±0.66	0.903

**Table-III: Postoperative complications of both groups (N=60)**

Variables	Group A n=30	Group B n=30	p-value
Dehiscence of anastomosis	2 (6.7%)	4 (13.3%)	0.389
Infection of surgical wound	5 (16.7%)	6 (20%)	0.739

## DISCUSSION

A study<sup>11</sup> was conducted to establish the safety of single layer continuous extra mucosal gut anastomosis. One hundred participants were involved in this descriptive study. The results depicted that 9% of the patients had anastomotic leakage while the wound infection occurred in 22% of the patients. It can fairly be concluded from the above results that the technique of single layer continuous extra mucosal gut anastomosis proves to be safer and brings about less complications in regards to wound infection and anastomotic leakage.

A study was conducted by Ahmad et al<sup>12</sup> regarding the complications and safety of single layer continuous extra mucosal anastomosis in gut in which safety was evaluated by post-operative complications as wound infection and anastomotic leak. Study concluded that single layer continuous extramucosal anastomosis is safe and associated with less rate of complications.

Safety of single layer continuous extra mucosal intestinal anastomosis was also evaluated by Olah A et al<sup>13</sup>. They determined it with two types of absorbable sutures polyglactin and glycomer. The authors regarded this technique as cheap and safe, easy to proceed, minimally threatening to blood supply and physiological. In our study dehiscence of anastomosis was observed as 6.7% and 13.3% for group A and B respectively. Infection of surgical wound was noted as 16.7% and 20% for group A and B respectively.

Another similar study was conducted by Sarin et al<sup>14</sup> and reported that use of single layer continuous technique has not been in practice due to the fear of gut ischemia. The study concluded that single layer continuous technique of gut anastomosis provides “acceptably reliable results”. This study is slightly differ from our study that we didn’t observe gut ischemia in our study.

A serosubmucosal anastomosis using the technique of single layer apposition is known to be a renowned method having beneficial effects as stated by Leslie et al<sup>15</sup>. It was concluded that the technique of handsewn single layer interrupted serosubmucosal sutures are “gold standard” in the anastomosis of gut including small or large bowel. A three-year study was performed by Burch Jm et al<sup>16</sup> with the objective of establishing the effectiveness of single layer continuous technique for the suturing of intestinal anastomosis in a surgical training program. The results observed were in the favor of single layer continuous anastomosis. He reported that single layer continuous anastomosis requires lesser time, lesser expenses. This study is also in favor of our study.

In a study Hussain et al<sup>17</sup> determined the efficacy of single layer continuous versus double layer interrupted sutures in gut anastomosis and reported that single layer technique is safer and cost-effective alternative in the construction of gut anastomosis as compare to interrupted technique.

In a study Mirza<sup>18</sup> reported that single layer interrupted sero-submucosal gut anastomosis observed with less incidence of anastomotic leakage and septic complications and this suturing technique is safe and effective at various sites of gut anastomosis. We also observed similar findings.

Cvetka et al<sup>19</sup> also conducted similar study regard the technique of single layer extra mucosal suture and reported that this method is safest and cost effective for intestinal suture. He observed that anastomotic leak occurs due to infection or abscess within the bowel wall, so suture must avoid touching the mucosa.

## CONCLUSION

Single layer continuous extra mucosal technique for the suturing of gut anastomosis proves to be safe, time conserving as compared to single layer interrupted technique.

## CONTRIBUTION OF AUTHORS

Mahboob A: Conceived idea, Designed research methodology, Data analysis, Manuscript writing

Qureshi WH: Manuscript writing, Data collection, Data analysis

Yousaf A: Manuscript writing

Iqbal MN: Data collection, Literature review

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