



COMPARATIVE STUDY OF LINEAR CLOSURE TECHNIQUE VERSUR PURSE STRING CLOSURE TECHNIQUE OF SKIN CLOSURE IN STOMA REVERSAL.

M. Rehman Gulzar¹, Faiqa Aslam², Muhammad Umar Farooq³, Shahbaz Ahmad⁴, Sabeen Adil⁵, Shuja Tahir⁶

1. FCPS
Associate Professor Surgery
DHQ Hospital Faisalabad.
2. FCPS
Senior Registrar Surgery
DHQ Hospital Faisalabad.
3. FCPS
Senior Registrar Surgery
DHQ Hospital Faisalabad.
4. FCPS
Assistant Professor Surgery
DHQ Hospital Faisalabad.
5. FCPS
Senior Registrar General Surgery
DHQ Hospital Faisalabad.
6. MBBS (PGR)
PG Trainee Cardiac Surgery
DHQ Hospital Faisalabad.

Correspondence Address:

Dr. Sabeen Adil
Department of General Surgery
DHQ Hospital Faisalabad.
ssabeen78@gmail.com

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ABSTRACT... Objectives: To compare the results of linear closure technique with purse string closure technique in terms of surgical site infection, wound healing (scar cosmesis) and wound length. **Study Design:** Comparative Study. **Setting:** Surgical Unit V, Faisalabad Medical University, Faisalabad. **Period:** January 2016 to January 2019. **Material & Methods:** A total of 100 patients were operated in our unit during the study period & were allocated into two groups randomly: Group A (Linear closure) Group B (Purse string closure) included 50 patients in each group. The primary outcome measures were, surgical site infection, wound healing (scar cosmesis) and wound length. **Results:** During follow up period Surgical site infection was noted in 17 patients out of 100 with 14 patients in Group A and 03 Patients in Group B (p value 0.002). Regarding wound healing 60% patients were having good scar and 20% patients were having satisfactory and 20% having poor scar in Group A. while in Group B 82% patients were having good scar and 18% patients were having satisfactory scar (p value 0.00). Mean wound length in Group A was 5.14 with SD 1.2978 while in Group B mean length was 3.8 with SD 1.3095. **Conclusion:** Our study concludes that purse string closure is superior to linear closure technique in terms of surgical site infection, wound healing (scar cosmesis) and wound length.

Key words: Linear, Purse String, Stoma, Surgical Site Infection, Wound Length, Wound Healing.

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INTRODUCTION

Stoma is commonly defined as exteriorization of any part of gut either temporarily or permanently. Common indications for stoma are peritonitis due to enteric or tuberculosis perforations, colorectal cancer surgery, inflammatory bowel disease and lower anterior resection of rectal cancer. Stoma closure also entails different complications, from stoma site infection to adhesion obstruction, leakage and large incisional hernias.¹

Reported incidence of SSI after stoma reversal is 0 to 40% Most frequent cause of SSI after closure is bacterial contamination of skin surrounding ileostomy/colostomy due to prolonged contact with bowel contents or their leakage that results in prolonger hospital stay, heavy antibiotics/ post op medication, in addition, return to normal life may be delayed.²

There have been different methods for stoma closure. However, Benergee noted that purse string closure in stoma reversal has been associated with lowest infection rate.³ Later on, this method results in smaller scar with superior cosmetic results. Suttan et al reported a study of 51 patients who underwent purse string closure for stoma and followed for 6 weeks, none of them developed wound site infection.⁴

Later on, Reid et al reported a comparative study of 60 patients dividing them in two groups, one with linear closure (n=30) and other one with purse string closure (n=30). Comparative results were significant less in 2nd result group than 1st group.⁴

In the past we had no much data supporting effectiveness of purse string closure. In this study we assess efficacy off purse string closure in

stoma reversal in comparison to conventional linear skin closure in terms of wound & scar dimension and wound infection.

MATERIAL & METHODS

This is a Comparative Study done at from DHQ Teaching Hospital, Faisalabad. January-2016 to January-2019. The study includes 100 patients.

All patients who underwent laparotomy with exteriorization of bowel as loop stoma (Colostomy or Ileostomy) after blunt or penetrating abdominal trauma (Stab injury or Firearm injury).

- Stoma made for malignancy
- End ileostomy / permanent colostomy
- Stoma that needed revision/extension of skin incision for any complication
- Pregnancy

MATERIAL AND METHODS

A comparative study was performed on 100 patients of stoma reversal. Linear closure was performed on 50 patients and purse string closure was performed in 50 patients. Patients were admitted via outpatient department for elective stoma reversal. Informed consent was taken from all patients and they were allocated to either Linear closure or Purse string Closure. Protocol proforma was attached with each chart and data pertaining to variable was entered. Patients were seen during follow up and any complications were noted and entered in the proforma. Statistical analysis was done using IBM SPSS statistics version 23.

As per routine, all patients were admitted through OPD and they underwent preop mechanical bowel preparation. After induction of appropriate anesthesia prophylactically 3rd generation of cephalosporin (ceftriaxone 1g) was administered. Stoma site was irrigated with normal saline 500ml and povidone iodine. In Purse string closure group circumstomal incision made measuring 3-5mm margins. Adhesiolysis done meticulously delivering intestinal loops out of the peritoneal cavity followed by resection and end to end anastomosis hand sewn or loop closure as per case. Afterward linear closure of fascia of rectus abdominus then purse string dermal closure

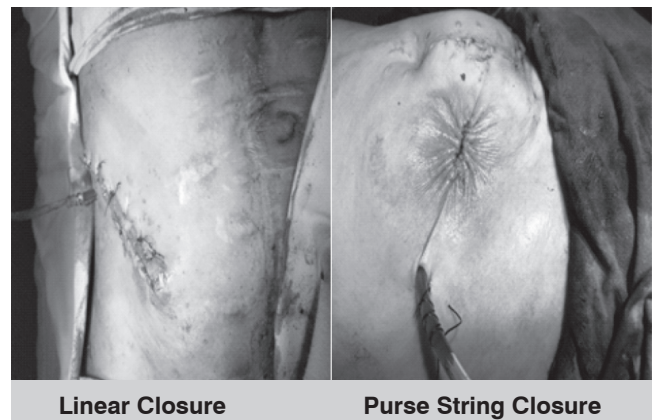
using non absorbable polypropylene no.2/0 suture. Sterile dressing was followed using loose packing of povidone iodine gauze.

In Linear closure group, elliptical skin incision made, stoma resection and anastomosis done identically with layer by layer closure of rectus sheath followed by dermal linear closure sterile dressing was done. Broad spectrum antibiotic cover with ceftriaxone 1 gram I/V BID and metronidazole 500 mg 1/V TDS given for five days. Patients were kept in ward for next few days as per routine. Liquid diet started after 48 hours when patient's bowel was open and no relative symptoms like vomiting or abdominal pain etc. were there. Once they were on appropriate semi solid diet patients were discharged from the hospital. Initial follow up was after 1 week and then were called for further follow up after 3 months of surgery. Study parameter (surgical site infection wound & scar dimension and patient's satisfaction) were observed at the time of surgery and at every follow up visit by concerned consultant. Data was recorded on proforma and both groups were compared.

The presence of swelling, redness, warmth at the surgical site with or without pus discharge and systemic features like fever and leukocytosis.

Dimensions of linear closure and purse string closure are recorded in centimeters

Appearance of scar is recorded as poor, satisfactory or good.



Linear Closure

Purse String Closure

RESULTS

100 patients were included in our study. In linear group mean age was 27 (15-50) with SD of 7.930. In purse string group mean age was 26.54 (15-50) with SD 8.62 Table-I.

| | Linear Group | Purse String Group |
|---------|--------------|--------------------|
| N | 50 | 50 |
| Minimum | 15 | 50 |
| Maximum | 15 | 50 |
| Mean | 27 | 26.54 |
| SD | 7.930 | 8.62 |

Table-I. Age distribution of patients.

36 patients (72%) were Male and rest of 14 patients 28% were Female in linear group. While in Purse string group 32 patients 64% were male and 18 36% were female Table-II.

| | Linear Group | Purse String Group |
|--------|--------------|--------------------|
| N | 50 | 50 |
| Male | 36 | 32 |
| Female | 14 | 18 |

Table-II. Gender distribution of patients.

There were no statistically differences between two groups.

Among Post-op complication, Surgical site infection was noted in 17 patients out of 100 with 14 (28%) patients in linear group and 03 (6%) patients in purse string group with p value 0.002 which was statistically significant.

| | Linear Group | Purse String Group |
|---------|--------------|--------------------|
| N | 50 | 50 |
| Yes | 14 (28%) | 03 (6%) |
| No | 36 (72%) | 47 (94%) |
| P Value | 0.002 | |

Table-III. Surgical site infection.

The possible reason for no major difference was due to the effect that central gap in purse string closure give way to exudative fluid out so that there is no collection inside wound while in linear closure if wound got infected stitch removal and regular dressing was only answer Table-III.

There were also variable results considering wound healing (scar cosmesis) among both groups. In linear group 30 patients 60% were having good scar appearance while among 10 patients 20% results was satisfactory. Patients having there wound infected, results were poor counting 10. In p group 41 patients were having very good results 82% while 9 were satisfactory 18%. They were those who had variable duration from operation to reversal due to multiple factors so that skin surrounding stoma was not healthy in that cases, needing more wide purse string incision and so variable scar however this difference was only 0.00% that is statistically not significant Table-IV.

| | Linear Group | Purse String Group |
|--------------|--------------|--------------------|
| N | 50 | 50 |
| Good | 30 (60%) | 41 (82%) |
| Satisfactory | 10 (20%) | 09 (18%) |
| Poor | 10 (20%) | 00 (00%) |
| P value | 0.00% | |

Table-IV. Wound healing (Scar Cosmesis).

Considering wound length in Linear group range was from 3.9 to 13 with mean length about 5.154 and SD of 1.2978. In Purse string group wound length was from 2-6.1 cm with mean length of 3.8 and SD of 1.3095 having p value 0.00 which was statistically significant Table-V.

| | Linear Group | Purse String Group |
|---------|--------------|--------------------|
| N | 50 | 50 |
| Minimum | 3.9 | 02 |
| Maximum | 13 | 6.1 |
| Mean | 5.154 | 3.82 |
| SD | 1.2978 | 1.3095 |

Table-V. Wound Length (cm).

DISCUSSION

There are different closure techniques for stoma in literature namely primary linear closure, secondary delayed closure and purse string closure. However, in spite of so many studies consensus of ideal technique for stoma closure is yet to be made. Various complications after stoma closure are anastomotic leakage, post

incisional hernia and small bowel obstruction which also affected quality of life.⁵ Most common complication is SSI. It has been reported that rate of SSI varies from 0-14%.⁶ The results of study, we performed, depicted SSI rate was 28% after primary linear closure while 06% SSI occur after purse string closure. Studies in past shows similar results.^{7,8} The higher result of SSI in primary linear closure technique could be due to many factors like patients with DM, obese patients, those having co-morbid conditions like hypertension, smoking, as quoted in past study.⁹ However, bacterial contamination of surrounding skin plays important role.¹⁰ Similarly, Akiyoshi et al¹¹ noted that presence of wound infection at the time of first surgery performed also have a pivotal role in later on infection at the time of stoma reversal. Even prolonged operating time have been significant risk factor for SSI after primary linear closure group.¹² In case of purse string closure technique reason for low SSI can be explained as there is a natural drainage effect that, until skin is epithelized, and granulation tissue grows, prevents wound infection.⁴

The consideration of SSI is having effect in healing of wound as well as there will be shorter healing time of wound if no infection like observed by Camacho- Mauries et al.¹³ Purse string closure wound is also easy to manage by patient even at home by washing it with soap and water daily without any assistant, help or visit to healthcare facility. Dressing management easy and less discomfort by patient.² Regarding scar expectations there was statistically significant difference p value about ----- for purse string closure vs ----- that of linear closure. Purse string closure results in circumferential subcuticular wound approximation with better cosmetic results as shown by other study¹⁰ Likewise Milanchi et al observed better patient satisfaction in purse string closure wound than primary linear group.¹⁰ It is noted by another group of study people that initial scar may be unappealing but final scar formations occurs along natural skin lines leading to pleasant scar.¹⁴

CONCLUSION

The lower SSI rate in purse string closure

technique with better cosmetic results is a good alternative technique to linear closure stoma reversal technique. However, there is always a space of best, more randomized trial can be done before definitive conclusion.







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AUTHORSHIP AND CONTRIBUTION DECLARATION

| Sr. # | Author(s) Full Name | Contribution to the paper | Author(s) Signature |
|-------|---------------------|--|---|
| 1 | M. Rehman Gulzar | Cheif surgeon, Proof reading, Supervisor of whole process. |  |
| 2 | Faiqa Aslam | Author, Surgeon, Data collection. |  |
| 3 | M. Umar Farooq | Author surgeon. |  |
| 4 | Shahbaz Ahmad | Author surgeon Proof reading. |  |
| 5 | Sabeen Adil | Surgeon References. |  |
| 6 | Shuja Tahir | Statistical work References. |  |