

COMPARISON OF PRIMARY VERSUS SECONDARY CLOSURE OF ILEOSTOMY-REVERSAL SKIN WOUND

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ABSTRACT

Background: Morbidity after stoma closure, however, is not negligible and the most common complication is postoperative surgical site infection. There is no consensus on the ideal closure technique of the stoma wound to minimize postoperative wound infection and multiple techniques have been proposed. The aim of this study was to compare the efficacy of primary versus secondary closure of ileostomy reversal skin wound in terms of wound infection.

Material & Methods: This comparative study included 60 patients, which were divided into two groups, primary closure (A) in which wound was primarily closed at the end of procedure and secondary closure (B) in which wound was left open for secondary healing, after fulfilling the inclusive and exclusive criteria from November 2011 to October 2012. Wound infection was noted postoperatively and was recorded in a proforma.

Results: There were 30 patients in each group. The male to female ratio and mean age±S.D in group A and B were (3.3:1 and 2.75:1, p=0.75) and (40.13±1.32 and 41.6±1.44, p= 0.90) respectively. The incidence of wound infection in primary skin wound closure was in 7(11.7%) patients and 6(10%) patients in secondary wound closure (p=0.75). There was no statistically significant effect of age and sex on the efficacy of primary versus secondary closure of ileostomy reversal skin wound, with the p-value of 0.80 and 0.58 respectively. The length of hospital stay was similar for both groups.

Conclusion: Primary closure should be encouraged as a routine method of closure of ileostomy-reversal skin wound.

KEY WORDS: Ileostomy reversal, Wound closure, Wound infection.

This article may be cited as: Ahmad M, Alam S, Ahmad Z, Akhtar M, Hussain M, Uzair M, Sadiq MU. Comparison of primary versus secondary closure of ileostomy reversal skin wound. *Gomal J Med Sci* 2013; 11:63-7.

INTRODUCTION

An intestinal stoma is a surgically created opening of the bowel onto the body surface.¹ Temporary stoma creation is an essential part of emergency and elective colonic surgery.² Surgical patients frequently need some type of intestinal stomas for a wide spectrum of disorders. Maintaining effective and enough decompression of gastrointestinal tract, securing distal bowel segments and anastomosis are the primary goals of ostomy formation as well as providing a minimum complication rate of closure.³ Ileostomy itself carries complications like bleeding, dehydration, necrosis, retraction, prolapse, stenosis and contact dermatitis.⁴

Reversal of gastrointestinal stoma is associated with a not insignificant complication rate, with wound infection being one of the most frequent problems. A review of the literature shows wound infection incidence of 2% to 41%.⁵

The commonest complication of stoma closure is wound infection/sepsis.^{2,6-8} Wound infection remains the commonest post-operative complication which not only prolongs the hospital stay, increases cost of treatment but can also lead to septicemia and long term complications like incisional hernia.⁹ It is the most common nosocomial infection accounting for 28% of all such infections.¹⁰

Patients who develop wound infection are up to 60% more likely to spend time in an ICU, 5-times more likely to be re-admitted to the hospital and 2-times more likely to die than are patient without wound infection.¹¹

Primary closure is rapid, uncomplicated healing of the skin defect and avoids long healing time,

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frequent dressing with significant resource implications. In primary closure scar is less and acceptable. In secondary closure the published wound infection rates are low, rapid healing process and free drainage of contaminated wound. Ileostomy closure is so often considered a "minor" procedure but it is associated with significant morbidity and mortality.^{2,6,12}

Lahat et al,⁵ found that primary closure was associated with a lower rate of wound infection than was secondary closure (10% vs 20%). In secondary closure healing of wound takes six to eight weeks and involve frequent dressing. Cosmetics outcomes are less than desirable and significant resource implications in secondary closure. In primary closure wound infection rates high, need frequent admission and chances of incisional hernia are high due to infection of wound.

Vermulst et al¹³, found 36% versus 5% infection in primary versus secondary skin wound closure after stoma closure. In other study wound infection was 8% after primary skin wound closure.¹⁴

Trauma and terrorism is a common occurrence in our part of the world and as a result ileostomy is commonly performed abdominal procedure in our local settings. Owing to difference in results of different studies mentioned above, the current study is designed to compare the primary closure with secondary closure of wound after ileostomy reversal in our local populations in terms of wound infections. The results of this study will provide us with current best method of closure and the same results will then be disseminated to other local health professionals so that future guidelines may be formulated. The objective of this study was to compare the efficacy of primary versus secondary closure of ileostomy reversal skin wound in terms of wound infection.

MATERIAL AND METHODS

This comparative study was conducted on patients with ileostomy at Surgical A Unit, Lady Reading Hospital, Peshawar from November 2011 to October 2012. Inclusion criteria were all the patients above 14 years, either gender with temporary ileostomy for 6 to 8th weeks of initial surgery and serum albumin more than 2.5g/dl. Exclusion criteria were all the patients with pre-existing stomal site wound infection, reversal of stoma through laparotomy, post-operative anastomotic leak, comorbidities like D.M. Chronic liver disease, ureamic patients and patients on chemotherapy, radiations.

Approval of the study was obtained from Hospital Ethical and Research Committee. Patients requiring ileostomy closure were booked and admit-

ted through outpatient department for closure at 6th weeks of initial surgery. Informed written consent was obtained. Pre-operative distal loopogram was done to check any distal pathology like stricture or leakage, presence excluded such patients. Patients fulfilled inclusion criteria were included in the study. Patients were randomly allocated into two groups A & B by lottery method. In group A the skin wound was closed primarily and in group B was closed secondary.

Detailed history, clinical examination, routine investigations like CBC, ECG, X-ray chest, blood sugar, HBsAg and Anti HCV were done in each case pre-operatively.

Closure was done on the next day of admission by a same consultant blinded from the details and inclusion of the patient in the study. Prophylactic antibiotics (ceftriaxone 1gm+ metronidazole 500mg) were administered intravenously at the time of induction of anesthesia. Elliptical incision was given around stoma and deepened into the peritoneum. Upon full mobilization of the loop, gut continuity was restored using polyglycolic acid 3/0 suture in extra-mucosal single interrupted layer. Rectus sheath was closed with polypropylene no.0 in continuous layer. Skin was approximated with polypropylene 2/0 suture in simple interrupted layer in primary wound closure at the time of surgery and left open in secondary closure and closed naturally by healing.

Patients were kept nil by mouth while I/V antibiotics and fluids were continued for 2-3 days post-operatively and/or till they pass stools and flatus. Daily progress including bowel sounds, passage of stool and flatus and any complications were noted. Patients were discharged from the hospital when they were able to take orally, stable clinically and there were no complications which was decided by the attending surgeon.

All cases were evaluated for post-operative fever, pain (in wound), redness, swelling of wound margins and/or discharge of pus from wound during stay in the hospital and on follow up visits for four weeks. Swabs/pus was taken from all the cases with any of the above findings and were sent to the laboratory for culture. All laboratory investigations were done by same pathologist and same laboratory.

Patients were advised to report to OPD if they develop wound infection or any other problem in between follow up visits. Data was collected using a specially designed proforma which was attached along with. The control of bias and confounders were done by strictly confining to exclusion criteria.

Data was stored and analyzed by statistical program SPSS version 16. Mean + standard devia-

tion was calculated for quantitative variables like age. For gender male to female ratio was calculated. Frequency and percentages were calculated for categorical variables like gender and efficacy. The results were presented through tables, cross tabulation, graphs and charts. Chi square test was applied to compare efficacy in both groups. A probability value of less than 5% ($p < 0.05$) was considered significant. Efficacy in both the groups was stratified among age and gender to see the effect modifications.

RESULTS

A total of 60 patients were included in this study which were divided into two groups and each group has 30 patients. The age and sex distribution among two groups is shown in table 1 and 2 respectively.

Table 1: Age group distribution among the two groups.

| Age group (years) | Skin wound closure | | Total |
|-------------------|----------------------------|------------------------------|------------|
| | Primary skin wound closure | Secondary skin wound closure | |
| 14-25 | 4 (06.7 %) | 3 (5%) | 7 (11.7%) |
| 26-35 | 7 (11.7%) | 7 (11.7) | 14 (23.3%) |
| 36-45 | 9 (15.0%) | 10 (16.7%) | 19 (31.7) |
| 46-55 | 6 (10.0%) | 4 (6.7%) | 10 (16.7) |
| 56-65 | 3 (5.0%) | 3 (5.0%) | 6 (10%) |
| >65 | 1 (1.7%) | 3 (5.0%) | 4 (6.7%) |
| Total | 30 (50%) | 30 (50%) | 60 (100%) |

Table 2: Sex distribution among the two groups.

| Sex | Skin wound closure | | Total |
|--------|----------------------------|------------------------------|-----------|
| | Primary skin wound closure | Secondary skin wound closure | |
| Male | 23 (38.3%) | 22 (36.7%) | 45 (75%) |
| Female | 7 (11.7%) | 8 (13.3) | 14 (25%) |
| Total | 30 (50%) | 60 (50%) | 60 (100%) |

The mean age was 40.13 ± 1.32 in group A (primary closure) and 41.6 ± 1.44 in group B (secondary closure).

There was no statistically significant effect of age and sex on the efficacy of primary versus secondary closure of ileostomy reversal skin wound, with the p-value of 0.80 and 0.58 respectively. (Table 3 & 4).

The efficacy of both methods was comparatively similar in terms of wound infection. (Table 5)

Table 6 shows the comparison of the safety of the two methods.

The mean hospital stay was 2 ± 0.55 days and 2.86 ± 0.34 days in primary versus secondary skin wound closure following ileostomy closure.

DISCUSSION

Temporary stomas are left in situ for a minimum of six weeks before closure, to allow completion of inflammatory and hypervascular phases which occur after surgery, reorganization of intra-abdominal adhesions and opportunity to improve and stabilize patients health. The closure of a temporary loop ileostomy requires close surgical attention and is not a simple procedure, involving complete intraperitoneal mobilization of the stoma, dissolution of all adhesions under direct vision to ensure no inadvertent tears and careful re-anastomosis ensuring that haemostasis is ensured at each step of procedure.¹⁵

An overall complication rate of 17% following stoma closure was cited in several studies with rates from 0% upto 42% reported.¹⁶⁻¹⁹ The literature thus indicates that postoperative complications occurring within thirty days of stoma closure will affect approximately 1 in 6 patients.⁸

It is still debated which closure technique of a stoma wound leads to the lowest wound infection rate. Although some series have reported very low (0-3%) surgical site infection after primary closure.²⁰⁻²² In our study, the wound infection rate in primary closure group was 11.7%, which is consistent with the previous reports in literature.²³⁻²⁵

Some studies has shown wound infection higher in primary closure of stoma reversal skin wound upto 40%.^{13,26} This higher rate of wound infection may be due to stoma type like colostomy and comorbidities like D.M, malnutrition, etc which were excluded from our study.

Prospective comparison between primary closure and delayed primary closure of wound has unexpectedly shown less wound infection in primary closure than delayed primary closure.²

The mean hospital stay was 2 days ± 0.55 in primary closure of wound group. This practice significantly reduces rate of wound infection, decrease the use of hospital resources and decrease economic cost without compromising care. In our study we have excluded all the confounding factors in our exclusion criteria for the study and apart from the primary outcome, in results we have stratified efficacy among the age and gender, to see effect modifiers. We found no statistically significant effect of age and gender on wound infection. Similar results have shown by various studies with no statistical significant effect of age and gender on wound infection.^{27,28}

Table 3: Comparison of frequency of wound infection in various age groups.

| Age group (years) | Wound Infection | | Total | p-value |
|-------------------|-----------------|------------|------------|---------|
| | Yes | No | | |
| 14-25 | 2 (3.3%) | 5 (8.3%) | 7 (11.7%) | 0.80 |
| 26-35 | 3 (5.0%) | 11 (18.3%) | 14 (23.3%) | |
| 36-45 | 4 (6.7%) | 15 (25.0%) | 19 (31.7%) | |
| 46-55 | 3 (5.0%) | 7 (11.7%) | 10 (16.7%) | |
| 56-65 | 0 (0%) | 6 (10.0%) | 6 (10.0%) | |
| >65 | 1 (1.7%) | 3 (5.0%) | 4 (6.7%) | |
| Total | 13 (21.7%) | 47 (78.3%) | 60 (100%) | |

Table 4: Comparison of frequency of wound infection gender wise.

| Sex | Wound Infection | | Total | p-value |
|--------|-----------------|------------|-----------|---------|
| | Yes | No | | |
| Male | 9 (15%) | 36 (60%) | 45 (75%) | 0.58 |
| Female | 4 (6.7%) | 11 (18.3%) | 15 (25%) | |
| Total | 13 (21.7%) | 47 (78.3%) | 60 (100%) | |

Table 5: Comparison of frequency of wound infection among the two groups.

| Wound | Skin wound closure | | Total | p-value |
|-------|----------------------------|-------------------------|------------|---------|
| | Primary skin wound closure | Secondary wound closure | | |
| Yes | 7 (11.7%) | 6 (10%) | 13 (21.7%) | 0.754 |
| No | 23 (38.3%) | 24 (40%) | 47 (78.3%) | |
| Total | 30 (50%) | 30 (50%) | 60 (100%) | |

Table 6: Comparison of the safety of the two methods.

| Safe wound closure | Skin wound closure | | Total | p-value |
|--------------------|----------------------------|-------------------------|------------|---------|
| | Primary skin wound closure | Secondary wound closure | | |
| Yes | 23 (38.3%) | 24 (40%) | 47 (78.3%) | 0.754 |
| No | 7 (11.7%) | 6 (10%) | 13 (21.7%) | |
| Total | 30 (50%) | 30 (50%) | 60 (100%) | |

The limitation of this study included less number of cases, short follow up period. We recommend a large multicenter prospective trial to confirm our findings.

CONCLUSION

Primary closure of ileostomy - reversal skin wound should be encouraged as a routine method of closure.

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| <p>CONFLICT OF INTEREST Authors declare no conflict of interest GRANT SUPPORT AND FINANCIAL DISCLOSURE None declared.</p> |
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