# Primary Versus Delayed Skin Closure In Patients With Stoma Reversal

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*ABSTRACT*

*Objective* — *To find out the rate of wound infection in primary versus delayed skin closure after intestinal stoma reversal.*

*Study design* — *Comparative study.*

*Place & Duration of study* — *Department of Surgery, Dow Medical College, Ruth KM Pfau Civil Hospital Karachi, from February 2018 to February 2019.*

*Methodology* — *This comparative study was done on 142 patients aged between 18-65 years at Civil Hospital Karachi. Patients were randomized to two groups of 71 patients each. In one group, skin was closed primarily after reversal of stoma, whereas delayed closure of skin was employed for the other group.*

*Results* — *There was no significant difference between age, gender and length of hospital stay among the two groups. In primary closure group 2.9% patients developed the surgical site infection and 7% in delayed closure group after intestinal stoma reversal that was statistically non-significant.*

*Conclusion* — *No significant difference was observed in the rate of wound infection for primary skin closure technique and delayed closure of skin technique after intestinal stoma reversal.*

*Key words* — *Stoma reversal, Primary skin closure technique, Delayed closure of wound, Wound Contamination.*

**INTRODUCTION:**

Stoma formation is frequently employed to evacuate the enteric content to outside of body in situations when primary anastomosis is not suitable.[1] Continuity of gut is restored after two to three months.[2] Stoma reversal is often associated with complications like the risks of anastomotic leak, para-stomal hernia formation, surgical site infection, and other non-surgical problems.[3] Infection of wound is the commonest complication encountered after reversal of stoma. The rate of this complication varies from 2% to 40% in literature.[4-8] Surgical site infections add to the burden of disease, prolong the hospital stay, increases morbidity (wound dehiscence, sepsis, incisional hernia), and discomfort along with increase in the total cost of treatment. [9] To date, the management of stoma wound closure has not been standardized and is still controversial.[2]

Various techniques have been utilized to close stoma wounds such as primary linear closure of wound, delayed skin closure, secondary closure, purse-string wound closure, and sub-dermal closure. There is a wide variation in wound infection rates among different techniques in the literature. Hence there is lack of agreement regarding the best approach for closure of the wound after reversal of stoma.[6-.9] In one randomized study it was observed that in patients with immediate closure of skin after reversal of stoma wound infection frequency was low when compared to patients in whom delayed closure of skin wound was done.[2] However another study on stoma reversal reported no infection in primary skin closure group and 8.3% in delayed skin closure group.[5]

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Murtaza et al, reported the frequency of surgical site infection in closed surgical wounds to be higher (16.9%) as compared to those patients in whom delayed skin closure was performed (4.2%).[10] The prime objective of this study was to assess the rate of wound infection between primary skin closure technique and delayed closure of skin technique after intestinal stoma reversal.

**METHODOLOGY:**

A prospective comparative study was conducted at Civil Hospital Karachi from February 2018 to February 2019. Patients were randomly allocated to two groups. Approval for the study was taken from ethical committee of Dow University of Health Sciences and informed consent was obtained from each patient at their time of induction. All the patients had their distal loopogram with gastrograffin done before surgery. Patients with ASA class III or IV, with chronic diseases like chronic liver disease, chronic renal disease, and congestive heart failure or malignancy, those with stoma primarily done through a midline incision, in whom stomal reversal was converted to laparotomy, on steroid etc and with immunocompromised status were excluded.

Patients were kept on clear fluids a day prior to the procedure and a solution of polyethylene glycol was utilized for clearance of bowel. Injection ceftriaxone 1gram and injection metronidazole 500mg were given intravenously before the start of the procedure. Skin was disinfected with 10% povidone-iodine. Upon mobilization of the bowel loops, anastomosis was done with either sutures (hand-sewn) or a stapler. The sheath was closed with continuous polypropylene sutures. In primary skin closure group skin was closed with interrupted polypropylene sutures while in delayed skin closure group wound was dressed with saline-soaked gauze daily using aseptic technique till postoperative day 3. If there were no signs of wound infection at day 3, then skin closure was done with interrupted polypropylene sutures.

The wound was observed daily until the discharge of the patient from the hospital and followed later at the out-patient department for four consecutive weeks. If patient developed local inflammatory signs such as erythema or induration or purulent drainage from the wound in this duration, then it was considered wound infection and laid open. Dressing was done daily until recovery.

IBM SPSS (Version 24; SPSS, Inc., Chicago, IL) software was used to analyze data. Continuous data were represented by mean with standard deviation and categorical data as frequency and percentages. Chi-square test was used to analyze categorical data, while Students t-test was utilized for continuous variables. Power of study set at 80% and a p-value of <0.05 was considered to be statistically significant.

**RESULTS:**

A total of 142 patients underwent stoma reversal who met the inclusion criterion. The patients were divided into 2 groups with 71 in each. The mean age for the immediate closure of skin group was 40.29 ± 0.93 year while for the delayed closure of skin group 42.19+ 1.59 year. Forty-nine (69%) patients were male and 22(31%) female in the primary closure of skin group and 48(67.6%) male and 23(32.3%) female in delayed closure of skin group.

The duration of hospital stay after intestinal stoma reversal in the patients with primary skin closure group was 7 ± 0.43 days and in delayed closure of skin group 7.47 ± 0.9 days which was not statistically significant. In the primary skin closure group the frequency of surgical site infections was 2.9%, whereas it was 7% in the delayed closure of skin group, however this was non-significant statistically. Moreover, frequency of wound infection in both the groups with respect to age and gender was not statistically significant (table I).

**DISCUSSION:**

Wound infection is the one of most frequent complications associated with stoma reversal and infection rates of up to 40% are reported in literature.[11] In this study overall infection rate was 5% which is comparable to results of several similar studies on skin closure techniques after stoma reversal.[12-14] It is still a matter of debate as to which of the methods is best to prevent wound infection after stoma reversal. Some studies favor primary closure of skin after stoma reversal, but there are studies that mentioned lower infection rate after delayed primary closure of stoma wound.[15,16]

Delayed primary closure technique is used in treating wounds in contaminated conditions and has shown to reduce frequency of infection, wound dehiscence, and hernia formation along with reduction in overall hospital stay.[14] Moreover, several retrospective studies have found delayed primary closure of wound after stoma reversal to be effective in reducing infection rate when compared with the wounds which were closed primarily.[17,18] In our prospective study lower rate of wound infection was found with primary closure technique. This may be due to strict inclusion and exclusion criteria in selecting patients. Thus delayed primary closure may not be a suitable option for skin closure after stoma reversal.

**Table I: Comparison of Two Skin Closure Techniques**

| | Primary Closure | Delayed Closure | P-Value |
|---|---|---|---|
| Age (Mean ± SD) in Years | 40.29 ± 0.93 | 42.19+ 1.59 | 0.091 |
| Male - n (%) | 49 (69%) | 48 (67.6%) | |
| Female - n (%) | 22 (31%) | 23 (32.3%) | |
| Hospital Length of Stay (Mean ± SD) in Days | 7.00 ± 0.43 | 7.47 ± 0.90 | 0.122 |
| Frequency of Wound Infection - n (%) | 2 (2.9%) | 5 (7%) | 0.441 |
| Frequency of Wound Infection in 30-60 years age group - n (%) | 0 (0%) | 4 (8.3) | 0.118 |
| Frequency of Wound Infection in Males - n (%) | 2 (4.0%) | 4 (8.3%) | 0.436 |
| Frequency of Wound Infection in Females - n (%) | 0 (0%) | 1 (4.3%) | 0.52 |

Vermulst et al mentioned similar findings in a study comparing immediate closure of skin and delayed skin closure of the wound after stoma reversal in which he observed less wound infection in primary closure of skin than delayed closure.[19] We further stratified the frequency of wound infection in relation to age, gender and length of hospital stay and did not find statistically significant difference. Similar findings have been reported in other studies.[20] The limitations of this include small sample size and being from single center.

**CONCLUSIONS:**

No significant difference was observed in the rate of wound infection between primary versus delayed closure of skin after intestinal stoma reversal.

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Farhan Zaheer: Designed, research methodology & manuscript writing.
Muhammad Osama: Data collection, literature review, data interpretation & statistical analysis.

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