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Effectiveness of Early Versus Late Dressing Removal in Contaminated and Clean Surgical Wounds

Masood Ahmed[1]*, Ishtiaq Ahmed[1], Hafiz Gulfam[2], Muhammed Kamal Subhanii[3] and Zumra Mahmood[4]

[1] Department of Surgery, Khawja Safdar Medical College, Sialkot, Pakistan

[2] Department of Surgery, AllamaIqbal Memorial Teaching Hospital, Sialkot, Pakistan

[3] House Surgeon King, Edward Medical University, Mayo Hospital, Lahore, Pakistan

[4] Gynecologist Lady, Walingdon Hospital, Lahore, Pakistan

**Corresponding e-mail: leo_conner53@yahoo.com*

ABSTRACT

Aim: *This study was conducted to assess the effectiveness of early versus late dressing removal in contaminated and clean surgical wounds.* ***Study design:*** *A Prospective non-randomized study.* ***Place and duration:*** *In the Surgical Unit of AllamaIqbal Teaching Hospital, Sialkot from March 2018 to March 2019.* ***Method:*** *Sixty patients age eighteen or above (planned surgery and emergency surgery) were enrolled in the study, admitted in hospital and operated. All surgical wounds met the criteria of contaminated and clean surgical wounds. Thirty patients were included in each group with early and late dressing removal. In the early removal group, within 48 hours, the surgical dressing was removed and in the late group 48 hours after surgical intervention. The incidence of deep and superficial surgical site (SSI) infection was studied in these two groups. Additional subordinate factors such as dehiscence of wound incidence and secondary suturing were too assessed.* ***Results:*** *Thirty patients were included in each group with early and late dressing removal for final scrutiny. The occurrence of superficial surgical sight infection was lower expressively in the early dressing removal group. The time required for full recovery (days) (8.60-10.70; p=0.734) was shorter considerably in the early dressing removal group. In the early dressing removal group, there was the significantly shorter postoperative hospital stay (days) (10.50 vs. 15.0; p ≤ 0.001).* ***Conclusion:*** *Early dressing removal considerably decreases the superficial SSIs incidence in contaminated and clean surgical wounds. It also considerably decreases the time of full wound healing and facilitates short hospital stay as compared to late dressing removal.*

Keywords: Late dressing removal, Early dressing removal, Quality of life, Postoperative stay, Wound dehiscence, Surgical site infection

INTRODUCTION

A sufficient amount of persons experience surgical procedures daily, which leads to infection at the surgical site (SSI) [1,2]. After surgery, the incision is closed with staples, stitches, adhesive glue or dermo bond. At the end of the surgery, the surgeon closes the wound covered with adhesive tape and sterile gauze and adhesive tape which have a sterile pad [3]. There is no time for examining wound deprived of the sepsis risk. Early removal of dressing supports early identification of SSI, which promotes faster patient mobilization after surgery [4]. Avoiding postoperative examination two or three days after surgery can cause substantial accretion of dirt and sweat that threaten the hygiene of the wound [5]. On the contrary, the early removal of a surgical wound can adversely affect the healing of wound by changing the healing atmosphere [6]. The incidence rate after SSI (both superficial and deep) ranged from 34% to 45%. Wound dehiscence causes considerable morbidity and extends the hospital stay [6]. The most feared sudden complication is a rupture of the abdomen, which requires immediate management. Other complications were deep abscesses, sepsis (early complications) and frequent hernia (late complications) (69%) [7].

Significant progress has been made in managing SSI in the latest centuries. Early removal of dressing is thought to be

helpful in initial SSI identification (both deep and superficial). Therefore, the clinical effectiveness of early versus late dressing removal was determined in contaminated and clean surgical wounds [8,9].

METHODS

This Prospective non-randomized study was held in the Surgical Unit of AllamaIqbal Teaching Hospital, Sialkot from March 2018 to March 2019. Informed consent was obtained from all patients. All recorded information was confidential and the patient could stop working at any time. The sample consisted of 60 patients who established a surgical infection after surgical intervention (contaminated and clean wounds) during the emergency and elective surgery. All patients of eighteen and above selected for surgery (emergency and planned) were categorized as contaminated and clean wounds (normal but colonized tissue wounds) were selected for the study. Infected wounds (wounds have purulent discharge) and contaminated (infected wounds or containing foreign bodies) are excluded.

Patients with stoma, postoperative ascites requiring additional surgery, advanced cancer and multiorgan failure were omitted from the analysis. Two study groups were made and compared. In group A: early dressing removal and group B: late dressing removal. Patients who developed surgical site infections were evaluated. Basic parameters, comorbidities, demographic data, and BMI were documented.

Working Groups

Group A: Early dressing removal: After the surgical method, in both clean-contaminated and clean wounds, 1-0 prolene was used for rectus muscle to close. With the solution of betadine; the subcutaneous area was washed followed by normal saline. With 2-0 prolene, the skin was sealed intermittently with the subcutaneous layer. After closing, with a betadine solution; the wound was washed charted by sprit solution. For one minute, the wound was permitted to dry. The wound was enclosed with 2 sterile pieces of gauze and a waterproof or plastic adhesive bandage (Dynoplast) was applied. Preoperative antibiotics were continued (according to the Institute's protocol). In this group, the dressing was removed within 48 hours after the operation and replaced daily. On the 8th day after surgery, sutures were removed.

After 48 hours, or if the wound becomes too wet, depending on what comes first, the bandage was changed. The first day of tissue granulation was observed and the size of the wound was closely monitored. After recording the wound contraction, the surgeon's assistant decided to close the wound with split-thickness skin graft (SSG), second intention to heal and delayed secondary closure.

Group B: Late withdrawal of the dressing: As in the early removal dressing group, sterile dressings were applied after the wound closure. In this group after 48 hours of surgery, the dressing was removed. In case of extreme soakage of the wound, the bandage was examined before forty eight hours earlier and that case was incorporated in the group of early dressing removal (Figure 1, Examination Scheme).

Parameters Evaluated

The chief results studied were the early incidence of superficial and deep SSI and late incidence of wound dehiscence. The number of days needed for a full recovery was examined for primary (surgical) or secondary purpose to cover granulation tissue. Secondary consequence factors such as hospital stay duration, multiple dressings, and the patients needed added antibiotic treatment were also examined. For a month, in both groups, all patients were followed up to perceive primary impediments (dehiscence of the wound) and late complications (incisional hernia) for up to six months. Surgical wound infections (both deep and superficial) were definite according to SSI criteria. Secondary intention healing was distinct as complete coverage of contracted wound surface with flat healthy granulation tissue at the finale of 1 month. Using SPSS 19.0, data were analyzed. Categorical variables were assessed using Fisher's exact test and chi-square test. Using the Mann Whitney test or t-test, continuous variables were assessed depending on whether the distribution of data was standard or not. With mean ± standard deviation, wound parameters were evaluated. A p-value of less than 0.05 was reserved significant.

RESULTS

In the entire study population, men (n=33; 54%) are women (n=27; 46%), BMI with M: F ratio of 1.2: 1, age distribution and gender were comparable in both groups. Both groups were comparable in relation to signals for elective or emergency surgery (31 *vs.* 29; p=0.588) (Table 1). In both groups, the DM was comparable (40% *vs.* 60%; p=0.68).

The distribution of surgical indications was similar and comparable in both groups (p=0.35). There was a substantial variation between the two groups between postoperative SSI days (66.8 *vs.* 87.2); p=0.001. There was no substantial variance in days among the two groups in terms of deep postoperative SSI (73.3 *vs.* 77.9; p=0.604) (Figure 1).

There was significant statistically variance among the 2 groups in the number of days needed for full healing of the wound (8.6-9.6; p=0.001). The average quantity of dressings essential for comprehensive healing of wounds can be compared between groups. The difference between the average rates of postoperative hospitalizations was statistically significant between the groups.

At the end of the month, all patients in both groups managed to close the wound for primary (surgical) or secondary purposes. In the early dressing removal group, one patient (3.33%) developed wound infection and the other patient (3.33%) developed a hernia during the period of follow-up.

Four patients needed secondary suturing due to the dehiscence of the wound. One patient from each group managed wound closure with the second intention and underwent a skin transplant for dehiscence of wound. One patient in the early dressing group done with Mesh-plasty for incision hernia after 6 months of follow-up (Table 2). During the observation period of six months, no abdominal abscess or deep abscess was detected.

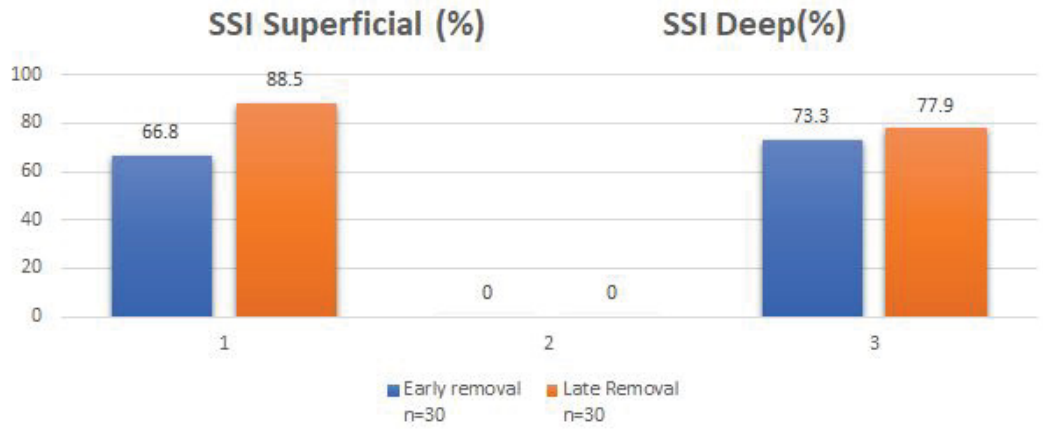

Figure 1 Incidence of SSI both deep and superficial (%) among the study groups

Table 1 Comparison of baseline parameters among the study groups

Demographic Parameters		Early Removal (n=30)	Late Removal (n=30)	p-value
Gender, N (%)	Male	17 (56.7%)	16 (53.3%)	0.237
	Female	13 (43.3%)	14 (46%)	
Age (Mean ± SD)		45.19 ± 7.25	44.08 ± 12.2	0.87
BMI (Mean ± SD)		22.92 ± 4.1	22.50 ± 3.65	0.46
Comorbidities, N (%)	Diabetes	12 (40%)	18 (60%)	0.68
	Obesity	8 (26.7%)	5 (16.7%)	0.46
	Hypertension	5 (16.7%)	7 (23.3%)	0.58
Indication, N (%)	Elective	18 (60%)	13 (43.3%)	0.59
	Emergency	12 (40%)	17 (56.7%)	

Table 2 Comparison of wound parameters among the two study groups

Wound Parameters	Early removal (n=30)	Late removal (n=30)	p-value
Number of days required for complete wound healing (N)	8.6	10.7	0.74
Number of dressings required for complete wound healing (N)	6.7	9	0.54
Mean Post-op hospital stay (days)	10.5	15	0.001
Follow up parameters Wound dehiscence (early) (%)	1 (3.3%)		
Incisional hernia (late) (%)		1 (3.3%)	

DISCUSSION

In this study, male predominance was present in both treatment groups. There were no substantial differences in the appearance of SSI (deep and superficial) in patients in terms of gender distribution (p=0.236). Around 87.96% of the surveyed people were under the age of fifty years. This distribution was similar to other literature [10]. Toon, et al., detects SSIs; 77.92% in early removal and 73% in late dressing removal belong to the 31 to 50 years age group. The average age is related tothe better repair of tissue mechanisms due to a healthier immune system and functional integrity [11]. BMI less than twenty-five was not the ultimate jeopardy aspect for the dehiscence of the wound (p=0.457). Due to restricted patients in this analysis, a greater sample size could deliver appreciated information on this relationship. Of all comorbidities, diabetes has conventionally been deliberated a risk factor for surgical site infections in many analysis, but according to Chetter, et al., Diabetes had no significant effect on wound dehiscence [9]. Similar results were obtained in this study.

Surgical indication (emergency or planned) has a substantial impact on the healing of the wound. Recurrent wound contamination followed by multiple bandage changes causes SSI [12]. In this study, the SSI incidence was advanced in patients undergoing emergency surgery. Sudden laparotomy was performed in 60% of the total population, and the risk of infection increased in parallel. The risk of developing SSI in emergency surgery has been reported to be 1.8 times higher [13]. In this study, male predominance was present in both treatment groups. There were no substantial differences in the appearance of surgical site infection (deep and superficial) in patients in terms of gender distribution (p=0.236). Dehiscence of the wound is not clearlydescribed by Toon, et al. [11]. A possible mechanism may cause an increase in abdominal pressure and wall tension, tightening of tissues and edges of the wound, and cutting of sutures through the muscle wall. In this analysis, surgical site infections (both deep and superficial) tend to increase the amount of dressing required for full wound healing. The dressing's number was not considered a distinct parameter in comparable analysis. Eliminating exudate with repetitive bandages will help reduce a total load of harmful toxic substances to end wound healing [9]. In this analysis, subjects in the early removal of the dressing group were discharged earlier than in the late dressing removal group. Toon, et al., noted no substantial variance between groups in terms of hospital stay duration (p=0.06) [11]. It was reported that early discharge of patients in the early bandage removal group was due to early detection of SSI (both superficial and deep compared to the late bandage removal group). During SSI rapid detection, appropriate measures were taken to control the infection. Therefore, wound healing is faster in the early healing group and the patient heals early.

No adverse events such as abdominal abscesses and abdominal foci were observed in this study. In this study, observation lasted 6 months and may not be enough to perceive late-stage difficulties such as an incisional hernia. At the end of the observation period, the incidence of hernia was 2.3% and was lower than the results of this study [14]. In this study, except for the variance in the SSI incidence, there was no significant variance in the attainment of the results of a healthy scar. All subjects in both groups achieved complete wound healing after the exclusion of patients whose concluding results could not be investigated due to observation, death or discontinuation of treatment.

If surgical site infections (deep or superficial) happen within 3 days of surgery, the likelihood of full healing of the wound is significantly reduced. This is mostly due to abnormal wound healing and infection. It is difficult to manage SSI as a cleaner with an antibiotic solution and bandage, and the range of additional antibiotics is difficult.

CONCLUSION

Early treatment reduces significantly the superficial SSIs incidence in contaminated and clean surgical wounds. It also considerably decreases the time needed for full wound healing and facilitates decrease hospital stay as compared to the late removal of the dressing group.

DECLARATIONS

Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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