Role Of Collagen Dressing Over Donor Site In Cases Of Split Skin Grafting

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ABSTRACT:

Background: Split Thickness Skin Graft (STSG) is graft that only contains the epidermis and a tiny portion of the dermis. Donor sites for split-thickness skin grafts can either be covered with different types of dressings. In this study, we looked at the function of collagen sheet dressing at the skin graft donor site and how it affected the healing parameters and compared it with conventional betadine dressing.

Methods: An prospective study conducted in 60 patients general surgery department. Collagen dressing or Betadine dressing over donor site were performed among study subjects by randomised process.

Results: Mean age of 60 study sample was 42.58 years (SD - 9.812 years), with 53 (88%) male and 7 (12%) female in study. Collagen-based dressings for the donor site for split-thickness grafts produced better results in terms of the rate of healing, post-operative pain, and length of hospital stay than the typical betadine gauze dressing whereas in case of total cost of the treatment and patient satisfaction, Collagen Dressings and Betadine Dressings both show almost similar result.

Conclusion: Early pain alleviation and a high ulcer healing rate are provided with collagen dressing over conventional betadine dressing.

KEYWORDS: Betadine dressing; Collagen dressing; Split Thickness Skin Grafting,

INTRODUCTION:

Split Thickness Skin Graft (STSG) is graft that only contains the epidermis and a tiny portion of the dermis. Since skin graft lacks own blood supply, unlike flaps, they have to rely on a healthy wound bed for graft in-growth. STSG can be obtained from numerous anatomical sites, several sources (autograft, homograft, allograft, or xenograft), and also in a range of thicknesses. The lateral thigh and trunk are the most often used locations for STS autografts since they are both visually concealed and convenient to harvest from because of their large surface area. Split-thickness skin grafts can be classified as thin STSGs (i.e. 0.15-0.3mm),

intermediate STSGs (i.e. 0.3-0.45mm), and thick STSGs (i.e. 0.5mm and above) based on their thickness (0.45-0.6mm).[1,2] Split-thickness skin graft donor sites can regenerate new skin within 2 to 3 weeks because they retain some dermis, including dermal appendages. In case of burn surgeries and big wounds where there are few donor sites, STSGs are useful because using donor sites can be done more than once after sufficient amount of healing has occurred. Donor sites for split-thickness skin grafts can either be covered with open or closed dressings.[2] Since closed dressings have demonstrated greater results in quicker healing, good quality of the regenerated epithelium, and more patient compliance, the open donor dressing has long been rejected in favour of the closed method. Additionally, it has demonstrated the benefit of shielding the donor site from infection, mechanical stress, wound desiccation.[2] In this study, we looked at the function of closed collagen sheet dressing at the skin graft donor site and how it affected the healing parameters.

METHODS:

Based on the selection criteria 75 patient attending general surgery OPD having ulcer were screened for eligibility, all those 60 who fulfilled the inclusion criteria were eligible to participate in the study. The purpose of the study explained to patients. Informed written consent were taken prior to actual participation of patient into the study. Patients of age <10 years and >70 years, pregnant women, cancer & immunocompromised patients, patients with coagulopathy & those on steroids, patients with connective tissue disorders including collagen vascular disorder etc. were excluded from study.

60 patients were divided in two groups, one receiving collagen dressing whereas other group receives betadine dressing, through a randomised process using block method. The medical records of the patients reviewed and demographic data (sex, age), medical history, referral symptoms and findings, first-second-fourth-eighth week examination findings, response to the treatment (pain relief and wound healing), side effects of the treatment and presence of recurrence of the disease were recorded and analysed.

RESULTS:

Mean age of 60 study sample was 42.58 years (standard deviation – 9.812 years), with the highest 66 years and lowest 20 years. There was 53 (88%) male and 7 (12%) female in the study while 23 (38.33%) samples were from 41-50 years age group. Traumatic ulcer most common cause of ulcer and it was present in all 52 (85%) subjects followed by burn injury (5 subjects) and pressure ulcer (3 subjects). 50 (83.33%) out of 60 subjects were having ulcer over legs while pressure ulcer was present in 3 (5%) subjects over gluteal region.

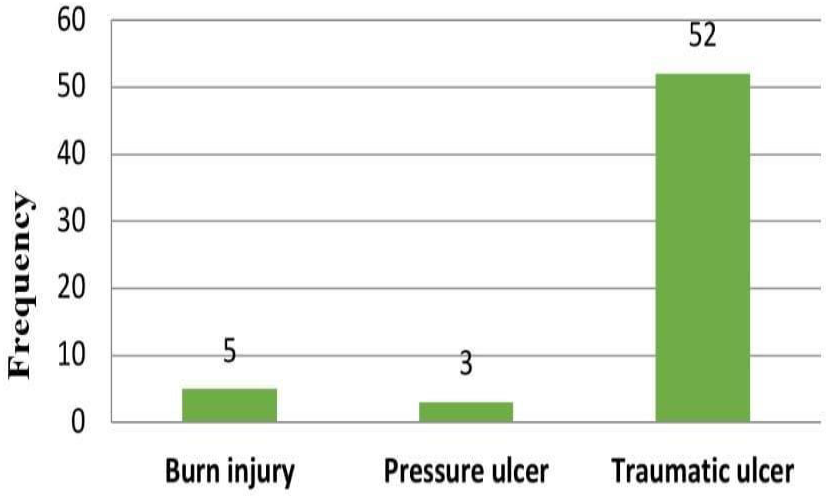

Fig. 1: Bar diagram showing cause of injury among study sample

Mean wound area in collagen dressing receiving group (19.5 $\pm$ 11.67 cm^2) was approximately similar with betadine dressing receiving group (18.33 $\pm$ 7.2 cm^2) and difference between them was statistically not significant (p = 0.643). It means both the groups were having similar wound area which is basic pre-requisite to conduct the further study and treatment outcome will not be considered as biased.

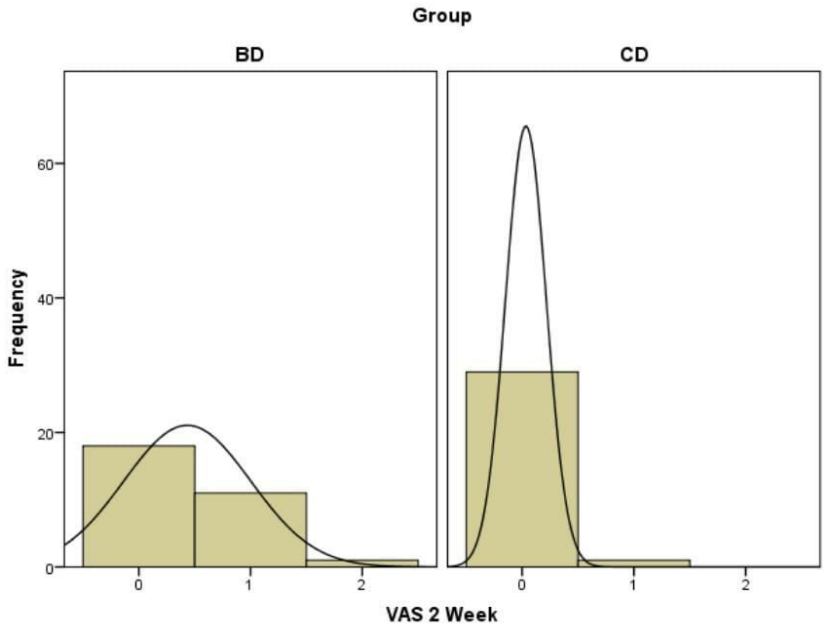

Fig. 2: Histogram showing Postoperative pain score 2 week

Mean post-operative pain score after 2 week of surgery in collagen dressing receiving group (0.03 ± 1.83) was lower than betadine dressing receiving group (0.43 ± 0.568) and difference between them was statistically significant (p = 0.001). It means pain relief from donor site was earlier in collagen dressing receiving group than betadine dressing receiving group.

Mean duration of surgery in collagen dressing receiving group (56.17 ± 7.621 min) was approximately similar with betadine dressing receiving group (56.17 ± 8.375 min) and difference between them was statistically not significant (p = 1.00).

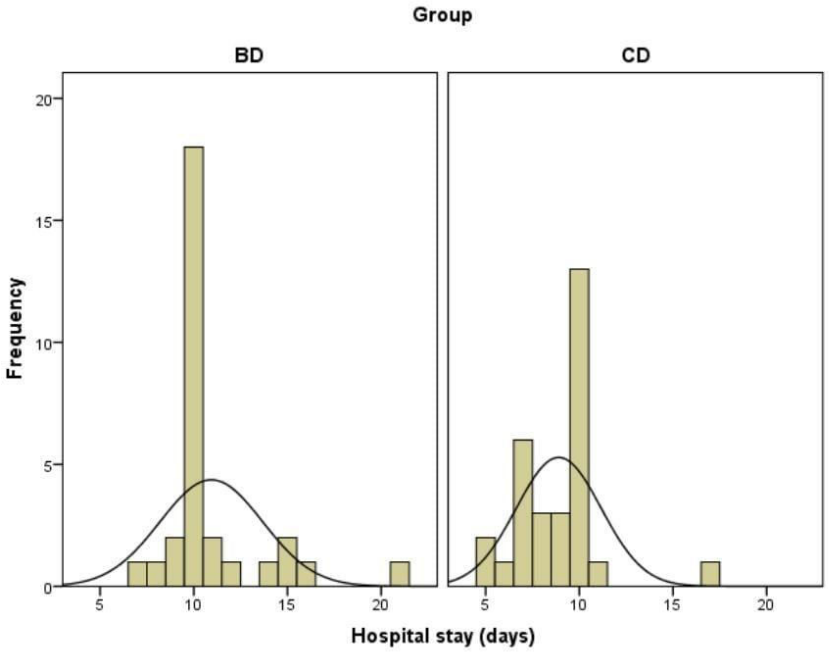

Fig. 3: Histogram showing Duration of Hospital Stay

Mean duration of hospital stay in collagen dressing receiving group (8.9 ± 2.26 days) was lower than betadine dressing receiving group (10.93 ± 2.74 days) and difference between them was statistically significant (p = 0.003). It means patients receiving collagen dressing were discharge earlier than betadine dressing receiving group.

Mean cost of treatment of surgery in collagen dressing receiving group (5900 ± 1213 rs) was approximately similar with betadine dressing receiving group (6116 ± 1654 rs) and difference between them was statistically not significant (p = 0.565). It means cost of treatment was similar in both the groups.

DISCUSSION:

Wound healing involves molecular expression of promoters and reduction of hinderers. Complex wound covering is a surgeon's biggest task, tissue transfer possibilities complicate the situation. The ultimate goal is to enable the patient to return to regular life. Since Tanner described meshing skin grafts for expansion in 1964,[3] the procedure has been utilised to remedy the lack of skin, although it has downsides. Slow healing, discomfort from raw skin windows in touch with dressing, uneven surface, cobblestone/snake skin look, pigmentation abnormalities, unattractive scars, and contractures plague mesh-grafted regions. Non-

inflammatory, non-toxic, low-antigenic collagen sheet with excellent rip strength and wound-peeling strength can be used to cover the donor sites. It aids in fibroblast and microvascular cell movement, collagen production, and biodegradation. It is impervious to bacterial migration, controls wound fluid flow, and reduces scarring. This clinical research evaluated the unique strategy of combining autologous meshed split thickness skin graft with collagen dressing to utilise collagen's advantages. Wide availability, cheap cost, convenience of application, no antigenicity, tissue compatibility, absence of lipids, elastin, and other immunogenic proteins, and pain alleviation stimulated the development of this technology.

The mean age of 60 study sample was 42.58 years (standard deviation – 9.812 years) with the highest 66 years and lowest 20 years involving both genders, 23 (38.33%) samples were from 41-50 years age group followed by 21 (35%) subjects in 31-40 years age group. Similarly, the study group in Narayan N et al work's was primarily made up of patients in their third, fourth, and fifth decades of life; the youngest patient in that group was 17 years old, and the oldest was 68.[4]

The majority of cases (52; 85%) had traumatic ulcers, followed by burn injuries (5 participants) and pressure ulcers (3 subjects). Similar wounding conditions necessitating STSG were reported in Narayan N et al in the form of trauma (6 subjects) followed by burns (4 subjects).[4]

In our study, fifty out of sixty subjects had ulcers on their legs, and three out of sixty had pressure ulcers on their gluteal regions. Similarly the lower extremity was the most common area that needed skin grafting in Narayan N et al, with seven cases, followed by the trunk (6 subjects), and then the upper extremity (4 subjects).[4]

The mean wound area in the collagen dressing receiving group (19.5 + 11.67 cm^2) was comparable to that in the betadine dressing receiving group (18.33 + 7.2 cm^2), and the difference was statistically insignificant (p = 0.643). While Narayan N et al.[4] treated larger wound areas ranging from 3100 cm^2 to 720 cm^2 requiring covering and Sreekumar NC et al having average wound area of 66.7 cm^2 in his study.[5]

The mean length of operation in the collagen dressing group (56.17 + 7.621 minutes) was similar to the betadine dressing group (56.17 + 8.375 minutes) and the difference was not statistically significant (p = 1.00). Similarly, Das S et al found that the length of surgery for the collagen dressing group was 32.33 + 6.261 minutes and for paraffin gauze it was 31.50 + 6.453 minutes, with no statistically significant difference (P = 0.614).[6]

In the course of our research, post-operative pain was evaluated separately from pain at the donor site. The difference in mean post-operative pain score between the collagen dressing receiving group and the betadine dressing receiving group was statistically significant (p = 0.001), showing that the collagen dressing receiving group had a lower score (0.03 + 1.83) than the betadine dressing receiving group (0.43 + 0.568). It indicates that pain reduction from the donor site was achieved earlier through surgery in the group that received collagen dressing as compared to the group that received betadine dressing. In the study by Sreekumar NC et al., researchers found that the region with collagen caused much less pain than the area with paraffin gauze. The difference was greatest during the first three days of the experiment (2.16 vs. 5.86, P 0.01), then decreased over the subsequent four days (0.4 vs. 3.4, P 0.01), and was at its smallest during the last three days (P > 0.02) This is most likely owing to the fact that collagen has anti-inflammatory properties.[5]

The difference in the mean length of hospital stay between the two groups was statistically significant (p = 0.003), with the collagen dressing receiving group having a shorter stay on average (8.9 + 2.26 days) than the betadine dressing receiving group having a longer stay (10.93 + 2.74 days). It indicates that patients who received collagen dressing were discharged sooner than patients in the group that received betadine dressing. In a study conducted by Das S and colleagues,[6] those who received collagen dressing had a significantly shorter period of

time spent in the hospital (mean = 4.4 days) compared to those who received paraffin gauze (mean = 5.47 days), this difference was statistically significant with a P value of 0.003 while in a study conducted by Narayan N and colleagues,[4] the majority of patients who received collagen dressing were discharged after the second dressing between 6-10 days.

According to the results of our research, the betadine dressing receiving group (4 subjects) had a significantly higher incidence of wounds that did not heal and discharge than the collagen dressing receiving group (1 subject). Postoperative problems such as seroma, haematoma, and infection were not experienced by any of the participants in the research. At the study by Das S et al.[6] a total of five patients developed an infection in the graft donor site while they were in the healing phase; two of these patients were in the case group (collagen dressing), and the other three were in the control group (paraffin gauze).

All phases of the healing process for a wound require collagen. It is a powerful coagulant and may absorb liquids up to 40 to 60 times its weight. This effect has been noticed when used in donor sites. Since Chung J et al. have studied the capacity of collagen to control bleeding, we cannot ascribe the absence of haematoma development in our work to this factor.[7] Collagen is semi-translucent, making it simpler to see healing underneath without disturbing it. Collagen will only interact with wound areas devoid of STSG (windows in mesh graft). After serving its purpose, the collagen above the skin bridges of the transplant can be removed with saline therapy. Therefore, neither the granulation tissue nor the patient are harmed by the removal of the dressings.

The difference in the mean cost of treatment for surgery between the collagen dressing receiving group and the betadine dressing receiving group was not statistically significant (p = 0.565). The collagen dressing receiving group had a mean cost of treatment of surgery that was approximately similar to that of the betadine dressing receiving group. This indicates that the cost of therapy was comparable for both groups. In Das S et al.[6] cost of collagen dressing was 387 $\pm$ 110 rupees while cost of paraffin gauze was 153 $\pm$ 0.0 rupees and the difference between the two groups was significant ($P < 0.001$). Reduces the need for frequent dressings, total length of hospital stay, and pain score are all factors that might impact how cost-effective this treatment is overall.

CONCLUSION:

Collagen-based dressings for the donor site for split-thickness grafts produced better results in terms of the rate of healing, post-operative pain, and length of hospital stay than the typical betadine gauze dressing whereas in case of total cost of the treatment and patient satisfaction, Collagen Dressings and Betadine Dressings both show almost similar result.

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All the authors read and approved the paper.

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