Original Article

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Surgery Section

A Clinical Trial to Assess the Efficacy of Hydrocolloid versus Paraffin Gauze Dressing for Split Thickness Skin Graft Donor Site Treatment

SHAILESHKUMAR M.E., PRAMOD MIRJI, VISHWANATH G., S.I. BASARKOD, CHHAYA JOSHI, RAJANI PATIL

ABSTRACT

Introduction: In spite of newer advances, split thickness skin grafts (STSG) still have an important place in many areas of general and plastic surgery. Though the technique of skin grafting is more or less standardized, the treatment of the donor site differs greatly and has been a topic of debate. The management of split-thickness skin graft donor site is targeted towards promoting the healing process, while minimizing adverse effects and complications.

Objective: To compare the percentage of epithelialization achieved by Hydrocolloid in comparison to Standard meshed Paraffin gauze on the Split thickness donor site on 12th post operative day.

Design: Clinical control trial

Setting: H S K hospital, Bagalkot

Population: 30 adult patients requiring STSG for various etiologies between April 2011 to August 2011.

Materials and Methods: The study included 30 adult patients. Half of the skin graft donor site in the proximal thigh was dressed with Hydrocolloid dressings and the rest with Standard paraffin Gauze dressing. The extent of epithelialization achieved by each of these dressings was assessed on 12th post op day after skin grafting.

Results: The number of donor areas that achieved complete (100%) epithelialization on the 12th post operative day by Paraffin gauze dressing was 7 (23.3%), whereas Hydrocolloid dressing achieved complete epithelialization in 18 donor sites (60%) (P = 0.016).

Conclusion: Hydrocolloid dressings are superior to Standard meshed Paraffin gauze dressings in the treatment of Split thickness skin graft donor areas.

Key Words: Split skin donor sites, Paraffin gauze, Surgery, Wound

INTRODUCTION

Dressing of wounds is a practice carried through centuries in order to protect the wound from the harmful external environment. The act of covering a wound mimics the function of the epidermis. Haemostasis aided by a dressing limits blood loss and minimises the dissemination of microbes and toxins, limits oedema, reduces pain and improves gas and solute exchange between blood and tissue [1].

In spite of various newer advances in wound coverage, split thickness skin grafts (STSG) still have an important place in many areas of plastic surgery. Though the technique of skin grafting is more or less standardized the treatment of the donor site has been a topic for debate. The STSG donor site usually receives little attention and is often a source of delayed healing with considerable pain and discomfort to the patient. To overcome this various dressing materials have been used [2].

The donor sites are managed with closed & open dressings with the latter being abandoned now. Meshed paraffin gauze is most commonly used in the closed dressings [3]. But it usually dries up & converts into a dry dressing eventually, resulting in considerable pain & discomfort to the patient with movements & at removal [4, 5]. Studies have shown that a moist environment promotes healing in a partial thickness skin loss. The use of polyurethane film, a semi permeable dressing maintains a moist environment allowing diffusion of oxygen and water vapour while providing a barrier to the passage of wound exudates. It has claimed to reduce the healing time and donor site pain. However it has proved difficult to use as wound exudate collects beneath the film and is liable to leak out [4, 5].

Hence the advent of newer Moisture retaining dressings like Hydrocolloids & Alginates.

Our study aims at comparing the efficacy of one of these newer dressings with Meshed paraffin gauze in the management of STSG donor sites.

MATERIALS AND METHODS

All eligible patients undergoing split thickness skin grafting at SNMC & HSK Hospital Bagalkot from April 2011 to August 2011were included for the study.

Suitable enrollees were adult non diabetic patients between the age group of 19 to 65 yrs, requiring split thickness skin grafting for various etiologies at SNMC & HSK Hospital, Bagalkot during the period of April 2011 to August 2011.The donor area being restricted to anterior thigh measuring between 10x8 to 20x8 cm.

Those who were not included for the study are when a split thickness skin graft has already been taken from the same donor area and when donor site wound is of non uniform depth.

A sample size of 30 was taken based on HSK Hospital statistics.

Study design: Non randomized Clinical comparative trial.

Method: In all suitable enrollees split thickness skin graft of approximately 0.3 mm thickness was taken from the anterior thigh using a Humby's knife. Immediately after taking the graft, the donor site was covered with saline soaked gauze for hemostasis. The donor area was then divided into two equal halves, the proximal half being marked "A" and the distal being "B". On area "A", 10 x 10 cm Hydrocolliod dressing was placed & on area "B", a 10 x 10cm Standard meshed paraffin gauze was placed. A pad & roller bandage were then applied over the primary dressing .The outer dressing was inspected on the 3rd post operative day, noting any signs of infection, if any then those patients were excluded from the study & were treated accordingly. Then the donor site was inspected by a treatment blinded observer after removal of dressings on 12th post operative day to assess the epithelialization & was graded as none (1), less than 50 % (2), more than 50% but not complete (3), or complete (4). A numeric score given to each rating is indicated in the brackets. Also photographs of donor site after removal of dressings on 12th post operative day were obtained. These photographed images were rated on the same scale by an independent treatment blinded senior surgeon of the Hospital & an average of these readings was taken.

RESULTS

Thirty paired side-by-side donor sites were studied. The donor site was divided into two equal halves A (proximal half) and B (distal half). On area A, a 10 x 10 cm Hydrocolliod dressing was placed & on area B, 10 x 10cm Standard meshed paraffin gauze was placed. A pad & roller bandage were then applied over the primary dressing and the outer dressing was inspected 3 days later to note any signs of infection. The donor site was inspected by a treatment blinded observer and a senior surgeon, after removal of dressings on 12th post operative day to assess the epithelialization percentage and scoring was done according to the predefined criteria. All data was analyzed using Chi-square test.

The study cohort consisted of a total of 30 patients meeting the predefined inclusion and exclusion criteria. 23 of them were males and 7 were females. The mean age of the study population was 38.5+/–14.59 yrs (40.6+/–13.22yrs for males and 31.7+/–17.86yrs for females). The sex distribution of the patients has been summarized in [Table/Fig-1].

Sex	Number	Percentage%
Male	23	76.66
Female	07	23.33

[Table/Fig-1]: Sex distribution of the cases

The age distribution of the study population was concentrated in the age group between 19 to 30 yrs. The number of patients between 19-30 yrs were 13 (43.33%), between 31 to 40yrs were 4 patients (13.33%), between 41 to 50 yrs were 5 patients (16.66%), between 51 to 65 yrs were 8 patients (26.66%). This has been summarized in [Table/Fig-2].

The etiology for the required skin graft included Traumatic injuries in 10 patients (33.33%), Cellulitis in 9 patients (30%), Burns/Scalds in 5 patients (16.66%), Carbuncle in single patient(3.33%), Fourniers gangrene in one patient (3.33%), Wound gape in one patient (3.33%), Necrotizing fasciitis in 2 patients (6.66%) and Tumour excision in one patient (3.33%). These have been summarized in [Table/Fig-3].

Age group (yrs)	Numbers	Percentage %
19-30	13	43.33
31-40	04	13.33
41-50	05	16.66
51-65	08	26.66

[Table/Fig-2]: Age distribution of cases

Aetiology of ulcer	Numbers	Percentage%
Trauma	10	33.33
Cellulitis	09	30.00
Burns/Scalds	05	16.66
Carbuncle	01	3.33
Fourniers gangrene	01	3.33
Wound gape	01	3.33
Necrotizing fasciitis	02	6.66
Tumour excision	01	3.33

[Table/Fig 3]: Aetiology of the ulcers

Diabetes mellitus was the most common coexisting disease in the study population i.e. in 7 patients (23.33%), followed by Hypoproteinemia in 6 patients (20%), Hypertension in 4 patients (13.33%), Anemia in 4 patients (13.33%) and none in 13 (43.33%). This is summarized in [Table/Fig-4]

Coexisting Disease	Number	Percentage%
Diabetes Mellitus	07	23.33
Hypertension	04	13.33
Hypoproteinemia	06	20.00
Anemia	04	13.33
None	13	43.33

[Table/Fig-4]: Co-existing diseases

The number of donor areas that achieved complete (100%) epithelialization on the 12th post operative day by Paraffin gauze dressing was 7 (23.3%), whereas Hydrocolloid dressing achieved complete epithelialization in 18 donor sites (60%) (P = 0.016). Intermediate i.e. between 50 to 100% epithelialization was obtained in 21 (70%) donor areas treated with Paraffin gauze dressing, whereas in Hydrocolloid treated donor areas it was in 11 (36.7%). Poor or <50% epithelialization was seen in 2(6.7%) donor areas of the Paraffin gauze group and only 1(3.3%) donor area treated with Hydrocolloid dressing had this result. These results have been depicted in [Table/Fig-5].

% Healing	Paraffin gauze	Hydrocolloid	Total
< 50%	2 (6.7%)	1 (3.33%)	3
50 – 100%	21 (70%)	11 (33.33%)	32
100%	7 (23.3%)	18 (60%)	25
Total	30 (100%)	30 (100%)	60

[Table/Fig-5]: Extent of Epithelialization by the dressings

There was no clinical evidence of donor site infection in both the groups, as judged by surrounding erythema or purulent exudate. No difference was found between Hydrocolloid dressings and

Paraffin gauze dressing in terms of exudate secretion, skin maceration, or hemorrhage from the donor site. It was also noted that the patient tolerance and ease of dressing change was much better with Hydrocolloid dressings.

DISCUSSION

The mesh paraffin gauze dressing has for years been the primary choice of surgeons for the coverage of split-skin donor sites, given its ease of application, comfort, low risk of infection, and minimal cost [6,7,8,9]. It has however, been found inferior in many other important aspects: it is a painful, adherent dressing under which donor sites do not appear to heal rapidly.

Measurement of epithelialization in donor sites is a difficult task. The use of contiguous sites in the same patient serves as control and even helps to eliminate some of them as done in our study here. Both sites were assessed and graded using identical methods and criteria [6].

Our study population consisted of 23 males and 7 females. The mean age of the study population was 38.5+/-14.59 yrs (40.6+/–13.22yrs for males and 31.7+/–17.86yrs for females). The age distribution of the study population was concentrated in the age group between 19 to 30 yrs. The Hydrocolloid dressings are a newer variety of moist to moist dressings which claim to be superior to the older moist to dry dressings in various parameters. But however the Hydrocolloids are more expensive than the Paraffin Gauze dressings and can lead to exudate accumulation under the dressing. In our study the availability of Hydrocolloids was not a problem as they are used in our Hospital for treating pressure sores.

Overall wound healing, as measured by percentage of epithelialized dermis, was faster with Hydrocolloid than with Paraffin gauze dressing. The number of donor areas that achieved complete epithelialization on the 12th post operative day by Standard paraffin gauze dressing were 7 (23.3%), whereas Hydrocolloid dressing achieved complete epithelialization in 18 patients (60%) (P = 0.016). This was similar to the results obtained by the earlier studies. The faster re-epithelialization rate that has been seen with the Hydrocolloid dressing can partially be explained by its physical properties. Hydrocolloid was found to form a fibrin layer between the dressing and the wound, creating a physical barrier that retains cytokines, particularly intrinsic growth factors [10,11,12,]. Furthermore, epithelial cell proliferation and migration are believed to be optimal in a moist environment [13]. This concept seems to be supported by evidence from many skin-graft donor site studies which have shown faster re-epithelialization rates when moist-environment dressings are compared with the traditional dry dressing [10,12,13,14]. The Hydrocolloid dressing forms a highly absorbent gel that facilitates its removal, thereby reducing trauma during dressing changes.

Excellent results were reported by Vloemans et al. It also helps in keeping the wound moist, inducing a favorable environment that facilitates recruitment of vital host defenses and necessary cell population for better wound healing [14, 15].

There was also no difference in wound secretion, bleeding, or wound infection between the 2 dressings. Incidence of infection also was similar in both the groups.

Although pain assessment was not an objective in this study, it was noted that the patients tolerated the Hydrocolloid dressings much better than the Paraffin gauze dressings and they were also noted to be much easier to remove or change in contrast to the Paraffin gauze dressings which became adherent to the wound surface and caused discomfort and pain during removal. And many studies done in this regard favour Hydrocolloid as a less painful donor site dressing [6].

The cost of treatment was higher in the Hydrocolloid group as compared to the Paraffin gauze group. However it was noted that the Paraffin gauze group needed more analgesics and early mobilization was affected. Although cost effectiveness was not assessed in this study earlier studies done in this regard concluded that, the more rapid healing, less pain, and less scarring found with Hydrocolloid treatment reduces postoperative morbidity, which in turn affects the global cost-effectiveness [6].

Based on the results above study it can be concluded that Hydrocolloid dressings achieve faster epithelialization of the donor site and are hence preferable to the paraffin gauze dressings.

CONCLUSION

Hydrocolloid dressings are superior to Standard meshed Paraffin gauze dressings in the treatment of Split thickness skin graft donor areas.

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AUTHOR(S):

1. Shaileshkumar M.E.
2. Pramod Mirji
3. Vishwanath G.
4. S.I. Basarkod
5. Chhaya Joshi
6. Rajani Patil

PARTICULARS OF CONTRIBUTORS:

1. Assistant professor, Dept of Surgery,
2. Assistant Professor, Dept of Surgery,
3. Associate Professor, Dept of Surgery,
4. Associate Professor, Dept of Surgery,
5. Assistant Professor, Dept of Anaesthesia,
6. Junior Resident, Dept of Surgery,

SN Medical college & HSK Hospital, Bagalkot, Karnataka, India-587101.

NAME, ADDRESS, TELEPHONE, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Shaileshkumar M.E MS, Assistant Professor,
Dept. of Surgery, SN Medical College and HSK Hospital,
Bagalkot, Karnataka, India-587101,
Phone: 9986308914
E-mail: shaileshemmi@gmail.com

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