Original Article

Comparison Between Honey and Alginate Dressings at the Skin Graft Donor Site

Skin Graft Donor Site Dressing

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ABSTRACT

Objective: Purpose of this study is to propose a more economical and effective skin graft donor site dressing to be used in our unit.

Study Design: Interventional: Quasi-experimental study.

Place and Duration of Study: This study was conducted at the Department of Plastic, Reconstructive and Hand surgery, Liaquat National Hospital, Karachi from August 2006 to February 2007.

Materials and Methods: A total of sixty (60) patients were included in this study. All patients are admitted patients who underwent skin grafting by air dermatome with same thickness. Half of them were dressed with Calcium alginate and half with honey impregnated gauzes.

Results: Mean Healing time in Group 'A' (Calcium Alginate) was 10.67 days and 11.1 days in Group 'B'(Honey impregnated gauze). Less pain was observed in Group 'B' than Group 'A' on day 2 and 3. Only one patient in Group B had infection. The average cost of treatment in group B was far less than group A and this is statistically significant.

Conclusion: Honey is a safe dressing for donor sites of SSG. It is particularly advantageous as it is cost effective, easy to apply and remove, and significantly reduces donor site pain especially in the first few days.

Key Words: Skin graft, donor site dressing, Calcium alginate and Honey

Citation of articles: Kashif H, Shah A, Ashfaq F, Sadiq M, Beg MSA, Siddiqui N. Comparison Between Honey and Alginate Dressings at the Skin Graft Donor Site. Med Forum 2019;30(6):142-146.

INTRODUCTION

Split thickness skin graft (SSG) is a widely used technique for coverage of skin defects. Its wide use of applications makes it valuable not only for plastic and reconstructive surgeons but also to other surgical specialties. The technique evolved from use in the back alleys of India in Pre-Christian time to become one of the most valuable clinical tools in modern surgery[1].

The donor area itself can be considered a clean open wound that will heal spontaneously. Care of the SSG donor site and the solutions to the problems concerning this region have been discussed for many years and several studies been performed for a favorable outcome[2]. But the optimal treatment of the SSG donor site remains an unresolved issue[3].

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Received: January, 2019
Accepted: April, 2019
Printed: June, 2019

The goal of management of split-thickness skin graft donor sites is to promote the healing process and to reduce the pain[4]. An ideal donor site dressing is one that prevents dehydration and wound infection while also achieving rapid and painless healing of the donor site[5].

In our unit the most frequent SSG donor site dressing is "Calcium Alginate", since it has proven value in treating moderate to heavily exudating wounds and also benefits later stages of wound healing[6]. During the healing of SSG donor sites, Infection, delay in healing, fluid and electrolyte imbalances, scar formation and the pain are the major problems[1]. In addition to calcium alginate[3,7] there are many different materials found in the literature like Opsite[8], Polyvinylchloride film[8], simple tulle gauze[8], honey[7,9,10], egg membrane[11], Amniotic membrane[12], Chitosan membrane, Acticoat (new silver-coated dressing) and many others. Honey is considered an ecomonical dressing because of its wide availability. It reduces pain and infection, increase granulations and epithelization and rapid healing with minimal scarring.

Moreover, it is hypertonic and decreases edema formation and contributes to nourishment of wound due to its high sugar content. No studies have been done to compare its usage in donor site of SSG dressing as compared to alginate dressings and the study aims to investigate its effectiveness versus alginate in terms of healing etc.

MATERIALS AND METHODS

Interventional: Quasi-experimental conducted at the Department of Plastic, Reconstructive and Hand surgery, Liaquat National Hospital, Karachi, Pakistan for six and half months (29-08-2006 to 12-02-2007).

Sample Size: Total number of patients were 60, divided into two groups.

Sample Technique: Non-probability, purposive sampling.

Sample Selection: Inclusion criteria:

- All patients of either sex with acute or chronic wounds admitted trough OPD or emergency department, Liaquat National Hospital, require skin grafting by Dermatome.

Exclusion criteria:

- Skin graft taken with Watson knife.
- Hemoglobin < 10 gm/dl.
- Children < 12 years

Data Collection Procedure: After taking the informed consent, all patients of either sex with acute or chronic wounds admitted trough OPD or emergency in Plastic surgery department, Liaquat National Hospital, who require skin grafting by Dermatome are included in our study.

After taking complete history, clinical examination and basic laboratory work up which includes Complete blood count (CBC), Urea, creatinine and electrolytes (UCE), Blood sugars, ECG and Chest X-ray. There will be 60 patients divided randomly in two groups of 30 (Group A = Calcium alginate, Group B = Honey impregnated gauze) by using envelop draw method. The honey used in this study was unprocessed, obtained by the same source (Langnese honey).The microbiological cultures were done before using honey and it showed no organism to grow. The thickness of the dermatome (Zimmer's) will be same for all patients i.e., 0.08 inches. All the donor areas were shaved in the theatre just before the procedure. After draping and painting (Povidone Iodine solution only) the donor area was made tense and skin was stretched by the assistant. Lubrication was done with solution of Normal saline and Pyodine scrub. Grafts were then taken by Zimmer's dermatome at the angle of 45. Total surface area of the wound will be measured in Operation Theatre at the time of skin grafting (by the centimeter scale). After harvesting graft, the initial blood at the donor area was cleaned and then directly applied Calcium Alginate (Kalginate,USA) or Honey Impregnated gauzes. Above this thick padding of Gamjee (Burn gauze) and then Crepe bandages applied on the donor area. All wounds are seen and photograph is taken at 10th and 14th day by the digital camera (free of cost) and only one patient's wound were followed for 20 days. Total number of days till complete healing will be recorded in each patient and group.

Degree of pain will be assessed by visual analogue scale on 24 hours, 48 hours, 5th day, 10th day and 14th day.

The cost of each dressing till complete healing are recorded.

All patients are seen by the same doctor in the hospital and in OPD.

All relevant information including age, gender, associated medical disorder, wound healing, pain score, presence or absence of infection and cost of treatment are recorded on Proforma.

All patients receive the same post-op analgesia: (Inj Nalbuphine 5 mg I/Vq6H for 1st day and Tab Panadol (Paracetamol 500 mg) 2 TDS, Cap Celbex (Celecoxib, selective COX-II inhibitor)100mg BD from 2nd to 5th day) and if patient require more than the above regime than Inj Nalbuphine 5 mg I/V SOS, which is also noted.

All patients receive the same post-op Antibiotics regime: Inj Augmentin (Amoxicillin+Clavulanic acid) 1.2 gm I/V q8H for the 1st 48 hours and the Tab Augmentin 625 mg TDS for 5 days.

Data Analysis Procedure: The data was entered and analyze by SPSS version 14.0. Frequency and percentage were computed for categorical variable like sex, co morbid and infection for group A (Calcium Alginate) and group B (Honey Impregnated Gauze).

Mean and standard deviation were computed for quantitative variables like age, hemoglobin, wound area (cm^2), healing time (days). Pain score (vas), cost of treatment for both groups.

Student t test was applied to compare mean significant difference between groups for age, hemoglobin, wound area (cm^2), healing time (days). Pain score (vas), cost of treatment. $P \leq 0.05$ was considered level of significant.

RESULTS

The average age of the patients was found 36.96 ± 15.9 (Ranging form 15 to 78) years. Out of 60 patients, 49 (81.7%) were males and 11(18.3%) females in this study with 4.5:1 female to male ratio.

In group A, the average age of the patients was found 36.87±16.83 while in group B, the average age was found 37.10±15.16, the mean difference was not statistical significant between the groups at P= 0.95. (table 1). The mean hemoglobin of the patients in group-A, 11.99±1.2 and in group-B, 12.06±1.47 the mean difference was not statistical significant between the groups at P= 0.83 (table 1). Regarding co morbids, out of 60 patients, 8(13.33%) has diabetes mellitus, 5(8.3%) hypertensive and 2(3.33%) were tuberculosis patients.

Comparison of mean healing time in days between groups is also presented in table 2. In group A, the mean healing time was 10.67±1.53 days and in group B mean healing time was 11.13±2.3 days, there was no statistically significant difference between the groups. Comparison of mean healing times in days between

groups according to wound area was presented in table 2.

In both groups, Post op pain in first five days is evaluated as this is the most problematic period for the patients in terms of pain. In group B, less pain was observed on day 2 and day 3 (P<0.05) as shown in table 3.

Figure No.1: GROUP "A" (Calcium Alginate) Split skin graft donor site (Thigh) 14th Post Op Day

FigureNo.2: Group "B' (Honey) Split skin graft donor site (Thigh) 14th Post Op Day

Table No.1: Comparison of age, hemoglobin, area between groups (Group A = Calcium Alginate; Group B = Honey Impregnated Gauze)

Variables	Group-A N=30	Group-B n=30	P-Value
Age (Years)	36.87±16.83	37.10±15.16	0.95
Hemoglobin (gm/dl)	11.99±1.2	12.06±1.47	0.83
Wound Area (cm2)	163.95±106.18	214.97±139.45	0.12

Comparison of total cost of treatment between groups is presented in table 4. The average cost in group A was Rs: 1,689.7±1,355.3. While in group B cost of treatment was Rs: 441.73±292.11. Cost of dressing in group B was significantly low than group A (P = 0.0001).

In group B, Only one patient had infection because of the presence of foul smelling discharge of wound, which is managed conservatively with only dressings. While in group-A No infection was observed.

Table No.2: Comparison of mean healing times (days) between groups according to wound area

Wound Area (cm^2)	Healing times (days)				
	Group-A		Group-B		P-Value
< 200	20	10.00±00	16	10.63±2.5	0.27
200 - 400	9	11.78±2.11	12	11.33±1.97	0.62
> 400	1	14.00±0.00	2	14.00±00	-

Table No.3: Day wise mean comparison pain (visual analogue scale) between groups

Pain (score) at different days	group-A N=30	group-B n=30	P-Value
Pain (day 1)	7.87±1.91	6.9±2.32	0.084
Pain (day 2)	6.13±1.57	4.8±2.58	0.019*
Pain (day 3)	4.8±1.61	3.67±2.34	0.033*
Pain (day 4)	3.47±1.61	2.77±1.91	0.133
Pain (day 5)	1.97±1.16	2.28±2.15	0.491

Table No.4: Comparison of mean total cost of dressing between groups according to wound area

Wound Area (cm^2)	Total cost of dressing (Pak Rupees)				
	Group-A		Group-B		P-Value
< 200	20	1,115±382	16	302±216.5	0.001
200 – 400	9	2,348±1073	12	556±278.2	0.001
> 400	1	7236±0.00	2	872±282	0.035

DISCUSSION

Split thickness skin grafting is one of the most common means of reconstructing for variety of defects or of multiple etiologies[4].

The overall efficacy of various dressings is usually determined based on time to healing, associated pain, infection rates, and expense. Various methods have been proposed for the management of donor sites of split thickness skin grafts, but no conclusive evidence-based consensus regarding the optimal dressing choice has been reached[15]. The purpose of all these methods is to achieve rapid and smooth healing of the wound, with minimal donor site pain and nursing care[2]. Cost efficiency should also be taken into consideration in selecting the type of dressing.

More recent evidence in the literature suggests that good hydration is the single most important external factor responsible for optimal wound healing[16]. Split-thickness skin graft donor site has often bigger problem for the patient than the original defect.

In the literature, there are reports about the success of honey in various types of wounds, especially burn wounds. Split-thickness skin graft donor sites are like partial thickness burn wounds. Honey's healing effects of burn wounds can also be expected on other types of wounds. Use of honey impregnated guaze is like semiopen dressing. As the honey impregnated guaze adheres to the wound, there will be no fluid accumulation beneath the dressing. There was no difficulty in removing honey impregnated gauzes, and these factors along with easy availability and cost effectiveness make honey suitable for the dressing of split-thickness skin graft donor site. Honey causes less pain and rapid healing at the skin graft donor site[17].

In the literature honey has not been compared with Calcium Alginate in the dressing of split thickness skin graft donor site dressing but it is compared with saline soaked gauzes, paraffin gauzes and hydrocolloid dressings. Honey was found to be superior than saline soaked gauzes and paraffin gauzes in terms of epithelization time and decrease pain but found no difference when compared with hydrocolloid dressing[9]. Honey can be an alternative material for the split-thickness skin graft donor site treatment[18].

Post op pain, especially in the first five days, is the real problem for most patients of the split skin graft donor site[19]. We also found less pain with honey than Calcium alginate in (4 out 5) first five post op days especially on Day 2 and 3 are statistically significant as shown in table 3.

Calcium Alginate is compared by many other dressing material. Hydrocellular foam was found to be more comfortable than Calcium Alginate[20]. Adhesive retention dressings are more comfortable than Alginate dressing in split thickness skin graft donor site.

Our mean healing time is also comparable to other international studies. Pannier et all in 2002 showed mean healing time for Calcium Alginate was 10 days and for paraffin gauze (Jelonet) was 11 days[21]. O'Donoghue et all in 2000 found mean healing time in Calcium Alginate group was 8.75 (range 7 to 14 days)[22]. Another study by Lawrence et all in 1992 found 72% of donor site wounds dressed with Calcium Alginate were healed at 10 days[23].

Only one patient in group B had infection that later managed by the dressings only and none of the patient in group A. This might be because of contamination of the honey or dressing material. This can easily be avoided by more aseptic measures using small new bottle of honey on every patient or make small sterile container of honey and then use one container for only one patient. We used unprocessed and undiluted imported honey (Langnese) easily available in the market was found to be sterile because no organism was isolated from it (Culture of honey before using was done by our microbiology lab).

According to Ho and Ying the infection rate was 2.9% in Calcium Alginate group. In another study by O'Donoghue et al only one patient out of 16 had infection in Calcium Alginate group.

Cost effectiveness is an important issue in the management of any type of wounds[4]. There is also a marked difference in the mean cost of dressings between two groups i.e. Rs.441/= for group A and Rs.1689/= for group A as shown in Table 4.

As a result, use of honey impregnated gauzes is superior to Calcium Alginate in terms of degree of pain and cost effectiveness in the dressing of split thickness skin graft donor site and hence it is a good alternative, especially in developing countries like ours, where cost is an important issue.

CONCLUSION

Honey is a safe dressing for donor sites of Split skin graft. It is particularly advantageous as it is cost effective, easy to apply and remove, and significantly reduces donor site pain especially in the first few days.

Author's Contribution:

Concept & Design of Study:	Hassan Kashif
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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