Honey Dressing Accelerates Split-Thickness Skin Graft Donor Site Healing

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Received: 14 July 2012 / Accepted: 21 November 2012 / Published online: 7 December 2012
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Abstract The management of the donor site after harvesting a skin graft is an important issue, as patients often report more discomfort at the donor site than at the recipient site. There is, however, a plethora of dressings available for the treatment and management of donor sites, yet, there is no widely accepted method established for these partial thickness wounds. Honey has been found to be useful in the treatment of burns and other wounds, split-thickness skin graft donor sites are like partial thickness burn wounds and honey's healing effect on burn wound can also be expected on these types of wounds. Therefore, this study was undertaken to evaluate the effect of honey on skin graft donor sites. From 2002 to 2004, 100 patients who have undergone skin grafting for various reasons formed the material of the randomized study divided into two groups of 50 each in honey-treated group and Vaseline gauze-treated group. Graft donor site area ranged from 30 to 48 cm², mean 32.6 cm². In the group treated with honey, 90 % of the patients had nil or only moderate pain, whereas in the group treated with Vaseline gauze, 88 % had nil or mild pain ($p > 0.001$, not significant). There were no allergic reactions in any of the patients in either group. On opening of the dressing on the 7th day, epithelialization has occurred in 48 patients as compared to 39 in group 2, i.e., donor sites treated with Vaseline gauze ($p < 0.05$, statistically significant). By the 10th day, all the wounds healed in honey-treated group, whereas 76 % of wounds healed in Vaseline gauze-treated group ($p < 0.05$). At 1 month follow-up, the results were

comparable in both groups, with regard to patient satisfaction. In conclusion, honey-impregnated gauze causes less pain and heals donor sites wounds faster with good cosmetic result.

Keywords Honey · Skin graft donor site · Wound healing

Introduction

Skin grafting as a reconstructive technique has many benefits, including accelerating the healing of burns and other wounds and correcting scar contractures. There are well-established techniques for caring the skin graft site to assure an adequate graft and promote wound healing. However, similar consensus does not exist regarding optimal donor site care or the dressing which would result in best healing and is cosmetically accepted. The ideal split-thickness skin graft (STSG) donor site dressing would promote healing and be comfortable for the patient, impervious to infectious organisms, easily applied, and cost-effective. These dressings can be grossly categorized into moist and non-moist dressings. The key difference is that moist dressings can prevent exudate desiccation by retaining moisture [1].

Honey is a mixture of sugars prepared by the bees from the natural sugar solutions called nectar obtained from flowers. It has been used for treatment of wounds since time immemorial and ancient Indian medicine, Ayurveda has described it in the use of ulcers and fissures. The use of honey or honey-impregnated gauze is a way of semi-occlusive dressing. In the treatment of burn wounds, it has been shown that honey promotes wound healing, prevents infection, and lessens the pain during the change of dressing [2–5]. This prospective randomized study was designed to compare honey-impregnated gauze dressings with paraffin gauze in skin graft donor sites with regard to healing time, infection rate, and patient comfort.

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Table 1 Assessment of pain at donor site

	None		Mild		Moderate		Severe		Total
	No.	%	No.	%	No.	%	No.	%	
Group 1, patients treated with honey group	25	50	20	40	4	8	1	2	50
Group 2, patients treated with Vaseline gauze	20	40	24	48	4	8	2	4	50

Materials and Methods

Hundred patients who underwent split-thickness skin graft for various reasons during the period from January 2002 to January 2004 at General Hospital, Sangli formed the material for the study. Informed consent of the patients or parents in the case of children was obtained and the Institute ethical committee has approved the study. This study was registered with randomized controlled trials as required. Hundred chits were prepared, 50 for group 1 and 50 for group 2 at the beginning of the study, and the patients were allotted to either group (group 1, honey treated; group 2, Vaseline gauze treated) depending on which chit they pick up.

A Humby's knife was used to harvest a 0.1-in. thickness skin graft from the thigh in all patients, and the size of the wound at the donor site was calculated by multiplying the length and breadth. In group 1 ($n=50$), honey-impregnated gauze was applied on the donor site. The honey used in the study was unprocessed and was obtained from *Syzygium cumini*; family Skeels, Myrtaceae, commonly known as Jambhul which was found to be having higher antibacterial activity than other local plant honeys [6]. The microbiological tests for the honey were performed and no microorganism colonization was seen. In group 2 ($n=50$), a sterile Vaseline gauze was applied. In both the groups, sterile cotton was applied and bandaged. The following observations were recorded in all patients: leakage of exudate from the dressing, skin reactions, pain, epithelialization, and cosmetic appearance. Pain was assessed daily by two separate observers. The patient was given a questionnaire listing four adjectives—pain not significant classified as none, mild, moderate, and severe as described by Poulsen et al. [7]. The pain scores judged by the patients were recorded and the percentage of observations in each category was calculated in Table 1. If there was clinical evidence of infection as evidenced by the discharge or the foul smell, the dressings

were opened and new dressings were applied after cleaning till the wounds healed.

In all the other wounds, the bandage was removed after 1 week in both the groups. The wounds were observed for evidence of epithelialization and a wound swab was taken for culture. The wounds were reassessed on the 10th day and the patients were discharged after the healing of the wounds. The cosmetic appearance was determined by asking the patient to grade the satisfaction of appearance as one among the three grades—grade 1, satisfactory; grade 2, happy with cosmesis; and grade 3 as excellent when he or she felt the appearance was as good as the normal skin.

The grades of assessment as judged by the patients were recorded and the percentage of observation in each grade was calculated (Table 2). This method was devised by the author taking into consideration the requirements of Indian patients, as they have it covered with clothes and this was done at the follow-up after 1 month at the outpatient clinic. The data were analyzed using chi-square test.

Results

Of the 100 patients who underwent skin grafting, 52 were males and 48 were females. Patients were in the age group of 8–60 years (mean 32.3 years). The reasons for skin grafting were burns (82 patients) and chronic ulcers due to other causes (18 patients). The skin graft donor site area ranged from 30 to 48 cm², mean 32.6 cm². The assessment of pain as judged by the patients or in the case of children by the parents is shown in Table 1. In the group treated with honey, 90 % of the patients had nil or only moderate pain, whereas in the group treated with Vaseline gauze, 88 % had nil or mild pain ($p>0.001$, not significant). There were no allergic reactions in any of the patients in either group. On opening the dressing on the 7th day,

Table 2 Assessment of patients or parents of children with regard to cosmesis of wound

	Grade 1		Grade 2		Grade 3		Total
	No.	%	No.	%	No.	%	
Group 1, patients treated with honey group ($n=46$)	4	9	10	21.7	32	69.5	46
Group 2, patients treated with Vaseline gauze ($n=44$)	6	13.6	8	18.1	30	68.1	44

Grade 1, satisfactory; Grade 2, happy with cosmesis; Grade 3, excellent when he or she felt the appearance was as good as the normal skin

epithelialization has occurred in 48 patients as compared to 39 in group 2, i.e., donor sites treated with Vaseline gauze, ($p < 0.05$, statistically significant). By the 10th day, all the wounds are healed in honey-treated group, whereas 76 % wounds are healed in Vaseline gauze-treated group ($p < 0.05$, significant). The culture swab taken on the 7th day in both groups did not show the growth of any organisms. At the follow-up after 1 month, 46 patients from honey-treated group and 44 from Vaseline gauze-treated group could be examined, the rest of them were lost for follow-up. All the wounds healed in both the groups, the skin appearance as assessed by the patients or parents of children is shown in Table 2 ($p > 0.05$, not significant). No hypertrophic scar was present in either group.

Discussion

An ideal STSG donor site dressing should be easy to apply, provide rapid re-epithelialization, and be pain free, infection free, and relatively inexpensive [8]. It should be immunologically tolerated, result in good quality healed skin with minimal scarring, cosmetically acceptable appearance, and to the patient's satisfaction. Most authors, however, prefer to protect the donor site wound from trauma and infection by covering it with low-adherent, Vaseline-impregnated gauze. These dressings can be grossly categorized into moist-like Tegaderm, Aquacel Ag and Kaltostat and non-moist dressings like scarlet red, Xeroform, Jelonet, etc. The moist dressings prevent exudate desiccation by retaining moisture [8].

In the treatment of superficial and partial thickness burns, honey was found to heal the burns earlier than conventional dressing, with minimal scarring and lesser depigmentation [3, 4]. The use of honey-impregnated gauze allows the wound to remain moist, prevents infection, and promotes rapid epithelialization. In the present study, of paraffin gauze versus honey, epithelialization was faster with honey and pain was less when given more comfort to the patient. The components and features of honey that are relevant to wound healing are its viscosity, water content, sugars (primarily glucose and fructose), antioxidants, a wide range of amino acids, vitamins and minerals, glucose oxidase, which produces hydrogen peroxide and provides most of the antibacterial activity, and gluconic acid which gives honey an acidic pH of 3.2 to 4.5 [5].

In the honey-treated group, pain was less as compared to the Vaseline gauze-treated group as honey forms a thin layer over the wound, preventing the contact of the wound with air and reducing the pain. Honey unprocessed and undiluted as obtained from beehives was found to be sterile and inhibits the growth of gram-positive and gram-negative

organisms. Although the patient satisfaction and degree of pain and preferences are highly subjective, this combined with rapid epithelialization and healing of graft sites earlier result in cost-effectiveness, which is an indirect evidence, makes honey a better choice of skin graft donor site dressings. Though some authors have used photographic evidence to substantiate better wound healing [9, 10], we did not consider it necessary as the patients or patients' parents' assessment gave a fair indication of result.

Conclusion

The use of honey-impregnated gauze promotes healing; it is effective, comfortable for the patients, safe and results in excellent cosmetic outcome and makes an ideal dressing for skin graft donor sites.

Acknowledgments The author expresses his sincere thanks to B. V. Jagtap for his help in conducting the study. Thanks are also due to the Dean Government Medical College, Miraj and General Hospital, Sangli for permission to publish the paper.

Conflict of interest None declared

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