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A Comparative Study Between Calcium Alginate Dressing And Paraffin Gauze Over The Split Thickness Skin Graft Donor Site Area.

Ranjan R[1], Jha RN[2], Chowdhary P[3]
[1]Assistant Professor, Department of Surgery, Subharti Medical College, Meerut. E mail: rr_sagitt@yahoo.co.in
&
[2]Ex Professor & Head, Department of Surgery, Darbhanga Medical College, Darbhanga
&
[3]Resident, Department of Microbiology, Subharti Medical College, Meerut

Abstract: Aims: To compare between Calcium Alginate dressing and Paraffin Gauze dressing over the split thickness skin graft donor site area.
Place and Duration of study: The cases of the present study were selected from the patients admitted in surgical ward in various units of Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga between December 2009 and November 2010.
Methodology: Subjects with split thickness skin graft donor sites, 18 years of age and over were included in this study. The patients were assigned randomly to either the Calcium alginate group or the Paraffin gauze group.
Results: Ease of dressing was judged to be significantly more convenient with calcium alginate dressings than those for paraffin gauze dressings (P=.05).The amount of dressing soakage was significantly less with calcium alginate dressings than with paraffin gauze dressings (P=.05). Calcium alginate treated sites were less painful than those treated by paraffin gauze as assessed clinically and this difference was significant statistically (P=.05). Removal of calcium alginate dressing was significantly less painful than paraffin gauze dressing (P=.05). Ease of dressing removal was judged to be significantly more convenient with calcium alginate dressings than those for paraffin gauze dressings (P=.05). Calcium alginate treated donor sites were reepithelialized completely within a mean time of 7-10 days, whereas paraffin gauze treated donor sites required a mean time of 10-14 days for complete reepithelialization (P=.05).

Keywords: Split thickness skin graft donor site, Calcium alginate dressing, Paraffin gauze dressing, Moist dressing

I. INTRODUCTION

Split thickness skin grafts (STSG) are grafts that include the full epidermal skin layer and part of the dermal skin layer [1]. Grafts that are up to four inches wide and 10-12 inches long can be removed from flat body surfaces. Common sites include the upper anterior and lateral thighs [2]. A variety of dressing options exists for STSGs donor sites. The ideal donor site dressing should be one that promotes rapid re-epithelialization, causes little pain, requires little care, is inexpensive, and has a low rate of infection [3]. Options include occlusive dressings, semiocclusive dressings , semiopen dressings (Vaseline gauze), and no dressing [4]. The donor sites heal by a process of reepithelialization. Epithelial cells migrate across the wound surface from the rim of the wound and the edges of various structures in the dermal layer such as sebaceous glands and hair follicles. This process results in an epithelial cover of STSG donor site usually within 7-14 days. The rate of healing is quite variable and is affected by factors

such as depth, size and site of the wound along with the age of the patient. The aim of the donor site management is to maintain an environment that promotes optimal healing and prevents morbidity that may include pain, infection and ultimately delayed healing. Following harvesting of the donor site primary dressing is placed on the wound and pressure bandaging applied. The dressings most commonly used in the STSG donor site fall into a number of generic category. The major categories are [5]:

1. Mesh gauze- Paraffin gauze
2. Polyurethane semi permeable transparent film
3. Hydrocolloids
4. Fiber dressings- Alginates
5. Retention dressings

It has been seen with all these dressings that post operatively the patients complain of pain over the donor site area which sometimes can be agonizing. Soakage of the dressings with oozing from the donor bed is another problem. With all these dressings healing of the donor site area, takes quite a long time and many a times is unpredictable. Removal of the dressing is another area where one faces difficulty as the dressings are almost always adherent to the wound bed and removal is quite uneasy and painful to the patient [6].

This study was undertaken for clinical evaluation of effectiveness of Calcium alginate dressing and traditionally used Paraffin gauze dressing over the split thickness skin graft donor site area, addressing the following criteria:

1. Time to full healing
2. Post operative pain
3. Leakage rates from the dressing & soakage
4. Patient comfort and ease of dressing
5. Quality of regenerated skin

Traditionally Paraffin gauze dressings are most widely used dressing for STSG donor site area in our hospital. These dressings are then covered with layers of absorbent dressing. The airflow through the dressings allows the exudates to dry and the dressings usually form a hard crust. Removal of the dressing often results in considerable pain and damage to the new epithelium. These dressings are relatively inexpensive and do not require specific expertise for application or post operative management. However during the post operative period, patients complain more often of discomfort or pain at the donor area. Additionally the poor cosmetic appearance of donor sites after healing is not readily accepted [7].

Calcium alginate dressings are a relatively underused form of dressing that provide moist environment for healing. These are highly absorbent and form a gel surface when in contact with a moist wound. They have haemostatic properties that are useful in the management of donor sites [8].

A significant advancement in wound care came with Winter's [9] study which showed that occluded wounds healed much faster than dry wounds and moist wound environment optimized the healing rates. Later Hinman and Mailbach [10] confirmed Winter's work on human beings. An open wound, which is directly exposed to air, will dehydrate and a scab or eschar is formed. This forms a mechanical barrier to migrating epithelial cells and is then forced to move in a deeper level of tissue, which prolongs the healing process. Moist healing prevents the formation of scab as the dressing absorbs the wound exudates secreted.

The idea of haemostasis was achieved utilizing an alginate dressing., which also provided the absorption component yet the dressing still required changing prior to complete healing, resulting in a painful event (Groves & Lawrence) [11]. Attwood [12] continued the use of alginate and demonstrated a decrease in healing time compared to paraffin gauze dressings.

II. MATERIALS AND METHODS

Aims: To compare between Calcium Alginate dressing and Paraffin Gauze dressing over the split thickness skin graft donor site area.

Place and Duration of study: The cases of the present study were selected from the patients admitted in surgical ward in various units of Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga between December 2009 and November 2010.

Methodology: Subjects with split thickness skin graft donor sites over lateral aspect of thigh, 18 years of age and over were included in this study. Total 50 patients continuously were included in the study. The patients were assigned randomly to either the Calcium alginate group or the Paraffin gauze group.

When the patients were found to be fit for surgery clinically, investigation wise and after pre anesthetic check up, they were posted for surgery – viz. release of contracture, wide excision of the marjolin's ulcer, excision/scraping of the chronic non healing ulcer followed by coverage of the raw area with split thickness skin graft. On the donor site Alginate fibre dressings soaked in normal saline or paraffin gauze dressings were spread over. In all cases occlusive dressings were applied and compression bandages were applied over. POP slabs were applied in some cases if needed.

Post operative care, complications and their management–

Dressings of donor site were left intact for 10 days post operatively. On 10th post operative day the dressings were removed and observed for

- Ease of dressing removal
- Pain while dressing removal
- Donor site healing

Donor areas were reviewed daily until fully healed.

A donor site follow up chart was used for conducting the clinical follow up of the healing process. The information gathered in the chart included pain complained by the patient and need of analgesics, bleeding rate and soakage, need of reinforcement dressings and percentage of reepithelialization. In addition the nursing staff assessed the convenience of dressing and its removal.

When the patients reported for follow up the donor site areas were evaluated for scarring, redness, hyper or hypopigmentation, pain, itching, raised scar and pliability of the scar.

III. RESULTS AND DISCUSSION

Table I: Ease of Application of Calcium Alginate Dressing As Compared With Paraffin Gauze Dressing

S. No.	Ease of Application	CA group	%	PG group	%
1.	Very Easy (VE)	20	80	5	20
2.	Quite Easy (QE)	3	12	15	60
3.	Not Very Easy (NE)	2	08	5	20
4.	Difficult (D)	0	00	0	00

Ease of dressing was judged to be significantly more convenient with calcium alginate dressings than those for paraffin gauze dressings (P=.05). Motta GJ [8] has advocated calcium alginate dressing as an ideal, easy to use dressing for moderate to heavily exudating wounds.

Table II: Amount of Dressing Soakage

S. No.	Amount of dressing soakage	CA group	%	PG group	%
1.	Nil (N)	9	36	5	20
2.	Minimal (Mi)	13	52	10	40
3.	Moderate (Mo)	3	12	8	32
4.	Heavy (H)	0	00	2	08

Our study showed that with alginate dressings soakage was minimal in 88% of cases signifying hemostatic properties of the alginate dressings. The amount of dressing soakage was significantly less with calcium alginate dressings than with paraffin gauze dressings (P=.05). Steenfos H H and Argen M S [13] conducted a study on alginate dressings and reported that the alginate dressing showed increased initial blood absorption resulting in quicker hemostasis. Segal H C, Hunt B J, and Gilding K [14] also reported the hemostatic properties of alginate dressings.

Table III: Pain at Donor Site Area

S. No.	Visual analogue scale	Verbal pain scale	CA group	%	PG group	%
1.	0	None (N)	2	08	2	08
2.	01	Minimal (Mi)	18	72	10	40

3.	02	Annoying (Ann)	2	08	8	32
4.	03	Moderate (Mo)	2	08	3	12
5.	04	Uncomfor table (Uc)	1	04	2	08
6.	05	-	0	00	0	00
7.	06	Dreaded (Drd)	0	00	0	00
8.	07	-	0	00	0	00
9.	08	Horrible (Hor)	0	00	0	00
10.	09	-	0	00	0	00
11.	10	Agonizin g (Ago)	0	00	0	00

Calcium alginate treated sites were less painful than those treated by paraffin gauze as assessed clinically and this difference was significant statistically (P=.05).

Table IV: Pain While Dressing Removal

S. No.	Visual analo gue scale	Verbal pain scale	CA grou p	%	PG grou p	%
1.	0	None (N)	1	04	0	00
2.	01	Minimal (Mi)	5	20	3	12
3.	02	Annoyin g (Ann)	9	36	5	20
4.	03	Moderat e (Mo)	5	20	5	20
5.	04	Uncomfo rtable (Uc)	3	12	8	32
6.	05	-	0	00	0	00
7.	06	Dreaded (Drd)	2	08	2	08
8.	07	-	0	00	0	00
9.	08	Horrible (Ho)	0	00	2	08
10.	09	-	0	00	0	00
11.	10	Agonizin g (Ago)	0	00	0	00

Removal of calcium alginate dressing was significantly less painful than paraffin gauze dressing (P=.05).

Dissa J J, Alizadeh K, Smith J W, Hu Q, Cordeiro P G [15] conducted a study and reported that donor site discomfort was minimal with alginate dressings.

Butler B E, Eadie P A, Lowlor D et al [16] reported the pain reducing effects of alginate dressings. Bettinger D, Gore D, Humphries Y [17] also reported the same pain reducing effects of alginate dressings.

Table V: Ease of Dressing Removal

S. No.	Ease of removal	CA group	%	PG group	%
1.	Very Easy (VE)	4	16	0	00
2.	Quite Easy (QE)	17	68	10	40
3.	Not Very Easy (NE)	4	16	10	40
4.	Difficult (D)	0	00	3	12
5.	Dressing Adherent (Adh)	0	00	2	08

Ease of dressing removal was judged by the nursing staff to be significantly more convenient with calcium alginate dressings than those for paraffin gauze dressings (P=.05). Bettinger D, Gore D, Humphries Y [17] conducted studies on alginate dressings on burn patients with split

thickness skin graft and concluded that alginate dressings had advantage over mesh gauze dressings in respect of ease of care and removal and was favoured by the nursing personnel. Butler B E, Eadie P, Lowlor D et al [16] also reported the ease of removal of alginate dressings.

Table VI: Donor Site Healing On 10th Post Operative Day

S. No.	Donor site healing	CA group	%	PG group	%
1.	Fully Healed (FH)	18	72	10	40
2.	Partially Healed (PH)	5	20	10	40
3.	Epithelial Islands (EIS)	2	08	3	12
4.	No Healing (NH)	0	00	0	00
5.	Dressing Adherent (Adh)	0	00	2	08

When the dressings were removed on 10th post operative day 18 cases (72%) had complete healing (epithelialization) in calcium alginate group compared to the paraffin gauze group only 10 cases (40%) (P=.05).

O'Donoghue J M, O'Sullivan S T, Beausang E S et al [18] reported that alginate dressings provide a significant improvement in healing in split thickness skin graft donor sites. O'Donoghue J M, O'Sullivan S T, O'Shaughnessy M, O'Connor T P [19] reported that the mean time to healing in alginate group was 8.75±0.78 days. Dissa J J, Alizadeh K, Smith J W, Hu Q, Cordeiro P G [15] reported that 91% cases had achieved complete reepithelialization by 7th post operative day.

IV. CONCLUSION

The findings are convincing enough to support a wider use of Calcium alginate dressings in the management of Split thickness skin graft donor site area.

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