International Journal of Research in Medical Sciences
Vhora P et al. Int J Res Med Sci. 2024 Aug;12(8):2794-2798
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20241959

Original Research Article

A comparative study of chlorhexidine-coated tulle gras versus polyurethane adhesive film for donor site wound dressing in split skin graft cases

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Received: 21 June 2024
Revised: 07 July 2024
Accepted: 08 July 2024

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ABSTRACT

Background: Restoration of the skin barrier after wounding prevents infection, and minimises wound contraction, cosmetic disfigurement and volume depletion. Skin grafting represents an effective solution for large skin defects. Optimum care for donor-site wounds should promote wound healing cost-effectively while preventing complications like pain, infection, and scarring. Healthcare professionals use various dressings and topical agents, but there is no ideal dressing. In our study, we aim to compare the efficacy of chlorhexidine coated tulle gras (CTG) and polyurethane adhesive film (Opsite) in managing donor site wounds in split skin grafts.
Methods: This study was conducted at the Department of Surgery, Lokmanya Tilak Municipal Medical College, a teaching hospital and tertiary care centre in Mumbai, from September 2012 to December 2014, following a prospective observational design, with a sample size of 50 patients.
Results: The study subjects were predominantly in the 20-30 age group (36.0%) and mostly male (72.0%). The Opsite group reported significantly higher comfort scores (56.0%) compared to the CTG group (36.0%, p=0.002). Healing time was significantly shorter in the Opsite group (7.36±0.7 days) compared to the CTG group (9.52±1.39 days, p=0.001). Pain scores were significantly lower in the Opsite group at all observed times. Deviations like soakage and slippage were frequent in the Opsite group (76.0% and 56.0%, respectively).
Conclusions: Opsite has advantages over CTG viz. faster healing and re-epithelization, decreased pain, and greater comfort. However, soakage and exudate formation are seen with Opsite.

Keywords: Dressing, Skin grafting, Wound, Opsite, CTG

INTRODUCTION

Skin, the largest organ of the human body, covers the entire external surface and serves as a critical barrier against environmental insults such as trauma, radiation, and infection.[1] Additionally, the integument assists in thermoregulation and controls insensible fluid loss. Restoration of an intact skin barrier following wounding is crucial to prevent infection, minimize wound contraction, maintain function, reduce cosmetic disfigurement, and avoid volume depletion. Historically, skin grafting, which was first performed in India over 2000 years ago, has become the most rapid and effective method for reconstructing large skin defects.[2]

The wound created after harvesting the skin, known as the donor site wound, typically re-epithelializes completely within 7 to 21 days, depending on the thickness of the split skin graft.[3] Optimal local care for these donor site wounds should not only promote wound healing and be cost-effective but also prevent complications such as pain, infection, and scarring.

Despite numerous dressings and topical agents available for donor site wounds, there is no consensus on the optimum dressing choice. Consequently, significant variation exists among healthcare professionals regarding their preferred wound dressing materials or topical agents for treating donor site wounds.[4]

The existing evidence comprises systematic reviews, yet there is no strong evidence supporting the effectiveness of any single dressing for donor site wound treatment, particularly for alginates.[5-8] These systematic reviews tentatively conclude that moist dressings are generally preferable over non-moist dressings in terms of wound healing. In light of this, our study aims to definitively compare the clinical efficacy of chlorhexidine-coated tulle gras and polyurethane adhesive film (Opsite) in managing donor site wounds in cases of split skin graft. The objectives of the study were to compare the efficacy of chlorhexidine-coated tulle gras and polyurethane adhesive film (Opsite) dressings for split skin graft donor site wounds based on time of epithelization, complications, pain scores, and comfort scores.

Aim

The aim of the study was to compare CTG v/s polyurethane adhesive film (Opsite) in donor site wound dressings of split skin graft cases.

Objectives

Objectives were to compare efficacy of CTG and polyurethane adhesive film (Opsite) dressing for split skin graft donor site wounds on basis of time of epithelization noted by healing time of wound, pain scores, comfort scores and deviations such as soakage and slippage.

METHODS

This study was conducted at the Department of Surgery, Lokmanya Tilak Municipal Medical College, Sion, a teaching hospital and tertiary care centre in Mumbai, India. The study spanned two years, from September 2012 to December 2014, and followed a prospective observational design with a sample size of 50 patients. Inclusion criteria were patients of either sex, aged 13 to 65 years, with donor site wound sizes up to 30x15 cm, willing to participate in the study, and not fitting into exclusion criteria. Exclusion criteria included patients with anaemia, diabetes, hypertension, known renal or hepatic dysfunction, immunocompromised status, pregnant females, and donor site wounds larger than 30x15 cm as a single area. The study was conducted with the ethical approval of the institutional review board, ensuring adherence to ethical standards in research involving human subjects.

An open controlled trial was conducted on 50 patients who met the inclusion criteria. Pre-operative assessments were carried out, including relevant investigations and confirming patient fitness. Written consent was obtained from all patients or guardians. Donor site wounds of 25 patients were treated with chlorhexidine-coated tulle gras, and the other 25 with polyurethane adhesive film (Opsite). Observations were made from day 1, with dressings changed on day 7 and thereafter until complete epithelization occurred. Wounds were examined for deviations like soakage, slippage, and exudate formation, and swabs were taken for culture and sensitivity. Epithelization status was assessed on day 10. Pain scores were recorded on days 1, 3, 7, and 10 using a visual analog scale, while comfort scores were awarded by patients based on their experience with each dressing. Additionally, healthcare professionals evaluated the handling quality of each dressing material, scoring them for ease of handling.

Statistical analysis was performed using IBM SPSS Statistics version 26.0. Descriptive statistics, including means and standard deviations, were calculated for continuous variables, while frequencies and percentages were used for categorical data. Comparisons between the two groups were made using the chi-square test for categorical variables and the student's t-test for continuous variables. A p value of less than 0.05 was considered statistically significant.

RESULTS

This study involved 50 randomly selected patients undergoing skin grafting to compare donor-site wound dressings. Twenty-five patients were treated with Opsite dressings and the remaining 25 patients with chlorhexidine-coated tulle gras (CTG) dressings. The study subjects were predominantly in the 20-30 age group (36.0%) and mostly male (72.0%). Both Opsite and CTG groups had similar distributions across age and gender, with no significant differences observed (Table 1).

Table 1: Age-sex distribution of study subjects.

Variables	Opsite		CTG		Total	
	N	%	N	%	N	%
Age group (in years)						
<20	4	16	4	16	8	16
20-30	10	40	8	32	18	36
30-40	5	20	7	28	12	24
40-50	5	20	4	16	9	18
>50	1	4	2	8	3	6
Gender						
Male	17	68	19	76	36	72
Female	8	32	6	24	14	28

The comparison of comfort scores between the Opsite and CTG groups revealed that 56.0% of patients in the Opsite group reported comfort, which was significantly higher compared to 36.0% in the CTG group (p=0.002). Mild discomfort was reported by 44.0% of patients in the Opsite group and 64.0% in the CTG group, while no

patients in either group reported extreme discomfort. In terms of handling, both groups had 100.0% easy handling and 0.0% difficult handling, with no significant difference between them (p=1.00, NS). This indicates that Opsite dressings were more comfortable for patients compared to CTG dressings, although both dressing types were equally easy to handle by healthcare professionals (Table 2).

The duration of healing was significantly shorter in the Opsite group compared to the CTG group. The mean healing time for the Opsite group was 7.36(±0.7) days, whereas the mean healing time for the CTG group was 9.52 (±1.39) days. The difference in healing times between the two groups was statistically significant (p=0.001), indicating that the Opsite dressing promotes faster healing of donor site wounds compared to the CTG dressing (Figure 1).

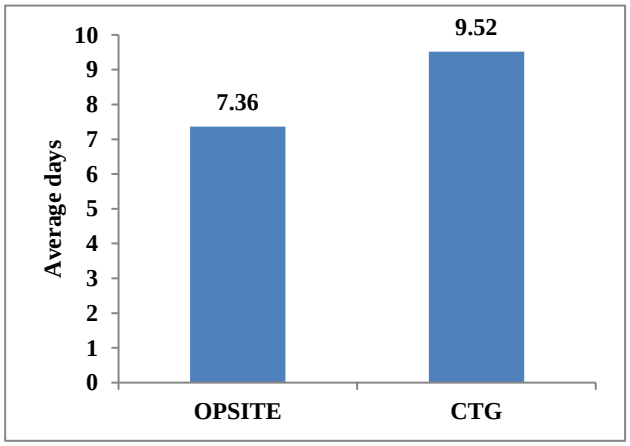

Figure 1: Duration of healing.

The comparison of mean changes in pain scores between the Opsite and CTG groups shows significant differences over time. At baseline, the mean pain score was 2.48±0.71 in the Opsite group and 4.76±0.88 in the CTG group. By day 3, the mean pain score decreased to 1.12±0.53 in the Opsite group and to 3.12±0.83 in the CTG group, with a significant p=0.001. On day 7, the pain scores further reduced to 0.52±0.65 in the Opsite group and 2.04±0.89 in the CTG group, again showing a significant difference (p=0.001). The change in pain scores from baseline to day 3 was -1.36±0.64 in the Opsite group and -1.64±0.57 in the CTG group, with a p=0.054, indicating no significant difference. However, the change from baseline to day 7 was -1.96±0.73 for Opsite and -2.72±0.61 for CTG, with a significant p=0.001. These results suggest that although both dressings effectively reduce pain over time, the Opsite dressing results in significantly lower pain scores compared to the CTG dressing by day 7 (Table 3 and Figure 2).

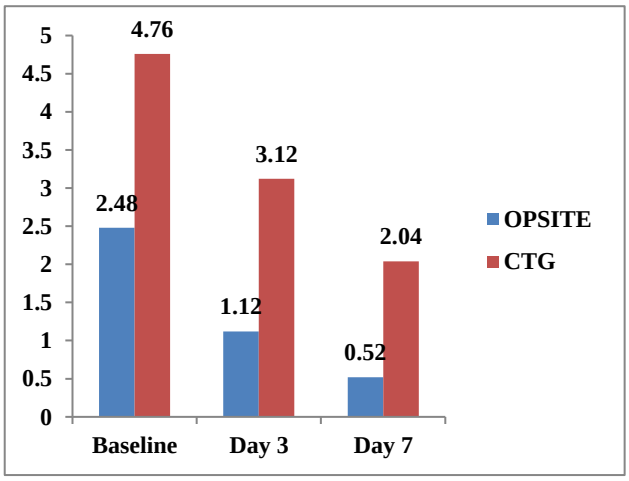

Figure 2: Comparison of mean changes in pain score between the groups.

The comparison of deviations between the Opsite and CTG groups shows a significant difference (p=0.0013). In the Opsite group, 24.0% of patients experienced no deviations, while in the CTG group, 100.0% of patients experienced no deviations. This stark contrast highlights the higher occurrence of deviations in the Opsite group. Specifically, 76.0% of patients with Opsite experienced slippage, 56.0% experienced soakage, and 16.0% had yellow exudate over the wound. None of these issues were reported in the CTG group. This indicates that the CTG dressing is associated with fewer complications and better stability compared to the Opsite dressing (Table 4).

Table 2: Comparison of comfort score between the groups.

Variables	Opsite		CTG		Total		P
	N	%	N	%	N	%	
Comfort score							
Comfort	14	56	9	36	23	46	0.002**
Mild discomfort	11	44	16	64	27	54	
Extreme discomfort	0	0	0	0	0	0	
Assessment							
Easy handling	25	100	25	100	50	100	1.00, NS
Difficult handling	0	0	0	0	0	0	

**Significant, NS-not significant.

Table 3: Comparison of mean changes in pain score between the groups.

Duration (days)	Opsite (Mean±SD)	CTG (Mean±SD)	P value
Baseline	2.48±0.71	4.76±0.88	-
Day 3	1.12±0.53	3.12±0.83	0.001*
Day 7	0.52±0.65	2.04±0.89	0.001*
Diff (Baseline-day 3)	-1.36±0.64	-1.64±0.57	0.054 NS
Diff (Baseline-day 7)	-1.96±0.73	-2.72±0.61	0.001*

*Significant, NS-not significant.

Table 4: Comparison of deviations between the groups.

Deviations	Opsite		CTG		Total		P value
	N	%	N	%	N	%	
Nil	6	24	25	100	31	62	0.0013
Slippage	19	76	0	0	19	38	
Soakage	14	56	0	0	14	28	
Yellow exudate over wound	4	16	0	0	4	8	

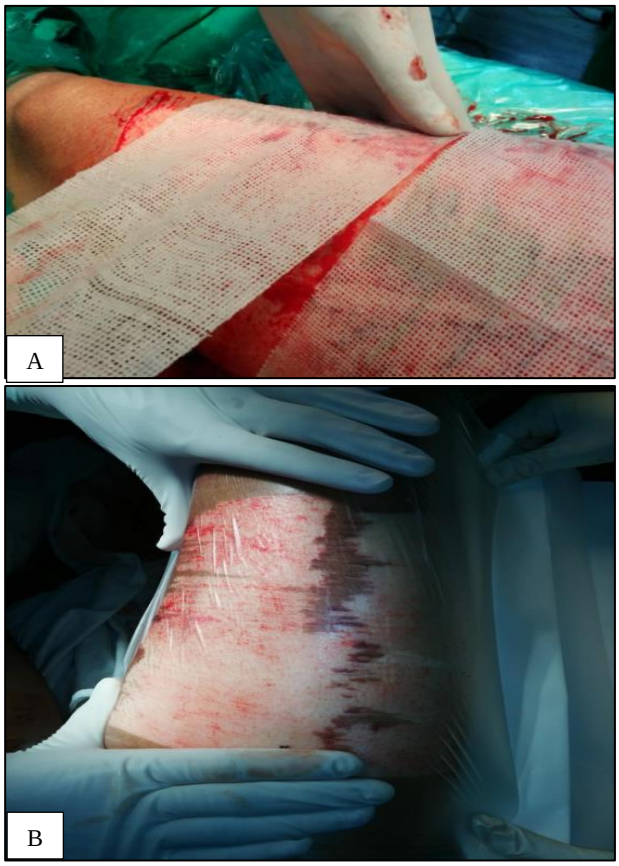

Figure 3 (A and B): Application of Bactigras and Opsite respectively.

DISCUSSION

Every year, approximately 7-8 million people in India suffer from burn injuries, with around 200,000 fatalities. At our burn's unit in Mumbai, we treat around 600 burn patients annually, accounting for 1.5% of total hospital admissions. Skin grafting is a crucial component of burn management to achieve wound closure in full-thickness burn wounds. Early epithelization of split-thickness skin graft (STSG) donor areas in burn patients is vital since donor sites may be limited, and re-harvesting may be necessary to obtain wound closure. The pain experienced by patients in the postoperative period is often more intense at the donor area than at the recipient site, which may make patients reluctant to undergo further procedures. To date, there is no consensus on the optimal donor site dressing that ensures early healing with minimal pain. Several authors have observed that creating a moist environment on the wound considerably reduces pain. In 1962, Winter and Chang demonstrated that moisture enhances wound re-epithelialization and angiogenesis, thus accelerating the healing rate.

In our study, we compared the efficacy of polyurethane adhesive film (Opsite) and chlorhexidine-coated tulle gras (CTG) for donor site wound dressings. The selected patients met inclusion criteria, had normal hemoglobin levels, and no addiction habits. The aim was to compare the two dressings concerning healing time, comfort score, and pain score. Results showed that age preponderance was more towards younger individuals, with 40.0% of the Opsite group and 32.0% of the CTG group belonging to the 20-30 years age group. Sex preponderance was more towards female patients, with 68.0% of the Opsite group and 76.0% of the CTG group being female. The mean pain score at baseline was significantly lower in the Opsite group (2.48) compared to the CTG group (4.76). On day 3, the pain score dropped to 1.12 in the Opsite group and 3.12 in the CTG group, with significant differences. By day 7, the pain score further decreased to 0.52 in the Opsite group compared to 2.04 in the CTG group. These findings indicate that Opsite dressings were less painful than CTG dressings, supported by studies such as those by Rakel et al, Persson et al, and Barnett et al.[5,9,10]

Regarding healing time, the mean duration was 7.36 days for the Opsite group, significantly less than the 9.52 days

for the CTG group. The 72% of patients with Opsite dressings healed by day 7, compared to only 12% in the CTG group. This faster healing time with Opsite dressings is supported by studies from Rakel et al, Iregbulem et al and Yadav et al.[5,11,12] In terms of comfort, 56.0% of patients in the Opsite group reported comfort compared to 36.0% in the CTG group. The majority of patients expressed mild discomfort with CTG dressings. Studies by Persson et al, Iregbulem et al, and Dornseifer et al found that polyurethane film dressings were more comfortable.[9,11,13] Lastly, both dressings showed no infections, and deviations such as slippage and soakage were significantly higher in the Opsite group. This study highlights that while Opsite dressings offer faster healing and greater comfort, they are associated with more deviations compared to CTG dressings.

CONCLUSION

Opsite has advantages over CTG dressing in terms of faster healing time, early re-epithelization and reduced pain. However, soakage and exudate formation does occur more frequently in Opsite dressings.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Lopez-Ojeda W, Pandey A, Alhajj M, Oakley AM. Anatomy, Skin (Integument). In: StatPearls. Treasure Island (FL): StatPearls Publishing. 2024.
2. Braza ME, Fahrenkopf MP. Split-Thickness Skin Grafts. In: StatPearls. Treasure Island (FL): StatPearls Publishing. 2024.
3. Ratner D. Skin grafting. Semin Cutan Med Surg. 2003;22(4):295-305.
4. Olawoye OA, Ademola SA, Iyun AO, Michael AI, Oluwatosin OM. Management of split skin graft donor site in the West African sub region: survey of plastic surgeons' practice. Ann Burns Fire Disasters. 2017;30(2):146-9.
5. Rakel BA, Bermel MA, Abbott LI, Baumler SK, Burger MR, Dawson CJ, et al. Split-thickness skin graft donor site care: a quantitative synthesis of the research. Appl Nurs Res ANR. 1998;11(4):174-82.
6. Wiechula R. The use of moist wound-healing dressings in the management of split-thickness skin graft donor sites: a systematic review. Int J Nurs Pract. 2003;9(2):S9-17.
7. Voineskos SH, Ayeni OA, McKnight L, Thoma A. Systematic review of skin graft donor-site dressings. Plast Reconstr Surg. 2009;124(1):298-306.
8. Schreuder S, Qureshi M, Vermeulen H, Ubbink D. Dressings and Topical Agents for Treating Donor Sites of Split-Skin Grafts: A Systematic Review Extended abstract. EWMA J. 2009;9:22.
9. Persson K, Salemark L. How to dress donor sites of split thickness skin grafts: a prospective, randomised study of four dressings. Scand J Plast Reconstr Surg Hand Surg. 2000;34(1):55-9.
10. Barnett A, Berkowitz RL, Mills R, Vistnes LM. Comparison of synthetic adhesive moisture vapor permeable and fine mesh gauze dressings for split-thickness skin graft donor sites. Am J Surg. 1983;145(3):37981.
11. Iregbulem LM. Use of a semi-permeable membrane dressing in donor sites in Nigerians. Ann Acad Med Singapore. 1983;12(2):425-9.
12. Yadav JK, Singhvi AM, Kumar N, Garg S. Topical phenytoin in the treatment of split-thickness skin autograft donor sites: a comparative study with polyurethane membrane drape and conventional dressing. Burns J Int Soc Burn Inj. 1993;19(4):306-10.
13. Dornseifer U, Lonic D, Gerstung TI, Herter F, Fichter AM, Holm C, et al. The ideal split-thickness skin graft donor-site dressing: a clinical comparative trial of a modified polyurethane dressing and aquacel. Plast Reconstr Surg. 2011;128(4):918-24.

Cite this article as: Vhora P, Baviskar MG, Vakil RB. A comparative study of chlorhexidine-coated tulle gras versus polyurethane adhesive film for donor site wound dressing in split skin graft cases. Int J Res Med Sci 2024;12:2794-8.