Original Research Paper

Volume - 14 | Issue - 10 | October - 2024 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

General Surgery

COMPARATIVE STUDY BETWEEN COLLAGEN DRESSING AND CONVENTIONAL FINE MESHED GAUZE PETROLEUM JELLY DRESSING IN HEALING OF DONOR SITE WOUND IN SPLIT THICKNESS SKIN GRAFT

Dr. Ashish Mishra	Junior Resident, Department Of General Surgery, baroda medical college, vadodara
Dr. Dharmendra K. Shah*	Professor and Head Of Unit, Department Of General Surgery, baroda medical college, vadodara*Corresponding Author
Dr. Mihir K. Shah	Assistant Professor &, Department Of General Surgery baroda medical college, vadodara
Dr. Abhishek Sardhara	Junior Resident, Department Of General Surgery baroda medical college, vadodara

ABSTRACT **Introduction:** Skin grafting is a common surgical procedure used to reconstruct and repair damaged skin resulting from trauma, burns, or surgical excision of skin lesions. Donor site wounds from STSG traditionally receive dressing with fine-meshed gauze impregnated with petroleum jelly. This approach aims to provide a protective barrier, prevent desiccation, and facilitate healing through a moist environment **Objective:** The purpose of the study is to compare the effectiveness of Collagen dressing versus conventional fine-meshed gauze with petroleum jelly dressing in the healing of donor site wounds following split thickness skin grafts. **Methods:** A total of 80 patients are taken and divided in two groups. Group A with collagen dressing and group B with conventional dressing. patient was followed up for epithelization (healing rate), pain assessment using VAS score and need of analgesia in both the groups. **Results:** patient with collagen dressing at donor site has low mean epithelization score as compared to conventional dressing. Mean VAS score is also low for collagen dressing as compared to conventional. Need of analgesia is also less in collagen dressing. **Conclusions:** collagen dressings offer significant advantages over conventional fine-meshed gauze with petroleum jelly in the management of donor site wounds following split-thickness skin grafts. The results demonstrate that collagen dressings not only accelerate the wound healing process but also significantly reduce patient discomfort, as evidenced by lower pain levels, reduced need for analgesia and a lower incidence of pruritus.

KEYWORDS : collagen dressings, conventional fine meshed gauze petroleum jelly dressings

INTRODUCTION

Skin grafting is a common surgical procedure used to reconstruct and repair damaged skin resulting from trauma, burns, or surgical excision of skin lesions. Among various techniques, split thickness skin grafting (STSG) involves harvesting a thin layer of epidermis and part of the dermis from a donor site, typically the thigh or abdomen, to cover the recipient site. While this procedure is crucial for wound closure and functional restoration, managing the donor site is equally critical as it affects patient comfort, recovery time, and overall outcomes (1).

Donor site wounds from STSG traditionally receive dressing with fine-meshed gauze impregnated with petroleum jelly. This approach aims to provide a protective barrier, prevent desiccation, and facilitate healing through a moist environment (2). However, the use of conventional gauze dressings has limitations, including frequent adherence to the wound bed, causing pain during dressing changes, and potential disruption of the fragile healing tissue, which may delay epithelialization and increase the risk of infection (3).

This dissertation aims to address this gap by conducting a comparative study between collagen dressings and conventional fine-meshed gauze with petroleum jelly dressing in the healing of donor site wounds following STSG. By systematically reviewing the existing literature, exploring the mechanisms of action of both dressing types, and conducting empirical research, this study seeks to contribute to the evidence base supporting best practices in wound care management for patients undergoing skin graft procedures (12).

In conclusion, optimizing the management of donor site wounds is crucial for enhancing patient recovery and minimizing complications associated with STSG. The comparative study proposed in this dissertation will provide valuable insights into the efficacy of collagen dressings versus conventional gauze dressings in this specific clinical context, thereby informing clinical decision-making and advancing wound care practices in reconstructive surgery (13).

MATERIALS AND METHODS

Study design: comparative study Sample size: $n = \frac{[2(Z\alpha + Z\beta)^2 \times \sigma^2]}{d^2}$

80 (with 95% confidence level and 90% power) 40 under collagen dressing 40 under conventional conventional fine meshed gauze petroleum jelly dressing

STUDY PERIOD:

The study was carried out over a period of 09 months that is from November 2023 to July 2024.

SAMPLING METHODS: purposive sampling technique based on inclusion and exclusion criteria. Statistical analysis: fishers exact test, chi square test, mann whitney test

STUDY CENTRE: baroda medical college, ssg hospital , Vadodara

INCLUSION AND EXCLUSION CRITERIA

INCLUSION CRITERIA:

1. AGE RANGE: Participants aged between 16 and 65 years were included to ensure the study encompassed a broad adult population while excluding very young and elderly patients who may have different healing capacities and comorbidities.

2. UNDERGOING SPLIT THICKNESS SKIN GRAFTING: Only patients scheduled for split thickness skin grafting (STSG) were considered, as the study focused on donor site wound healing associated with this specific procedure.

3. INFORMED CONSENT: Participants who provided written informed consent, demonstrating their willingness to participate and understanding of the study, were included.

4. DONOR SITE AREA: The donor site area ranged from 50 to 200 cm^2, ensuring consistency in wound size for accurate comparison between the two dressing types.

EXCLUSION CRITERIA:

1. AGE RESTRICTIONS: Patients younger than 16 years or older than 65 years were excluded to avoid confounding effects related to age-specific healing processes.

2. INCOMPLETE TREATMENT: Patients who did not complete their treatment at SSG Hospital were excluded to ensure complete follow-up data for accurate analysis.

3. LACK OF CONSENT: Patients who did not provide consent were excluded, as participation required voluntary agreement.

4. IMMUNOCOMPROMISED STATE: Patients on steroids, immunosuppressant drugs, or those with HIV/AIDS were excluded due to their altered wound healing responses.

5. UNCONTROLLED COMORBIDITIES: Patients with uncontrolled diabetes, uncontrolled hypertension, or psychiatric disorders were excluded, as these conditions could significantly affect wound healing.

6. COLLAGEN HYPERSENSITIVITY: Patients with known hypersensitivity to collagen were excluded to prevent adverse allergic reactions.

7. DONOR SITE SIZE: Patients with donor site areas less than 50 cm^2 or greater than 200 cm^2 were excluded to maintain uniformity in wound size for comparison.

APPLICATION METHODOLOGY

After harvesting split skin graft (SSG) using humby's knife, DSW is mopped with a sterile mop. A wet collagen sheet (bovine) of required dimension is taken and prior to application it is washed with normal saline until it is free of isopropyl alcohol preservative, then applied over the donor site ensuring that the trapped air is removed. A light dressing is done with non-adherent padding. In conventional dressing fine meshed pewtroleum dressing was applied instead of collagen sheet while rest of the procedure remains the same, as above.

PARAMETERS TO ASSESS OUTCOME:

- Primary endpoint with respect to the effectiveness of wound dressings in treatment of donor site wound is time taken for complete wound healing. Wound healing here is defined as re-epithelisation of the total wound surface.
- We decided re epithelisation of donor site wound to be assessed by an independent investigator who is unaware of the treatment given.
- 3 =complete epithelization, 2= scattered or spotty epithelisation, 1= no epithelisation. Wound is inspected on 14^{th}, 18^{th} and 22^{nd} postoperative day.
- Pain assessment is done using the VAS score on postoperative 1,2,3 and 14 at 8 o'clock In the morning.
- Pruritis over the donor area can also be assessed on day 14^{th} and 22^{nd} postoperatively.
- Duration of need of analgesia and type of analgesics (NSAIDS) to be given to patient having vas score more than equal to 4

0= no need
1= 1-3 days
2= 4-10 days
3=11-14 days
4=>14 days

RESULTS

Comparison of the Age of Patients Between Two Dressing Techniques

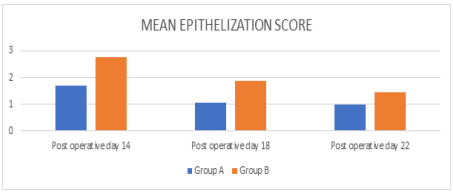
AGE GROUP	Total number of patients N=80	GROUP A (Collagen dressing) N=40	GROUP B (Conventional dressing) N=40
<20	11	6	5
21-30	7	5	2
31-40	25	15	10
41-50	13	4	9
51-60	11	5	6
61-70	12	4	8
>70	1	1	0

Comparison of the Gender of Patients Between Dressing Techniques

GENDER	TOTAL NUMBER	GROUP A N=40	GROUP B N=40	CHI SQUARE VALUE
MALE	62	34	28	Odds ratio =2.42
FEMALE	18	6	12	

Comparison of Wound Healing (in terms of Mean Epithelization Score) of Patients Between Two Dressing Techniques

Mean epithelization score	Group A (Collagen dressing) N=40	Group B (Conventional Dressing) N=40	P value
Post operative day 14	1.70	2.78	<0.001
Post operative day 18	1.05	1.89	<0.001
Post operative day 22	1	1.46	<0.001

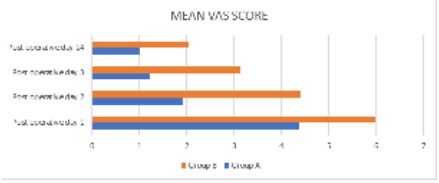


This table compares the mean epithelization scores, which measure wound healing progress, between Group A and Group B on postoperative days 14, 18, and 22. Group A consistently showed better wound healing with lower mean epithelization scores across all time points. The scores were significantly lower in Group A on all days, with P values less than 0.001, indicating a statistically significant faster healing process for the patients in Group A compared to those in Group B.

Comparison of Pain Assessment via Mean VAS Score of Patients Between the Two Dressing TechniquesPain levels, as assessed by the mean Visual Analog Scale (VAS) scores, were consistently lower in Group A compared to Group B from postoperative day 1 to day 14. On the first day, Group A had a mean VAS score of 4.37 compared to 5.97 in Group B, and the difference remained significant through day 14. This suggests that patients in Group A experienced less pain overall, which may correlate with the more effective wound healing observed in this group.

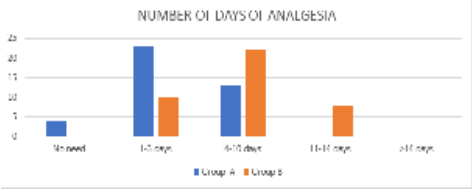
Table- 4: Comparison of pain assessment via mean VAS Score of patients between the two Dressing techniques (N=80)

Mean vas score	Group A	Group B	P value
Post operative day 1	4.37	5.97	<0.001
Post operative day 2	1.93	4.41	<0.001
Post operative day 3	1.24	3.14	<0.001
Post operative day 14	1.02	2.05	<0.001



Comparison of Number of days of Analgesia required in Group A and Group B

No. of days of analgesia required	Group A N=40	Group B N=40
No need	4	0
1-3 days	23	10
4-10 days	13	22
11-14 days	0	8
>14 days	0	0



DISCUSSION

The aim of this study is to evaluate and compare the efficacy of

collagen dressings with conventional fine-meshed gauze with petroleum jelly in the healing of donor site wounds following split-thickness skin grafts. Specifically, the study focuses on key outcomes such as wound healing time, pain management, pruritus incidence, and the overall requirement for analgesia. By analyzing these parameters, the study seeks to determine whether collagen dressings provide any clinical benefits over traditional gauze dressings in terms of accelerating wound healing, reducing patient discomfort, and minimizing complications associated with wound care.

The significance of this study lies in its potential to influence clinical practices in wound management, particularly for patients undergoing skin graft procedures. Donor site wounds are known for their pain, risk of infection, and slow healing process, which can significantly impact patient recovery and overall quality of life. Identifying an optimal dressing that can enhance healing and reduce pain and pruritus can lead to improved patient outcomes, shorter hospital stays, and reduced healthcare costs. Additionally, this study contributes to the growing body of evidence supporting the use of advanced wound dressings, such as collagen, which are becoming increasingly popular due to their bioactive properties that promote tissue regeneration. By providing a comprehensive comparison with traditional dressings, this study aims to offer valuable insights that could guide healthcare professionals in selecting the most effective wound management strategies, ultimately improving patient care and recovery outcomes in clinical settings.

This study compared the efficacy of collagen dressings with conventional fine-meshed gauze with petroleum jelly in the management of donor site wounds following split-thickness skin grafts. The key findings of the study can be summarized as follows:

WOUND HEALING: On postoperative day 14, the mean epithelization score for Group A (collagen dressings) was significantly lower at 1.70 compared to 2.78 in Group B (conventional gauze) ($P < 0.001$). This trend continued on days 18 and 22, with Group A showing scores of 1.05 and 1.00, respectively, versus 1.89 and 1.46 in Group B ($P < 0.001$).

PAIN MANAGEMENT: On postoperative day 1, the mean VAS score for Group A was 4.37, significantly lower than Group B's score of 5.97. By day 14, the scores had further decreased to 1.02 in Group A and 2.05 in Group B ($P < 0.001$).

ANALGESIA REQUIREMENTS: Patients in Group A required an average of 1.25 days of analgesia compared to 1.95 days in Group B ($P < 0.0001$). Notably, 4 patients in Group A required no analgesia at all, while all patients in Group B needed pain relief.

INCIDENCE OF PRURITUS: By postoperative day 14, only 10 patients in Group A reported pruritus, compared to 30 in Group B. By day 22, pruritus had resolved in all patients in Group A, while 7 patients in Group B continued to experience this symptom.

These results clearly indicate that collagen dressings are more effective than conventional gauze with petroleum jelly in enhancing wound healing, reducing pain, lowering analgesia requirements, and minimizing pruritus in patients with donor site wounds.

CONCLUSION

The findings of this study provide compelling evidence that collagen dressings offer significant advantages over conventional fine-meshed gauze with petroleum jelly in the management of donor site wounds following split-thickness skin grafts. The results demonstrate that collagen dressings not only accelerate the wound healing process but also significantly reduce patient discomfort, as evidenced by lower pain levels, reduced need for analgesia and a lower incidence of pruritus. These outcomes have important implications for clinical practice and patient care which is also comparable to the previous discussed Studies.

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