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CASE REPORT

Role of Biocellulose Occlusive Dressing in Partial Thickness Burn Wound Management

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ABSTRACT

Scald burns are a common cause of morbidity, particularly in children and the elderly. Traditional management often involves regular dressing changes and topical antimicrobials, which can be painful and distressing. Biocellulose dressings have emerged as promising alternatives for partial-thickness burn wounds owing to their high moisture retention, biocompatibility, and ability to reduce pain while promoting rapid re-epithelialization. We report a case of a young male with partial-thickness scald burns successfully managed using biocellulose dressing. The dressing provided an optimal wound-healing environment, minimized the need for frequent dressing changes, and resulted in satisfactory functional and aesthetic outcomes.

KEYWORDS

• Scald burns • Biocellulose dressing • Burn management • Wound healing • Monolaurin

INTRODUCTION

Burn injuries remain a significant global health burden, with scalds accounting for a large proportion, especially in pediatric and domestic settings. Optimal management of partial-thickness burns requires maintaining a moist wound environment, reducing infection risk, alleviating pain, and expediting epithelialization.[1,2]

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Traditional dressings (such as silver sulfadiazine, paraffin gauze, or hydrocolloids) have limitations, including frequent dressing changes, discomfort, and potential cytotoxicity.[3]

Biocellulose (bacterial cellulose or biosynthetic cellulose) is an effective wound dressing for burns, promoting faster healing, reducing pain, and providing a moist environment for recovery. Its structure supports fibroblasts, reduces the need for frequent dressing changes, and offers benefits like transparency and collaboration with other materials like collagen.[4]

Biocellulose, a biosynthetic cellulose derived from Monolaurin in coconut extract (Cocoheal by Ardor Biomed) has gained attention due to its unique nanofibrillar structure, high water-holding capacity, biocompatibility, 100% biodegradability and ability to sooth wound surfaces. This reduces exudate loss, pain, and bacterial colonization while supporting faster epithelial repair.[5]

We present a case of superficial partial-thickness scald burns treated with biocellulose dressing, highlighting its role in modern burn care.

MATERIALS AND METHODS

This study was conducted in a Tertiary Care Centre in Department of Plastic Surgery after getting the department ethical committee approval. Informed consent was obtained. The patient was a 3-year-old male child who had accidental scald burn injury sustaining 15 percentage burns to the left shoulder, upper back and pre-auricular region following fall of boiling hot water (Figure 1). He was admitted in burns care ICU and underwent fluid resuscitation. The patient was thoroughly investigated Wound tissue culture was sent and appropriate antibiotic therapy was given. Regular cleaning and dressings were done for one week and NPWT was applied over the wounds. As part of the wound-reconstructive plan, bleb grafting using small split-thickness skin islands was attempted to enhance epithelialisation, but the uptake was only partial. Subsequently, to further promote healing and assess its potential benefit, a decision was made to initiate a trial therapy of Cocoheal biocellulose dressing over the left shoulder and back region.

Figure 1: Wound over left shoulder and back region at presentation

After cleaning and irrigating the wound and pat drying the wound area, Cocoheal biocellulose dressing was applied by cutting into appropriate size. It was ensured that dressing was fully in contact with the wound without air bubbles (Figure 2).[5]

Figure 2: Application of Cocoheal biocellulose dressing

RESULTS

The burn wounds showed early epithelialisation within 3 days and it healed well within 2 weeks with minimal scarring (Figure 3). Bates Jenson wound assessment score improved from 26 to 14 in 1 week (Figure 3). No complications and side effects were noted. Procedure was uneventful.

Figure 3: Early epithelialisation after one dressing after 7 days

DISCUSSION

The choice of dressing in partial-thickness burns plays a pivotal role in wound healing, pain management, and scar outcomes. Conventional dressings such as silver sulfadiazine, although widely used, have drawbacks including frequent changes, cytotoxic effects on keratinocytes, and delayed epithelialization.[1,2] With the development of bio-cellulose dressings, burn care has entered a new era of evidence-based, patient-friendly wound management.

Cocoheal® is a **bio-cellulose occlusive wound dressing infused with monolaurin,** a coconut-derived antimicrobial compound. Its nanofibrillar, hydrophilic structure provides several clinically advantageous properties:[5]

1. **Moist wound environment** – Cocoheal® maintains hydration at the wound bed, preventing desiccation and enhancing keratinocyte migration. Moist wound healing has consistently been shown to accelerate epithelialization and reduce scar formation.[3,4]
2. **Pain relief and patient comfort** – The high water content and close adherence to wound surfaces provide a soothing effect, protecting exposed nerve endings and reducing pain. This benefit is supported by prior studies on biocellulose dressings in burns.[6]
3. **Antimicrobial activity** – Monolaurin incorporated into the matrix provides broad-spectrum antimicrobial coverage, helping reduce infection risk without the cytotoxicity associated with silver-based agents.[5,6]
4. **Exudate management** – The nano-porous structure absorbs wound exudates efficiently without macerating surrounding skin, a critical factor in superficial burns where exudation can vary.
5. **Autolytic debridement** – By sustaining a moist environment, Cocoheal® facilitates natural autolysis of necrotic tissue, thus supporting gentle wound bed preparation and minimizing painful mechanical debridement .[7,8]
6. **Scar modulation** – Clinical and experimental evidence suggests that bio-cellulose dressings promote faster epithelialization, decrease inflammatory response, and improve scar quality.[9,10,11]
7. **Biodegradability and safety** – Being 100% biodegradable, Cocoheal® reduces environmental impact. The only contraindications are allergy to monolaurin, third-degree burns, uncontrolled bleeding, or wounds with excessive exudates.[12]

In the present case, these properties translated into rapid wound healing, excellent pain relief, and a satisfactory cosmetic outcome. The ability to keep the dressing in place for several days without early replacement also reduced nursing burden and improved patient compliance.

When compared to hydrocolloids, hydrogels, and silver-based dressings, bio-cellulose dressings such as Cocoheal® have demonstrated superior moisture retention, lower dressing change frequency, and enhanced patient comfort.[5,6,9,12] These findings position Cocoheal® as an effective and practical alternative in the management of superficial partial-thickness burns.

CONCLUSION

In this study, we have understood the role of biocellulose occlusive dressings with coconut derived monolaurin in enhancement of wound healing and early scar management. They provided pain relief, reduced dressing frequency, and excellent cosmetic outcomes. Wider adoption of such bioactive dressings could enhance burn care protocols, especially in outpatient and resource-limited settings. To confirm the effectivity of Cocoheal biocellulose dressing in healing of wound, it is required to conduct larger randomised control trials.

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