CASE REPORT

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Bio-cellulose Dressing in the Management of Deep Second-Degree Burns: Our Experience

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ABSTRACT

Thermal burns are a common cause of mixed second burn injuries, often associated with pain, frequent dressing changes, and delayed epithelialization. Biocellulose dressings have emerged as advanced wound care materials due to their moisture-retentive, biocompatible, and analgesic properties

KEYWORDS

• Biocellulose • Second degree burns

INTRODUCTION

Burn injuries represent a significant global health burden, with scald burns accounting for a substantial proportion, particularly in paediatric, domestic, and occupational settings. Optimal management of Mixed second-degree burns aims to maintain a debridement and cover for deep areas, moist wound environment, prevent infection, minimize pain, and accelerate epithelialization while reducing scar formation.[1,2]

Conventional burn dressings such as silver sulfadiazine, paraffin gauze, and hydrocolloids are widely used but are often associated with drawbacks including frequent dressing changes, pain during removal,

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delayed epithelialization, and potential cytotoxic effects on regenerating tissue.[3] These limitations have prompted the development of advanced wound dressings that better support physiological healing.

Biocellulose, also known as bacterial or biosynthetic cellulose, is a natural polymer produced by microbial fermentation. Its nanofibrillar structure closely mimics the extracellular matrix, allowing excellent adherence to the wound bed, high moisture retention, and enhanced cellular proliferation.[4] Biocellulose dressings coated with monolaurin derived from coconut extract-coconut water and oil respectively (Cocoheal®, Ardor Biomed) have recently gained attention for their antimicrobial properties, biocompatibility, and ability to reduce pain while promoting rapid wound healing.[5] This article reports our clinical experience using Cocoheal® in a patient with second degree mixed burns.

METHODS

A 46 year old male patient presented with mixed second degree scald burns involving approximately 15% of the total body surface area, affecting the face and right upper limb. The injury resulted from accidental blast injury at workplace (commercial kitchen oven) with flash exposure to high temperature flame.

Initial management included fluid resuscitation, wound assessment, systemic antibiotics, and daily conventional wound care for one week. Following which deep areas over the volar forearm wear tangentially excised with a motorised dermabrader and then Meshed autografts were applied. Graft loss was noted probably owing to wound infection. Wound bed preparation was done in the following week- using biocellulose (Cocoheal®) was selected for definitive wound management t bed is ready for grafting

After thorough wound cleansing with saline and pat-drying, the biocellulose dressing was trimmed to fit the wound dimensions and applied carefully to ensure complete contact with the wound surface without air entrapment (Figure 1). The dressing was secured with a secondary non-occlusive dressing as per manufacturer guidelines.[5] Wound progress was monitored clinically after four days, and healing was assessed using the Bates–Jensen Wound Assessment Tool (BJWAT).

Figure 1: Cocoheal® bio-cellulose Dressing applied to deeper areas

RESULTS

Rapid healing was evident within four days of biocellulose dressing application. Progressive wound healing occurred without signs of infection, maceration, or allergic reaction.

The BJWAT score showed a marked improvement from 26 at the time of biocellulose application to 20 within four days indicating rapid wound bed improvement (Figure 2). The patient reported significant pain relief and comfort, and the number of dressing changes was markedly reduced. No complications or adverse events were observed during the treatment period.

Figure 2: Wound showing reduction in BJWAT score

DISCUSSION

Effective management of deep partial thickness burns requires a definitive cover, prior to which a dressing that supports epithelial regeneration while minimizing patient discomfort is required. Biocellulose dressings fulfill these requirements by maintaining a stable moist environment, reducing water loss, and promoting fibroblast activity.[3,4]

The high water content of biocellulose provides a cooling and analgesic effect, protecting exposed nerve endings and significantly reducing pain during both rest and movement.[6] The nanofibrillar, semi-permeable structure allows absorption of wound exudate while preventing desiccation and maceration,

thereby facilitating autolytic debridement and optimal wound bed preparation.[7,8]

Cocoheal® biocellulose, derived from monolaurin in coconut extract, additionally offers broad-spectrum antimicrobial activity without the cytotoxic effects commonly associated with silver-based dressings.[5,6] In comparison with hydrocolloids, hydrogels, and silver-impregnated dressings, biocellulose has demonstrated superior patient comfort, fewer dressing changes, and faster epithelialization.[5,6,9,12]

The present case highlights these advantages, demonstrating rapid healing, excellent pain control, and favorable cosmetic outcomes. Reduced dressing frequency also decreased nursing workload and improved overall patient satisfaction. However, biocellulose dressings are contraindicated in full-thickness burns, wounds with excessive exudation, or patients with known monolaurin allergy.[12]

CONCLUSION

Biocellulose dressings represent a valuable advancement in the management of deep partial-thickness burns. Their ability to promote epithelialization, reduce pain and minimize dressing changes makes them an effective alternative to conventional dressings. Wider adoption of biocellulose dressings such as Cocoheal® may enhance burn care, particularly in outpatient and resource-limited settings.

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