Keratin Dressings For Effective Wound Care Management in Acute Superficial and Partial Thickness Burn Injuries

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Introduction:
Wound epithelialisation is essential in the healing of superficial and partial thickness burn injuries. This trial of keratin-based products from the ReplicineTM range (Keraplast Technologies LLC, (www.keraplast.com)) was motivated by the ability of the keratin to accelerate healing and thus minimise scarring. The keratin in this range of products has been shown to enhance the activation of keratinocytes stimulatng migration and proliferation rates, and up-regulating the expression of key basal membrane proteins (type IV & VII collagens). Previous studies in partial thickness wounds (split skin graft donor sites) have demonstrated that the keratin gel and the keratin matrix used in this study, increase epithelialisation rates in some patients. The keratin gel has also been shown to reduce the incidence of poor scarring in a linear surgical wound.

Aim:
To develop a suitable dressing regimen and determine the effectiveness of keratin based products for superficial and partial thickness burns and compare to current standard care.

Methods:
Observational case study series of 40 patients who underwent standard burn management for acute burns, incorporating keratin dressings, inclusive of two keratin gels called keragelTM and keragelTM, and a keratin matrix called keramatrixTM. Inclusion criteria: burns presenting within 24 hours of injury and less than 10% total body surface area. Exclusion criteria: deep partial or full thickness burns requiring skin grafting or other operative management and infected burns.

Patients were treated with keratin-based products and secondary dressings as required. The patients were followed up for a minimum of 6 months. Scar assessments were done at 6-12 months using the patient and observer scar assessment scale (POASAS) to subjectively evaluate the effectiveness of the keratin-based dressings.

Results:
40 patients with 61 distinct burn areas were treated, 58 of these (95%) healed rapidly with no complications. Epithelialisation occurred at 6 days for superficial burns, and 10 days for partial thickness burns. Localised infection was noted in 2 burn areas (3%), however following treatment with oral antibiotics and topical antimicrobials (e.g. ActicoatTM), healed with no further complications. Split skin grafting was required to treat 1 patient with deep dermal burns. All burn scars were assessed using the POSAS scar assessment scale 6-12 months post injury, the average POSAS score 7.6 for patient and 6.0 for nurse observer.

Discussion:
Standard care dressings were used in combination with keragelTM and keramatrixTM and appropriate dressing regimens developed, allowing ease of use for patients in a community setting. No hospital admissions, therefore, procedures or antimicrobials were required except for the 3 patients requiring treatment for subsequent wound infection and one split skin graft. This was particularly important in small children who may have otherwise have required initial inpatient treatment under a general anaesthetic and outpatient follow up.

Patients were pleased with the comfort provided by the dressings and flexibility to return to a regular daily routine. Healing rates were at least equivalent to that expected with standard care. Similarly, scarring and skin color change, as quantified by the POSAS scar assessment, were very good.

Conclusions:
There is an unmet need for products that both rapidly epithelialise superficial and partial thickness burns and provide ease of use in community or outpatient settings. The range of keratin-based products trialed in this study highlighted fewer admission rates and theatre time, provided rapid healing, favourable scar outcomes and low numbers of complications.

References
4. A. Davidson, C. Marsh, H. Iona, J. Simcock. A Study Of Keratin Dressings In Skin Graft Donor Site Epithelialisation, under review for Journal of Wound Care

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