

Clinical evaluation of a barrier cream in periwound skin management



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Chronic wounds produce excessive exudate which causes moisture-associated skin damage, also known as maceration. Maceration occurs when healthy skin is in contact with moisture (e.g. wound fluid, sweat, urine) for prolonged periods, which can cause the skin to become soft. The aim of this evaluation was to prevent and manage maceration in the periwound skin area. Four patients with Harikrishna Periwound Skin Classification Class 2 periwound complications were recruited to test out a newly developed barrier cream in the management of periwound maceration. All four wounds showed improvement in the periwound skin, whereby there was decreased or no maceration after the application of the barrier cream, with no adverse events reported. The barrier cream appeared to be effective in managing maceration of the periwound area. It further affirms that barrier products, in the form of creams, lotions and sprays are crucial in managing the periwound, as the keratinocytes move from the periwound area into the wound bed to help promote epithelialisation. The limitation of this evaluation is that it involves a small sample group, which might not represent the wider population.

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Wound healing is a complex series of events that are interlinked and dependent on one another, and can be defined as the physiological processes by which the body replaces and restores function to damaged tissues (Tortora and Grabowski, 2000).

One of the many physiological functions of the skin includes protection against mechanical, chemical, thermal trauma; invasions of infectious pathogens and excessive fluids (Tortora and Grabowski, 2000). Chronic wounds produce excessive exudate which causes moisture-associated skin damage, also known as maceration. Maceration occurs when healthy skin is in contact with moisture (e.g. wound fluid, sweat, urine) for prolonged periods, which can cause the skin to become soft. It presents as a pale opaque rim surrounding the wound (Gray et al, 2011). This change in the skin can lead to a breakdown of the periwound area (Cameron, 2004).

Keratinocytes are the dominant cellular component of epidermis and have several critical roles in the wound healing

process. They are involved in the intricate mechanisms of initiation, maintenance and completion of wound healing (Pastar et al, 2008). Basal keratinocytes from the wound edges and dermal appendages, such as hair follicles, sweat glands and sebaceous (oil) glands, are the fundamental cells liable for the epithelialisation phase of wound healing (DiPietro et al, 2003). Keratinocytes migrate without proliferating at the initial stage (Bartkova et al, 2003). Migration can begin as early as a few hours after wounding. However, epithelial cells require viable tissue to migrate across, so if the wound is deep it must first be filled with granulation tissue (Mulvaney and Harrington, 1994).

For this evaluation, the Triangle of Wound Assessment (TOWA) and the 2015 Harikrishna Periwound Skin Classification (HPSC) were applied. The TOWA is a holistic and simple wound assessment framework that is divided into three areas: the wound bed, the wound edge and the periwound skin (Dowsett et al, 2015). While 2015 HPSC was used to describe and categorise the wound edges and skin surrounding the wound (Nair, 2018).

Table 1. The 2015 Harikrishna Periwound Skin Classification (HPSC) (Nair, 2018)

Class	Subtype	Periwound condition
0		Normal
1		Fibrous tissue/tissue at risk
2	A	Exudate centered with desiccation
	B	Exudate centered with maceration
	C	Exudate centered with allergy
3		Inflammation without infection
4		Inflammation with infection
5		Atypical (senescent cells/cancer/subcutaneous emphysema)

Objective

To prevent and manage maceration in the periwound skin area.

Method

The evaluation was carried out in an outpatient setting at the Wound Care Unit, Kuala Lumpur Hospital, Malaysia (WCUHKL). Participants comprised of patients who came for their routine treatment visit. There were four patients with chronic wounds who developed periwound complications recruited for this evaluation. The wounds were assessed using the TOWA. Wounds were cleansed with distilled water and debrided accordingly. Wounds were dressed with advanced moisture retentive dressings, as per standard of care. A newly developed barrier cream was tested on the periwound area to manage maceration, due to excessive exudation. Dressing changes were performed twice a week, routinely. The periwound skin was classified using the 2015 HPSC as shown in *Table 1*.

This evaluation conformed to the guidelines set out in the Declaration of Helsinki for Ethical Principles for Medical Research involving Human Subjects. The evaluation was approved by the Hospital Review Board (local institution board). The objectives and potential risks involved were explained to the patient in detail. Informed consent and permission to use wound photographs and case details for publication/research purposes were obtained.

Results

The evaluation was carried out in an outpatient setting at the WCUHKL. The participants comprised of patients who came for their routine treatment visit. A total of four patients who had maceration (HPSC Class 2B) were recruited; two patients with diabetic foot ulcers (DFU) and two patients with chronic venous ulcers. No other barrier products had

been applied to the wounds during the time when the patients were recruited. No adverse events were reported. All four wounds showed improvement in the periwound skin, whereby decreased or no maceration was observed after the application of the barrier cream.

Case 1

A 59-year-old male with diabetes mellitus (DM) and dyslipidaemia presented with a left anterior shin abscess. The wound was debrided and the patient then referred to the WCUHKL for further management (*Figure 1 and b*).



Figure 1. The images above depict the periwound before (a) and after (b) the application of the barrier cream

Case 2

A 62-year-old male with no known medical illness presented with a venous ulcer over the left medial malleolus (*Figure 2a & b*).



Figure 2. The images above depict the periwound before (a) and after (b) the application of the barrier cream

Case 3

A 55-year-old male with a left infected DFU over the plantar aspect. Wound debridement was done and the foot was offloaded with felt pads (*Figure 3a & b*).

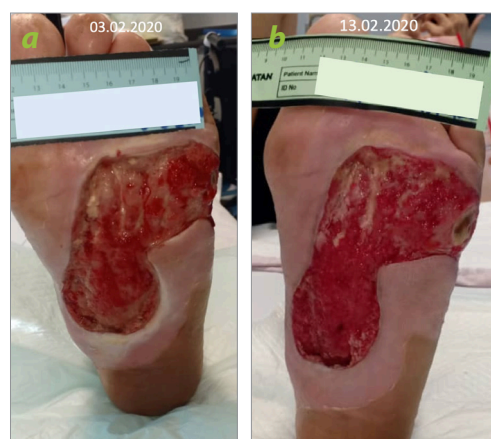


Figure 3. The images above depict the periwound before (a) and after (b) the application of the barrier cream

Case 4

A 62-year-old female presented with a hallux diabetic ulcer on her left foot (*Figure 4a and b*). The DFU was surgically debrided twice and the patient referred to the WCUHKL. No other comorbidities were identified.



Figure 4. The images above depict the periwound before (a) and after (b) the application of the barrier cream

Discussion

Complications such as periwound skin breakdown should be avoided in patients with a wound, as this can lead to increased wound size, delayed healing and increased levels of pain. To manage exudate production effectively, it is essential for a balance to be achieved between the extremes of wound desiccation and wetness. Moisture can induce significant damage in the skin folds, perineum and areas surrounding a wound or stoma comprising the skin's normal function as a barrier. Therefore, we find that the four cases in this prospective case series exhibited periwound skin maceration and this new barrier cream helped in managing maceration and preventing recurrence.

Protection of the skin against moisture damage is an important component of comprehensive skin and wound care. Skin barrier products such as barrier ointments, liquid polymers, and cyanoacrylates can be applied to the periwound region to create a protective layer that simultaneously maintains hydration levels, while blocking external sources of moisture and irritants (Woo et al, 2017). Usage of barrier cream is cost-friendly and an effective way in minimising damage to the friable skin.

Barrier cream is a topical formulation which functions as a physical barrier between the skin and contaminants that may irritate the skin (Bauer et al, 2010). On that account, barrier cream plays an important role in protecting the periwound skin and managing complications, and can be used to minimise the periwound skin's contact with exudate, thus preventing maceration and skin damage.

Conclusion

Management of the periwound skin is important, as highlighted in the TOWA. Barrier products such as creams, lotions and sprays are crucial in managing the periwound, as the keratinocytes move in from the periwound area into the wound bed to help promote epithelialisation.

The new barrier cream tested has been shown to be effective in preventing maceration, by reducing contact with exudate from the wound bed itself. The barrier cream is also hypoallergenic and made from a plant source. Therefore, there were no side effects nor adverse events reported in this case series. The limitation of this evaluation is that it involves a small sample group, which might not represent the wider population.

Potential source of bias

Selection bias will be present in this evaluation as the participants were only selected from the pool of patients at the WCUHKL and, therefore, may not represent the wider population.

Declaration of interest:

MEDIMOVA PLT sponsored the barrier creams used for this evaluation. The authors have no conflicts of interest to declare.

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