Managing chronic, autoimmune disease-related wounds with polymeric membrane dressing



Authors:
Joshua Jeevan, Wan Safarizan Wan Saleh, Norfarahwati Abdul Ghani

Patients with wounds due to an underlying autoimmune disorder present a unique challenge for wound care professionals. Firstly, the complexity of the wound and its aetiology requires a multidisciplinary approach. Secondly, the use of immunosuppressive therapy — essential to control the systemic immune response — increases the risk of infection but slows down the normal wound healing processes. Here we present two case reports on autoimmune disease-related wounds in two female patients. The first case involved a young adult with a systemic lupus erythematosus (SLE) who had a wound over the left gaiter region for more than a year and had been treated with multiple hydrogel dressings without showing improvement. The second case is an elderly patient who developed multiple necrotic wounds over her bilateral lower limbs. She had been treated with conventional dressings for several months but once her biopsy results revealed that she had pyoderma gangrenosum (PG), was switched to a polymeric membrane dressing (PMD). Both patients recovered well with no recurrence after wound re-epithelization.

Joshua Jeevan, *Medical Officer, Wound Care Unit, Seri Manjung Hospital, Perak, Malaysia;* ***Wan Safarizan Wan Saleh,*** *Registered Nurse, Wound Care Unit, Seri Manjung Hospital, Perak, Malaysia;* ***Norfarahwati Abdul Ghani,*** *Registered Nurse, Wound Care Unit, Seri Manjung Hospital, Perak, Malaysia*

Vasculitis and autoimmune diseases play a role in 20% to 23% of patients with chronic lower limb extremity ulcer (Shanmugam, 2017). Autoimmune diseases should be considered in patients with slow-healing wounds who do not respond to appropriate vascular intervention and standard local wound care. Wounds in people with autoimmune diseases are more painful and take much longer to heal — 14.6 months, on average, compared with 10.3 months in their counterparts with healthy immune systems (Shanmugam, 2011). A multidisciplinary team with a holistic approach is needed for systemic disease control which will improve the clinical outcomes for many of these challenging patients with wounds that do not heal. This study was conducted to evaluate the role of polymeric membrane dressing in wound healing.

First case study

Systemic lupus erythematosus (SLE) is an autoimmune disease, in which patients have unusual antibodies in their blood that are targeted against their own body tissues (William, 2014). Leg ulceration is a rare but well recognized complication of SLE (Chia, 2014). We report on an 18-year-old female with SLE, who had been diagnosed when she was 16 years old. She was on oral steroid therapy and had a leg ulcer for 18 months. At the initial assessment, the wound measured 8cm x 4cm x 1cm over the lateral aspect of the left leg and had signs of local infection ***[Figure 1]***. Biofilm was suspected and the patient reported that dressing changes were very painful. An ankle-brachial pressure index (ABPI) was documented 0.91 and no osteomyelitic changes were noted on X-ray analysis. This ulcer had previously not responded well to a variety of topical dressings.

Method

Wound progression and pain scale were assessed by charts provided by the Malaysian Ministry of Health (MOH) dressing procedures were carried out based on the MOH Standard Operating Procedures. The wound was cleansed

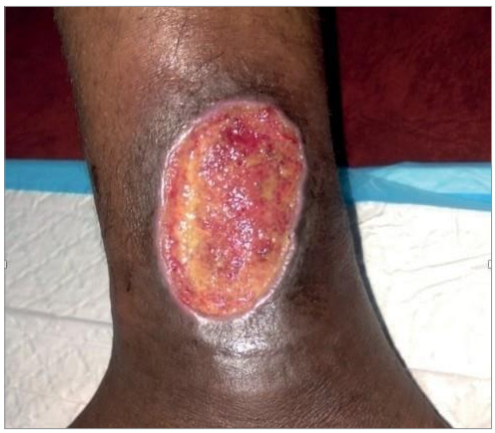

Figure 1 (Day 1). An 8 cm x 4 cm x 1 cm ulcer with 30% of slough with moderate amount of exudate

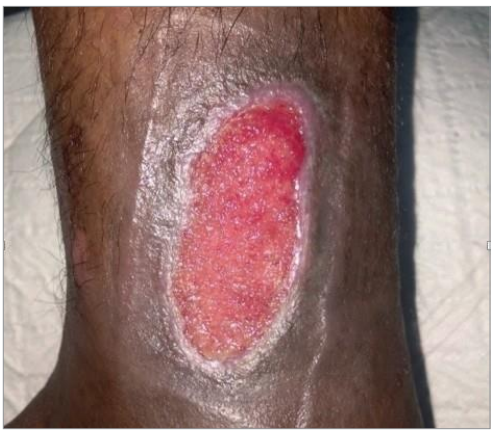

Figure 2 (Day 21). The ulcer with 20% epithelization and 80% granulation tissue

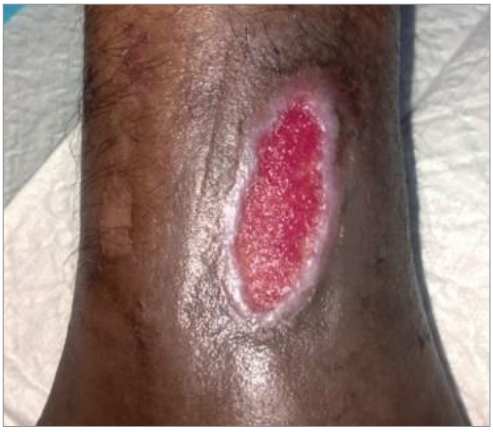

Figure 3 (Day 39). The ulcer with 35% epithelized and 65% granulation tissue

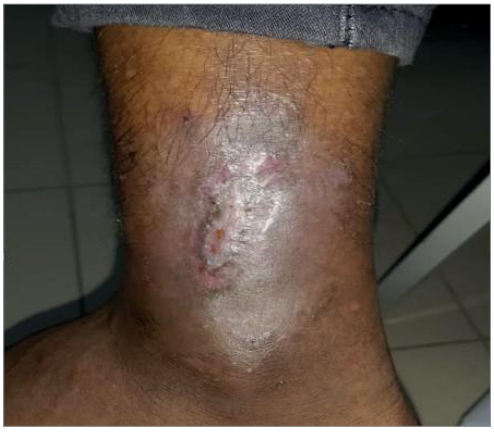

Figure 4 (Day 62). Ulcer fully epithelized

with sterile water, PMD was placed onto the wound bed and was secured by taping after circumferential gauze to gauze cover. This protocol was repeated every two days until Day 21, which was later converted to every three-days regimen until wound closure on Day 62.

Results

A reduction of 34% wound surface was seen from Day 21 *[Figure 2]* and there were 35% of epithelization tissue on Day 39 *[Figure 3]*. The wound achieved complete epithelization after two months duration *[Figure 4]*. Local infection subsided at Day 12 and onwards. Pain score had gradually reduced from Day 14 onwards as the patient required oral opioid analgesia thrice per day initially.

Second case study

Pyoderma gangrenosum (PG) is an autoimmune neutrophilic dermatosis resulting in cutaneous ulceration. Lesions typically develop as a pustule or bulla that subsequently ulcerates with purulent drainage. The lesions have rapid onset and progression with necrotic borders and surrounding inflammation and erythema (Braswell, 2015).

We report a hypertensive 63-year- old female, newly diagnosed with PG after developing multiple necrotic skin lesions over bilateral lower limbs. The wounds were initially debrided and PG was diagnosed after the analysis of the biopsy results. The patient was then started on oral steroid therapy. Initial assessment of wound measuring 5 cm x 6.5 cm x 0.2 cm over the lateral aspect of the left leg with signs of local infection *[Figure 5]*. Wound exudative and very painful dressing change were noted. An ABPI of 0.83 was documented. The patient had two wounds over the right lower limb measuring 4 cm x 4 cm at the medial malleolar region *[Figure 6]* and anterolateral shin *[Figure 7]* which were Day 16 after surgical debridement. The ABPI was recorded at 1.13. The wounds responded poorly with other topical advanced dressings.

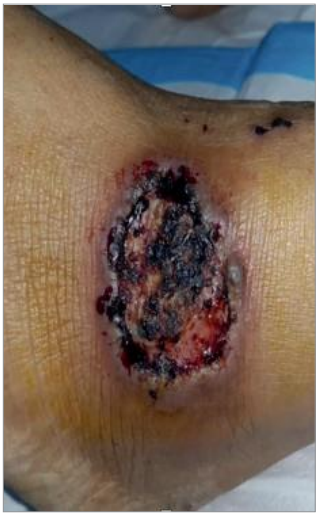

Figure 5 (Day 1). Wound 1 with necrotic tissue

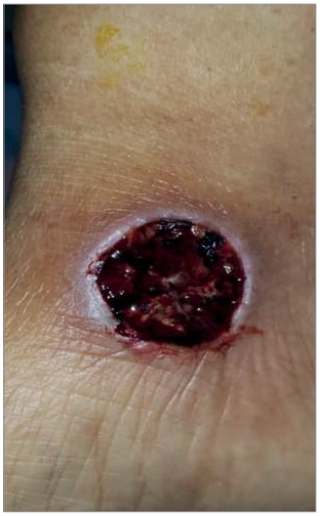

Figure 6 (Day 1). Wound 2 with necrotic tissue

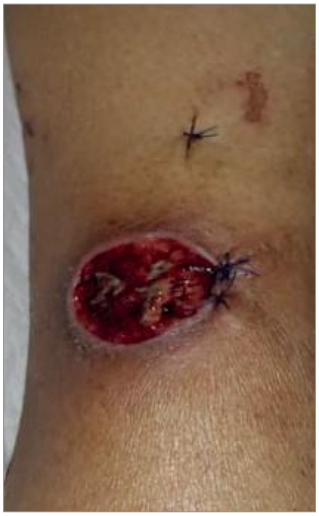

Figure 7 (Day1). Wound 3 with necrotic tissue

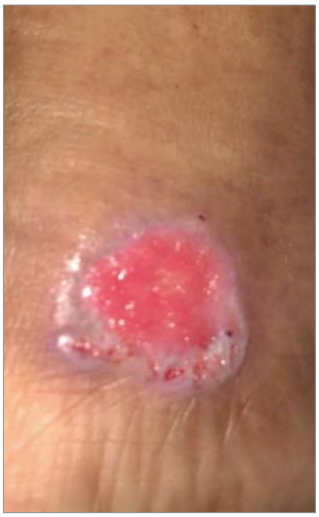

Figure 8 (Day 13). Wound 2 with granulating tissue

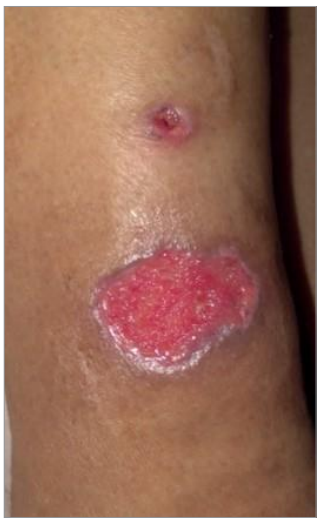

Figure 9 (Day 13). Wounds 3 with granulating tissue

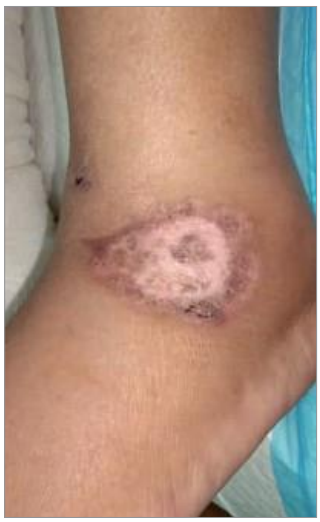

Figure 10 (Day 40). Wound 1 has fully epithelized

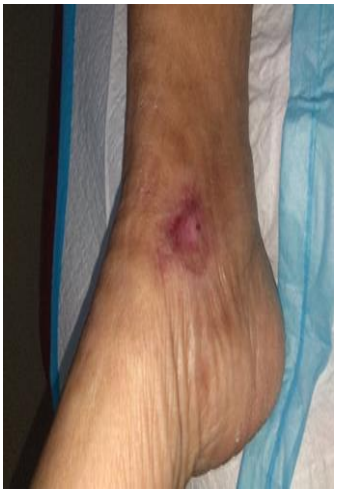

Figure 11 (Day 34). Wound 2 has fully epithelized

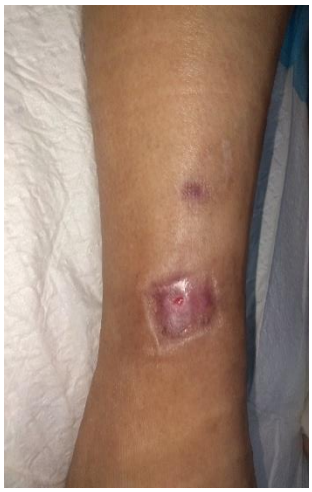

Figure 12 (Day 36). Wound 3 has fully epithelized

The patient was referred by medical team for further management as the wound was getting necrotic prior to surgical debridement.

Method

Wound progression and pain scale were assessed by charts provided by the Malaysian MOH and all dressing procedures were conducted based on the MOH Standard Operating Procedures. The wound was cleansed with sterile water, PMD was placed onto the wound bed and was secured by taping after circumferential gauze to gauze cover. The protocol was repeated every day until Day 13 over the left lateral malleolar region, which was later changed to every two-days regime. The wounds over the right lower limb was dressed every two days until full re-epithelization on Day 40.

Results

A reduction of 23% wound surface was seen from Day 13 onwards *[Figure 8]* and *[Figure 9]* with predominant granulation and epithelization tissues. The wound achieved complete re-epithelization after six weeks duration *[Figure 11]* and *[Figure 12]*. Local infection subsided at day thirteen and onwards. Pain score had gradually reduced from Day 15 onwards. The wound over the left leg fully epithelized on Day 40.

Discussion

PMD was chosen due to its ability to reduce nociceptive response, thus reduces pain, facilitates autolytic debridement and enhances rapid wound healing on chronic wounds (Davies, 2011). Liquefied slough will be absorbed by the dressing, eliminates the need for painful mechanical debridement which is pivotal in autoimmune wounds.

Challenges

When patients with autoimmune disorder develop a wound, the treatment is often not straightforward and requires the wound care team to work holistically. The majority of the patients have very fragile skin, which limits the use of adhesives. In addition, the use of immunosuppressant treatment increases the risk of infection and oral prednisolone slows wound healing but it is necessary to control the systemic disease. Therefore, wound recurrence is very common in patients with autoimmune disorders due to impaired quality of their skin.

Conclusion

PMD is a promising dressing material and effective in healing these two autoimmune related wounds. However, the underlying aetiology of the wound should be addressed and treated prior to application of this dressing. Furthermore, large clinical trials are needed to establish the efficacy of PMD in treating autoimmune related wounds. WAS

References

Braswell SF, Kostopoulos TC, Ortega-Loayza AG (2015) Pathophysiology of pyoderma gangrenosum (PG): An updated review. *J Am Acad Dermatol*73(4): 691–8

Chia HY, Tang MB (2015) Chronic leg ulcers in adult patients with rheumatological diseases a 7-year retrospective review. I*nt Wound J* 11(6): 601

Davies SL, White RJ (2011) Defining a holistic pain-relieving approach to wound care via a drug-free polymeric membrane dressing. *J Wound Care* 20 (5): 250–4

Shanmugam VK, Schilling A, Germinari A et al (2011) Prevalence of immune disease in patients with wounds presenting to a tertiary wound healing centre. *International Wound Journal* https://doi.org/10.1111/j.1742-481X 2011.00899.x

Shanmugam VK, Divya Angra, Hamza Rahimi, Sean McNish (2017) Vasculitic and autoimmune wounds. *J Vasc Surg Venous Lymphat Disord* 5(2): 280–92