TREATMENT OF FOUR RARE AND DIFFICULT WOUNDS REQUIRING EXCEPTIONAL WOUND BED PREPARATION

Rudi Deleus
R.N., C.C.N., Head Nurse; Burns Unit, Intensive Care Department
Gasthuisberg University Hospital, Leuven, Belgium

INTRODUCTION
Local management of a non-healing wound involves wound bed preparation. Wound bed preparation aims to ensure the formation of granulation tissue which leads to complete wound closure. It focuses on debridement, bacterial balance, management of wound exudates and the overall health status of the patient. Due to its broad antimicrobial activity, chlorhexidine gluconate is widely used in forms of aqueous solutions as a topical antiseptic. Enzyme alginogels have a dual mode of action: the alginogel structure continuously debrides necrotic tissue, exudate, pus and bacteria thus removing it from the wound bed where it may otherwise inhibit healing whilst the antimicrobial enzyme system (EGI enzyme complex) selectively targets the microbial cell wall of entrapped bacteria without damaging cells involved in wound healing. This communication describes a wound management plan consisting of wound irrigation with chlorhexidine gluconate 0.05% combined with topical application of an enzyme alginogel® with an antimicrobial enzyme system, for the continuous debridement of four wounds in two patients and the restoration of bacterial balance and management of exudate in those wounds.

WOUND EVOLUTION & TREATMENT
Case 1
A 30-year-old, clinically obese woman was admitted to hospital suffering from tiredness and exhaustion. She was diagnosed with thrombosis of the left arm and lung embolism. Simultaneously, cellulitis of the abdominal wall and an anal fistula developed.

The patient presented with markedly painful abdominal and femoral injuries with central necrosis (biochemically documented inflammation with CRP >25 mg/L, [ULN = 5 mg/L]). Both wounds were excised down to the fascia. Proteus sp. was detected in draining liquid cultures and Enterobacter sp. in wound fluid cultures. Amoxicillin and clavulanate and tobramycin were administered.

Treatment consisted of repetitive debridement, povidone-iodine Vaseline compresses and skin grafts failed. The patient was transferred to the burns unit and the new wound management plan initiated. Initially, the wounds were irrigated daily with chlorhexidine gluconate 0.05% before a liberal application of the enzyme alginogel® which was covered with a non-adhesive dressing. An exudate levels decreased wound cleaning was performed every second day and the enzyme alginogel® left in situ for 2 to 3 days.

Case 2
A 56-year-old man was admitted to the Plastic and Reconstructive Surgery Unit, presenting with an open hip wound and an open perineal wound following leg amputation with flap reconstruction. Diagnosis included diabetes mellitus type II; urinary sepsis; obese; traumatic paraplegia; cysto-prostatectomy with Bricker derivation; left leg amputation due to MRSA infection of his hamstring; and gluteal transposition flap.

On admission both wounds were colonised with MRSA and Proteus mirabilis. The hip wound was initially closed after partial granulation and was covered with foam dressings. The perineal wound was covered with yellow slough, mainly on the dorsal side. Complications of the flap reconstruction included wound dehiscence and inability to approximate the junctions of both flaps. The former was initially closed after partial granulation of the wound was achieved and was covered with foam dressings. Meanwhile, the residual defects at the junction of both flaps were grafted (autologous skin grafts).

Pressure sores developed and conservative treatment with Povidone-iodine Vaseline gauze was unsuccessful. The exposed and infected hipbone was milled but this did not lead to granulation tissue formation. Further, the hip wound cavity was filled with slough and the perineal wound was not healing, therefore the new wound management plan was initiated. Treatment consisted of daily extended irrigation using chlorhexidine gluconate 0.05%, followed by liberal enzyme alginogel® application which was covered by a non-adhesive overlap and fixed with a PU film during the first 4 weeks; and subsequently 3 times per week.

RESULTS
Abdominal wound: The excised abdominal wound showed fat necrosis at the edges at the start of treatment (Figure 3). By Day 3 of the new wound management plan granulation tissue was visible and by Day 6 a clean and viable wound appeared (Figure 2). On Day 20 the wound was again excised (Figure 4). Daily enzyme alginogel® dressings were applied. Five days later (Day 25) the allogenic skin grafts replaced by autologous skin grafts. Re-epithelisation was noted with the autologous skin grafts at Day 31 (Figure 5); further epithelisation was documented as the wound went onto complete healing.

Femoral wound: Fat necrosis was visible at the wound edges of the surgically excised thigh wound at the start of treatment (Figure 4). Granulation tissue was noted at Day 3. By Day 21 the wound was almost completely granulating (Figure 5). Autologous skin grafts were applied on Day 22 and by Day 77 re-epithelisation was clearly noted (Figure 6).

Hip wound: Figure 7 shows the wound with the newly milled hip ridge clearly visible and the remnants of the enzyme alginogel® before dressing change and chlorhexidine gluconate 0.05% irrigation. By Day 27 there is no sign of infection and the wound is clean with granulation tissue partially covering the hip bone (Figure 8). By Day 50 granulation tissue completely covered the hip bone (Figure 9) and by Day 56 marked wound retration is noted (Figure 10).

Perineal wound: At the start of treatment, the perineal wound had an atonic aspect (Figure 11). By Day 21, the wound is clean with fat necrosis reducing (Figure 12) and by Day 31 the wound has gradually retracted (Figure 13). After 50 days of this treatment a nicely red, granulating wound without clinical signs of infection is seen (Figure 14).

CONCLUSION
Complete wound healing was achieved in both wounds of case one. The wounds of case two remained colonised with MRSA and Proteus mirabilis, however, since the enzyme alginogel® restored bacterial balance, wounds progressed towards healing; wounds became visible cleaner within a few days and epithelisation was noted; although complete healing had not been achieved when patient two was dismissed from the hospital. In the perineal wound, adherence of wound flaps was not achieved, and in the hip wound granulation tissue completely overgrew the exposed bone of the hip wound after 4 weeks. After several weeks of treatment both wounds had retracted markedly.

A treatment consisting of daily chlorhexidine gluconate 0.05% irrigation followed by liberal enzyme alginogel® application ensured the non-traumatic removal of necrotic tissue within and around the ulcer and created a good environment for subsequent skin transplantations. The enzyme alginogel® absorbed large volumes of exudate, conformed to the wound, and sustained granulation and epithelisation. The combination of chlorhexidine gluconate 0.05% hydrotherapy followed by the enzyme alginogel® proved to be a suitable product for wound bed preparation in all four wounds discussed.

*Enzyme alginogel® = Flaminal® Forte

Reference List