CASE STUDY: REMOVAL OF BIOFILM IN INFECTED VENOUS LEG ULCER (VLU) USING PRONTOSAN® WOUND IRRIGATION SOLUTION AND GEL

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Background/Introduction
Biofilms develop when different species of bacteria adhere to a surface and secrete a glue-like slimy structure allowing them to become anchored to their surface, often causing detrimental effects (Montana State University, 1998-2006). Biofilms can develop anywhere that bacteria is present including human tissue. The known presence of biofilms in wounds is a relatively recent development and is associated with the potential to delay healing resulting in a chronic inflammatory state (Wolcott et al, 2008). Chronic wounds such as leg ulcers are colonized by various microorganisms and as such may have an abundance of biofilms (James et al, 2008) which by their nature protect themselves against the effects of cleaning solutions, antibacterial and antiseptic substances, including antibiotics. Regular sharp debridement of the wound bed can disrupt the biofilm, making it weaker to then allow other treatments to be effective such as systemic antibiotics and topical antiseptics such as silver and honey (Wolcott et al, 2009). However multiple strategies are required at the same time to continually suppress the biofilm (Wolcott et al, 2009).

Sharp debridement must only be undertaken by a skilled practitioner. Difficulties can arise due to lack of skills and competencies to provide regular sharp debridement to patients with chronically infected wounds and therefore other strategies may have to be considered.

An 84 year old lady with a six month history of recurrent exacerbating chronic infected Venous Leg Ulcer (VLU) was referred to the Complex Wound Clinic (CWC). A case study was undertaken to evaluate the effectiveness of using a Polyhexamidine (PHMB) and Undecylenamidopropyl Betaine (Betaine) wound irrigation solution and gel (Prontosan).

In a retrospective review (Andriessen and Eberlein, 2008) the use of Prontosan solution for cleansing of venous leg ulcers contributed significantly to optimization of the local wound environment, preventing secondary infection. Betaine is widely used in the cosmetic industry.

Past Medical History
- Chronic Lymphoid Leukaemia. There was no active treatment.
- Bilateral Knee Replacement.
- Aortic Stenosis.
- Bilateral Stripping Varicose Veins.
- Recurrent Leg Ulcer.
- Hiatus Hernia.

Medication
- Co-Dydramol up to 8 daily.
- Diazepam 5mg OD.
- Omeprazole 20mg OD.
- Calcium Carbonate and Calciferol 1.5g and 10mcg.

Previous Treatments
- Multiple courses of broad spectrum antibiotics.
- Topical antiseptic Hydrofibre dressing.
- Support bandaging toe to knee.
- Required daily dressings to manage exudate and strike through.

Assessment
The wound to the left lateral aspect measured 38 sq cms with 100% slough and covered in a glassy, sticky structure that lay proud of the wound bed and had green malodorous exudate (photo 1). Several previous courses of antibiotics had proved unsuccessful and the wound swab demonstrated no bacterial growth. She had a high pain score of 8 out of 10 and was unable to tolerate high compression therapy and taking Co-Dydramol four times daily. It was therefore probable that there was presence of biofilm in the wound, which caused the pain and exacerbation of the wound. The patient who had previously been out-going and very extrovert had become socially isolated and depressed due to pain and exudate levels.

Method
Commenced dressings three times weekly
- Irrigating then soaking wound with Prontosan wound irrigation solution for 10 minutes.
- Applying Prontosan gel to wound bed.
- Applying Hydrofibre Ag and multi-layer Hydrofibre to absorb exudate.
- Continued support bandaging as before.

Results
Within 3 days there was a noticeable difference in the wound bed. The raised shiny surface was no longer present and there was evidence of approximately 25% granulation tissue and less peri-ulcer inflammation (photo 2). Two weeks after initiation of treatment regime, the wound bed had reduced in size to 34 cms sq and had 50% granulation tissue (photo 3). The pain score had reduced to 3 out of 10 and four layer bandaging was commenced and tolerated and frequency of dressings was reduced to twice weekly. 12 weeks later the wound measured 16 cms sq with 98% granulation (photo 4) and required weekly dressings.

Conclusion
The rapid progression in the appearance of the wound bed, reduction of pain and exudate suggests that the biofilm which was probably present in the wound was penetrated and removed by using Prontosan wound irrigation solution and gel. It appears that the combination of the antimicrobial effect of PHMB and the cleansing effect of Betaine disturbed the biofilm layers thus reducing bioburden. This allowed the patient to tolerate high compression bandaging, the gold standard treatment for venous leg ulcers, which had previously not been possible due to extreme pain levels. The patient’s quality of life improved with a reduction in pain, reduction in exudate levels requiring only weekly dressings. Her mobility increased and she could begin to walk short distances again allowing her to go out and resume normal social activities. The cost of wound management was reduced with only weekly visits by the District Nurses being required compared to daily visits prior to intervention, and through reduced use of antibiotics.

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