A review of the in vitro and clinical evidence for ACTISORB® Silver 220 Activated Charcoal Dressings

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Abstract

Introduction

Wound malodour is a distressing symptom associated with chronic wounds, and has been shown to significantly affect patient quality of life.1,2 Wound malodour is often associated with chronic colonisation and infection with anaerobic bacteria,3 which produce volatile, malodorous compounds through their metabolism.

Silver impregnated activated charcoal dressings (SIAC) are comprised of activated charcoal cloth impregnated with silver, within a nylon sleeve. When applied to wounds, the activated charcoal absorbs bacteria and volatiles, while silver in the cloth inactivates bacteria1,2.

Method

In vitro antimicrobial evaluation against anaerobic bacteria

The efficacy of SIAC to reduce bacterial populations was evaluated against a panel of 10 facultative and obligate anaerobic bacteria; Bacteroides fragilis (BF), Enterococcus faecalis (EF), Vancomycin-resistant Enterococcus faecalis (VREa), Vancomycin-resistant Enterococcus faecium (VREb), Staphylococcus aureus (SA), Methicillin-resistant Staphylococcus aureus (MRSA), Methicillin-resistant Staphylococcus epidermidis (MRSE), Pseudomonas aeruginosa (PA), Proteus mirabilis (PM) and Clostridium difficile (CD) by triplicate log10 reduction assay. Samples of culture were removed at various time points over 24 hours and total viable counts (TVC) determined.

Clinical evaluation and evidence

A review of the clinical evidence available has been conducted and multiple clinical studies across all levels of evidence have been published demonstrating the clinical effectiveness of SIAC. Most recently, an international case series evaluated the use of SIAC on 7 patients with critically colonised chronic wounds; 5 venous leg ulcers, and 2 diabetic foot ulcers.3 Within the context of this study, SIAC was applied over a period of 2 to 4 weeks, and wounds were evaluated weekly during treatment for wound malodour, wound size, and extent of granulation.

Results and discussion

The in vitro test results showed that SIAC achieved a >5 log10 reduction in TVC of all facultative and obligate anaerobic organisms challenged within 24 hours. This is consistent with previous data, demonstrating that SIAC is effective against >150 clinically relevant pathogen strains, including anaerobes and two strains of Candida5.

Numerous clinical studies have shown reduction in malodour and progression towards wound healing. A recent publication confirmed these clinical findings.

Conclusions

Together the evidence presented demonstrates the efficacy of ACTISORB® Silver 220 in the management of a range of chronic malodorous wounds to reduce facultative and obligate anaerobic bacterial populations in vitro and reduce malodour, and so may have a positive impact on patient’s quality of life.

Clinical data

A series of 7 case reports3 involving the use of ACTISORB® Silver 220 dressing in the management of different critically colonised wound scenarios. Patients were managed for a minimum of 2 weeks and a maximum of 4 weeks, with the decision to continue management with a silver dressing based on continual assessment.

Example Case Reports

An additional series of 6 case reports5 showed the use of ACTISORB® Silver 220 dressings in the management of various niche wound scenarios. Patients were managed for a minimum of 3 days and maximum of 3 weeks depending on the wound on the nature of the wound.

Methodology

ANTIMICROBIAL ACTIVITY OF ACTISORB® SILVER 220 EVALUATED IN VITRO BY LOG10 REDUCTION ASSAY

• Bacterial suspensions were sampled at frequent time points over the duration of testing.
• Test organisms: Bacteroides fragilis (BF) NCTC 9343, Enterococcus faecalis (EF) ATCC 49352, Vancomycin-resistant Enterococcus faecalis (VREa) PHL 33, Vancomycin-resistant Enterococcus faecium (VREb) PHL 26, Staphylococcus aureus (SA) ATCC 6538, Methicillin-resistant Staphylococcus aureus (MRSA) PHL 2, Methicillin-resistant Staphylococcus epidermidis (MRSE) NCTC 11964, Pseudomonas aeruginosa (PA) ATCC 27312, Proteus mirabilis (PM) NCTC 9559 and Clostridium difficile (CD) ATCC 43255.
• Assay conditions: Assay conducted in 0.1% Bacto™-peptone (BD Worldwide, Oxford, UK) at 37°C with anaerobic incubation.
• Test dressings were placed into a quantified bacterial suspension. Dressings tested in triplicate.
• Samples taken at 0, 15, 30, 60, 180 and 1440 minutes, residual antimicrobial activity neutralised, and remaining bacteria enumerated onto Fastidious Anaerobe Agar (FAA) ±5% horse blood (for CD and BF) or Tryptone Soy Agar (TSA) for all other strains.
• Log reductions were calculated compared to a gauze control.

References