How DACC dressings work to reduce bioburden and bacteria

This article outlines the use of antimicrobial dressings that contain dialkyl carbamoyl chloride (DACC). Unlike traditional antimicrobial dressings, DACC dressings bind to pathogens rather than destroying them. This reduces the level of bacteria in the wound and the dressings can be used in between episodes of debridement to prevent bacteria from re-establishing.

“I  is very easy to become overwhelmed by the different types of dressings available for the management of wounds. Grouping the dressings together into families makes it easier to understand how they work and which wounds they are more effective in treating.

One family of dressings are the antimicrobials. The most commonly used antimicrobial dressings will either contain silver, iodine, honey or polyhexamethylene biguanide (PHMB). These antimicrobials all work by damaging the bacterial cell wall or disrupting bacterial cell function (Butcher, 2011).

Dialkyl carbamoyl chloride (DACC) is another type of antimicrobial agent. DACC does not actively damage bacterial cell walls or disrupt bacterial function as the traditional antimicrobial dressings do, however, it is an extremely effective and safe antimicrobial for infection management and prevention.

How does DACC work?

DACC is a hydrophobic fatty acid that has the ability to reduce the level of bacteria in a wound without actively destroying the pathogens (Ljungh et al, 2006). Most pathogenic organisms have hydrophobic properties. When bacteria or fungi come into contact with a DACC-coated dressing, which is also hydrophobic, they bind to the dressing (Probst et al, 2012). Once bound to the DACC-coated dressing, the bacteria or fungi become inactive. The pathogens are removed from the wound with each dressing change. This helps to reduce the level of bacteria in the wound bed (Bowler et al, 1999).

Clinical indications

It is recommended best practice not to use traditional antimicrobial dressings for longer than 2 weeks without review, in order to prevent widespread misuse and unnecessary long-term use (Wounds UK, 2010). Additionally, long-term use is not recommended for iodine or silver-containing dressings because these can be systematically absorbed (Butcher, 2011). Although PHMB and honey are not systematically absorbed, their bacteriocidal action leaves debris in the wound bed (Butcher, 2011).

Uniquely, there is no systemic absorption of DACC from dressings.

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STUART THOMPSON-MCHALE
Tissue Viability Nurse Specialist, Nottingham University Hospitals NHS Trust
and bacteria are removed from the wound bed on the dressing. This means that it is safe to use DACC-coated dressings for longer than 2 weeks and they are safe for use as a prophylaxis in controlling bacterial growth in wounds (Butcher, 2011). This is of significant value when treating chronic wounds. Chronic wounds have a high bioburden which often delays healing and has the potential to cause infection (Bowler et al, 2001).

Debridement is recommended as a first-line treatment to reduce the bioburden and non-viable tissue present in chronic wounds (Vowden and Vowden 2011). There are various types of debridement, such as sharp, enzymatic, larval and autolytic. Often more than one method of debridement will be used to manage a chronic wound.

If a chronic wound is not debrided on a regular basis, bioburden will return to the wound. Because DACC-coated dressings are able to remove bacteria, they can be used between episodes of debridement to prevent bioburden re-establishing and causing the wounds to become static with the potential to become infected.

Evidence from in vitro studies has shown that DACC-coated dressings bind to several types of common wound pathogens (Ljungh et al, 2006), including:

- Methicillin-resistant Staphylococcus aureus (MRSA).
- Staphylococcus aureus.
- Pseudomonas aeruginosa.
- Candida albicans.

DACC has also been found to be effective at binding to biofilm (Butcher, 2011).

**Clinical evidence for the use of DACC**

DACC-coated dressings are indicated for all types of wounds and for fungal skin infections.

In an evaluation by Hampton (2007), Cutimed® Sorbact® dressings were used with 21 patients

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<td><strong>Dressing type</strong></td>
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<td>Cutimed Sorbact Dressing Pad</td>
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with various types of chronic non-healing wounds, including pressure ulcers, leg ulcers, sinus wounds, surgical wounds and trauma wounds. All but one of the wounds demonstrated healing, and a reduction in odour and exudate levels.

DACC has also been found to be effective in diabetic foot wounds. These wounds are very susceptible to infection and often require regular debridement and careful management to reduce bioburden.

Haycocks et al (2011) describe two case reports in which Cutimed Sorbact was used to treat and manage the bioburden in diabetic foot ulceration. In both cases, the foot ulcers showed a reduction in ulcer size and the wounds healed.

One study looked at the use of DACC in preventing surgical site infection in women undergoing caesarean section (Stanirowski et al, 2016). The rate of superficial and deep surgical site infection was 1.8% in patients who received DACC dressing, compared to 5.2% in the group that received a standard surgical dressing.

In a multi-centre European study of 116 patients, 81 people with an infected wound received effective treatment with DACC dressings. Wounds healed in 21% of patients during the study and a further 72% showed an improvement in wound healing. Reductions in wound pain were also reported (Kammerlander et al, 2001).  

**Table 1**

| Antimicrobial dressings have a key role in effective wound management. It is important to select the appropriate dressings for the patient and to know when a DACC-coated dressing is indicated to control bioburden. Wound infection and bioburden remain a problem. Using a DACC-coated dressing that removes bacteria from wounds in a safe, non-toxic manner gives healthcare practitioners an option for controlling bioburden.

DACC is a very safe product compared to traditional antimicrobial dressings. It is not necessary to review the use of DACC every 2 weeks as with traditional antimicrobial dressings.

It is important to emphasise that although DACC is a safe dressing, regular wound assessments should always be carried out a regular basis. This is to ensure that DACC dressings are appropriate.

A DACC-coated dressing can also be used as a prophylactic in order to keep bacterial bioburden under control without the worry of systemic absorption or topical skin reaction. Even with the strictest of aseptic non-touch technique, wounds can still become contaminated and eventually colonised by bacteria. A systematic review of DACC dressing by Totty (2017) cited evidence to indicate that the prophylactic use of DACC dressings considerably reduces the bacterial burden in wounds when compared to the use of conventional dressings. The review also found DACC dressings are more favourable in reducing bacterial burden when compared to the use of more traditional silver dressings.

When treating patients with chronic wounds, regular assessments should be carried out. Chronic wounds can often be heavily colonised with bacteria and biofilm keeping them in a recalcitrant state of healing. Often it is necessary to use traditional antimicrobial dressings and DACC dressings to ensure that bacteria in wounds is being kept under control. Holistic assessments on a regular basis will also ensure that other factors are taken into account if a wound fails to respond to treatment. Holistic assessments on a regular basis will also ensure that other factors are taken into account if a wound fails to respond to treatment.

**References**

Bowler PG, Duerden BI, Armstrong DG (2001) Wound microbiology and associated approaches to...
wound management. Clin Microbiol Rev 14(2): 244–69


