Sorbsan Silver: A combined silver–alginate dressing

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ARTICLE POINTS

1 Silver-containing dressings have broad-spectrum antibacterial action.

2 In the presence of exudate, alginate dressings produce a most wound-healing environment. They are also believed to initiate the clotting cascade.

3 A new range of products combines silver and alginate in the same dressing.

4 A short case study using a new silver–alginate dressing showed benefits in odour control and exudate management.

KEY WORDS
- **Silver dressings**
- **Alginate dressings**
- **Malodour**
- **Exudate**
- **Symptom management**

Introduction

Silver-containing healthcare products are gaining in popularity because they have a broad-spectrum antibacterial action and are not yet associated with bacterial drug resistance. Furthermore, alginate dressings have properties that make them useful in the management of chronic wounds, as they provide a moist wound-healing environment in the presence of exudate (Morgan, 1996) and can help initiate the clotting process (Hampton and Collins, 2003). To take advantage of the distinct properties of these agents a new range of dressings combines both silver and alginate. This article describes the properties of silver and alginate dressings and includes a case study on the use of a combined silver–alginate dressing in a person with diabetes and peripheral arterial disease.

The management of chronic wounds represents a significant burden, not only in terms of direct costs to healthcare services (Vanscheidt et al, 2003) but also in terms of patient safety and quality of life (Valencia et al, 2001). Chronic wound management becomes an even greater problem when bacteria are present in the wound as this can have a negative impact on healing (Hampton and Collins, 2003). At the same time there is grave concern over the increase of multi-resistant bacterial strains in wound care (Graham, 2005).

The role of silver

Silver has been used for medicinal purposes for thousands of years and is once again gaining in popularity due, in part, to the rise of these multi-resistant bacterial strains (Driver, 2004). Silver products have two key advantages:

- they are broad-spectrum antibacterials (exhibiting antimicrobial activity against a broad range of micro-organisms)
- they are not yet associated with drug resistance (Lansdown, 2002; Percival et al, 2005).

As a consequence, silver is being included in many commercially available healthcare products (Percival et al, 2005). A number of research studies have examined the effectiveness of silver-based products in reducing bacterial burden and treating wound infection and the general conclusion is that silver can be a useful tool in treating colonised wounds (Graham, 2005) and has been used widely for many years in wound care to help manage local infection (Vanscheidt et al, 2003).

The fact that bacteria have not yet developed a resistance to silver is attributable to the action of three mechanisms (Thurman and Gerba, 1989):

- interference with electron transportation
- binding to bacterial DNA
- effects on cell membrane interactions causing structural damage.

Having basic information regarding silver's chemical properties and potential actions in the wound bed is important to its appropriate clinical use (Ovington, 2004).

The role of alginates

When a blood vessel is damaged, a mixture of clotting factors utilise calcium to initiate the clotting cascade; therefore, calcium is an important part of stabilising

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1 When in contact with serum or wound exudate, the insoluble calcium alginate in an alginate dressing is partially converted to the soluble sodium salt.

2 A hydrophilic gel is then produced over the wound, providing an ideal moist wound-healing environment and pain-free dressing changes (Morgan, 1996).

3 Lansdown et al (1997) supported the view that silver actually enhanced wound healing, possibly because of the trace elements zinc and calcium and this makes it a sensible decision to place both silver and alginates into the same dressing.

4 This has been achieved in a new range of alginate dressings.

the wound (Ganong, 1995). Alginate dressings are made from seaweed, they create a hydrophilic gel in the presence of exudate and they have a high calcium content. A large number of reactions in mitochondria are calcium-dependent and calcium can thus be regarded as an intracellular messenger by which particular reactions are speeded up while others are slowed (Majno and Joris, 1996). The transport of calcium across the mitochondrial membrane can be seen as an important cellular control mechanism (Rose, 1991).

When in contact with serum or wound exudate, the insoluble calcium alginate in an alginate dressing is partially converted to the soluble sodium salt. A hydrophilic gel is then produced over the wound, providing an ideal moist wound-healing environment and pain-free dressing changes (Morgan, 1996). As the alginate exchanges calcium ions for sodium ions in the wound bed, the clotting cascade is initiated and this makes alginates particularly useful dressings in wounds that bleed easily, as well as supporting the healing process (Hampton and Collins, 2003).

Lansdown et al (1997) supported the view that silver actually enhanced wound healing, possibly because of the trace elements zinc and calcium and this makes it a sensible decision to place both silver and alginates into the same dressing. This has been achieved in a new range of alginate dressings known as Sorbsan Silver (Unomedical, Redditch).

Sorbsan Silver

Sorbsan Silver is a one-layer alginate dressing incorporating silver, whereas Sorbsan Plus consists of a layer of alginate fibre, which is bonded on to an absorbent viscose pad. This is backed with a blue viscose/polyester layer to indicate the outer surface of the dressing. Silver has now been attached to the lowest layer to form the Sorbsan Silver Plus dressing.

According to the Surgical Materials Testing Lab (2002), the hydrophilic gel produced by Sorbsan when in contact with serum, wound exudate, or solutions containing sodium ions 'overlays the wound and provides a micro-environment that is believed to facilitate wound healing.'

Dressing choice in the diabetic foot

Foot ulceration affects 15–20% of people with diabetes. It is a major precursor to amputation in this group, and early and appropriate treatment provides the greatest opportunity for healing (Bergin and Wraight 2006).

Ideally, dressings should alleviate symptoms, provide wound protection, and encourage healing. Wound dressings represent a vital part of the management of diabetic foot ulceration. Selection must be carefully thought through as no single dressing fulfills all the requirements of a person with diabetes and an infected foot ulcer (Hilton et al, 2004). Nevertheless, one of the highest risks in the diabetic foot is the potential to develop clinical infections and the affect of this on wound healing (Schmidt et al, 2000).

The use of silver-releasing dressings in the management of wounds at high risk of infection has a clinically favourable influence on wound prognosis (Meaume et al, 2005) and in the author's opinion this would mean Sorbsan Silver has a firm place in the treatment of the diabetic foot.

Using Sorbsan Silver in practice: A case study

Mrs M is an 85-year-old lady with type 2 diabetes who lives in a nursing home. She has peripheral arterial disease which has led to ischaemic damage to the left foot. Unfortunately, due to heart failure, Mrs M's condition does not permit surgery.

On initial examination (*Figure 1*), the wound was extremely wet (the existing amorphous hydrogel and foam dressing was changed daily), and was malodorous with patches of necrotic tissue.

Sorbsan Silver Plus was applied with the aim of reducing the bacterial burden within the wound as well as the amount of exudate. The evaluation of the dressing's success was to be an assessment of the number of dressing changes required and the extent of odour reduction.

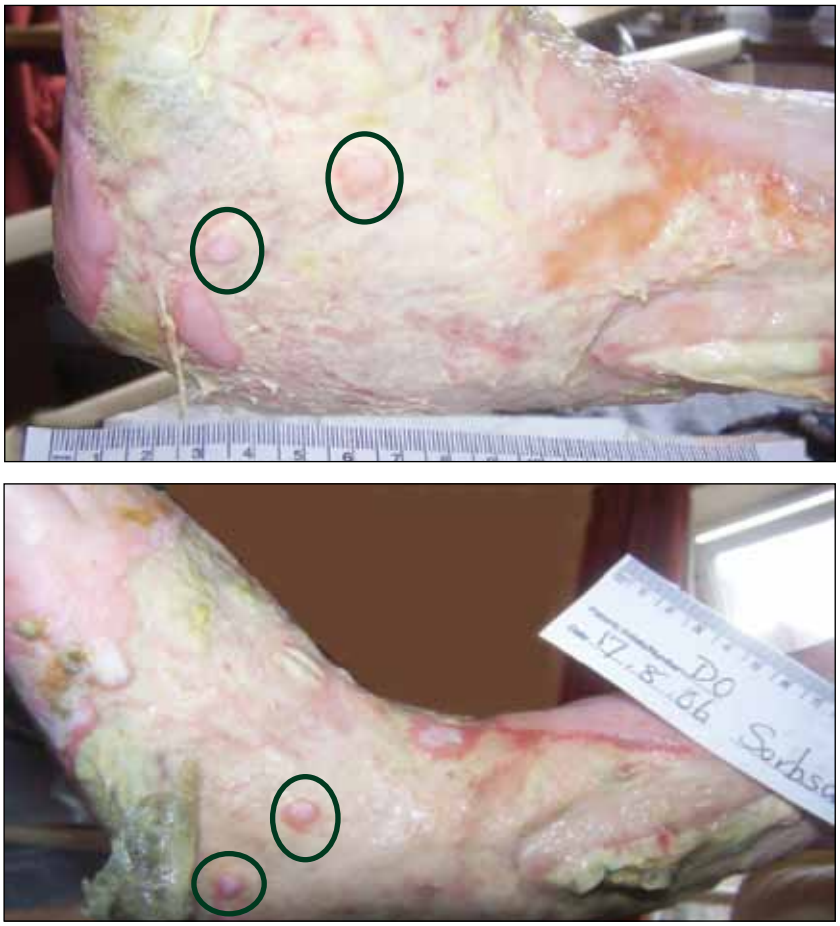

Figure 1 (top). The wound on 10.08.2006, prior to the application of the silver–alginate dressing. Figure 2 (above). The wound on 17.08.2006, following a 1-week application of the dressing. The silver–alginate dressing was changed three times during the week. Note the signs of healing at the edges of the wound and the increased definition of small epithelial islands (ringed).

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1 During a 1-week test period, the combined silver–alginate dressing was changed three times and the odour was noticeably reduced.

2 Management of symptoms becomes important in wounds that may not heal. In this particular case, reduction of odour and exudate production would be a sensible rationale for the selection of the combined silver–alginate dressing.

The evaluation was over a 1-week period. During that week, the dressing was changed three times and the odour was noticeably reduced. The small islands of epithelium became more defined during that week, and epithelial tissue also started becoming defined at the wound margins (*Figure 2*).

The wound pathology was such that healing may not be the final outcome of this wound. Management of the symptoms becomes important in this instance and a reduction of odour and exudate production would be a sensible rationale for the selection of Sorbsan Silver Plus.

Conclusion

In the author's opinion, the addition of silver, high calcium content and the ability to provide an ideal healing environment for this type of wound makes these combined alginate–silver dressings a useful addition to any wound care formulary. In addition, the antimicrobial property of the dressing would lend itself particularly well to care of the diabetic foot. ■

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