

## Introduction

Antimicrobial resistance (AMR) is now a significant issue, with the United Nations and other international agencies estimating that antimicrobial drug-resistant diseases could cause 10 million deaths each year by 2050 if no action is taken, costing £66 trillion, or €76.7 trillion (Interagency Coordinating Group on Antimicrobial Resistance, 2019). AMR increases patient morbidity, extends hospital stay, and increases treatment costs and mortality rates (Fletcher et al, 2020). Therefore, strategies and products are needed that can be incorporated into an antimicrobial stewardship (AMS) approach. In wound care, this means using products that are not topical antibiotics (Kramer et al, 2018). Instead, infection should be managed using topical antimicrobials containing agents that do not contribute to AMR, such as silver (Kramer et al, 2018; Edwards-Jones and Spruce, 2019). The Askina® Calgitrol® range (B. Braun) has been designed to manage infection by delivering a controlled and sustained release of silver ions to the wound bed, and is suitable for use in a range of wounds, including common wound types such as venous leg ulcers (VLUs), pressure ulcers (PUs), diabetic foot ulcers (DFUs) and burns.

## Managing infection

It is well recognised that infection can significantly delay healing in chronic wounds, which in turn affects patient quality of life (Wounds UK, 2017). In fact, the main cause of wound chronicity is direct microbial contact with the wound and its proliferation on it; additionally, microbes become involved in biofilm production, which further delays healing and renders the wound resistant to treatment (Bianchi et al, 2016; Rahim et al, 2016).

The wound infection continuum (IWII, 2016) describes the stages that represent the gradual increase in the number and virulence of microorganisms, together with the response they invoke within the host – see Figure 1 for further information.

Infection must be effectively managed in order to improve healing outcomes and reduce resource use and costs to healthcare systems, while improving patient quality of life. Driven by the increase in AMR, topical antimicrobials are being increasingly used in wound care (Fletcher et al, 2020). Topical antimicrobials, such as silver, differ from antibiotics and their threat of widespread resistance is low; as these dressings have multiple sites of antimicrobial action on target cells, they should be regarded as an important tool in managing infection in wounds (Kramer et al, 2018).

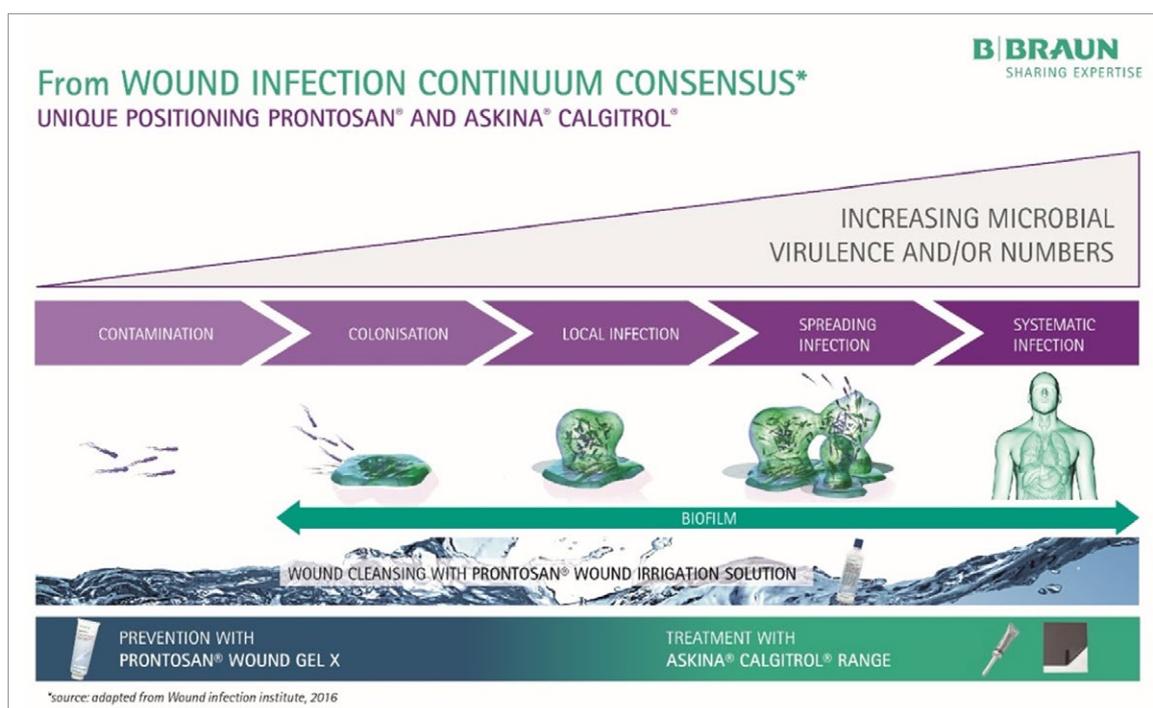


Figure 1: The wound infection continuum (adapted from IWII, 2016)

## The effect of COVID-19

The COVID-19 pandemic has caused concern for many patients who may develop an infection at home when hospitals are already inundated with coronavirus cases. Unfortunately, one of the key challenges during this time has been patients presenting late (either not wanting to see a clinician due to shielding, or not being able to get to their primary care clinician for a referral), and therefore wounds becoming infected, with statistics suggesting that amputation rates have increased as a direct result of this (Chadwick et al, 2020).

An Italian survey (Tinelli and Sica, 2020) found that only 22.6% of patients with chronic wounds went to the wound clinic as usual; in 59% of cases, the frequency of appointments at the clinic drastically decreased. The study found 12.8% of patients had not had their wound dressing changed during the lockdown period while 20.5% of patients were prescribed antibiotics to manage wound infection.

## Silver as a topical antimicrobial

Topical antimicrobials such as silver differ from antibiotics, as they have multiple antimicrobial actions on target cells and therefore a low risk of bacterial resistance. As a result, antimicrobials play an important part in controlling bioburden in wounds while limiting exposure to antibiotics and reducing further development of AMR (Kramer et al, 2018).

Silver dressings are indicated for use on acute or chronic wounds with local infection. Silver may be incorporated into dressings in a number of different forms; silver in the ionic form has been demonstrated to have a broad antimicrobial effect, making it ideal for use in dressings. Ionic silver does not require activation with water or saline, meaning that silver ions are available and able to exert antibacterial action from the first contact with the wound bed. This swift mechanism of action means that bacterial growth is inhibited, limiting the development of infection (Kędziora et al, 2018).

## The Askina Calgitrol range

The Askina Calgitrol range has been designed to deliver a controlled and sustained release of silver ions (Ag<sup>+</sup>) to the wound bed, while being suitable for different levels of exudate and types of wounds (i.e. differing depth or flat wounds). It is available in three product formulations:

- **Calgitrol Paste.** A paste that conforms closely to the wound bed, helping to prevent any 'dead space' where bacteria may

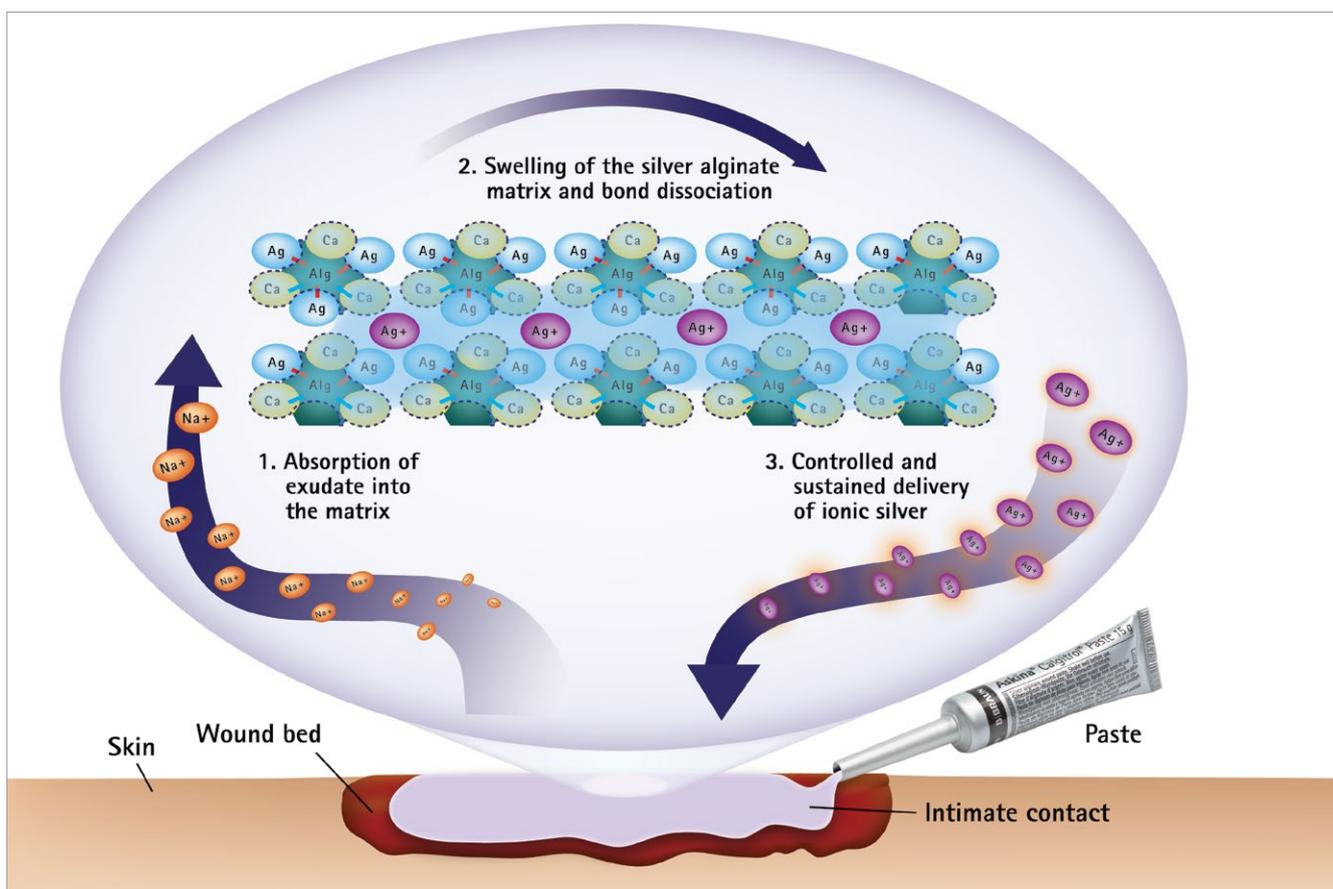
flourish. Calgitrol Paste provides moisture and antimicrobial activity. It should be applied directly to the wound bed and covered by a secondary dressing (Askina Foam or Askina DresSil, depending on the level of exudate) that allows the paste to remain in place while avoiding drying out. It is supplied sterile in a tube with a long cannula to aid application of the paste into tunnels, sinuses and all depth wounds. The high concentration of silver ions (180mg ionic silver/15g paste) contributes to increased efficacy.

- **Calgitrol THIN.** A sterile wound contact layer dressing that includes the patented matrix formulation, which combines alginate and silver alginate with 10% of bonded water. In contact with exudate, the alginate matrix forms a soft gel, allowing the liberation of silver ions. Again, the high concentration of silver ions (141mg/100cm<sup>2</sup>) contributes to increased efficacy.
- **Calgitrol Ag.** A sterile dressing consisting of two layers: the ionic silver alginate matrix and the added benefit of an absorbent polyurethane foam layer. The concentration of silver ions is as high as in Calgitrol THIN (141mg/100cm<sup>2</sup>). Due to the foam layer, Askina Calgitrol Ag has excellent exudate management: absorbing, retaining and evaporating excess exudate. Therefore, Askina Calgitrol Ag is able to contribute to maintaining physiological moisture at the wound bed.

Askina Calgitrol products are suitable to treat infection in chronic and acute wounds, by reducing bacterial load, preventing multiplication of bacteria in the wound bed and promoting healing. All the products use ionic silver in direct contact with the wound bed and have the same mode of action (see Figure 2). The products are suitable for a range of wound types, including key indications such as VLU, PUs, DFUs and burns.

## Use in VLUs

VLUs are a common chronic wound that can be a challenge in clinical practice. In the UK, the annual cost was found to be £1.94, or €2.26, billion for managing 731,000 leg ulcers (Guest et al, 2017). Key considerations in treating VLUs include exudate management, infection control and selection of a dressing that is suitable for use in conjunction with compression therapy. Calgitrol Ag may be used where infection risk and exudate management are both considerations; whereas Calgitrol THIN provides an option where a thinner dressing is required. However, in high-exudate wounds, a secondary dressing should be used to manage exudate: for example, Calgitrol THIN and Askina Foam for VLUs, as they can be used under compression.



**Figure 2: Mode of action of Askina Calgitrol**

Calgitrol Paste can be used in conjunction with other dressings if necessary. In VLU where exudate is a particular issue, Calgitrol Ag may be left in place for up to seven days or until the dressing is saturated with wound exudate. This seven-day release provides the steady delivery of ionic silver to wound bed. However, it is important to note that, in infected wounds, the general recommendation is to change dressings daily.

Final selection of the appropriate Calgitrol product should be made according to the characteristics of the wound, such as: deepness and pocketing, flat or irregular wound surface, as well as exudate level. For example, venous leg ulcers exhibit high levels of exudate, so it is preferable to use Calgitrol Ag, as the foam has excellent exudate management capacity (Durante and Chiarolanza, 2008). Calgitrol THIN can be useful where a foam is not needed as a secondary dressing to manage exudate; Calgitrol THIN is not only appropriate for wounds with low to moderate exudate, but also suitable to fill deep wounds. Calgitrol Paste

provides moisture and antimicrobial properties. The paste is useful for deep or cavity wounds, with pockets or tunnels (Forma, 2016).

### Use in PUs

In a systematic review of European studies (Moore et al, 2019), prevalence of PUs was found to be consistently high, identifying a continued need for resource allocation into PU prevention and management. Across the studies, the median prevalence was 10.8% (standard deviation: 7%; range: 4.6–27.2%). The highest PU prevalence reported was from the Netherlands (27.2%;  $n=17,494$  participants), and the lowest was from Finland (4.6%;  $n=629$  participants). There is a lack of up-to-date costing information, but the cost of treating a PU has been estimated between £1,214 or €1,415 (category 1) to £14,108 or €16,446 (category IV); costs increase with ulcer severity because the time to heal is longer and incidence of complications is higher (Dealey et al, 2012). The Askina Calgitrol range is indicated in Stage II–IV PUs (UK PU

category). Calgitrol THIN can be cut to size if necessary before removing the protective films and is suitable for use on both shallow and cavity wounds and in difficult-to-dress locations – e.g. the heel, sacrum or other bony prominence where PUs may be likely – due to the thinness of the dressing. Calgitrol Paste is suitable for use on any PUs where undermining or tunnelling is present (Cazzarò, 2013).

## Use in DFUs

DFUs are complex wounds at high risk of infection, which can have a severe impact. The mean cost of care for a DFU over 12 months is an estimated £7,800 or €9,092 per DFU, of which 13% is attributable to amputations (Guest et al, 2018). Infection leads to delays in wound healing and increases the risk of loss of limb and life (IWII, 2016). It is vital to implement effective strategies in order to manage infection in DFUs, in order to improve mortality and morbidity rates (Wounds International, 2017).

Without early and optimal intervention, the wound can rapidly deteriorate, leading to amputation of the affected limb (Wounds International, 2017). Therefore, Askina Calgitrol dressings and paste are ideal for use on DFUs. The long wear time of the dressings, plus ease of removal with minimal trauma, also make them an ideal choice for DFU management (Gallarini, 2013). Additionally, while lack of sensation may be an issue, removal with minimal trauma is still a requirement.

## Use in burns

Burns can be particularly challenging in clinical practice, being at elevated risk of infection; the cost in the UK has been found to be £89.6, or €104.4, million for managing 87,000 burns (Guest et al, 2017). A study of patients with partial-thickness burns showed that use of Calgitrol Ag resulted in significantly fewer dressing changes, required significantly less nursing time, healed significantly faster (7 days versus 14 days), and had lower pain scores compared to patients treated with silver sulfadiazine (Opananon et al, 2010).

A further study of patients with deep burns undergoing late escharectomy showed that, by day 18, the microbiological burden in the wounds of patients treated with Calgitrol Ag was reduced to a greater extent than in patients treated with antiseptic ointment. Wound preparation for split skin grafting was also significantly shorter for patients treated with Calgitrol Ag than it was for those treated with the antiseptic ointment (Chymrev, 2011).

Burnt tissue has favourable conditions for bacterial colonisation, therefore effective treatment must be carried out according to an infection prevention protocol. Calgitrol Paste is recommended for use in burns as it decreases the microbial load while supports the debridement of non-viable tissue and prepares the wound bed to receive skin grafting.

## Tips for use in practice

Wound characteristics will guide selection and application of the dressings and paste (Figure 3), along with the individual needs of the patient and their wound, assessed according to a structured tool, such as TIMES (Wounds UK, 2016).

**Calgitrol Paste:** Shake the tube prior to use and remove the outer protective film and cap. Apply a thick layer of paste to the entire surface of the wound bed and cover with an appropriate secondary dressing – e.g. Askina Foam or Askina DresSil – depending on the amount of exudate (Cazzarò, 2013).



Figure 4: Application of Calgitrol Paste

**Calgitrol THIN:** Select the appropriate size that will completely cover the wound surface, ensuring a 2–3cm margin beyond the edges of the wound – if necessary, several dressings can be overlapped to cover a large wound area. Remove the backing films and place over a shallow wound or roll and pack into deep wounds; the dressing can be placed with either side in contact with the wound as both sides are identical. Cover with an appropriate secondary dressing depending on the amount of exudate.

**Calgitrol Ag:** Select the appropriate size that will completely cover the wound surface, ensuring a 2–3cm margin beyond the edges of the wound; if necessary, several dressings can be overlapped to cover a large wound area. Place the dressing with the silver matrix (dark surface) in contact with the wound.



Figure 5: Lower limb burns treated with Calgitrol Ag

Figure 3. Recommendations for application

	Askina Calgitrol Paste	Askina Calgitrol THIN	Askina Calgitrol Ag
			
Flat superficial wound (low exuding wounds)	✓	✓	
Flat superficial wounds (moderate to highly exuding wounds)	✓		✓
Small sinuses and tunnels	✓		
Deep cavity and difficult-to-dress wounds	✓	✓	

Secure Calgitrol Ag with a secondary dressing or bandage as appropriate. As wound exudate progressively softens the calcium/silver-alginate matrix, part of this softened matrix can remain in the wound upon dressing removal, giving it a greyish appearance; however, this is normal and does not pose any risk of toxicity.

### How to remove

Calgitrol Paste may be removed by thoroughly cleansing the wound with sterile saline or Prontosan® Wound Irrigation Solution. Any patches of paste that have dried out should also be removed in this way. Calgitrol THIN will change consistency within 2–3 days of application into a dark-coloured paste, which can be removed easily by washing the wound with sterile saline or Prontosan Wound Irrigation Solution.

To remove Calgitrol Ag, gently lift it from the wound. If necessary, sterile saline or Prontosan Wound Irrigation Solution may be used to aid removal. After dressing removal, thoroughly cleanse the wound to remove any dressing residue.

### Use in practice: part of a step-up/step-down regimen

Askina Calgitrol products are ideal for use as part of an infection management regimen that can be stepped up or down depending on the individual needs of the patient and their wound at that time. Prontosan® (B. Braun) wound bed preparation products – available as wound irrigation solution, gel and debridement pads – are designed with a focus on infection prevention (Bellingeri, 2016).

A step-up/step-down approach is recommended, using Prontosan to prevent infection, and Askina Calgitrol used to manage infection where required. Wound cleansing with Prontosan Solution and Prontosan Debridement Pad should form the basis of wound management and can be used in conjunction with Askina Calgitrol (Peghetti, 2019). A case series (Naude, 2018) showed excellent results with this combined approach, with 93% of wounds showing improved progress to healing. All of the patients experienced a decrease in pain and improvement in their quality of life within 24 hours of treatment. The shorter healing time and reduction of infection also resulted in a cost reduction of more than 60% compared to the cost of previous treatment.

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## Summary

The Askina Calgitrol range is effective on a wide range of wounds where infection management is required. The mode of action, incorporating the broad-spectrum antimicrobial action of ionic silver, is highly effective at managing wound infection as part of an AMS-informed approach. Askina Calgitrol is an excellent option for treating an infected or at-risk wound because it delivers high therapeutic levels of silver to treat the infection effectively. The silver works immediately on contact with the wound bed (no activation needed), and therefore is suitable for early intervention with the 2-week challenge. Due to the threat of AMR, an approach that follows AMS principles is essential in wound care, making ionic silver the ideal choice.

### FAQs

- What is the role of silver dressings in wound management?
- Where can I learn more about the 2-week challenge?
- Where can I see case studies using Askina Calgitrol in practice?



■ For the answers to these and other questions, please follow the QR code

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