Dressing selection for the treatment of coumarin necrosis


Summary
The correct dressing selection is of vital importance in producing as rapid a healing response as possible. John Timmons demonstrates the effects of a new dressing for the treatment of coumarin necrosis. Coloplast, the manufacturers of the dressing, Biatain Adhesive, supported the author while he was treating the patient.

Introduction
The use of foams in wound care is widespread, and as a result there are a number of foam dressings on the market. These dressings are versatile and are often chosen for their ability to absorb exudate from wounds, ensuring patient comfort and compliance.

Biatain Adhesive is relatively new to the market. It has a unique 3D polymer foam that helps to absorb and retain fluid even under compression. In addition, the dressing has an adhesive layer made up of thin hydrocolloid, which helps reduce damage to the surrounding skin when treating wounds.

This case study describes the care of a 28-year-old renal patient who began to develop purpuric patches after treatment with high doses of warfarin, given to maintain patency of her renal fistulae. The first of these lesions appeared on her lower abdomen, with subsequent lesions occurring on her breasts and right arm. Although a rare complication of coumarin (warfarin) based therapy, the consultant quickly diagnosed these lesions as coumarin necrosis. The majority of reported cases are in women (82 per cent) and the most commonly affected sites are those areas high in adipose tissue (Griffin 1994). One case has been reported of a male patient with foot and leg lesions, however.

Case study
A 28-year-old woman had been receiving haemodialysis for two years. She was slightly overweight (105kg dropping to 85kg). The patient had been commenced on warfarin to prevent clotting within the atriovenous shunt established for the dialysis.

Coumarin necrosis
Coumarin necrosis is a rare complication of warfarin therapy and is reported to affect only one in 1,000-10,000 patients (Sternberg and Pettyjohn 1995), with relatively few cases reported in the literature. Typical cases present with a well-defined purpuric rash, which eventually progresses to bullae formation that, in turn, leads to superficial skin necrosis. The most common sites for these lesions are the breasts, buttocks, thighs and abdomen (Stone and Rosen 1986). They most often appear within three to ten days of warfarin loading, and the clinical path of the necrosis appears to be unaffected by the continuation or withdrawal of the coumarin therapy (Griffin 1994).

The actual mechanisms by which warfarin causes skin necrosis are poorly understood, but it is believed to be related to the action of warfarin on vitamin K in the clotting mechanism. Some authors point to protein C deficiency as a potential cause (Sternberg and Pettyjohn 1995). (Protein C is a plasma protein that inactivates clotting factors V and VIII.)

Pathogenesis is thought to involve the presence of occlusive thrombi in the subcutaneous vessels, which leads to capillary wall rupture and ultimately haemorrhage. The resultant reduction in blood supply leads to necrosis of the skin. Early research suggests that treatment with protein C concentrate can be effective in reversing the effects of the skin necrosis (Griffin 1994), however, this is at present unsubstantiated.

John Timmons RGN, DipNS, MN, is Tissue Viability Nurse Specialist, Monklands Hospital, Airdrie.
The first lesion appeared in 1997, in the form of a reddish-blue purpuric rash on the lower abdomen, following a loading dose of warfarin. Three weeks later, this rash began to break down with the blue areas developing into necrotic tissue, which extended as far as the subcutaneous fat (Fig. 1). Initially, when the symptoms were first recognised, the warfarin therapy was stopped. The literature suggests, however, that continuation of therapy does not compromise the patient in any way and, as a result, the warfarin was recommenced.

Within six months, a further petechial lesion developed on the patient’s right breast. This lesion followed the same pattern as the abdominal one, and the skin broke down over the following few weeks revealing the sub-dermal tissue. Due to the initially superficial nature of the wounds the patient experienced a large degree of pain, particularly at dressing changes when the wounds were exposed to the air.

Another wound developed on the patient’s upper right arm (Fig. 2). The wound was irregular in shape, with deeper areas of damage in the centre and more superficial areas of damage at the outer edges. Initially, the wound was only lightly exuding and bacteriology swab revealed a moderate growth of *Staphylococcus aureus*. However, the level of exudate fluctuated throughout the course of treatment.

**Treatment aims**

The key aims of treatment of this patient were to:

- Reduce the pain caused by the wound.
- Provide a dressing that coped with the exudate from the wound.
- Prevent infection of the wound and promote healing.
- Use a dressing that was unobtrusive, comfortable and easy to apply.

The tissue viability nurse was contacted, and initially used hydrocolloid dressings. The wound exudate levels soon exceeded the capacity of the dressing, however, and it was decided to use a hydrogel on the sloughy areas with a new type of foam dressing. Biatain Adhesive is a new foam dressing made up of highly absorbent 3D-polymer foam with a hydrocolloid adhesive-backing layer. The key functions of the Biatain are to lock away the exudate while preventing maceration of the wound edges and surrounding skin. Figures 3-10 show the progress of the wound to the arm over 14 weeks.

**Fig. 1. Lesion to lower abdomen, 1997**

**Fig. 2. Lesion to arm, October 4 1998**

**Fig. 3. October 21 1998**

**Outline of patient treatment**

The most disturbing aspect of this type of necrosis was the pain experienced by the patient. The pain team were involved from the outset to gain control over the pain and thereby reduce the anxiety of the patient. Altered body image was also an important psychological...
factor that added to the patient’s distress.

Initially, the pain experienced by the patient was controlled by the use of nitrous oxide and oxygen during dressing changes and non-steroidal anti-inflammatory drugs (NSAIDs). As the wound deteriorated, however, it became necessary to use opiates in the form of morphine sulphate tablets to control the pain. The dose of morphine was gradually reduced as the wound progressed toward healing.

Once the hydrocolloid dressings were replaced by the new foam dressing, the wound exudate was controlled much more effectively and dressing changes were soon reduced from daily to twice per week. The level of exudate within the dressing could be noted through the outer cover, which meant that timing of dressing changes was easier to assess.

This increased visibility also assisted in reducing the pain experienced by the patient as the wound was exposed less often. The dressings were easy to apply and remove and the patient was able to carry out the dressing changes on her own when required. In addition, as the dressing handled the exudate well, it remained intact during the course of treatment. From a body image perspective, the dressings were unobtrusive and difficult to see under clothing, which was beneficial considering the age and lifestyle of the patient.

The wound itself was of irregular dimensions and part of the superficial damage was exposed to the adhesive layer of the dressing. As this layer consisted of a hydrocolloid, however, there was no interruption to the healing process. The wound healed after approximately 14 weeks of treatment.

Once the central area had been desloughed, the hydrogel was stopped and the Biatain was...
used until healing was achieved. There were no episodes of wound infection during treatment.

Conclusion

The use of coumarin-based anticoagulants is very common and the incidence of coumarin necrosis is relatively rare. There is the potential for patients to develop deep wounds within a short space of time, however, and prompt diagnosis is therefore essential to prevent further complications. In addition, it is important to consider all aspects of the patient’s treatment and not merely to address each problem in isolation.

In this case, complete healing was achieved within 12 weeks of commencing treatment with the dressing and it would appear that the dressing was an excellent product for wounds of this type. The ease of use was of benefit to both patient and staff and the overall performance in terms of exudate handling was good.

Given the healing problems often experienced by renal patients, this wound took a relatively short time to heal. This has helped to improve the quality of life for the patient and reduce costs with respect to the nursing intervention and number of dressings required.

Acknowledgements

The author would like to thank the ward sister and staff in the Renal Unit, Monklands Hospital.