Effective exudate management and the Eclypse® dressing range

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An optimal wound environment for promoting healing is dependent on maintaining moisture balance (i.e. an environment that is neither too wet, nor too dry). Practitioners need to understand what is normal and what is problematic exudate for wound healing, as well as the impact that wound fluid might be having on the patient's quality of life. For example, if dressings chosen are unable to contain the volume being produced, this can lead to embarrassment and social isolation, as well as discomfort to the patient from wearing bulky dressings. Assessing and understanding the cause of excess exudate will help practitioners to develop goals with the patient and target treatments to achieve the best outcomes overall. This article examines what is meant by a moist wound-healing environment and looks at one dressing range, Eclypse®, that has been found to contribute to moist wound healing and promote patient quality of life (Rafter et al, 2015).

KEYWORDS:
■ Wounds ■ Exudate ■ Quality of life ■ Eclypse® dressing range

Winter (1962) is heralded as one of the most important proponents of moist wound healing. Since his work, the development of wound management products that help to ensure that moisture is maintained at the wound bed has increased. Today, there are a plethora of products that help to donate moisture to dry wounds or remove excess moisture from the wound bed. The goal is to achieve the 'goldilocks' environment, where the moisture levels are 'just right'. This article examines what is meant by wound bed moisture and the role that exudate has to play in wound healing. It also considers the problems associated with a high volume of exudate and potential management options, with a focus on problems affecting the lower limb.

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EXUDATE

When tissue is injured, the volume of fluid leakage from capillaries increases. This results from an increase in inflammatory mediators, such as histamine, that makes capillaries more 'leaky' to allow leucocyte migration into injured tissues (Thomas, 1997). In addition to leucocytes, this fluid contains a variety of:

- Different cytokines
- Electrolytes
- Nutrients
- Growth factors
- Enzymes.

The exact content of 'normal' exudate will change during the course of wound healing and be affected by a range of factors such as the patient's nutritional status, circulation and tissue perfusion (*Table 1*) (White and Cutting, 2006).

In wounds healing in a normal time frame, exudate plays an important role as it helps to promote the environment needed to achieve wound closure by:

- Preventing the wound bed from drying out
- Helping tissue-repairing cells to migrate across the wound
- Encouraging the wound to naturally debride necrotic cells (autolysis)
- Supplying nutrients that are essential for cell metabolism (World Union of Wound Healing Societies [WUWHS], 2007).

However, in wounds where there is too much or too little exudate, the process of healing can actually be impeded (Trengove et al, 2000). Thus, clinicians should always assess exudate as part of their comprehensive holistic assessment considering its colour, consistency, volume and odour, and use the findings to help guide care plans (WUWHS, 2007).

PROBLEMATIC EXUDATE

Exudate is generally considered 'normal' if it is straw-coloured and clear. Clinicians are often taught to look out for highly viscous exudate because its high protein content may represent the presence of infection or prolonged inflammation (Cutting, 2003); it is also indicative of necrotic tissue autolysis (WUWHS, 2007). Exudate that is yellow, green or milky is often a sign of high levels of cellular material (Sussman and Bates-Jensen, 2007). Although this might be expected when infection is present, it should not be considered as diagnostic of wound infection. Further clinical assessment of the patient and the wound should be undertaken, considering signs and symptoms of infection such as increase in pain, change in odour, wound size increase, pyrexia and general malaise (WUWHS, 2008).

Where exudate does not contain the constituents required to support wound healing, or where the volume is higher than expected, it may delay wound healing and have a negative impact on the patient's quality of life.

Changes in exudate volume are expected throughout wound healing, but higher volumes are typical during the inflammatory stage or where inflammation is prolonged (Clark, 1996). The presence of foreign bodies and wound chronicity are just two examples that may result in prolonged inflammatory wound activity.

The patient's systemic condition may also result in excess exudate, particularly where comorbidities cause systemic or local difficulties with fluid circulation. Patients with cardiac, renal, hepatic or respiratory disease may become centrally and peripherally overloaded with fluid. This causes increased fluid loss into interstitial spaces as a compensatory mechanism (WUWHS, 2007).

Other conditions that result in oedema, although often more localised, include lymphoedema, venous hypertension and sensor/motor dysfunction of limbs. This group of factors most often affects the lower limbs and may be both the cause or the result of impaired mobility (Benbow and Stevens, 2010). Regardless of the systemic or local cause, if a wound is also present, fluid loss will increase.

IMPACT OF EXCESS EXUDATE

Although exudate is important for wound healing, excess mismanaged exudate can have negative effects. Matrix metalloproteinases (MMPs) are found within wound exudate and are important for normal wound healing. However, in high levels, these enzymes can be destructive to the normal repair mechanisms in the wound bed (Parks, 1999). Tissue inhibitors of metalloproteinases (TIMPs) are the mechanism by which MMPs are normally turned off. However, in chronic wounds, these may fail to stop proteolytic activity because the levels of MMPs can be significantly raised (Trengove et al, 1999). Where there is a high volume of protein-rich exudate, microorganisms can thrive resulting in a copious volume of exudate as the body attempts to mount an immune response (Yager, et al, 1996).

Uncontrolled exudate can also have a damaging impact on the periwound skin. Proteolytic enzymes, excess moisture and pH changes will all affect periwound skin integrity. Skin and wound margin maceration, excoriation, wound size increase, irritation and pain are all common symptoms of uncontrolled exudate (Lawton and Langøen, 2009).

Of all wound-related symptoms, excess exudate is often considered to be the most debilitating (Jones et al, 2008). The negative impact that this can have on quality of life is widely recognised, and patients may find it difficult to mobilise, socialise or even manage their own activities of daily living as a result (Chase et al, 2000). Thus, in the author's clinical experience, exudate management should be a central concern for clinicians.

EXUDATE MANAGEMENT

If exudate assessment suggests an imbalance that could result in impaired wound healing, local and systemic factors involved should be considered. Without holistic consideration of the patient's general overall health, wound management may be misdirected with dressings becoming simply passive participants in the management of the wound, doing little to actively improve the condition of the wound and promote healing.

With lower leg ulceration, exudate can be particularly difficult to control, especially in patients where management of an underlying condition is challenging. For example, a patient with venous hypertension who also has peripheral vascular disease may not be appropriate for management with compression therapy, the gold standard treatment for lower leg venous hypertension (European Wound Management Association [EWMA], 2003).

Typically, wound exudate will start to decrease as venous return is improved and peripheral fluid accumulation reduces (Kroger and Assenheimer, 2013). Despite the wealth of evidence supporting compression therapy in patients with venous leg ulceration for improving outcomes (Nelson et al, 2004; O'Meara et al, 2012), some patients will be unable or unwilling to tolerate this intervention for a variety of reasons including pain, social acceptability, availability/access to services, fear and contraindicating comorbidities.

Peripheral oedema secondary to acute decompensated failure of the cardiac or renal systems will require medical management, often with medications, to improve the ability to circulate and filter excess fluid volumes (Kroger and Assenheimer, 2013). With medical management being the central consideration in these conditions, a high volume of exudate may be a transient feature of the wound (Navas and Martinez-Maldonado, 1992). As such, exudate management products become a temporary symptom control mechanism, although are vital for patient comfort and prevention of further skin breakdown. However, once medical management has stabilised the patient, compression therapy can be considered and may be

Table 1: Exudate contents

Function	Constituents
Haemostasis	▸ Fibrin ▸ Thrombocytes
Immune response	▸ Polymorpho-nuclearcytes ▸ Lymphocytes ▸ Macrophages
Molecular transport/ osmotic pressure regulation	▸ Plasma proteins ▸ Globulin ▸ Fibrinogen
Tissue regeneration regulation	▸ Growth factors ▸ Matrix metalloproteinases (MMPs) ▸ Tissue inhibitors of metallo-proteinases (TIMPs)
pH buffering/regulation	▸ Inorganic salts
No function	▸ Necrotic tissue ▸ Metabolic waste products from cellular activity ▸ Microorganisms

of particular value longer term (Kroger and Assenheimer, 2013).

Chronic ulceration of the lower leg is often subject to high bioburden (Thomsen et al, 2010). The inflammatory response that is stimulated by the presence of microorganisms will in turn increase exudate volume. When infection in the wound or surrounding tissues is present, an increase in exudate is often expected (EWMA, 2006). Management of exudate for this reason centres around good microbial management and may require both systemic and local antimicrobial therapies (Alhede and Alhede, 2014).

Assuming that the underlying pathology for a high volume of exudate is addressed — it is beyond the remit of this article to highlight all cases — absorbent products then have a key role to play. If the underlying pathology cannot be managed, they become even more crucial as they can help to restore a degree of function that might otherwise be lost. However, the choice of absorbent dressing is not always easy. Multiple factors need to be considered, such as how the exudate is managed by the product or whether additional dressings are required to address other wound environment factors (e.g. bioburden, necrosis, etc). It is also necessary to consider how the product will be secured to the area in question.

FOAMS, FIBRES AND SUPERABSORBERS

Although still available, traditional 'absorbent' products based on cotton gauze, cotton wool and fluff fiber are of limited use when a wound is producing a significant volume of fluid. Over the decades since Winter (1962) and his work on moist wound healing, the range and mode of action of wound management products available to healthcare practitioners have increased. While this gives greater choice, it can also be difficult to determine which products are the most useful for each individual situation.

Foam dressings are traditionally considered for wounds producing a low volume of exudate, where the expectation is that the dressing can be retained for one week. They work by simple absorption methods and wick fluid into a polyurethane matrix (Sussman, 2010). Should there be too much exudate for a foam dressing alone, fibre-based dressings such as alginates and hydrocolloid fibre are often used as adjuncts, or alone beneath a bandage or other securing product. These two types of fibre-based products work by converting the fluid into a gel (Thomas and Loveless, 1992; Walker and Parsons, 2010). However, if exudate volume is high, frequent dressing changes will be needed. This can have a negative impact on the patient's social and psychological needs and be a limiting factor for other activities of daily living (Cutting et al, 2013), as well as taking up nursing time. This is where the emergence of superabsorbent dressings has played a key role in improving patients' quality of life and wound-healing outcomes (Lloyd-Jones, 2012).

Superabsorbent dressings typically work by drawing fluid into a desiccated core of material where it is converted into a gel (Faucher et al, 2012). Because the fluid is fully sequestered, this reduces the risk of maceration and absorbs not only fluid, but also harmful components (e.g. elevated MMPs) of wound exudate. In a recent audit of 80 wounds in acute hospital and community settings, one superabsorbent dressing range — Eclypse® (Advancis Medical) — was found to be effective at absorbing and containing large quantities of fluid into its moisture-locking core, as well as providing patient comfort and having a positive impact on quality of life (Rafter et al, 2015).

Eclypse® dressing range

Eclypse dressings can be used to treat a variety of challenging wounds (such as leg ulcers, pressure ulcers, etc), and can be used under compression therapy. They can be left in place for up to seven days, although wear time should always be dependent on the volume of exudate being produced.

The dressings create a favourable-healing environment by managing and controlling a moderate-to-high volume of wound exudate, which is locked away in the dressing core, thereby effectively drawing exudate and bacteria away from the wound bed. By containing fluid in the dressing, leaks are prevented and the periwound skin is protected and kept intact (Godar and Guy, 2010).

Figure 1.
Eclypse Boot.

Figure 2.
Eclypse Contour.

Eclypse dressings are formed of several layers, each with a separate function. Once the fluid has passed through a contact layer, it reaches a rapid wicking layer that distributes the fluid evenly across the dressing and away from the wound bed. The fluid is then absorbed into a central moisture-locking layer, which contains superabsorbent crystals. Upon coming into contact with fluid, the crystals instantly expand to form a gel. This gel is permanently retained within the dressing and further fluid absorption can take place. A water-resistant backing layer creates a barrier against bacteria and prevents strikethrough, although its microporous material allows the wound to 'breathe'.

Shaped products

Choosing dressings for wounds in the lower limb can be difficult due to variations in limb shape and size and the problem of gravity exerting an effect on exudate. The Eclypse® Boot and foot range (*Figure 1*) can help to overcome this problem by enclosing part or whole of the foot in superabsorbent material. By providing this absorbent capacity at the lowest area of the limb, exudate run-off into footwear is greatly reduced or completely prevented.

Eclypse® Contour (*Figure 2*), the newest addition to the range, can be used on the lower limb without encasing the foot, but while still having better conformity to the limb shape compared to more regular-shaped products, such as square or rectangular dressings. The size and shape of the dressing is such that it can be used in difficult-to-dress areas such as the underarm, abdomen, back and lower leg and thigh. A major benefit of improved conformity is maximising exudate uptake. If the dressing has even contact with the whole of the wound surface, it can draw fluid directly into the product.

The Eclypse range of products have both specific anatomical applications, as well as more standard shapes. This gives clinicians flexibility to choose the product that best fits patients' needs.

CONCLUSION

Appropriate exudate management is essential for wound healing, cost-effective wound care and to promote patient quality of life (Godar and Guy, 2009). Thus, clinicians need to assess and understand the exudate being produced and use this information to guide decision-making so that a plan of care can be drawn up in full consultation with the patient that balances specific wound management objectives and patient quality of life goals. JCN

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