Evaluation of a superabsorbent dressing in a primary care organization

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Currently, the NHS is facing the challenge of delivering high-quality care and improving efficiency, as a result of an increasing demand for health-care resources (Department of Health (DH), 2010). For tissue viability nurses, managing exudate is one of the most challenging and costly aspects of patient care. As the majority of wounds are chronic in nature, and cared for in the community setting (Drew et al, 2007), it is vital that nurses choose cost-effective dressings with the appropriate clinical benefits. Consequently, during recent years, industry has introduced superabsorbent wound dressings and pads. This article outlines a 40-patient evaluation of DryMax Extra (Aspen Medical).

What is the cost of wound care?

The cost of wound care is estimated at £2.3–£3.1 billion per year and accounts for 3% of the annual NHS expenditure billion at 2005/2006 prices (Posnett and Franks, 2007). While the management of wounds is diverse and highly variable across UK providers (Posnett and Franks, 2007), Drew et al (2007) stated that the cost of wound care in 2005–2006 was £2.5–3.1 million per 100 000 population, and Vowden et al (2009) estimated the cost at £2.03 million per 100 000 population (2006–2007 prices). These statistics illustrate the financial impact of wounds and, ultimately, the importance of managing exudate.

ABSTRACT

This 40-patient evaluation of superabsorbent dressing DryMax Extra (Aspen Medical) was conducted within a large UK primary care organization adhering to an agreed evaluation protocol as approved by clinical governance. Exudate management and key performance requirements of absorbent dressings are considered with an analysis made of the clinical data relating to DryMax Extra. Clinical expectation of the product was rated and met in 38 of 40 cases, relating to ease of use, patient comfort, exudate management, maceration prevention, wear time and visual improvement of the wound bed. Additionally, evaluation findings resulted in a recommendation for formulary listing in 34 cases. Consequently, the authors recommend that there is a need for a large comparative study of the clinical and financial outcomes of superabsorbent dressings.

KEY WORDS

Exudate management • Superabsorbent dressing • DryMax Extra

Exudate and wound healing

When a wound develops, the dermis is disrupted, resulting in fluid (exudate) flowing from an area of high pressure in the tissues to an area of low pressure in the wound. The production of exudate occurs as a result of vasodilatation during the early inflammatory stage of healing, and its production in the acute wound is normal (White and Cutting, 2006).

Although exudate is often perceived as undesirable, it plays an important role in keeping the wound moist and promoting healing (White and Cutting, 2006). As exudate is present on the wound surface, it promotes moist wound healing by stimulating growth factor production, matrix metalloproteases (MMPs), and macrophages, while allowing the migration of fibroblasts (Cutting, 2003). Exudate also provides the essential nutrients for cell metabolism, and enables the diffusion of immune and growth factors, as well as assisting the separation of dead or damaged tissue-autolysis (World Union of Wound Healing Societies (WUWHS), 2007).

What is the ideal level of exudate needed for wound healing?

A degree of moisture is essential for moist wound healing (Winter, 1962); however, the ideal level of exudate for healthy uncomplicated healing is unknown (Vuolo, 2004). Although exudate decreases over time in normal wounds (Ratliff, 2009), those with chronic wounds can experience an increase in exudate, as it contains a high level of MMPs, which can be a significant factor in delayed wound healing (WUWHS, 2007).

Both low and high levels of exudate can lead to significant clinical challenges; for example, a low level of exudate can result in drying of the wound and can inhibit the healing process (Dowsett and Newton, 2005), but a poorly-managed high level of exudate can cause peri–wound damage (Bishop et al, 2003).

Exudate management

When managing exudate, it is important to consider the underlying cause; for example, if exudate is caused by oedema or infection, this should be managed appropriately by the clinician. Exudate can be a clinical challenge when the dressing leaks, or there is a high frequency of dressing changes. This also applies to when there are peri-wound

changes such as maceration or skin stripping. Maceration presents as a white discolouration owing to overhydration of the surface keratocytes. Macerated skin is weaker than non-macerated skin, as it is damaged by physical trauma and eroded by proteolytic enzymes in the exudate (Young, 2000; Fletcher, 2002). Skin protectors such as 50:50 ointment, Vaseline, or barrier films and creams, may be used to prevent maceration from occurring.

Other clinical challenges include delayed healing, discomfort or pain, and fluid and electrolyte imbalance, owing to protein loss. Considering these challenges, the key principles of effective exudate management are:

- Treating the underlying cause(s)
- Assessing local, systemic, psychosocial and wound-related factors
- Optimizing the wound bed by maintaining the appropriate level of moisture
- Preventing and treating exudate-related problems, e.g. peri-wound maceration

Dressing selection

In accordance with Thomas' (2008) recommendations, dressings are required to:

- Maintain the wound and surrounding skin in an optimum state of hydration
- Contain exudate or cellular debris to prevent transmission of microorganisms into or out of the wound
- Maintain the wound at the optimum temperature and pH
- Be easy to apply and remove
- Provide bacterial protection
- Prevent the release of particles or non-biodegradable fibres into the wound
- Protect the peri-wound skin from potentially irritant wound exudate and excess moisture
- Be non-toxic
- Require minimal disturbance or replacement
- Manage exudate and MMPs.

The British National Formulary (BNF) (Joint Formulary Committee, 2011) identifies three types of dressings that may be used to manage exudate. This is according to the differing levels of exudate, described as light, moderate-to-heavy and heavy. Simple absorptive dressings hold fluid until pressure is applied. When pressure is applied, fluid is released, which may lead to maceration and poor fluid handling. As with other dressings in this category, they should not be applied to lightly exuding wounds, as they may cause dryness.

DryMax Extra

Several dressings are classified in the BNF (Joint Formulary Committee, 2011) as 'superabsorbent cellulose and polymer dressings'. These vary significantly in structure and function, as well as cost. DryMax Extra is an absorbent cellulose and polymer dressing that is indicated for use on heavily-exuding wounds. It is a low profile (slim) dressing based on superabsorbent polymers, contained inside a propylene cover.

How does DryMax Extra work?

Superabsorbent polymers can absorb up to 20 times as much fluid, which is several times their own weight. When wound fluid comes into contact with the superabsorbent polymers, it will attach to the polymer chains and form a complex network structure, resulting in visible swelling and gelling. The superabsorbent dressing absorbs and retains exudate taken up through the dressing in a vertical wicking process that minimizes the risk of maceration of the peri-wound area. This allows for appropriate management, extended wear time, and a reduced number of dressing changes. In addition, the dressing's low-adherent contact layer aids the conformability and prevents sticking to the wound.

Method

Forty participants were recruited from a variety of clinical settings across a primary care organization by the county tissue viability team to undertake evaluations of the superabsorbent dressing. Three criteria were measured:

- Clinical performance and patient outcomes
- Clinical and patient acceptability
- Wear time and financial implications.

Evaluators were instructed to seek indications where exudate could not be managed effectively with the current simple absorptive dressing available within the local formulary, resulting in the patient requiring increased dressing changes. Evaluation forms were developed by adapting the existing standard formulary evaluation forms with absorbent-specific questions. Questions were agreed by the tissue viability team, and received approval by clinical governance.

Inclusion criteria

To be included in this evaluation, all patients had to be:

- Over 18 years old
- Willing to participate, with the capacity to give consent
- Seen with an indication suitable for treatment using a skin barrier product
- Seen regularly by the evaluator
- Screened and treated accordingly, if they had clinical signs of infection.

Exclusion criteria

Patients were excluded from the product evaluation if they

- Were under 18 years of age
- Did not wish to participate or have capacity to consent
- Could not follow instructions for product use
- Presented with any other reasons that led the evaluator to feel the patient should be excluded, e.g. non-concordance or risk of not attending follow-up appointments

Results

Wound type and location

Wound types included leg ulcers (n=21), cellulitis (n=4), surgical wounds (n=9), pressure ulcers (n=3), a diabetic ulcer (n=1), and a fungating wound (n=1) (*Figure*

1). One participant's wound type was not recorded. Wounds were located on the leg (*n*=24), foot (*n*=1), abdomen (*n*=7), hip (*n*=2), sacrum (*n*=1), and breast (*n*=1) (*Figure 2*). Wound location was not recorded for 4 participants.

Tissue types were recorded as mixed tissue (*n*=2), sloughy (*n*=12), infected (*n*=8), granulating or healthy tissue (*n*=12), and fungating (*n*=1). Tissue type was not recorded for 5 participants.

Exudate types

Exudate types were recorded as haemopurulent (*n*=6), serous (*n*=17), sero-sanguinous (*n*=4), purulent (*n*=9), and haemorrhagic (*n*=1) (*Figure 3*). This was not recorded in 3 participants. In cases where purulent and haemopurulent exudate was recorded, additional information was not provided on antibiotic therapy status. Therefore, it is unclear if the exudate levels had decreased as a result of treatment, or if the absorbent capacity of the dressing handled the exudate levels. However, the exudate type and level remained static throughout the evaluation period.

Previously used dressings

Previously used dressings, in line with the current Worcestershire formulary listings, were reported to be Eclypse (*n*=7), Aquacel (*n*=4), Mesorb (*n*=9), Gamgee (*n*=1), dressing absorbent pads (*n*=12), silicone foam dressing (*n*=2), Tegaderm Foam (*n*=1), Sorbsan Plus (*n*=1) and negative pressure wound therapy (*n*=1). No previous dressing use was recorded in 2 cases.

Previous dressing wear times were recorded as three-time daily changes (*n*=3), twice daily dressing changes (*n*=3), daily (*n*=21), every 2 days (*n*=9), and every 3 days (*n*=3). Previous dressing wear time was not recorded for 1 participant.

DryMax Extra performance results

Application and removal

Application of the superabsorbent dressing was recorded as being very easy (*n*=21), easy (*n*=13), fairly easy (*n*=5) and difficult (*n*=1). For the case described as difficult, the evaluator related this result to the complexity of the wound, rather than the ability of the dressing.

Removal was recorded as being very easy (*n*=27), easy (*n*=11), and fairly easy (*n*=2). Difficult removal was not reported during the evaluation.

Exudate management

Exudate management and fluid handling properties were reported as being better than the previous dressing in 38 cases; 2 patients reported no to this question (*n*=2) (*Figure 4*). Additional information was not supplied by the evaluators to explain the cases where no was indicated. Exudate and fluid handling was reported to be excellent (*n*=24), good (*n*=14) and fair (*n*=1). One patient did not respond to this question. Maceration developed in only 1 case, and 2 patients did not report on this question. No adverse events were reported during this evaluation.

Patient comfort

Patient comfort was reported as being very comfortable (*n*=19), comfortable (*n*=15), and fairly comfortable (*n*=3) (*Figure 5*). Comfort levels were not reported in 3 cases.

Wear time

Wear time of was reported as being longer than expected (*n*=2), as expected (*n*=32), and less than expected (*n*=2). Wear time was not reported in the case of 4 participants.

Figure 1. Wound type

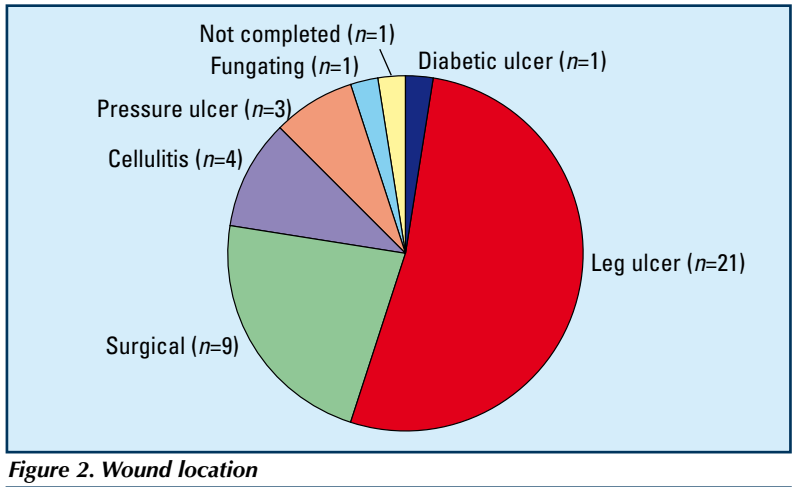


Figure 2. Wound location

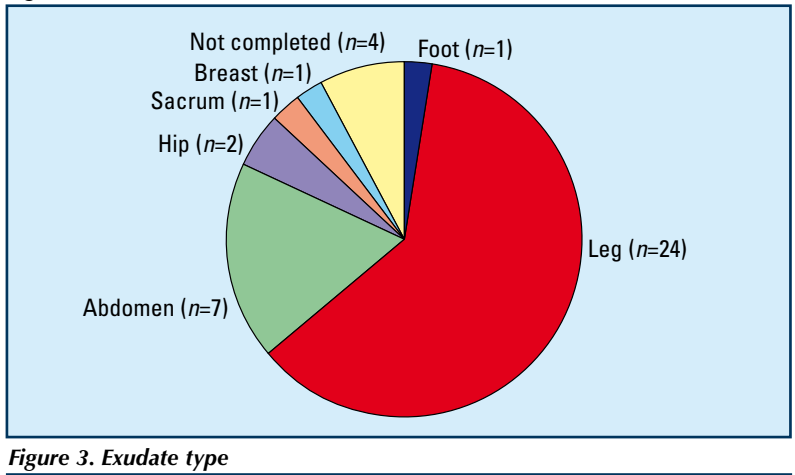
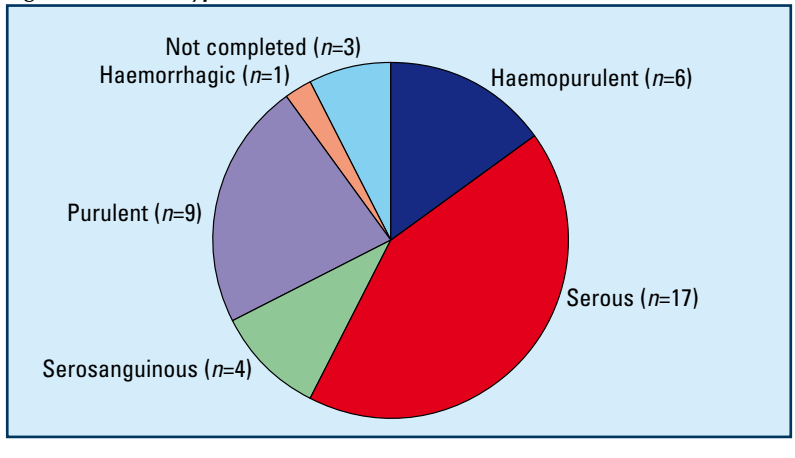


Figure 3. Exudate type



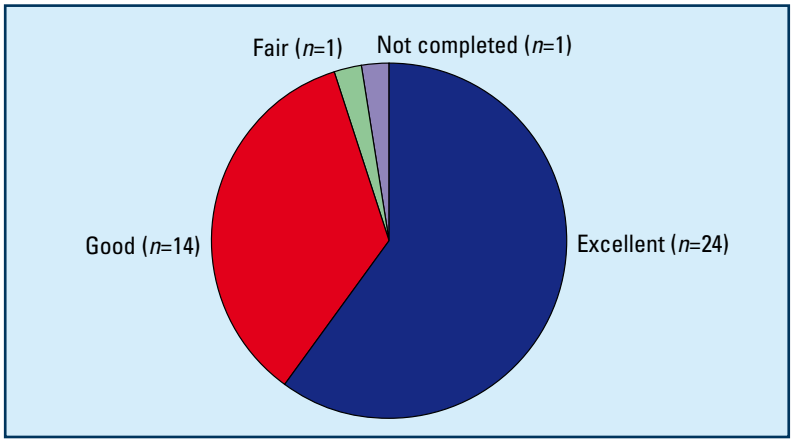


Figure 4. Exudate and fluid handling

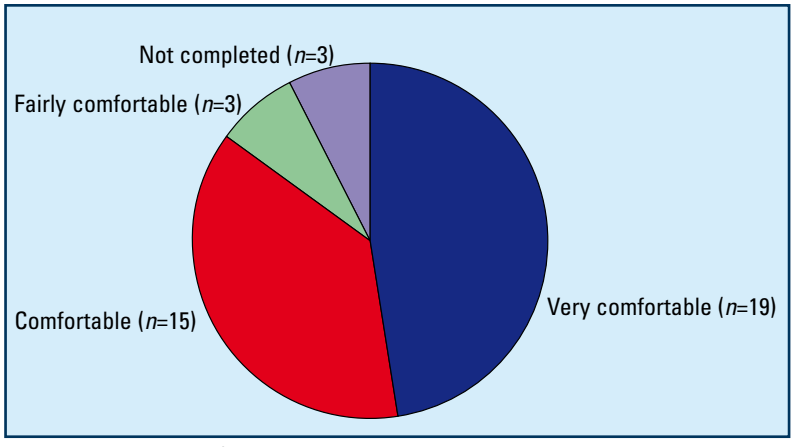


Figure 5. Patient comfort

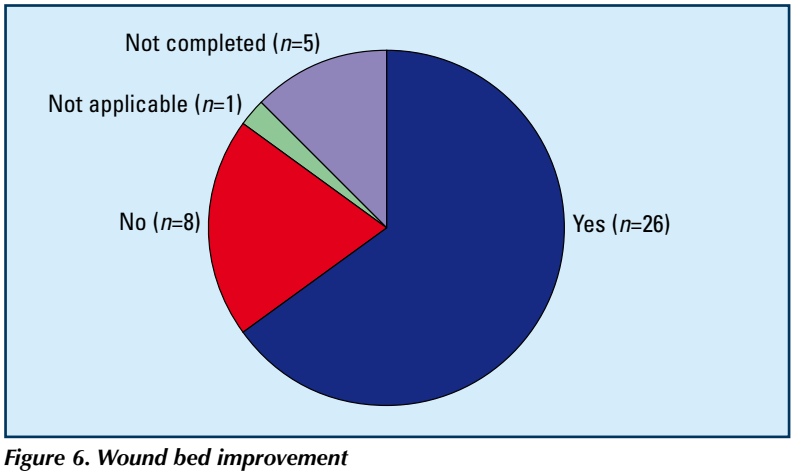


Figure 6. Wound bed improvement

Visual improvement

When asked about visual improvement of the wound bed, 26 participants reported yes, and 8 said no (*Figure 6*). This question was not applicable for 1 fungating wound, and was not responded to by 5 participants.

Formulary listing

On the topic of formulary listing potential, 34 participants said they would like to see the superabsorbent dressing included, 2 said no, and 4 did not vote.

Formulary inclusion review process

The process within Worcestershire Health and Care NHS Trust for the introduction of new products to the wound management formulary is vigorous, robust and based on Wounds UK's (2008) *Best Practice Statement: Development of a Formulary*. This includes multiple evaluations across both acute and primary health-care settings. First of all, the need for a new wound management product has to be agreed, and then a literature review must be undertaken. Following this, a bespoke audit tool is created to look at specific outcomes. Following clinical governance approval, company representatives present the product to the appropriate health professionals within the trust, and a level of support agreement is made to undertake a product evaluation. Tissue viability services have to agree to evaluate the product.

Discussion

Exudate management poses significant challenges to health professionals, and it is essential to consider the underlying cause of the wound to treat symptoms appropriately. Additionally, it is vital for the clinician to consider the desired clinical outcome of exudate management, protection of the peri-wound area and appropriate frequency of dressing changes. A reduction of visits can enable the patient to have more independence, and allow clinicians to manage their workload appropriately, including out-of-hours services. This will also minimize the overall costs of dressings by increasing wear time.

The evaluation of DryMax Extra has explored a range of clinical indications, including ease of use, patient comfort, wear time, and fluid handling. The high absorption capacity of the dressing allows clinicians to maximize wear time, thereby reducing dressing change frequency and minimizing the number of times the wound is disturbed, while protecting the peri-wound area. Clinical expectation of the product was met in 38 of 40 cases, relating to ease of use, patient comfort, exudate management, maceration prevention, wear time and visual improvement of the wound bed.

Successful exudate management can dramatically improve time to healing, prevent exudate-related issues, increase patients' quality of life, and improve health-care efficiency. The assessment of local, systemic, psychosocial and wound-related factors, treating the underlying cause, and optimizing the wound bed by maintaining the appropriate moisture level are important factors in preventing and treating exudate-related problems. Limitations to this evaluation include not measuring the effects of antibiotic therapy on exudate level status, and the comparison of superabsorbent dressings to simple absorbent dressings available on the formulary. There is a need for a large comparative study of the clinical and financial outcomes of superabsorbent dressings. **BJCN**

Conflict of interest: Aspen Medical provided the evaluated product and administrative support to facilitate this clinical evaluation

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