Wound exudate: what GPNs should know

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Highly exuding wounds can affect people of all ages, often causing distress, anxiety and social isolation. Managing these challenging wounds can also represent a significant cost to the NHS. This article looks at exudate and the difference between normal and excessive exudate and examines the causes of a high volume of exudate and its effect on the patient. Exudate assessment is an important part of holistic assessment, which is also explored in the article. Strategies GPNs can employ to manage exudate, including wound dressings and other devices, are then discussed.

KEY WORDS:

- Exudate
- Assessment
- Chronic wounds
- Periwound skin

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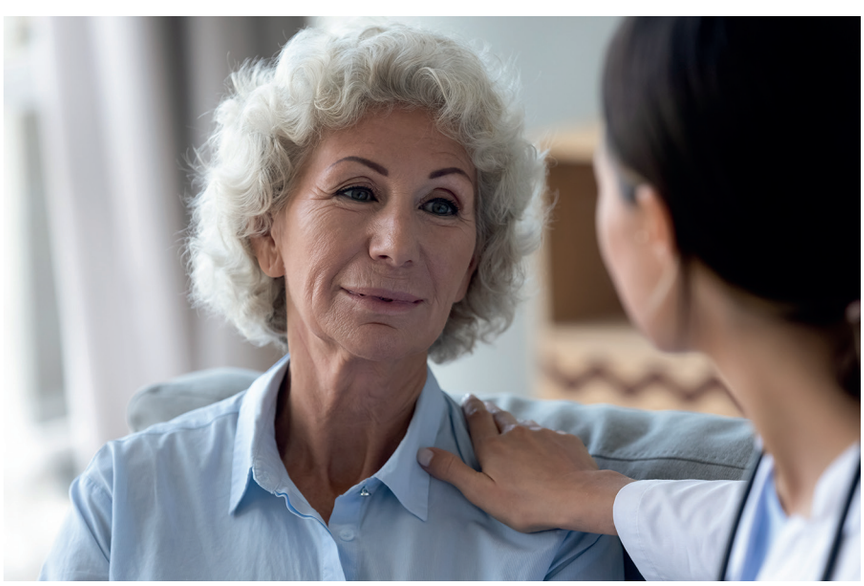

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Managing wound exudate is a complex challenge faced by many healthcare professions on a daily basis. Exudate management can often be overlooked during the busy daily workloads of healthcare professionals (Geraghty, 2016). For patients whose wounds produce excess exudate, it causes malodour, and feelings of disgust, self-loathing and low esteem (Herber et al, 2007). It is essential, therefore, that general practice nurses (GPNs), who manage wounds on a regular basis, understand what wound exudate is, and when it is normal or abnormal. An awareness of the importance of holistic assessment and effective management is also vital.

WHAT IS WOUND EXUDATE?

Exudate is derived from fluid that has leaked out of blood vessels and closely resembles blood plasma (World Union of Wound Healing Societies [WUWHS], 2007). It is produced as a normal and essential part of the wound healing process (Lloyd Jones, 2014). However, overproduction of wound exudate, in the wrong place or of the wrong composition, can adversely affect wound healing (Moore and Strapp, 2015; WUWHS, 2019). Exudate is best defined as:

> *Exuded matter; especially the material composed of serum, fibrin, and white blood cells that escapes into a superficial lesion or area of inflammation.*
>
> (WUWHS, 2019)

IMPORTANCE OF WOUND EXUDATE

In wounds which are healing naturally through the normal, recognised phases, exudate supports the healing process by (WUWHS, 2019):

- Maintaining a moist environment
- Maintaining diffusion of immune mediators and growth factors across the wound bed
- Allowing the migration of tissue-repairing cells
- Delivering essential nutrients for cell metabolism
- Facilitating debridement by the body's own mechanism of autolysis.

Table 1 outlines a simple overview of the normal wound healing process and the main events that occur in each phase.

It is important to remember that wound healing is a dynamic process and that phases can overlap and do

not occur in isolation of each other (Timmons, 2006).

When associated with wound healing, exudate is often perceived in a negative way, despite being an important part of the wound healing process when present in the optimal volume (Tickle, 2017).

EXUDATE IN CHRONIC WOUNDS

In chronic wounds, the inflammatory process is extended and exudate volume increases with harmful consequences (Nichols, 2016). Chronic wound exudate contains higher numbers of matrix metalloproteases (MMPs), which break down newly formed healthy tissue and lacks the growth factors needed to facilitate timely healing (Nichols, 2016).

Therefore, the amount of exudate and its composition can delay or prevent wound healing, affecting patients' physical and psychological wellbeing, and also placing increasing demands on healthcare resources (Wounds UK, 2013).

REASONS FOR A HIGH VOLUME OF WOUND EXUDATE

In typical wound healing, exudate volume will decrease as healing occurs (Adderley, 2008). However, there are reasons why some wounds produce excessive exudate (*Table 2*), and why others are typically affected (*Table 3*) (Gardner, 2012).

IMPACT OF EXCESS EXUDATE

A high volume of exudate can be distressing to patients and their carers because of malodour, leakage, pain and discomfort, and increased soiling of clothes and bed linen (Adderley, 2008; WUWHS, 2019). Malodour has been reported to cause great distress and makes patients and carers feel isolated (Gethin et al, 2014).

Practice point

Poor nutritional status can have a direct effect on wound healing. Patients with highly exuding wounds will benefit from a full nutritional assessment and protein, vitamin, mineral and trace element replacement.

Table 1: A simple overview of the phases of normal wound healing (Brown, 2015)

Phase of wound healing	Main events that occur
Phase 1: inflammation	■ 0–3 days ■ Haemostasis followed by vasodilation carrying the cells necessary for healing process ■ Classic signs of inflammation — redness, heat, swelling and pain
Phase 2: destruction	■ 1–6 days ■ Cleaning the wound, preventing infection and providing the best conditions for wound healing
Phase 3: proliferation	■ 3–4 days ■ New tissue is regenerated and constructed by fibroblasts consisting of new blood vessels, collagen and other connective tissue
Phase 4: maturation	■ 21 days and two years ■ Epithelial cells move over newly formed granulation tissue and reduce the size of the wound by contracting and pulling the edges together ■ Macrophages re-organise the collagen within the newly healed wound to form a scar

The consequences of a high volume of exudate combined can lead to patients becoming dissatisfied with exudate management delivery and even cause depression (Beldon, 2016).

A high exudate volume can also contribute to malnutrition. This is not only due to malodour reducing a patient's appetite, but also because exudate is rich in protein, which could need replacing to prevent protein deficiency (Adderley, 2008).

Excessive wound exudate also results in frequent dressing changes to ensure containment and help prevent potential wound infection and biofilm development (WUWHS, 2019). This inevitably involves more nursing time and resource and impacts on a patient's normal activities of daily living.

Copious exudate can can also have a significant impact on the skin surrounding the wound. The periwound area is defined as within 4cm of the wound edge (Dowsett and Allen, 2013) and can show signs of (Young, 2017):

- Maceration, pale in colour or red if inflamed (the first stage of maceration is sometimes referred to as over or hyper-hydration, which is said to be reversible [WUWHS, 2019])
- Excoriation, which is a skin erosion and often partial thickness.

Periwound moisture-associated dermatitis is one of the four clinical manifestations covered by the umbrella term moisture-associated skin damage (MASD), namely:

- Incontinence-associated dermatitis (IAD)
- Intertriginous dermatitis
- Periwound moisture-associated dermatitis
- Peristomal moisture-associated dermatitis (Young, 2017).

EXUDATE ASSESSMENT

Assessment of wound exudate should take place in the context of holistic wound assessment, considering the whole patient and comprising at least the generic wound assessment minimum data set (Coleman et al, 2017; Wounds UK, 2018), including:

- Overall health of the patient
- Current wound management
- Patient/carer concerns
- Periwound region
- Wound and exudate assessment
- Risk of further wound development (WUWHS, 2019).

Exudate assessment should consider the type, colour, consistency, and volume being produced and if there is any odour

Table 2: Why some wounds produce a high volume of exudate (Gardner, 2012)

■ Size and position of the wound
■ Underlying conditions that increase capillary leakage, e.g. cardiac, renal or hepatic failure
■ Pathology of the wound
■ Failure of the lymphatic system
■ Increased bacterial burden
■ Medication, e.g. steroids
■ Presence of oedema

Table 3: Wounds that are typically affected (Gardner, 2012)

■ Chronic venous leg ulcers
■ Postoperative dehisced wounds
■ Fungating wounds
■ Burns
■ Inflammatory ulcers, such as rheumatoid ulcers and *pyoderma gangrenosum*
■ Skin donor sites
■ Infected diabetic foot ulcers

present (WUWHS, 2019) — all of which provide useful indicators of the stage of healing and possible wound-related problems (*Table 4*).

For example, too much or too little exudate can delay healing and so clinicians need to judge the stage of healing with the exudate volume. Determining the amount of exudate is generally subjective, such as the simple system of +, ++ and +++ and low, moderate, high because of a lack of defined criteria for what each means (Kerr, 2014; WUWHS, 2019).

In addition, examining the dressing or device on removal provides valuable information about the nature of the exudate and the performance of the dressing/device (WUWHS, 2007). For example, is the dressing leaking, or saturated? Some dressings incorporate a measure so that you can track the exudate on the back of the dressing, helping to ensure that it is left in place for as long as possible and not changed too early.

Underlying conditions that result in fluid overload may also increase volume of exudate (Wounds UK, 2013). These include conditions that lead to oedema, such as congestive cardiac failure and chronic oedema (WUWHS, 2019). It is important that treatment of these conditions continues with caution where necessary, following best practice guidelines (Wounds UK, 2019).

EXUDATE MANAGEMENT

Wounds which are producing a copious volume of exudate can be clinically challenging, cause pain and distress to the patient, and be costly to manage (Vowden et al, 2015).

The focus of exudate management will depend on the results of holistic assessment, but should include (WUWHS, 2019):

- Managing factors that are giving rise to the high exudate volume, e.g. removal of wound biofilm and managing local wound infection, optimising the patient's condition and any wound-related symptoms to improve quality of life
- Providing patient and carer education
- Conducting further investigations and making specialist referrals, as required
- Optimising the condition of the wound bed and periwound skin, e.g. by wound debridement
- Improving the wound bed moisture level

Practice point

Why not reflect on a patient with a chronic wound with excess exudate. Consider if you have selected the correct dressing to meet their individual needs.

- Preventing and treating any exudate-related problems.

WOUND DRESSING SELECTION

There are a number of wound dressings available to manage exudate, some of which are designed specifically for a high volume. Selection should be based on the most appropriate product for the individual patient, wound site and underlying aetiology, as well as the volume of exudate being produced (Beldon, 2016). Selection will also need to be based on availability and local wound dressing formularies.

Although dressings are the main option for managing exudate, there are other devices that can be useful, such as negative pressure wound therapy (NPWT) (Gardener, 2012; Nichols, 2016; WUWHS, 2019), and wound care bag systems or stoma bags (Beldon, 2008; Nichols, 2016; WUWHS, 2019).

In general, dressings manage fluid by absorbing it and/or allowing it to evaporate from the dressing's

Table 4: Significance of exudate type (adapted from Vowden et al, 2015; WUWHS, 2019)

Type	Consistency	Colour	Significance
Serous	Thin, watery	Clear, amber	Often considered normal, but increased volume may indicate infection
Fibrinous	Thin, watery	Cloudy	May indicate presence of fibrin strands
Serosanguinous	Thin, slightly thicker than water	Clear, pink	Presence of red blood cells indicates capillary damage
Sanguinous	Thin, watery	Reddish	Low-protein content due to venous or congestive cardiac disease, malnutrition
Purulent	Viscous, sticky	Opaque, milky, yellow or brown, sometimes green	Presence of white blood cells, bacteria, slough or other materials
Haemopurulent	Viscous	Reddish, milky	Established infection
Haemorrhagic	Viscous	Dark red	Bacterial infection Capillary damage indicating trauma

Patient story one

Figure 1.

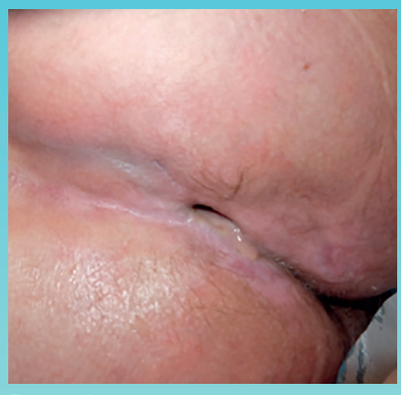

Figure 2.

This patient was an elderly gentleman who had been in hospital for prostate cancer and had had several rounds of chemotherapy. He also had spinal cord compression and so his mobility was extremely poor, which resulted in a category 3 pressure ulcer, with significant damage to the periwound skin (*Figure 1*). The wound was locally infected and so he was started with an antimicrobial dressing within the cavity, which was covered with a superabsorbent polymer (SAP) dressing, Zetuvit® Plus Silicone Border (HARTMANN UKI), ensuring that the dressing had contact with the skin at all times.

Initially, the dressing was changed twice daily, and he only had short periods out of bed. This had a significant impact on his quality of life because it was so restricted and he was extremely embarrassed by the odour from the wound. However, after two weeks' treatment, improvement was seen in the condition of the periwound skin. The odour had started to reduce and the patient felt willing for his family to visit, which he had not previously wanted because of the odour.

After six weeks, the periwound area had fully healed (*Figure 2*) and the patient was feeling well. The nurses reported that the dressings were easy to apply and remove and the odour had completely gone. The patient's quality of life changed because he was able to get out of bed, go to the local pub, and the nurses were able to start topical negative pressure therapy.

surface (Wounds UK, 2013). While some primary dressings require a separate method of fixation, or do not absorb much and so need a secondary absorbent dressing, others provide both the fixation and fluid-handling function in one (WUWHS, 2019). The dressing or dressing combination selected should be able to absorb exudate in a way that:

- Facilitates a moist wound healing environment without leakage or damage to the wound bed or surrounding skin (and be compatible with any periwound skin protectant products used)
- Remain in place for a suitable length of time (WUWHS, 2007).

Table 5: Causes of periwound skin damage (adapted from Bianchi, 2012)

■ Exudate – the harmful components of some exudate, exudate sitting on the skin causing maceration
■ Adherence of dressings — aggressive adhesives and materials
■ Allergic reactions to the components of dressings
■ Repeated application and removal of dressings
■ Presence of wound infection
■ Underlying aetiologies, e.g. those causing chronic oedema

Superabsorbent dressings have been designed to manage a high volume of exudate and have greater fluid-handling capacity than traditional foam dressings (Gardner, 2012; Barrett, 2015). They vary in the way that they absorb and retain fluid, and how they function under compression (Wounds UK, 2013).

Some superabsorbents can lock fluid inside the dressing — fluid which may contain bacteria and harmful MMPs (Wounds UK, 2013). These dressings have increasingly been used to manage excess exudate, which has been acknowledged in a recent consensus document (WUWHS, 2019).

It is also important to manage any underlying conditions which may be causing the high volume of exudate, such as infection and/or biofilm, as well as the removal of devitalised tissue within the wound bed by debridement.

PREVENTING PERIWOUND SKIN DAMAGE

Having a knowledge of the different causes of periwound skin damage helps to identify risk, initiate appropriate treatment strategies or allow referral to appropriate services (Bianchi, 2012). The potential causes of periwound skin damage are outlined in *Table 5*.

Highly exuding wounds often require more frequent dressing changes and the adherence of the dressing material to the wound bed

Remember...

Exudate is a good indicator of the state of a wound. Changes in colour, viscosity or smell should be a trigger to reassess the wound.

and periwound skin can damage newly formed cells and cause pain and distress to patients (Wounds UK, 2013). It can also lead to damage to the skin's surface and stripping of the skin's barrier, which in turn initiates an inflammatory skin reaction leading to oedema and pain (Young, 2017).

Prevention of periwound skin damage begins with a thorough wound and skin assessment and a management plan that includes avoiding contact between the periwound skin and moisture through appropriate device or dressing selection (WUWHS, 2019). Alongside appropriate dressing use, which should be applied in close contact with the wound as described in the patient stories here, skin protectants can be used which form a barrier between the skin and moisture (Beeckman et al, 2015). If there is already periwound skin damage present then it will be important to also restore the skins properties (Beeckman et al, 2015).

"Highly exuding wounds often require more frequent dressing changes and the adherence of the dressing material to the wound bed and periwound skin can damage newly formed cells and cause pain and distress to patients.

Prevention of periwound skin damage should always begin with thorough wound and skin assessment, and a management plan that protects periwound skin from the damaging effects of excess exudate through appropriate dressing or device choice (WUWHS, 2019). As well as selecting appropriate dressings — which should be applied in intimate contact with the wound, as in the patient stories here — skin protectants can be used to form a barrier between the skin and moisture (Beeckman et al, 2015).

Remember...

Management of the underlying cause of excess exudate and underlying comorbidities, along with enlisting the cooperation of the patient, are important if timely wound healing is to be achieved (Beldon, 2016).

Patient story two

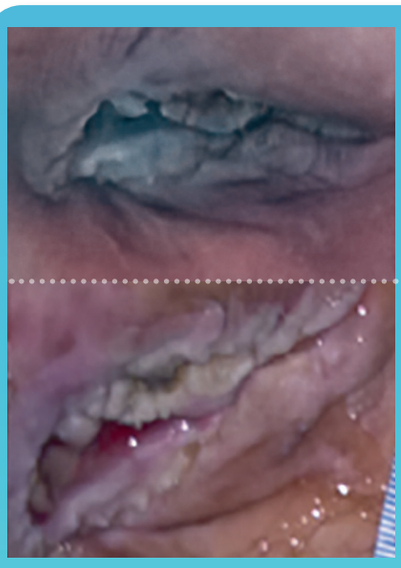

Figure 3.

This 24-year-old patient had a spinal injury. He had had four category 4 pressure ulcers for the past seven years and was awaiting plastic surgery. His concordance with treatment was poor, and he insisted on using foam dressings with adhesives, which were not managing the volume of exudate effectively and there was a great deal of periwound skin damage resulting in wound infection (*Figure 3*).

The decision was taken to try Zetuvit® Plus Silicone Border, again ensuring that the dressing was in intimate contact with the wound surface.

After just two weeks' treatment, the condition of the periwound skin started to improve (*Figure 4*) and the patient was concordant with treatment and a great deal calmer. He liked the dressing and was able to shower, and commented that the dressing was actually the 'boss', as it was improving his quality of life.

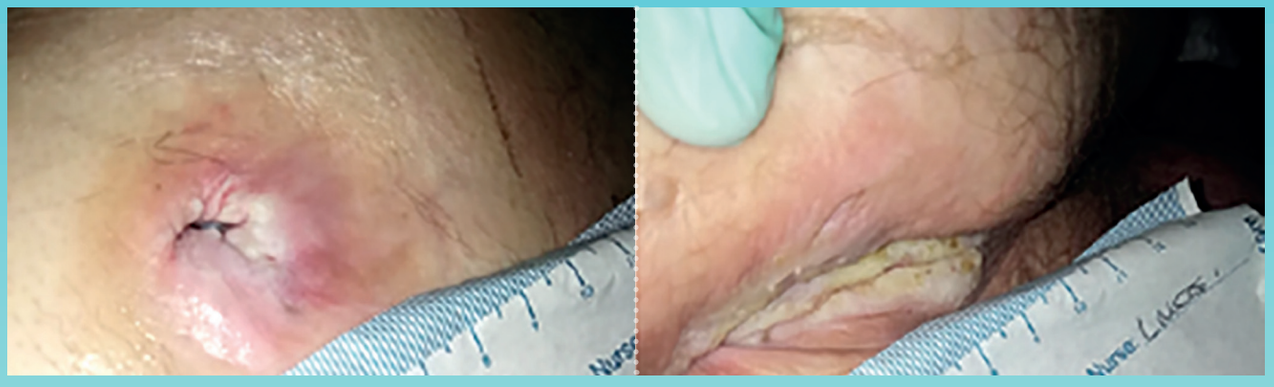

Figure 4.

If there is already periwound skin damage present, the additional step of helping to restore the skin may be required (Beeckman et al, 2015).

CONCLUSION

Exudate plays a key role in wound healing in certain situations and scenarios.

Effective assessment and management of exudate is therefore key to ensuring timely wound healing without complications. GPNs should have the appropriate skills and training to ensure that they understand the importance of accurate assessment of exudate as part of holistic assessment of a patient and their wound. When this is combined with a good understanding of wound dressings and devices used to manage a high volume of exudate, improvements for the patient and their quality of life will be seen. GPN

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Key points

- Wound exudate is part of the normal wound healing process.
- Too much exudate and its composition can delay or prevent wound healing, affecting patients' physical and psychological wellbeing.
- Assessment of wound exudate should take place in the context of holistic wound assessment
- Dressings are the main option for managing a high volume of exudate, but there are other devices that can be useful.
- Superabsorbent dressings have been designed to manage excess exudate, having a greater fluid-handling capacity than traditional foam dressings.

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