

WOUND ASSESSMENT

PART 2: EXUDATE

Wound exudate provides the moist environment required for cell regeneration. However, in chronic wounds exudate can become excessive and prevent healing. Changes in the volume, colour, consistency and odour of exudate can indicate problems within the wound, which need to be addressed. Therefore, it is important that nurses can correctly assess these characteristics of exudate in order to provide appropriate care.

“The challenge for wound management is to get the balance of exudate right — neither too dry nor too wet.”

Wound assessment is a skill that is an essential part of successful wound care (Dowsett, 2009). Information gained from wound assessment is used to decide what stage of healing the wound is at, whether it is progressing or deteriorating, and whether the treatment plan is appropriate or not. Documenting this information is an essential part of care. It can be recorded in narrative form in the patient’s care record, but the most commonly used format for recording wound assessment is in a chart or form. Such forms act as prompts to ensure all the major elements are assessed (Brown, 2006), and bring all the relevant information together into a format that is easy to interpret.

The previous article in this series on wound assessment looked at measuring wounds. This article will focus on exudate: what it is; how to assess and record information about it; and its significance for healing. It will also mention strategies for managing exudate.

What is exudate?

Exudate is also known as ‘wound fluid’ or ‘wound drainage’. When

there is a break in the skin, an inflammatory response is initiated and the capillaries become more permeable. Serous fluid leaks out into the wound bed and forms the basis of exudate (World Union of Wound Healing Societies [WUWHS], 2007).

Exudate contains water, electrolytes, nutrients, proteins, inflammatory mediators, proteases, growth factors, white blood cells and micro-organisms (White and Cutting, 2006). It is a normal part of wound healing and promotes a moist environment which allows epithelial cells to migrate across the wound (Dowsett, 2011). The growth factors and nutrients contained in exudate are necessary for healing and the moist environment also facilitates autolysis (the separation of necrotic tissue from healthy tissue) (WUWHS, 2007).

However, the challenge for wound management is to get the balance of exudate right and ensure the wound is neither too dry nor too wet. In chronic wounds the inflammatory process is prolonged and exudate builds up with harmful consequences.

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Chronic wound exudate contains higher amounts of matrix metalloproteases (MMPs) which break down newly forming healthy tissue. It also lacks the growth factors usually found in acute wound exudate that are necessary to facilitate timely healing (White and Cutting, 2006). Excess exudate in chronic wounds can result in damage to the surrounding skin if it is not managed appropriately.

Reasons for high levels of exudate

- ▶ A large wound will naturally produce more exudate. However, there are other causes that can account for heavy exudate. Pyoderma gangrenosum, rheumatoid ulcers, leg ulcers and burns are known to produce greater amounts of exudate (Wounds UK, 2013).
- ▶ Lymphatic obstruction or failure secondary to other pathophysiological causes, such as venous hypertension will prevent reabsorption of fluid from the tissues back into the lymphatic vessels.
- ▶ Cardiac, renal or hepatic failure causes fluid retention in the tissues from increased capillary leakage (Gardner, 2012).
- ▶ Patients who sleep in a chair at night, or who do not elevate their legs effectively, will experience heavier exudate in their feet and lower legs as a direct result of gravity, and often manifests as skin changes, such as maceration in the toes or heels where the tissue around the wound has become ‘soggy’, more fragile and easily damaged.
- ▶ Infection will also increase the amount of exudate produced as a result of vasodilation (White and Cutting, 2006).

Problems caused by excessive exudate

Assessment of exudate needs to take into account the adverse

Table 1: Description of exudate levels (WUWHS, 2007; Wounds UK, 2013).

Dry	No visible moisture Not an ideal wound healing environment (except for ischaemic wounds) Surrounding skin may be dry, flaky, hyperkeratotic
Moist	An ideal wound environment Dressing may be lightly marked Wound bed could appear glossy Surrounding skin may be intact and hydrated
Wet	Primary dressing may be extensively marked Potential for periwound maceration
Saturated	Free fluid is visible Primary dressing is wet and leakage is visible on secondary dressing Strike-through may occur Risk of macerated periwound skin
Leaking	Free fluid is visible Dressings are saturated with leaking of exudate from primary and secondary dressings High risk of periwound maceration and excoriation

effect it can have on the patient, as well as the wound’s ability to heal. Heavy exudate which is not being contained in the dressings will leak and soil patients’ clothing, footwear, or bedding. This can lead to embarrassment and anxiety about being with others, which in turn can result in social isolation and depression (Davies, 2012; Lloyd Jones, 2014). Saturated dressings will usually also be malodorous. Too much exudate can cause skin stripping due to the corrosive effects of the harmful enzymes on the surrounding healthy skin, causing excoriation and maceration which can be very painful.

Heavy exudate will also increase the risk of infection when dressings become saturated and strikethrough occurs. Strikethrough breaches the dressing barrier and creates a track for bacteria to reach the wound bed (Wounds UK, 2013). This

usually occurs with porous dressing materials which don’t have bacteria-proof backing layers.

The patient is also at risk of protein loss from high levels of exudate and this will impair healing as protein is a building block of new tissue (Wounds UK, 2013).

Assessment

Wound assessment charts usually provide prompts to assess and document four characteristics of exudate: volume, colour, viscosity and odour (Rivolo, 2015). Exudate should be assessed by inspecting the wound bed, as well as the dressing in situ and any stains on the dressing after removal as this can give valuable information (Wounds UK, 2013).

Exudate volume

The amount of exudate has always been very difficult to measure in

practice. Traditionally, nurses have documented exudate levels using the symbols +, ++ and +++ however this is highly subjective (Kerr, 2014; Lloyd Jones, 2014). Even terms such as 'light', 'moderate' and 'heavy' will mean different things to different nurses — and even to the same nurse on different occasions. A better gauge of volume is to assess the dressing type and its wear time. The frequency of dressing changes, how saturated the dressing is on removal, and the condition of the surrounding skin at each dressing change are good indicators of exudate volume. *Table 1* shows an example of descriptions of exudate levels. It is expected that as wounds heal, the amount of exudate will gradually reduce and dressings can be changed less frequently using less absorbent products.

Strike-through is a term that is frequently used by nurses when describing the state of dressings. It is often used when staining can be seen on the outer surface of the dressing.

Care must be taken when using this term as staining does not always mean that strike-through has happened. Strike-through occurs when the barrier of the dressing has been breached and bacteria can track back down the dressing to the wound bed. It is not the same as staining. Many modern dressings are designed with a semi-permeable, waterproof and bacteria-proof backing. Stains or marks on the back of these dressings indicate that exudate has been absorbed into the dressing and locked away, but the dressing does not need to be changed until the staining is visible over about 75% of the dressing surface or within 1-2cm of the dressing edge although this can be checked with the manufacturer for product-specific characteristics. Allevyn™ Life (Smith & Nephew), as an example, is a foam dressing with

Table 2: Descriptions of exudate and its significance (WUWHS2007; Wounds UK 2013).

Type	Consistency	Colour	Significance
Serous	Thin, watery	Clear, straw-coloured	Often considered normal but increased volume may indicate infection (e.g. <i>Staphylococcus aureus</i>). May also be due to fluid from urinary or lymphatic fistula
Fibrinous	Thin, watery	Cloudy	May indicate presence of fibrin strands which would indicate a response to inflammation
Serosanguineous	Thin, slightly thicker than water	Clear, pink	Presence of red blood cells indicates capillary damage (e.g. after surgery or a traumatic dressing removal)
Sanguineous	Thin, watery	Reddish	Low protein content due to venous or congestive cardiac disease, malnutrition – or enteric or urinary fistula
Purulent	Viscous, sticky	Opaque, milky, yellow or brown, sometimes green	White blood cells, bacteria, slough or from enteric or urinary fistula. Bacterial infection (e.g. <i>Pseudomonas aeruginosa</i>)
Haemopurulent	Viscous	Reddish, milky	Established infection. May contain neutrophils, dying bacteria, inflammatory cells, blood leakage due to dermal capillaries, some bacteria
Haemorrhagic	Viscous	Dark red	Capillaries break down easily and bleed due to infection or trauma

an indicator that shows patients and nurses when the dressing needs to be changed.

Colour

Exudate is usually amber or straw coloured, similar to plasma (Davies, 2012). Any change in colour can indicate a possible problem. Green usually indicates bacterial infection

with *Pseudomonas aeruginosa*. Red indicates the presence of red blood cells and might suggest local trauma to the wound bed, perhaps from dressing adherence. A cloudy, milky or creamy colour can be the result of fibrin strands in the exudate (part of the inflammatory process) or the presence of white blood cells and bacteria indicating infection.

Sometimes, the residue from a dressing left on the wound can alter the colour (for example, iodine or silver will stain it brown or grey). Wounds should be cleansed before assessment to remove any residue.

Exudate viscosity

This means assessing the consistency of the exudate. Normal exudate is thin and watery. Thick, sticky exudate indicates high protein levels and can indicate infection. It may also be caused by an enteric fistula, or the presence of necrotic or sloughy tissue. Again, residue from dressings such as hydrogels may give the appearance of thick viscous exudate and should be removed by cleansing. Thin, runny exudate can mean low protein levels which may be a result of malnutrition, congestive cardiac disease or venous disease. It may also suggest a urinary, lymphatic or joint space fistula (Kerr 2014; WUWHS 2007).

Table 2 shows the common descriptions and significance of the appearance and viscosity of exudate.

Exudate odour

Unpleasant odour can be caused by infection, or be the result of a sinus or enteric or urinary fistula (WUWHS, 2007). It might also be the result of interaction between a dressing product and the wound (for example, when using hydrocolloids). Odour can be subjective. Table 3 suggests a simple way to quantify odour. There have been other more detailed scoring tools which have been developed to help measure this (such as TELER) (Brown et al, 2004) which might be particularly useful for more complex wounds.

Whichever method is chosen for recording exudate characteristics, the important thing is that it is used consistently by all nurses caring for the patient. Describing and recording exudate in a clear and measurable way will ensure that

Table 3: Description of odour (WUWHS, 2007).

Low	Wound odour present after removal of primary dressing
Moderate	Odour present when removing secondary dressing May require more frequent dressing changes
High	Odour present before dressing change and patient is aware of it Treat wound infection and/or remove necrotic tissue if clinically indicated

NB: Some dressings, such as hydrocolloids, may produce a characteristic odour

appropriate dressings are selected and the effectiveness of treatment plans can be evaluated (Kerr, 2014; Jones, 2015). Any unexpected change in volume, colour, viscosity or odour can indicate a problem which must be addressed (Wounds UK, 2013).

Practical points to consider when managing wound exudate

- ▶▶ Correct underlying lymphatic or venous hypertension using appropriate compression bandaging. This must only be applied after a holistic assessment including Doppler ankle brachial pressure indices (ABPI) ultrasound to rule out arterial insufficiency and should be applied by clinicians who have been trained and assessed as competent to apply compression.
- ▶▶ With soft pitting or chronic oedema causing lymphorrhoea; consider differential diagnoses such as cardiac, renal or hepatic failure. Diuretics may be indicated. Liaison with the patient's GP or physician is essential.
- ▶▶ Educate and support patients to maximise concordance with treatment
- ▶▶ Protect surrounding skin from the corrosive effects of excessive exudate using barrier creams or films.

- ▶▶ Select dressings which conform well and stay in place to minimise leakage and patient distress.
- ▶▶ Select appropriate dressing products according to exudate type and amount. Dressings suitable for low exuding wounds include hydrogels, hydrocolloids and semi-permeable films. Dressings suitable for more highly exuding wounds include foams, alginates, hydrofibers, and superabsorbents.
- ▶▶ For large dehisced surgical wounds, or wounds producing very large amounts of exudate that cannot be managed with conventional dressings, consider topical negative pressure therapy (Wounds UK, 2013). This applies a negative pressure to the wound bed and draws fluid away, wicking it through a foam or gauze medium into a sealed canister. This can substantially reduce the frequency of dressing changes, speed up time to wound closure, and improve patients' quality of life by eliminating the leakage and odour from wet dressings. There are certain contraindications and cautions so a careful assessment is required before this is used.
- ▶▶ Sometimes a wound manager bag is indicated. This is similar to a stoma bag and is useful for managing exudate from fistulae because these wounds tend to produce very high amounts of

exudate which is challenging to manage with dressings (Adderley 2010). A wound manager bag can contain greater volumes of exudate and many can be emptied like a stoma bag, removing the need for frequent dressing changes.

Conclusion

In conclusion, assessing exudate is an essential part of wound assessment (Ousey and Cook, 2012) and provides important information about the stage of healing or any complications such as infection. Achieving the right moisture balance to prevent the wound drying out, while preventing maceration and excoriation, is arguably the most important goal of good wound care, but it is often the most challenging. **WE**

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