

'Leaky legs' is not a diagnosis!

Impact of exudate on patients with venous leg ulceration

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When caring for people with venous leg ulceration, exudate management is commonly seen as one of the main challenges for clinicians. However, unfortunately, the reason for this wound-related symptom is often not identified or fully understood and therefore the clinical interventions necessary to address the problem are not implemented (Tickle, 2016). This results in people living with wounds that are failing to heal and producing a volume of exudate that has a significant impact on their quality of life (Cunha et al, 2017). Commonly, the words 'leaky legs' or 'wet legs' are documented in patient notes as the presenting problem — this is not a clinical diagnosis; it is a symptom of an underlying condition which more than likely is venous disease. Unless this is recognised and treated correctly, those 'leaky legs' will continue to be a problem and potentially could have a devastating impact on the patient. It is therefore important to have a good understanding of venous disease as well as the role that exudate plays in wound healing, from initial wounding, through the stages of healing, and when (and why) it becomes a problem.

KEYWORDS:

■ Exudate ■ Venous leg ulceration ■ Quality of life

ROLE OF EXUDATE IN HEALING

Exudate is produced as an essential part of the healing process, and in wounds that are healing normally it plays an important role by:

- ▶ Providing a moist environment that allows tissue-repairing cells to migrate across the wound bed
- ▶ Enabling the distribution of essential growth factors and immunological mediators across the wound bed
- ▶ Supplying all the necessary nutrients required for cell development
- ▶ Promoting autolysis (natural debridement) of dead tissue.
(World Union of Wound Healing Societies [WUWHS], 2019).

When a wound is progressing normally, exudate usually presents as a straw-coloured fluid and, generally, the volume produced will decrease as healing takes place. Wounds that are failing to heal will often produce a high volume of exudate and this can lead to adverse effects on both the wound and the person living with the wound (Green et al, 2014).

COMPOSITION OF EXUDATE

Exudate is derived from blood and contains a wide range of essential components, all with their own function (*Table 1*; WUWHS, 2019). It also contains micro-organisms, debris from devitalised tissue and metabolic waste products that have occurred because of the healing process. If these components are not managed or controlled, problems may occur.

It is known that the composition of exudate in a non-healing wound is different from a healing wound (Vowden and Vowden, 2003). A non-healing wound contains higher levels of pro-inflammatory cytokines which stimulate the process that increases the level of matrix metalloproteases (MMPs) (WUWHS, 2019). High levels of MMPs may result in the degradation of the extracellular matrix (ECM), the essential 'scaffolding' necessary for wound repair. Levels of growth factors are lower than in a healing wound, which impacts negatively on the proliferation and migration of cells necessary for new blood vessel formation as well as epithelialisation and wound contraction (Kroeze et al, 2012). Mitosis, the proliferation of fibroblasts and a key feature of wound healing, is also lower in a non-healing wound (WUWHS, 2019).

INTERSTITIAL FLUID BALANCE

To prevent fluid accumulating in the tissues, there is a process of drainage and recirculation of interstitial fluid. Previously, it was thought that 90% of fluid was reabsorbed into the capillaries with the remaining amount draining back into the lymphatic system (Mortimer and Rockson, 2014). However, research has discovered that the lymphatic system plays a more prominent role, with all the interstitial fluid being taken up where it becomes lymph; this is eventually returned to the central circulatory system (Mortimer and Rockson, 2014).

The amount of interstitial fluid is controlled by various factors and, if the rate of production exceeds drainage capability, it will result in tissue oedema (Mortimer and

Rockson, 2014). If a wound is present, the amount draining from that wound will also increase — this is known as wound exudate. The type and volume of exudate produced is often determined by the status of the wound and may give an indication of its potential to heal (Vowden and Vowden, 2003).

CAUSES OF HIGH EXUDATE VOLUME

There are some wound types which are more prone to a higher volume of exudate; these include chronic venous leg ulcers (VLUs), dehisced surgical wounds, fungating wounds and burns (WUWHS, 2019). Local and systemic factors will increase the risk of abnormal exudate volume, such as:

- ▶ Infection
- ▶ Presence of foreign bodies
- ▶ Malnutrition
- ▶ Medication
- ▶ Venous insufficiency
- ▶ Heart failure
- ▶ Patient's tolerance of the treatment plan

(WUWHS, 2019).

Lack of robust wound assessment, incorrect diagnosis and inappropriate dressing selection are also contributing factors.

LEG ULCERATION AND THE IMPACT OF EXUDATE ON QUALITY OF LIFE

In venous leg ulceration, the presence of venous stasis increases the hydrostatic pressure in the capillaries leading to a greater permeability of the capillary walls and an increase of leakage into the tissues that presents as oedema (Wounds UK, 2013). Non-healing VLUs tend to be stuck in the inflammatory phase of the healing process, producing exudate that contains high levels of inflammatory mediators and proteolytic enzymes (Raffetto et al, 2020). This results in increased protease activity, ECM destruction and further delays in healing. Furthermore, if this harmful exudate is in contact with the skin, it can cause periwound skin damage and wound expansion (Wounds UK, 2013).

Table 1: Examples of exudate components (WUWHS, 2019)

Exudate component	Function
Water	▶ Medium for other components, prevents tissues drying out
Fibrin	▶ Blood clotting
Immune cells (e.g. lymphocytes and macrophages)	▶ Immune defence, growth factor production
Platelets	▶ Blood clotting
Proteins (e.g. albumin, fibrinogen, globulins)	▶ Transport of other molecules, anti-inflammatory effects, blood clotting, immune factors
Growth factors	▶ Stimulate cellular growth
Proteases	▶ Degradation of proteins, assisting in autolysis and cell migration, scar remodelling
Metabolic waste products	▶ By-products of cellular metabolism
Micro-organisms	▶ All wounds contain some micro-organisms
Wound debris/dead cells	▶ Proteases in exudate aid autolysis of devitalised tissue

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It is known that those living with leg ulceration frequently report a poor quality of life due to wound chronicity. Unmanaged exudate is commonly responsible for this and is cited by patients as one of the worst things about living with a leg ulcer (Menon, 2012). The presence of these highly exuding, non-healing wounds triggers a series of problems which affect the individual physically, psychologically and/or socially (Gethin et al, 2014). The impact can be devastating, and it is essential that this is acknowledged as part of patient holistic wound assessment and steps taken to alleviate suffering.

There are several exudate-related factors that contribute to poor quality of life.

Leakage and malodour

Leakage and malodour can be extremely distressing to patients and their carers, with many reporting adverse effects on their psychological wellbeing. Some describe feelings

of self-loathing, disgust and low self-esteem and report how the stigma associated with these wound-related symptoms leads to significant embarrassment and a withdrawal from social activities (Gethin et al, 2014). Wound leakage impacts on relationships, with some female patients describing a loss of femininity and being unable to be intimate with their partners. Issues with body image and self-esteem are common (Salome et al, 2016).

There can also be a socioeconomic impact, as some people stop going to work or even worse are dismissed by their employers because of their leaking, malodorous wound, leading to a loss of income (Gonzalez and Verdu, 2011). After failing to have wound exudate managed effectively by their healthcare worker, anecdotally it has been suggested that some patients try to manage the problem themselves by buying sanitary products to wrap around their legs or applying plastic bags to contain the leakage. This can potentially lead to further damage and complications. A person's everyday functioning as a result of living with leakage and malodour is restricted, with depression and low mood being a common presentation (Green et al, 2014).

The unpleasant odour present in some wounds is usually associated with a high bacterial load when



Figure 1.
Malodour associated with dressings saturated with chronic exudate.



Figure 2.
Exudate will often leak through bandages onto clothing and bedding.

exudate volume is high (Figure 1). This malodour is an extremely stressful factor for patients, causing problems such as poor appetite, nausea, vomiting and weight loss (Green and Jester, 2009). The odour acts as a constant physical reminder to the patient of their wound (Jones et al, 2013), with some describing the inability to escape the 'smell'. The embarrassment and shame caused by malodour is devastating for patients, with some trying to manage the situation by withdrawing from any social activities and creating a self-imposed isolation (Green and Gibson, 2013).

Soiling of clothing and bedding

Leakage of exudate and associated soiling of clothing and bedding is another distressing factor for patients and can impact on everyday tasks such as an increase in washing due to frequent clothing and bed linen changes (WUWHS, 2019). For those who are dependent on others

for help, the additional laundry requirement can place a huge burden on carers or family members, leading to guilt and sometimes a breakdown in relationships. More recently, in the author's opinion, with energy prices being so high, it is likely that patients have been concerned about the costs associated with frequent clothing and linen changes. This will only increase the anxiety experienced (Figure 2).

Increased pain associated with periwound skin damage

Wound-related pain has been highlighted as a factor associated with exudate, which significantly impacts on quality of life because of how it limits a person's daily activities (Goto and Saligan, 2020). Pain can inhibit mobility, sleep, diet, lifestyle, and relationships. A person's mental health can be affected, and chronic pain can lead to depression and social isolation (Goto and Saligan, 2020).

Pain associated with exudate is commonly due to periwound skin damage, but the prevalence is not well documented. It is acknowledged, however, that its impact is 'substantial', both on individuals and healthcare systems (Woo et al, 2017).

High levels of harmful MMPs, together with a high bioburden within the exudate, is toxic to the skin, causing a breakdown of the skin barrier (Figure 3) (Wounds UK, 2013). Patients describe the pain as burning, sharp and constant, with many saying that they get little reprieve even with analgesia (Green and Jester, 2009). One large-scale international survey involving patients with chronic wounds found that 25% of respondents experienced pain around the wound, likely from periwound maceration and local inflammatory responses (Woo et al, 2008). Periwound maceration delays overall wound healing and is also associated with higher pain levels before and during dressing changes (Woo et al, 2017). It is therefore important that skin protection is a consideration when planning wound care for a patient.

Increased episodes of infection

Unmanaged exudate increases the risk of infection, as this wet

environment allows microbes to thrive and proliferate, resulting in local or sometimes spreading/systemic infection (Percival and Suleman, 2017) (Figure 4).

Unfortunately, misdiagnosis of infection frequently results in patients taking multiple courses of systemic antibiotics rather than the root cause of local infection being addressed (Finlayson and Edwards, 2019). This constant locally infected and inflammatory status, complicated by biofilm, results in highly exuding, static wounds (Finlayson and Edwards, 2019). Thus, it is essential that clinicians can recognise and



Figure 3.
Skin maceration secondary to unmanaged exudate.



Figure 4.
Local wound infection/biofilm secondary to oedema and a high exudate volume.

diagnose infection so that it can be treated appropriately.

Increased clinical interventions

People living with highly exuding wounds often require increased input from healthcare services for dressing changes. The economic impact of this demand on the National Health Service is considerable, with nursing/clinical resource being the greatest cost (Dowsett, 2015; Guest et al, 2015). However, the need for frequent dressing changes also impacts on the quality of life of the person living with that wound. Having to regularly attend a dressings clinic or having community nurse visits, sometimes every day, disrupts a person's routine, interferes with mealtimes, work commitments or family and social time, adding to the stress and anxiety that many experience. Dressing changes may be traumatic for some due to wound-related symptoms such as odour or pain. Indeed, patients report having anticipatory pain due to having had dressing change experiences that have lacked care and compassion or an acknowledgement of the amount of pain experienced (Woo, 2015).

In the author's clinical experience, unfortunately, these frequent dressing changes will often continue as routine practice because of a failure to stop and consider why the wound remains so wet. Unless this is done, the root cause of the problem will remain undiagnosed and the scenario will not improve.

HOW CAN WE MINIMISE THE PROBLEMS?

Identify and treat the underlying cause

It is essential that the underlying cause of excess exudate is identified, as without this it is likely that the leg ulcer will remain unhealed, prolonging the negative impact on the individual's life.

For those presenting with leg ulceration, it is likely that the aetiology will be venous stasis resulting in oedema of the lower limb which impacts on a high exudate volume (Wounds UK, 2013). Assessment, as recommended by

the National Wound Care Strategy Programme (NWCSP, 2023), should be undertaken within two weeks of a person presenting with a lower limb wound to help establish aetiology and to ensure that patients are put on the correct treatment pathway. This early intervention and commencement of therapeutic care enhances healing and prevents the production of harmful exudate and its association with wound chronicity.

'It is important to reinforce that to treat the underlying venous disease therapeutically, the correct "dosage" of compression should be applied.'

Strong compression therapy (delivering a minimum of 40mmHg) in the form of multilayer bandaging or leg ulcer hosiery kits is the gold standard treatment for VLU's (Shi et al, 2021; NWCSP, 2023). Its mode of action is multifaceted, but it is particularly efficient in reducing oedema and controlling exudate volume by lowering venous hypertension and decreasing capillary permeability (Fletcher et al, 1997). Reduction in exudate volume following application of therapeutic compression can be rapid, resulting in improvements to the wound bed and periwound skin health, as well as a reduction in pain. Wound inflammation then diminishes and healing progresses into its proliferative phase (Fletcher et al, 1997).

It is important to reinforce that to treat the underlying venous disease therapeutically, the correct 'dosage' of compression should be applied. Unfortunately, use of reduced compression has become commonplace, only delivering half the pressure required for healing (Hopkins, 2023). As a result, oedema is often not managed effectively, and exudate continues to have a detrimental impact on both the wound and the individual. This sub-optimal care should be challenged,

and changes made in practice to ensure that all patients receive the best, therapeutic, evidence-based treatment.

Prevent wound infection

The risk for developing infection should be considered as part of holistic leg ulcer assessment with aetiology seen as a significant factor (International Wound Infection Institute [IWII], 2022). The presence of oedema and excess exudate associated with venous disease is likely to increase microbial bioburden in the wound, so a proactive approach based on therapeutic compression and absorbent dressings should be used. Wound cleansing and debridement should also be part of the treatment plan as an additional means of preventing wound infection, together with appropriate frequency of dressing changes based on exudate assessment and treatment evaluation (European Wound Management Association [EWMA], 2004).

Address pain and periwound skin damage

The cause of pain should be identified and included as part of overall holistic leg ulcer assessment. Infection and limb oedema are common causes of leg ulcer pain (Price et al, 2007), but as previously mentioned, exudate is also a contributing factor due to the damage it does to the periwound skin.

Reducing oedema and exudate through therapeutic compression will ultimately have an impact on pain levels, but appropriate dressing selection to enable optimal fluid handling is important, as is the protection of the periwound skin (Figures 5 and 6). Using skin barrier products such as barrier films is an effective way of protecting vulnerable skin from further damage and will help to reduce pain associated with this (Wounds UK, 2013).

Analgesia is an important component in this holistic assessment (Richardson and Upton, 2011). Patients should always be advised on both pharmacological and non-pharmacological options as part of their pain plan in partnership



Figure 5.
Before the use of absorbent dressings.



Figure 6.
After the use of effective absorbent dressings which help to reduce skin maceration.

with their lead healthcare professional.

Acknowledge the role of dressings

Dressings play an important role in the management of excess exudate. They handle exudate and its components through absorption, retention, and moisture vapour transmission and if applied correctly are efficient when working against gravitational forces and the mechanical forces applied by compression therapy modalities (Menon, 2012). However, it is important to point out that not all dressings are designed to perform effectively when working against gravitational and compressive forces, so selection should be based on

clinical presentation and a good understanding of the product being considered for use.

When selecting a dressing, consideration should be made about its ability to reduce the risk of strikethrough leakage or its contact with the periwound skin so that maceration or excoriation can be avoided. The type and volume of exudate should also be taken into account, as dressings may vary in how they handle viscosity for example. It is important to understand the mode of action of the various dressings available, as without this knowledge there is the danger that a wound may deteriorate due to dressings being chosen incorrectly.

Specifications such as size, shape, and the dressing's ability to conform to the limb should also be considered, together with its ability to stay securely in place (Figure 7). Dressings selected using these criteria should help determine the 'wear time' of the product and enable more accurate care planning regarding frequency of dressing changes (Alvarez et al, 2021).

Consider patient tolerance of their treatment plan

Patient non-concordance is frequently cited by healthcare professionals as a reason for non-healing VLU's (Stanton et al, 2016), with the reluctance to have compression therapy impacting significantly on the wound's ability to heal. Without therapeutic compression, the underlying cause of high exudate and non-healing will not be addressed and therefore the wound will become complex and static.

Pain is often a reason why patients cannot tolerate compression, but rather than label as 'non-concordant', clinicians should work closely with them to identify the reasons why they are finding treatment difficult to tolerate. Having a clear explanation of the causes of leg ulceration or why exudate volume is high, using active listening skills and showing empathy for their situation will help develop positive

nurse-patient relationships built on trust. Clinicians, however, need to be confident in their approach, both in their sharing of knowledge and in their practical skills. Support should be sought through education and training if this is lacking.

CONCLUSION

Managing exudate associated with VLUs appears to be a common problem for clinicians, but the greater concern should be for the impact it has on those living with these wounds, particularly in relation to poor quality of life. Exudate and odour are cited as major factors contributing to this, with patients reporting that these symptoms were inadequately managed by healthcare professionals (Green and Jester, 2009). Those living with heavily exuding wounds are constantly worried about what other people are thinking, and this is made worse if they are having to work. These concerns have a considerable impact on mental health and people become increasingly socially isolated (Green and Jester, 2009).

Acknowledging the impact these wounds may be having on a patient should form part of holistic leg ulcer assessment. Rather than accepting that excess wound exudate is typical with this wound type, clinicians should recognise that this presentation is not normal and start to manage the problem effectively.



Figure 7.
Choose dressings that conform to the limb.

Identifying underlying causes of excess exudate, such as infection, oedema, or underlying medical conditions (e.g. heart failure) is essential, and a plan to address the underlying cause should be actioned immediately. Being proactive and providing therapeutic care (e.g. strong compression therapy and using dressings that are designed to effectively manage exudate without loss of performance when exposed to gravitational and mechanical forces) in a timely way will prevent wound chronicity and further complications. In addition, it is essential that the impact of the wound and wound-related symptoms on patient quality of life are acknowledged, and that the care plan includes actions necessary to improve their situation. **JCN**

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