

VENOUS LEG ULCERS: DON'T FORGET THE SKIN

Venous leg ulcers are classified as a chronic condition of the lower leg and, as such, many skin changes occur as a result of sustained venous hypertension. The identification and management of these skin changes is an important aspect of the venous leg ulcer clinical pathway in order to maintain healthy skin and wellbeing. This article will describe aspects of skin care, such as washing the legs and the application of emollient therapy for dry skin, as well as exploring the causes of hyperkeratosis and fungal infection; both of which can be associated with venous leg ulcers.

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Venous leg ulceration is the most common type of leg ulcer with approximately 1% of the UK population experiencing this condition at some point in their lives. The main cause is venous hypertension, which occurs as a result of valvular incompetence and calf muscle pump insufficiency (Scottish Intercollegiate Guidelines Network [SIGN], 2010).

Skin changes occur in the lower leg as a result of a rise in venous pressure over a prolonged period of time and early recognition and management of this can aid diagnosis and lead to appropriate management (Newton, 2012).

Management of skin changes, such as dry, flaky skin; eczema; hyperkeratosis; and fungal infections will be explored in this article, as will the importance of washing the legs and undertaking appropriate emollient skin care. It is important to recognise that effective skin care is an integral part of the venous leg ulcer management plan in order to reduce the risk of infection and tissue breakdown.

Skin changes associated with venous disease of the lower leg

Skin changes in people with venous leg ulcer occur as a result of changes within the deep and superficial veins (*Figure 1*). The exact pathophysiology of venous skin disease is unclear, but according to Middleton (2007), it is probably due to leakage of blood constituents into the surrounding tissues.

The prevalence of skin changes, including hyperpigmentation and eczema due to chronic venous insufficiency, affects between 3% and 11% of the UK population (Nicolaidis et al, 2000). The changes in the skin can present in a variety of ways as described in *Table 1*.

In the early stages of venous disease the skin becomes dry and flaky. However, over time, the skin cells build up into a thickened layer of dry, scaly skin known as hyperkeratosis (Anderson, 2009).

As the veins become engorged, there is a loss of interstitial fluid balance, which causes dehydration of the epidermal skin layer.

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Table 1. Skin changes associated with venous hypertension.

Visible skin changes	Potential cause
Mild to moderate pigmentation, especially in the gaitor area of the lower leg.	The breakdown of red blood cells; hemosiderin is deposited in the tissues.
Dry, flaky, scaly or hyperkeratotic skin.	A loss of intracellular fluid balance causes dehydration of the skin. This, together with venous congestion, leads to a build-up of keratin over time on the skin surface.
Red, scaly, and/or flaky skin, which may have blisters or crusty areas.	Due to venous hypertension, waste products leak from the blood vessels into the surrounding tissues, setting up an inflammatory response.

Alternatively, the skin can become over-sensitive and a more acute form of eczema develops, which can form itchy, wet, erythematous patches on the skin of the lower leg.

Hyperkeratosis

Hyperkeratosis is a chronic condition associated with venous disease (Cameron, 2007). It presents as areas of thickened, scaly skin over the lower leg, which can build up into several layers. As a result of venous congestion and the loss of intercellular fluid balance, a build-up of keratin, which is a protein found in the epidermal skin layer, occurs. This is characterised by the presence of dry, scaly skin, which then develops over time into thickened scaly lesions.

The main aim of treatment for hyperkeratosis is to reduce the thickness of the skin layers and this can be achieved through the using topical preparations that contain products such as salicylic acid and urea.

Salicylic acid is a type of medicine called a keratolytic, which works by breaking down keratin in hardened, thickened skin, helping to shed the skin scales and soften and improve

the appearance of the skin. Diprosalic® (MSD) ointment is an example which has a combination of salicylic acid and betamethasone, a topical corticosteroid. This is particularly useful if the skin is inflamed and itchy, as well as being dry and scaly. It should be avoided where there are areas of broken skin.

The long-term use of Diprosalic is not recommended as it can cause skin irritation. However, short-term use combined with good skin cleansing and compression therapy to address the underlying venous disease is worth considering.

Alternatively, the use of urea-based emollients can be very effective at rehydrating dry, scaly skin. Urea is a natural component of the skin, but is found to be deficient the skin is dry. When a urea-based emollient is applied to dry skin, however, it penetrates the outer layers of the skin where it is absorbed and retains water. The skin therefore becomes rehydrated. An example is Calmurid® (Galderma UK) cream, which contains 10% urea and 5% lactic acid. Lactic acid improves water retention and also breaks down keratin to

help the absorption of the urea (Galderma, 2010). Despite being a cream, Calmurid contains none of the ingredients that cause allergies in patients with venous disease. The application of emollients alone may help to rehydrate the skin, but it is the underlying pathology that needs to be addressed, therefore, in isolation they may not prevent recurrence of the hyperkeratosis.

Venous eczema

Venous eczema is also known as stasis eczema or gravitational eczema, which is defined as a result of stasis or pooling of blood from insufficient venous return in the lower legs. Hypertension in the venous system causes increased permeability of the blood vessels and leakage of blood products into the surrounding tissues. Although it is not fully understood, it is thought that this process activates inflammatory cells and fibroblasts which, in turn, cause irritation of the skin (Middleton, 2007).

Eczema can be described as acute or chronic. Acute venous eczema is where the skin becomes wet, weepy, and itchy. In some cases, the skin reaction may be as a result of an allergic contact dermatitis and patients with venous leg ulcers are at a higher risk of developing an allergy to certain products. The occlusive nature of leg ulcer treatments



Figure 1. Older man with gravitational eczema. Note the hemosiderin staining and dry, scaly skin.

on skin where the barrier function has already been disturbed may create the perfect environment for an allergic dermatitis to occur (Newton and Cameron, 2003).

Topical steroid preparations are recommended for acute eczema (SIGN, 2010). Ointments should be used in preference to creams as many creams contain potential sensitisers, which can cause allergic reactions (Cameron and Powell, 1992).

Chronic eczema on the other hand presents as dry, scaly, and itchy patches on the lower legs and is treated with emollients to lubricate the skin and compression bandaging to reduce venous hypertension, which is associated with the development of eczema. Cameron (2007) also suggests that patients with eczematous skin benefit from having their lower legs immersed in warm water for 10–15 minutes to soften the skin before applying an emollient.

Washing the lower leg

There remains controversy regarding the washing of lower limbs and as Lindsay (2007) highlighted, research findings to support the practice of soaking legs in tap water to cleanse legs affected by ulceration are inconclusive.

However, many patients enjoy having their legs washed, especially when they are wrapped in compression bandages for many months. This procedure can improve their overall quality of life and sense of wellbeing. Leg soaks are, therefore, an important element of the leg ulcer management pathway. Lindsay (2007) and Cameron (2007) suggest that washing the lower legs allows removal of dry, loose tissue, and helps to prevent a build-up of dry scabs, especially when emollients are added to the water. It is also a good way of removing topical preparations and ulcer dressings that may have become adhered.

For some clinicians, the process is time consuming and many do not have the

appropriate resources to be able to undertake this procedure safely and efficiently. In the author's Trust there was a recent challenge to washing patients legs by the infection control team as the practice of using the same buckets for every patient was not deemed to be safe in terms of reducing cross-infection risks. The author surveyed colleagues across the south-west region and identified that soaking legs was common. However, the practice of lining, cleaning, and replacing the bucket/container was variable.

Recommendations from this review confirmed the need to line the buckets/containers and wash them thoroughly between patients. This is supported by Lindsay (2007) who stated that if containers were to be used they should be lined to ensure heavy soiling from soap and skin scale is disposed of easily. Good practice dictates that the buckets are replaced on a regular basis and some areas have colour-coded buckets to remind staff when they are to be replaced. When filled with water, the buckets are heavy and staff may need to be mindful of their Trust's manual handling guidance and find safe ways of filling and moving them.

Tap water is an accessible, efficient, and cost-effective way of cleansing leg ulcers, and as they are already colonised with bacteria, sterile cleaning solutions are inappropriate (Patel and Beldon, 2003). This is also supported by the SIGN guidelines (2010), which state there is no contraindication to regular cleansing of the leg and that ulcerated legs should be washed normally in tap water.

Managing dry skin

As previously described, venous disease leads to the skin being compromised. Its capacity to hold water is reduced and the skin becomes dry and flaky. As leg ulcers are predominantly a condition that affects older people, skin integrity is also affected by the aging process. Skin loses its elasticity due to changes in connective tissue and increased dryness of the skin occurs as a result of sebaceous glands

producing less oily substances. Therefore, to ensure good skin health an intensive skin care regime should be in place for patients with venous incompetence, as well as those who develop venous leg ulcers.

Emollient is the medical term for moisturiser (Royal College of Nursing, 2008) which soothes, softens, and hydrates the skin. Most dry skin conditions benefit from the regular use of emollients and soap substitutes (Green, 2011), however, each patient will need to be treated in accordance with their individual circumstances and requirements. When the skin is inflamed or eczematous, a more intensive skin care regimen should be introduced.

Some emollients contain excipients, which may be potential sensitisers in venous disease, although this is rare. Examples of emollient preparations and their indications (British National Formulary, 2013) include:

- ▶▶ Calmurid – contains urea, therefore, is good for hyperkeratosis and dry, scaly, itchy skin.
- ▶▶ Cetraben® (Genus Pharmaceuticals) cream – good for dry, inflamed and chapped skin. Contains cetostearyl alcohol and parabens.
- ▶▶ Dermal® (Dermal Laboratories) cream/lotion – good for dry, itchy skin. Contains an antimicrobial agent and cetostearyl alcohol.
- ▶▶ Doublebase® Dayleve Gel (Dermal Laboratories) – indicated for dry, itchy skin. Does not contain any potential sensitisers.
- ▶▶ Diprobace (Schering-Plough) ointment – indicated for dry skin conditions. Does not contain potential sensitisers.
- ▶▶ E45 (Reckitt Benckiser) – for relief of dry skin. Contains cetostearyl alcohol.
- ▶▶ Epaderm (Mölnlycke) cream/lotion – For dry skin. Can be used as a soap substitute. Contains cetostearyl alcohol and parabens.
- ▶▶ Hydromol® (Alliance Pharmaceuticals) – for dry skin. Can be used as a soap substitute. Contains

cetostearyl alcohol.

- ▶ Liquid and white soft paraffin – Greasy ointment used on very dry skin as it forms a layer on the skin to prevent moisture loss.
- ▶ Olatum® (Stiefel) – for dry skin. Contains cetostearyl alcohol.

The type of emollient required depends on the condition of the skin, the frequency of application required, and patient acceptance. In people with venous leg ulcer, ointment-based preparations which are greasy and last longer are recommended. Where the skin is very dry, the frequency of application needs to be increased or the use of an emollient containing urea would be advised. Ideally, legs should be soaked prior to the application of an emollient to enhance the absorption into the skin. The emollient should be applied in a downward manner to avoid aggravation and blocking of the hair follicles (Wingfield, 2011).

Antimicrobial emollient preparations are particularly useful where bacteria are implicated in the pathogenesis of inflammatory, dry skin conditions as this can help to reduce skin infections especially those caused by *Staphylococcus aureus*.

Good skin care is important at all stages of venous leg ulcer management. However, if treated at an early stage, many of the secondary skin disorders, such as cellulitis and fungal infection could be prevented.

Identification and management of fungal infections

Fungal infections of the lower limb are usually caused by dermatophytes which are a group of fungi that affect the skin, hair and nails (Achterman and White, 2012). They infect keratinised tissue, where they take their nutrients and are also influenced by damp, warm local environments, which is why patients with venous disease are vulnerable. In this case, the dermatophytes are transmitted by direct or indirect contact with infected exfoliated skin and there is

an increase in susceptibility to infection where there is a pre existing injury or damage to the skin. The most common dermatophyte that can cause skin irritation and rashes in patient with leg ulcers is *Tricophyton rubrum* or athlete's foot. It is not uncommon to find macerated, erythematous skin between patient's toes and web spaces and this can then spread to the lower leg or cause a cellulitis.

Fungal infections are usually diagnosed on clinical presentation. However, fungal scrapings can be taken for culture and microscopy. Treatment is usually topical with preparations such as ketoconazole or miconazole. These are applied twice daily for 1–2 weeks after the skin has healed. Alternatively, terbinafine can be used for 1 week. If secondary infection is suspected, oral antibiotics may also be required in more severe cases.

Conclusion

The management of patient's skin is an essential part of the venous leg ulcer patient pathway and should not be underestimated.

It is important to remember that the application of topical preparations, including washing the skin, is indicated as part of a more intensive therapy regimen, which also includes the application of compression bandages or hosiery to reverse the underlying venous disease. Keeping the skin healthy ensures prevention of further complications, such as infection and ulcer deterioration, as well as improving the wellbeing. **WE**

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