

Development of the hybrid tissue viability nurse/lymphoedema nurse

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To effectively deal with complex wounds, the importance of oedema and that all oedemas are on a lymphoedema continuum needs to be understood. The efficiency of lymphatic drainage is paramount to oedema management and wound healing. Therefore, interventions to help prevent damage to lymphatic capillaries, and techniques to facilitate lymphatic drainage and lymphangiogenesis should be considered as part of wound management. This article highlights the importance of the lymphatic system in the treatment of leg ulceration and the emergence of a new 'hybrid nurse', who combines the specialisms of tissue viability and lymphoedema to improve patient outcomes, reduce waiting times, and improve efficiency within the NHS with the provision of a one-stop service.

KEYWORDS:

- Lymphoedema ■ Chronic oedema ■ Venous leg ulceration
- Tissue viability nurses ■ Lymphoedema specialists

The NHS is driven by the need to improve health economics, as reflected in the work undertaken by NHS England to improve leg ulcer care and ensure coordinated pathways across the country (NHS England, 2017). Clinical commissioning groups (CCGs) face a growing problem of how to address the increasing costs of leg ulcer care in a population with rising comorbidities, including obesity, heart disease and diabetes (Public Health England [PHE], 2018). Guest et al (2016) suggested that the prevalence of chronic wounds could be growing at a rate of 11% per annum, with costs potentially

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increasing to £8–£9 billion per year. Indeed, the annual cost of treating patients with leg ulcers in the UK is an estimated £1,938 million (Guest et al, 2016).

Wound care is managed across multiple settings, such as GP surgeries, walk-in centres, and patients' own homes, by a range of healthcare professionals with varying levels of expertise (Srinivasiah et al, 2013; Guest et al, 2015; Gray et al, 2018). They are constantly under pressure to make the right choices for their patients, often in silos, where decisions may not be based on best evidence and variations in practice and fragmentation of services can occur (Gray et al, 2018).

The National Wound Care Strategy Programme (NWCSP) began its work in 2018 and aims to take a data-driven approach to developing national clinical standards of care, improving patient experience and outcomes, as well as working alongside industry to ensure that wound care products are reaching patients at the right time (King et al, 2018). However, in the author's clinical opinion, there is an argument that the work undertaken does not go far enough to address one of the major problems related to chronic leg ulceration — which is the link to lymphatic disease.

LEG ULCERATION AND CHRONIC OEDEMA/ LYMPHOEDEMA

White et al (2016) described the care of patients with venous leg ulcers as 'palliative in many cases meaning that little or no clinical improvement is achieved due to inadequate compression application in many cases and mere "management" of exudate'. The view that patients with leg ulcers do not always receive equitable, efficient and effective care, resulting in prolonged ulceration and poor quality of life, has been expressed by many (Posnett and Franks, 2008; Vowden et al, 2009; Ousey et al, 2013; O'Donnell et al, 2014; Day, 2015; Bishop and White, 2017; Guest et al, 2017; Dowsett and Taylor, 2018; Gray et al, 2018). Guest et al's work (2016) showed healing rates to be in the order of 6–9% in routine clinical practice. However, there is evidence that specialist leg ulcer clinic provision results in higher healing rates (White et al, 2016; Stanton et al, 2016).

These patients are resource intensive, especially those who also have chronic oedema. This input is often prolonged over many months or years due to inappropriate management strategies, including poor wound care choices, lack of compression therapy, and poor patient concordance (Todd, 2017). To plan effectively for specialist services to improve the standard of care given, 'opportunity cost' (i.e. benefits not being seen due to not selecting the best option) needs to be understood. This refers to the potential for used resources to achieve more value elsewhere in the healthcare system (Muir Gray, 2011). In the author's clinical experience, there is an overuse of ineffective treatments for patients with chronic oedema and leg ulceration, leading to wasted patient benefit and poor value to the healthcare system (Piller, 2009; White et al, 2014). For example, compression therapy, which is considered gold standard treatment, is not used widely enough (National Institute for Health and Care Excellence [NICE], 2012; O'Donnell et al, 2014).

Studies undertaken in the UK have shown significantly high prevalence rates of chronic oedema, particularly in the elderly population (Hardy and Taylor, 1999; Moffatt et al, 2003; Morgan et al, 2005a; Moffatt et al, 2012; Keast et al, 2019; Moffatt et al, 2019). Prasad et al (1990) found that 55% of patients with ulcerated legs had oedema, while Moffatt et al (2019) found that between 52% and 69% of patients cared for by community nurses had chronic oedema, and of these, 73% also had a leg ulcer, concluding that oedema may be a significant factor in ulcers which are slow to heal. Keast et al (2019) also found that the most common underlying condition in patients with chronic oedema was venous disease and, of those, 39.71% had an open wound.

In the UK, access to specialist lymphoedema services for patients with lower limb chronic oedema/lymphoedema with ulceration varies across the country (Williams,

2003). It is mostly provided in palliative care centres and in many cases there is no access for patients with ulceration or a non-cancer diagnosis. These patients are invariably referred to tissue viability nurses (TVNs), who while having expert knowledge in managing wounds and ulcers, often have had no specific education on chronic oedema and its implications (White et al, 2014).

However, a combined lymphoedema and tissue viability service in East Sussex CCG has led to the development of a 'hybrid specialist nurse', with training in both tissue viability and lymphoedema.

BACKGROUND

So, how can this hybrid nurse save money and improve care given to this patient group? To understand this, the different definitions for lymphoedema and chronic oedema and the current problem with care provision need to be considered.

White et al (2014) stated that: *Many clinicians are aware of, and recognise, overt lymphoedema, but knowledge of lymphovenous disease and its ramifications is poor. It requires treatment from experienced clinical teams, well versed in the diagnosis and management of the lymphovenous diathesis of lipodermatosclerosis, ulceration, cellulitis and lymphovenous oedema.*

Chronic oedema is an umbrella term for abnormal swelling of tissues which lasts for three months or more, regardless of whether the aetiology is lymphatic or venous in origin. There are several types of chronic oedema, i.e. dependency oedema, venous oedema and lymphoedema (Humphreys et al, 2017). Development of oedema, and subsequent skin changes, as well as ulceration are the result of a delicate balance between the severity of venous hypertension and the compensatory mechanisms, one of which is the lymphatic system (Nicolaidis et al, 1986). Peripheral

Practice point

Moffatt et al (2017) found that approximately 3.99 people in every 1,000 have chronic oedema, increasing to 12 in every 1,000 over the age of 85. Chronic oedema presents a major clinical problem within community nursing services in the UK, which is potentially going to increase as the population at risk is set to grow (Moffatt et al, 2017; Moffatt et al, 2019; Wound Care People, 2019).

oedema is often classified according to possible systemic causes, such as heart failure, nephrotic syndrome, and venous obstruction, but this approach fails to appreciate that more than one cause can contribute to the development of oedema, and the central role that lymphatic drainage plays in balancing tissue fluid (Mortimer et al, 2014).

The term lymphoedema is commonly used to refer to tissue swelling associated with primary lymphatic insufficiency or secondary damage to the lymphatic system, due to surgery, infection, cancer, trauma or long-term venous disease (International Society of Lymphology [ISL], 2013).

Mortimer and Rockson (2014) believe that the approach to treating chronic oedema is often misguided and inappropriate. They state that:

The clinical approach should consider all possible physiologic factors influencing both lymph drainage and microvascular filtration, rather than relying upon a diagnosis confined to a single clinical category such as heart failure. Arguably, it may be better to consider the presence of chronic oedema as synonymous with the presence of lymphoedema, inasmuch as all oedema represents relative lymph drainage failure.

In the author's clinical opinion, the definitions of chronic oedema and lymphoedema add to the confusion. In reality, they should be defined as 'lymphoedema' and

treated in the same way by qualified clinicians versed in the treatment of tissue viability and lymphoedema.

PHYSIOLOGY

Starling's work in the late 1880s introduced a model of capillary fluid exchange based on hydrostatic and oncotic pressures, which was revised by Levick in 2010 (Starling, 1896; Levick and Michel, 2010). Mortimer and Rockson (2014) and Levick and Michel (2010) found that there was no net reabsorption of fluid back into the venous side of the blood capillaries, but only diminishing net filtration into the interstitium. The endothelial glycocalyx layer (EGL) controls the movement of proteins and fluid across the blood capillary wall, therefore fluid and blood proteins are removed from tissues via reabsorption through lymphatic capillaries alone. Consequently, a new understanding that all oedemas are on a lymphoedema continuum emerged (Bjork, 2013; Mortimer and Rockson, 2014; Bjork et al, 2018). The lymphatic system has three main functions:

- ▶ It acts as a host defence in relation to immunity
- ▶ It has a nutritional function responsible for fat absorption
- ▶ It preserves the balance of fluid (Mortimer and Rockson, 2014).

Oedema develops when the filtration rate in the microvascular circulation exceeds lymph drainage for a sufficient period. This is because lymph flow is low or the filtration rate is high, or a combination of both.

Lymphovenous disease is due to insufficiency of the venous and/or lymphatic system, in combination

Practice point

Chronic oedema of the lower limb is not always dealt with promptly or effectively. This can be due to cost, lack of knowledge and inexperience of clinicians (Williams, 2003; Moffatt et al, 2005; Morgan et al, 2005b).

with possible systemic contributors, such as heart failure, leading to accumulation of protein-rich fluid in the interstitial space. The presentation of protein-rich fluid in the interstitial space has a bearing on how treatment of these often complex patients should be approached, and is in many instances why they develop chronic wounds which are slow to heal (Rasmussen et al, 2016).

UNDERSTANDING THE DISEASE PROCESS

Leg ulcer education programmes have tended to concentrate on venous disease as the predominant cause of leg ulceration. Venous hypertension is caused by failure of the calf muscle pump to return blood back up the leg. Incompetent valves in the deep, perforating or superficial veins lead to the backflow of blood. The resulting increase in pressure leads to leakage of blood particles and fluid into the tissues, causing the signs and symptoms of venous hypertension, e.g. ulceration, haemosiderin staining, varicose eczema, lipodermatosclerosis, varicose veins, telangiectasia (spider veins), and the tissue is generally soft and pitting.

In chronic venous hypertension, greater permeability leads to haemosiderin staining and the further extravasation of proteins causing increased oncotic pressures. These further compromise the lymphatic system, resulting in chronic oedema and lymphostatic fibrosis (Green and Mason, 2006) (Figure 1).

Characteristics of chronic oedema include:

- ▶ Swelling of more than three months' duration, which remains unchanged on elevation
- ▶ Positive Stemmer's sign (inability to pinch fold of skin at base of second toe due to thickening)
- ▶ Skin and tissue changes, including:
 - Dry, flaky skin
 - Hyperkeratosis — hard, scaly skin
 - Skin creases, e.g. around the ankle and toes



Figure 1.
Chronic oedema to the lower limb.

- Fibrosis of the tissues
- Lymphangioma — blister-like bulging of dilated lymphatic vessels
- Papillomatosis — cobblestone effect on the skin due to lymphangioma and fibrosis
- Increased subcutaneous fat
- Tendency to bacterial and fungal infections.

(Williams, 2003)

Lymphoedema affects wound healing because as the tissue in the limb continues to harden, it affects blood flow and supply. With late-term fibrosis, bacteria can find many places to hide and be protected. The more extensive the fibrosis, the harder it is for antibiotics to reach the bacteria leading to increased risk of infection. In turn, wound infection results in further damage to the lymphatic system. Fibrosis also affects nerves, which can substantially increase pain and discomfort (Nicolaidis and Zukowski, 1986; Green and Mason, 2006; Green, 2007).

Thus, to help chronic wounds heal, it is important to understand how localised periwound lymphoedema affects wound healing (Bjork, 2013). To fight bacteria and prevent infection, a continuous flow of lymph is needed, as the white blood cells use the lymphatics to drag bacteria and toxins to lymph nodes, in turn triggering an immune response. When the lymphatic system is compromised, debris, dead

Practice point

Many factors contribute to the increased prevalence of lymphoedema, including:

- ▶ Increased survival of heart failure patients
- ▶ Numerous medications associated with oedema
- ▶ Increased incidence of obesity
- ▶ Increasing surgical procedures involving removal or damage to the lymph nodes
- ▶ An ageing population.

cells, and other by-products of wound healing cause the wound environment to stagnate, slowing healing. In the author's clinical experience, such patterns are seen in patients with chronic or difficult-to-heal leg ulcers, supporting the argument that lymphoedema is one of the main contributory factors for non-healing wounds.

All patients with lymphoedema require a modified approach to compression bandaging regimens (Moffatt et al, 2005; Green, 2007; Charles, 2013). Patients who have had a previous deep vein thrombosis (DVT) and have post-thrombotic syndrome are at risk of developing lymphoedema with intractable venous ulceration (Brautigam et al, 1998; Walker et al, 2003). Therefore, if the simple rules of compression therapy in venous disease are applied, this will concentrate proteins by removing some of the water, with the remaining proteins holding



Figure 2.
Chronic oedema to the foot and toes.

onto water molecules. The aim of compression therapy is slightly different with venous oedema and lymphoedema (Tables 1 and 2).

For pure venous oedema, the compression element of the bandage is started at the ankle with little being applied to the foot. However, if there is any damage to the lymphatic system, if you apply the bandage system in this way you will potentially begin to see the development of oedema to the foot and in the toes and above the knee (Figure 2) because you are not moving all fluid to the functioning lymphatics. This can lead to reduced mobility as a result of swelling at the knee, and often cellulitis due to fungal infections between the toes and static fibrosed wound beds. These patients have different clinical problems compared to patients with venous ulceration alone (see Tables 1 and 2) and require modification of the multilayer bandage systems to move the fluid to functioning lymphatics and break down fibrotic tissue, which is not the case when undertaking venous bandaging. In the author's clinical experience, appropriate assessment and treatment according to the oedema presentation is vital to prevent increased wound bed chronicity. Access to specialist practitioners for advice on how to modify treatments for individual patients is also essential (Dodds, 2002).

CONCLUSION

Incidence of lymphoedema will almost certainly increase in the future. It has been considered an 'orphan' disease, as it does not fall into any medical specialty. Consequently, few doctors or nurses, unless they are specialists in the field, are well versed in its pathophysiology or treatment (Brenner et al, 2007). Interventions to help prevent damage to lymphatic capillaries and techniques to facilitate lymphatic drainage and lymphangiogenesis need to be considered as part of routine wound management (Bjork and Hettrick, 2019).

Table 1: Aim of lymphatic compression (EWMA, 2005; Patsch and Junger, 2006)

▶ To reduce formation of excess interstitial fluid by opposing fluid filtration from blood capillaries into the tissue, thereby decreasing the lymphatic load
▶ To ensure that fluid is shifted into areas with functional lymphatics
▶ To increase lymphatic reabsorption and stimulation of lymphangion contractions
▶ To enhance muscle pump action resulting in increased frequency and amplitude of lymph collector contractions
▶ To break down fibrosclerotic tissue

Table 2: Aim of venous compression

▶ To reduce venous reflux and improve venous return
▶ To reduce venous hypertension
▶ To maximise calf muscle pump action
▶ To reduce elevated matrix metalloproteinase levels to promote healing of venous leg ulcers

To improve outcomes for patients, assessment skills and management plans should be adapted to consider chronic oedema/lymphoedema. Care pathways should be revisited to include treatment to break down fibrosis in the wound bed to improve lymphatic drainage and ultimately the microcirculation (delivery of oxygen and nutrients to the wound). Patients also need education and to be taught simple lymphatic drainage techniques (SLD) if appropriate, with follow-up regimens and maintenance compression hosiery and advice tailored to their condition, i.e. considering the differences between soft and stiff knits and the possibility of rebound oedema.

Importantly, as in the author's service, the specialisms of tissue viability and lymphoedema could be merged to treat lower limb ulceration caused by lymphovenous disease/chronic oedema. Services should be streamlined so that patients have continuity of care, seeing one service and one specialist. In the long term, this not

only improves health and wellbeing, but also helps to reduce the overall cost of care. In turn, this will lessen the postcode lottery experienced by many patients trying to access non cancer-related lower limb wound healing services. **JCN**

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KEY POINTS

- Wound care is managed across multiple settings, such as GP surgeries, walk-in centres, and patients' own homes, by a range of healthcare professionals with varying levels of expertise.
- A combined lymphoedema and tissue viability service in East Sussex CCG has led to the development of a 'hybrid specialist nurse', with training in both tissue viability and lymphoedema.
- To help chronic wounds heal, it is important to understand how localised periwound lymphoedema affects wound healing.
- Services should be streamlined so that patients have continuity of care, seeing one service and one specialist.

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Revalidation Alert

Having read this article, reflect on:

- Your understanding of how localised periwound lymphoedema affects wound healing
- Improving outcomes for patients with chronic oedema/lymphoedema
- What causes lymphovenous disease and how treatment should be approached.

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