Lymphovenous oedema (phlebolymphoedema): The nature and extent of the problem

CONTRIBUTORS

RICHARD WHITE, *Scientific Editor,* Wounds UK*; Professor of Tissue Viability, University of Worcester, Worcester*

MIKE ELLIS (**ME**)
Tissue Viability Clinical Nurse Specialist, Royal Devon and Exeter NHS Foundation Trust

JULIET PRICE (**JP**)
Tissue Viability Clinical Nurse Specialist, Royal Devon and Exeter NHS Foundation Trust

JUSTINE WHITAKER (**JW**)
Director & Nurse Consultant, Northern Lymphology Ltd; and Senior Lecturer, University of Central Lancashire

ANNE WILLIAMS (**AW**)
Lymphoedema Nurse Consultant and Researcher, NHS Highland Lymphoedema Project/The Haven, Blantyre

While many clinicians are aware of, and recognise, overt lymphoedema, knowledge of lymphovenous disease and its ramifications is poor. Its prevalence is similar to that of leg ulceration. 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.

Apart from raising awareness, the clinical problems faced include assessment, diagnosis, and management. There is also the important issue of skin care, which usually accompanies lymphovenous disease (Bianchi et al, 2012).

The pathophysiology and management of chronic venous insufficiency are well known, although clinical outcomes do not reflect this. Inappropriate, or lack of treatment, inevitably leads to increasing overload and thus damage to the lymphatic system (Piller, 2009).

The focus of this debate is the coexistence of oedema with venous ulceration, and not on lymphoedema secondary to cancer, surgery, renal disease, and drug therapy.

Richard White

How should vascular status be assessed in cases of leg ulceration with oedema?

ME: Pragmatically, with safety in mind, and in partnership with the patient. The clinical history, signs and symptoms are important to assess in all cases, but even more so when dealing with chronic oedema (Lymphoedema Framework, 2006).

Standard ankle brachial pressure index (ABPI) may not be very accurate due to the effect of additional fluid density on the Doppler signal, particularly if not using the correct probe type (Worboys, 2006). It may also be very difficult to apply external pressure due to increased limb size and density (Vowden and Vowden, 2000). In my experience, many nurses in the community will rely solely on ABPI values and, therefore, fail to compress a perfectly suitable limb because the sounds were muffled or the ABPI out of normal range.

JP: Lower leg oedema is a symptom of pressure changes in the vascular system, and sustained pressure changes inevitably lead to a failure in the lymphatic system (Piller, 2009).

As gold standard treatment includes graduated compression unless contraindicated, assessing the vascular status is paramount. A comprehensive clinical assessment including medical history, current health status, familial history, and clinical observation for the signs of lymphovenous disease must be undertaken.

Ulceration of the lower leg may not be typically venous or appear in the lower gaiter area, and ulcer size is often small because lymphorrhea damages the skin and presents as small breaks and blistering. Symptoms of venous disease, such as venous staining, varicose or spider veins, atrophy blanche and hyperkeratosis may be present, but untreated oedema can make them difficult to observe. The clinical picture alone cannot be relied upon to provide definitive diagnosis of the underlying disease processes.

Based on my own clinical experience, dense oedemas may render large arteries uncompressible, which makes assessment of APBI with handheld Doppler difficult and ABPI readings alone are not reliable enough to rule out arterial disease. Community nurses should develop a skill set and knowledge base to feel confident to apply compression from the clinical picture, coupled with listening to and palpating arteries.

Laser toe Doppler can be useful and in the inpatient setting duplex scanning will give a definitive diagnoses (Barnes, 1991).

JW: ABPI is the most commonly used approach to assessing the status of the arterial system within leg ulceration. However, when the ulcer is painful, too wet or infected, it is difficult to inflate a cuff around the leg to achieve the optimum pressures for an accurate result. ABPI leaves room for error in that it is entirely dependent on the skill of the

individual and their professionalism to follow exact protocol, and reproducibility between practitioners can be difficult to achieve. When oedema is present, then the availability of the correct cuff size for the circumference of the limb is often an obstacle. An extra probe (5MHz) is needed due to the tissues being thicker and deeper. Due to lack of rigorous evidence it is not known if false results are achieved due to the inability to compress the limb in the same way as an unswollen limb, which raises the question as to whether it is entirely safe.

Dopplex Reporter computer software (Huntleigh Technology) can be loaded onto a laptop for portability, and works with the handheld Doppler and probe to capture the output of individual vessels. It records whether the vessel flow is tri-, bi- or monophasic which gives indications to levels of arterial disease. The waveforms for as many individual vessels as necessary are recorded. There is little room for error with this method and the result is printed to add to the patients' notes. This is the method used widely in Northern Lymphology's clinic, with success. The software costs around £450, plus Doppler.

We need to consider methods that are safe, show an accurate picture, eliminate the need to refer unnecessarily but streamline those who do need referral, and are relatively cheap.

The visual aspect and verbal questioning of the patient is paramount and should not be omitted at the expense of electronic equipment. Use of a visual analogue scale should be considered as these can be revisited to demonstrate improvement outcomes.

AW: Research evidence indicates that leg ulceration and chronic swelling commonly coexist (Moffatt et al, 2004). However, leg ulcer guidelines (Scottish Intercollegiate Guidelines Network, 2010) often fail to explore the challenges of assessing vascular status in these patients. Duplex scans can be useful in identifying treatable venous pathologies contributing to oedema development. However, ABPI may be difficult to perform, or unreliable in patients with chronic swelling, thickened and hard fibrotic tissues.

In practice, the consequence of not being able to record an accurate ABPI is that practitioners delay or avoid using compression therapy. This results in these patients experiencing a gradually deteriorating quality of life due to worsening oedema, exudate, cellulitis, and reduced mobility.

It is essential that we undertake a comprehensive assessment to consider social aspects, individual cognition, lifestyle and self-management ability, alongside risk factors for arterial disease, such as smoking, history of stroke, intermittent claudication, previous skin necrosis, or amputation. Furthermore, once a decision to use compression is made, the use of short-stretch bandages over appropriate padding provides effective variation between working and resting pressures, enhancing venous and lymphatic return, while also reducing the risk of tissue necrosis.

When should community clinicians refer patients for more expert attention?

ME: Refer early in the process, particularly if there is poor or no healing despite providing gold standard therapy or the clinician is unable to provide this therapy. This relies on the staff knowing how important managing lymphovenous oedema is for the treatment of leg ulcers and prevention of recurrence. Piller (2009) clearly highlighted the need to accurately assess both the degree of oedema and the cause.

Although chronic venous lymphatic insufficiency may be the most likely cause of lower limb swelling, it is important that medical assessment and investigation rules out any other causes requiring alternative treatment.

JP: A multidisciplinary team approach is advocated when treating these complex patients and early advice from clinical specialists should by sought to prevent further complications. If arterial disease is suspected (ABPI below 0.6 or above 1.3, significantly different readings are found when the main arteries are compressed, if the reading are dampened, monophasic or a clinical history of claudication is given) a vascular opinion should be sought (Barnes, 1991). Dermatological advice is also important for early treatment of skin conditions and prevention of infection (Chatham, 2013).

As high BMI can be a causative factor in lymphovenous disease, early contact with dietetic services is also recommended (Lymphoedema Framework, 2006). Diabetes in patients with high BMI is being seen more frequently and so it can be important to involve endocrinologists and diabetes nurse specialists early in the patient journey. Peer support can be very useful and some patients with lymphovenous disease will respond well to the leg club model (Lindsay, 2001).

JW: This is does not have a straightforward answer due to different levels of expertise, care pathways and commissioning across the UK. Anne Williams and I are working to produce a tool for levels of intervention and appropriate referral for patients with chronic oedema.

Some lymphoedema services that would be best placed to manage oedema are often not commissioned if a wound or ulcer is present. The patient then goes to leg ulcer, tissue viability or vascular clinics for management. These services have an expert grasp on managing wounds and ulcers, but often have had no specific education on managing chronic oedema and its implications.

Bandaging techniques and the science behind them often just includes below knee. Product suppliers can offer training

in extending the use of bandages above the knee. However, this has many implications which question skill, competence and depth of knowledge and understanding of the underlying pathology.

Every clinician should refer a patient to an appropriate specialist if what they assess or observe is out of their professional remit, even if this means out-of-area referrals or special commissioning for the condition until appropriate measures are in place to properly manage such patients locally.

Accessing appropriate education with suitable information providers should be a priority.

AW: The causes of chronic oedema in patients with ulceration are often complex and multifactorial.

Piller (2009) suggested that there is often a mix of a "mechanical insufficiency", as in primary lymphoedema, and "dynamic insufficiency", for example, due to cardiac failure, or inflammatory changes. Therefore, practitioners must focus on improving venous and lymphatic systems if the ulcer is to have a chance of healing.

Sadly, ulcer management often ignores the lymphatic system and misinformed treatment can even exacerbate some problems, such as toe oedema.

Referral for more expert attention is required if:

- An ulcer is non-healing due to the presence of chronic oedema, excessive exudate and/or periulcer oedema. Chronic ulceration causes significant damage to the superficial lymphatic system under the skin – a type of lymphatic failure local to the ulcer.
- Oedema involves the toes, foot, thigh, genitals and/or trunk, buttocks; the patient may require specialist manual lymph drainage to redirect fluid towards healthy lymphatics.
- There is a possibility of primary lymphoedema (often family history), or a secondary "acquired" lymphoedema (due to surgery, cancer treatment).
- A patient has recurrent cellulitis; this may indicate underlying lymphatic insufficiency (Damstra et al, 2008).
- Clinicians are unfamiliar with short-stretch bandaging, the most effective approach to enhance venous and

lymphatic return (Partsch, 2007).

- Clinicians are unfamiliar with European-class compression garments, indicated for chronic oedema.

What are the priorities for treatment in the case of patients with concomitant leg ulceration and oedema?

ME: Whether you view the symptom or the cause as the key to management, the treatment will generally be the same. Compression will improve the symptoms of the underlying lymphovenous disease because it addresses the physiological impairment (Partsch, 2003; Lymphoedema Framework, 2006). That said, this is only possible if you have a fully informed patient who is an equal participant in their treatment.

JP: The treatment priorities with patients who have concomitant leg ulceration and oedema should be consistent and the treatment plans must be made in agreement with and taking into consideration the wishes and understanding of the patient and carers because concordance can be poor in this patient group (Van Hecke et al, 2008).

Correct diagnosis and timely treatment is not always offered. We still see patients who have presented to their general practice with swollen, heavy legs which leak and break into ulcers but have not received any consistent care or undergone assessment.

Care of the ulcer will incorporate principles of wound bed preparation or TIME (Schultz et al, 2004). It is necessary to remove the venous cause and thus reduce progression of the chronic disorder with graduated compression bandaging or treatment hosiery kits (Partsch, 2003). Manual elevation and exercise is important, as is good skin care. But paramount is understanding of the patient as an individual and a multidisciplinary approach to care.

JW: There are many priorities for these mixed aetiology patients. The most important is reducing the risk of infection and cellulitis in the ulcer and the soft tissues.

The lymphatic system has three responsibilities – homeostasis, immunity and removal of dietary lipids from the gut to the circulation.

When the homeostasis aspect is unbalanced, as is the case with lymphovenous oedema, then an inappropriate level of fluid is in the tissue space. This inhibits cellular level activity that affects the immunological response. Inflammation is often apparent, which then puts extra burden on the already-compromised immune system.

This means that patients are very likely to have frequent cellulitis attacks during wound management despite scrupulous aseptic care. This group of patients benefits from the application of an antimicrobial such as PHMB while the ulcer is present.

It is a priority to gain control of the oedema and reduce it not just in the area of the ulcer but in the whole limb. When the lymphatic system is compromised, it is not just in the area where the skin has broken down, but the whole limb. Often a problem will be proximal to the ulcer and requires the appropriate management to acknowledge this.

In the field of chronic oedema we would never partially bandage a fully compromised system. Gaining control of the oedema enhances the function of the lymphatic system, enabling it to perform more efficiently. This, in turn, improves healing, control and management to begin the rehabilitation process.

AW: The first priority is working in partnership with patients and their families, learning what influences their self-management and personal lifestyle choices.

This may initiate small changes, such as elevating the end of the bed at night, walking in good-fitting shoes, or weight loss, that can make a big impact on oedema. People often lose confidence in their legs if they are ulcerated and leaking, becoming depressed and disillusioned if their ulcer is painful and does not heal. It is not surprising that some sit in the chair for long periods with increasingly swollen legs. Sensitive, timely, and person-centred education is, therefore, essential.

Another priority is choosing an effective and comfortable compression therapy system, based on an understanding of the science, and comprehensive assessment of individual patient needs. Short stretch bandaging is indicated in these patients to improve venous return and promote lymph drainage by stimulating contraction of the collector lymphatics in the leg. Regular bandage reapplication in the early stages of oedema reduction enables frequent skin monitoring and care. If exudate is problematic, this may indicate infection, or ineffective oedema management.

Finally, practitioners must work well as a team, to ensure there is continuity in care, and skilled use of compression therapy. It only takes one poorly applied bandage to cause deterioration of a healing ulcer!

What are the skin treatment recommendations in this patient group?

ME: Emollient therapy. I do not think this can be overstated. Patients with this condition will often have skin conditions associated with the build-up of interstitial fluid.

While correcting the lymphovenous impairment, it is essential that the skin is optimised by using both washes and leave-on emollients (Lymphoedema Framework, 2006; Piller 2013; Trayes et al, 2013).

JP: Patients with lymphovenous disease will have impaired lymphatic drainage dependant on the chronicity of their

disease (Hoffman, 2010). As the skin is a microbial barrier, any small breaks, trauma or ulceration provide a route for bacteria to penetrate into the protein-rich lymph fluid and multiply rapidly, leading to cellulitis. Skin treatments should prevent infection and aim to keep the skin in optimum condition.

Recommendations are that the patients has good primary and ongoing skin assessment by a competent clinician to recognise underlying dermatological conditions such as venous eczema, lipodermatosclerosis, hyperkeratosis, folliculitis and maceration and begin treatment. Involvement of the patient and carer, listening to their preferences and concerns, educating them to recognise any skin changes early and know how and to whom to escalate concerns, is vital to concordance.

Washing the limb to maintain hygiene using a water-soluble soap substitute while keeping the environment as sterile as possible especially when ulceration is present are significant challenge in community settings (Wingfield, 2009).

JW: Many bandage systems and wound care products are licensed for up to 7 days. This is often interpreted as the length of time to leave the product on before it needs changing, rather than using the patient's condition, situation and evidence to manage it individually.

When an individual has chronic oedema, abnormal levels of water and protein are in the tissue. This can lead to skin changes both at the surface and subcutaneous level.

Daily washing with an emollient and then application of cream/emollient is recommended to help prevent deterioration of the skin, prevent bacterial and fungal manifestations, promote removal of dead skin and enhance drainage of the superficial lymphatics.

When compression is applied to tissue with any level of oedema, regardless of whether the tissue is pitting or non-pitting, a reduction in volume will occur. This reduction is shrinking the tissues towards their original size. When this happens (as it should) then dead skin cells are sloughed off the surface, generally in larger than normal quantities.

If a bandage remains in place for 7 days, then this dead skin sits between the new skin and the bandage material, and irritation and potential infection can occur. Although it is unnecessary to change a bandage every day, patients with oedema and ulcers require a much more frequent bandage change – three times a week until complete swelling reduction is achieved.

Another aspect supporting a more frequent bandage change is the process when compression is applied to oedematous tissue. The actual pressures achieved when following the manufacturer's recommendations will depend on the thickness and type of tissue (e.g. fibrosis, doughy, watery). Hysteresis and crêpe of bandage materials, coupled with a reduction of oedema, means that the therapeutic pressure applied on day 1 will be very different on day 3, and one could question whether any therapeutic value at all is being achieved on day 7.

AW: The initial lymphatic network under the skin connects to pre-collector and contractile collector lymphatics, draining lymph through the limb, via lymph nodes, towards the blood circulation (Mortimer, 2000). The lymphatic system drains fluid and provides immune surveillance. Daily skin washing, careful drying and application of a suitable emollient (following local protocols) is essential to keep the skin and lymphatic system healthy.

The lymphatics within and around an ulcer site become damaged by ulceration, and problems such as hyperkeratosis, dermatitis, lipodermatosclerosis, and cellulitis. Hyperkeratosis should be removed using a gentle debriding product prior to applying an emollient.

An inflammatory response promotes more tissue swelling, further overwhelming the lymphatics and delaying healing. Cellulitis should be well managed to prevent recurrence, and may require 14 or more days of antibiotics if the limb is swollen (British Lymphology Society, 2013).

Fungal infection, particularly between swollen toes or in the groin, is a source of recurrent cellulitis. Toe bandaging may be necessary, the feet must be washed regularly, nails skilfully cared for, and tinea pedis actively treated to eradicate and prevent reinfection.

Patients require prompt diagnosis of skin conditions and patch testing where allergy is suspected.

Above all, skilled use of long-term compression garments is key to improving skin health for many patients, enabling lymphatics under the skin to regenerate (Mortimer, 2000).

What can be done to increase awareness so that oedema can be controlled and ulcers healed?

ME: Traditional classroom training is becoming less available. More experienced members of staff also have less time to provide peer support and education. This is leaving a perceived deficit in the knowledge of frontline staff dealing with this patient group.

Close contact with industry is one simple way that teams can access support from people who live and breathe the products used to manage this condition. This takes the practical and financial burden away from cash-strapped healthcare organisations.

JP: The problem of awareness stems from clinicians. We are poor at recognising and diagnosing this condition and often treat the symptom of ulceration without tackling the underlying disease. We are not consistent in the advice and education we give.

Knowledge varies, and lack of knowledge leads to our patients losing confidence in the care we provide. This is a chronic progressive disorder, which is on the increase.

Raising awareness in general practices and community nursing bases is key. Compression product suppliers can be a really useful education resource.

JW: We need an absolute recognition that a mixed aetiology of lymphatic and venous exists and is as important a consideration as the venous and arterial mixed aetiology. That way, it will begin to be taught as a regular part of tissue viability and leg ulcer courses.

It is embedded into chronic oedema training and where there is sound knowledge and expertise of chronic oedema and tissue viability, then the healing and management rates are excellent.

Pathways and appropriate commissioning can begin to evolve from this. Initially, it will require investment because patients will need more frequent appointments, but in the long term this cost will be offset by shorter healing times. A diagnostic tool (currently in development) will assist community staff in determining when to treat and when to refer.

AW: Historically, in the UK the lymphatic system and chronic oedema has been poorly understood. Making robust pathways and clinical guidelines accessible online, enables practitioners to diagnose and manage the various conditions that contribute to oedema in a patient, rather than blindly using the default: diuretics!

Education at all levels should continue to encourage early detection of oedema, for example at stage 1 when the condition is reversible (International Society of Lymphology, 2009).

It is not surprising that practitioners (and patients) feel that oedema cannot be controlled once the condition becomes stage 3 with chronic skin and tissue changes.

Better awareness can be achieved when lymphoedema practitioners work closely with community nurses, collaborating with specialists in dermatology, vascular, and tissue viability.

Changing practice from below-knee four-layer bandaging to full-leg short-stretch bandaging can provide "miraculous" results in patients with chronic ulceration and oedema.

Providing group self-management support for patients and carers empowers, enhances awareness and promotes confidence in self-care and use of compression. Patients can then become educators of professionals!

Each practitioner has a responsibility to improve their knowledge within and beyond their specialist area.

By increasing knowledge of the impressive choice of compression therapy and garments available on Drug Tariff, practitioners become more confident in promoting a positive message that something can be done to improve life for these patients. WUK

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