Dealing with common lower limb problems in primary care

Annemarie Brown

This two-part series will discuss common lower limb problems, including venous leg ulceration, oedema (including oedema associated with lymphovenous disease), lymphoedema and lipoedema. This article will focus on the causes of these conditions and discusses the signs and symptoms to enable community nurses to diagnose and differentiate between the types of lower limb problems. Part two of the series will focus on management strategies for simple, uncomplicated venous leg ulceration and oedema, which can be successfully managed with skin care and compression therapy, without specialist skills. It will also briefly outline the management of lymphorrhoea or ‘leaking legs’, which can be challenging for nurses. The aim of this series is to enable community nurses to choose the most effective treatment in terms of efficacy and patient acceptability.

KEYWORDS:
- Wounds
- Lower limb
- Oedema
- Lymphovenous disease

Abnormal lower limb swelling is variously referred to as chronic oedema, lymphovenous oedema, lymphoedema or lipoedema (Todd, 2012). Generally, oedema is defined as an ‘accumulation of fluid in the intercellular tissue that results from an increased volume of fluid’ (Trayes et al, 2015). Chronic oedema includes oedema which develops as a result of venous disease, dependency oedema and lymphovascular disease and is classed as ‘chronic’ if it has been present for three months or longer (Todd, 2012).

Lymphoedema is an increasing health concern in the community and it has been estimated that up to 63% of women develop lymphoedema after cancer breast surgery, while up to 70% of men develop the condition following prostate cancer (Keast, 2013). The International Lymphoedema Framework (ILF) Annual Report in 2008 estimated that 48% of chronic oedema/lymphoedema in England and Scotland was secondary to malignancy, and 52% was related to other causes (Keast, 2013). Although common, with an estimated prevalence of 0.13–2% (Dale, 1985; Moffatt et al, 2003; Rabe et al, 2003), these conditions are often not correctly diagnosed and, therefore, not treated in a timely manner (Todd, 2012; Anderson, 2016).

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It is outside the scope of this article to discuss assessment in depth, however, community nurses will need to conduct a holistic assessment, including medical history, medications and lifestyle, together with a vascular assessment and clinical examination of the lower limb to rule out other less common causes of oedema, such as cardiac or renal failure, before starting compression therapy.

Although the presentation of these conditions have similarities, the causes are very different and it is important to differentiate between them in order to provide optimum treatment (Keast 2013).

VENOUS LEG ULCERATION AND LYMPHOVENOUS DISEASE

Oedema as a result of venous disease develops when there is disruption to normal venous return (Williams and Keller, 2005). One of the major causes is chronic venous insufficiency, where the flow of venous blood from the lower legs back to the heart is impaired (Todd, 2012). If a patient is inactive or stands for long periods, the calf muscle pump is inactive and the combination of this lack of pumping action, together with the effects of gravity, results in blood pooling in the distal veins (Todd, 2012).

In the presence of faulty or ineffective valves in the perforator veins, the blood backflows to the superficial veins. Partsch and Mortimer (2015) found that the intravenous pressure in the dorsal foot vein of a normal-sized adult was between 80–100mmHg on standing; this dropped to under 30mmHg when the person started to walk. However, in patients with venous hypertension, intravenous pressure...
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is not substantially reduced and, as a result, fluid leaks out of the venous system into the interstitial spaces and results in oedema (Mortimer and Levick, 2004).

Open venous ulceration itself is not a condition, but a symptom of an underlying venous disorder, which can range from mild thread veins to large areas of open ulceration with accompanying lymphatic involvement (Muldoon, 2013).

Additional risk factors for venous ulceration include (Muldoon 2013):
- Increasing age and natural decline of the vascular system
- Past medical history of deep vein thrombosis (DVT)
- Increased pelvic congestion and obesity, particularly around the abdomen
- Muscle wasting disorders, such as arthritis, which affects the calf muscle pump
- Immobility or sedentary lifestyles.

Although the pathophysiology of venous leg ulceration is known, the precise mechanism of ulcer development is still largely unknown, although there are several theories which seek to explain the process, including lymphoedema, venous insufficiency and lipoedema.

### LYMPHOEDEMA

True lymphoedema is caused by the excessive accumulation of protein-rich fluid in the tissues (Keast, 2013), however, it develops through mechanical failure of the lymphatic system rather than as a failure of the venous system itself and results in excessive fluid in the interstitial spaces (Todd, 2012).

#### Function of the lymphatic system

The lymphatics form part of the immune system and are primarily responsible for fighting infection and maintaining fluid balance within the body by removing excessive tissue fluid, proteins and waste products from skin, fat, muscle and bone (Keast, 2013).

Tissue fluid, consisting mainly of water and protein molecules, is transported within the lymphatic capillaries, which sit just below the skin’s surface. This fluid flows in one direction towards the lymph nodes or glands where metabolic waste matter, lipids, bacteria, cytokines and fibronectin are filtered out by the body’s defence system. Once this has occurred, the lymph becomes a milky fluid and drains back into the blood within the large veins of the body where it is pumped back to the heart and is finally excreted as urine by the kidneys (Mortimer and Levick, 2004). Normal functioning of the lymphatic system is dependent on a delicate balance between the volume of lymph fluid and the system’s ability to transport the fluid in an efficient way.

Lymphoedema is the likely cause of swelling if it has been present for more than three months, does not respond to elevation or diuretics, and has the presence of one or more secondary skin changes, such as (Moffatt et al, 2003):
- Positive Stemmer’s sign (indicating the presence of lymphoedema — if positive, the skin of the forefoot cannot be pinched and lifted)
- Elephantiasis (severe swelling in the arms, legs, or genitals)
- Skin folds
- Hyperkeratosis (thickening of the outer layer of the skin
- Papillomatosis (benign epithelial tumours).

### Table 1: Causes of oedema and lymphoedema

<table>
<thead>
<tr>
<th>Most likely cause</th>
<th>Lymphoedema</th>
<th>Oedema</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute deep vein thrombosis</td>
<td></td>
<td>†</td>
</tr>
<tr>
<td>Post-thrombotic syndrome</td>
<td></td>
<td>†</td>
</tr>
<tr>
<td>Arthritis</td>
<td></td>
<td>†</td>
</tr>
<tr>
<td>Presence of carcinoma</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Congestive cardiac failure</td>
<td></td>
<td>†</td>
</tr>
<tr>
<td>Chronic venous insufficiency</td>
<td></td>
<td>†</td>
</tr>
<tr>
<td>Poor mobility/dependency</td>
<td></td>
<td>†</td>
</tr>
<tr>
<td>Liver/renal disorders</td>
<td></td>
<td>†</td>
</tr>
<tr>
<td>Drug-induced swelling, beta-blockers, etc</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. **Hyperkeratosis and skin folds.**

Figure 2. **Bilateral lymphoedema.**

Table 1: Causes of oedema and lymphoedema.
Together let’s keep an ambitious objective in mind: ZERO.

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The causes of oedema and lymphoedema are shown in Table 1.

Lymphovenous disease occurs when the patient has chronic oedema in combination with signs of venous disease that has been present for a long time, whereas lymphoedema is due solely to an inefficient lymphatic system (see Table 2).

**Primary lymphoedema**

Primary lymphoedema occurs from birth, but often only manifests itself in adolescence, and can be for no obvious reason (Lymphoedema Framework, 2006).

It has been estimated that at birth, one in 6,000 people will develop lymphoedema (Moffatt et al, 2003). It is thought to be due to an underdeveloped lymphatic system and, as a result, an excessive accumulation of protein-rich fluid within the tissues. Treatment consists of skin care, exercise, manual lymphatic drainage and compression therapy. Both primary and secondary lymphoedema cannot be cured and treatment is aimed at maintaining a reasonable limb shape and minimising associated risks, such as frequent episodes of cellulitis. Early intervention is necessary to prevent the condition becoming worse and potentially unmanageable.

**Secondary lymphoedema**

Secondary lymphoedema occurs when the patient has a condition which prevents the lymphatic system from working effectively. Common causes are:

- Cancer and cancer surgery, for example, lymph node removal from the axillae (underarm) to prevent the spread of breast cancer. As a result, lymphoedema often develops on the affected arm. Other examples include surgery for certain gynaecological cancers, which involve the removal of the inguinal (groin) lymph nodes. This will result in lymphoedema of the legs. Similarly, the effects of radiation may cause scar tissue to develop; this can lead to ineffective drainage of lymph fluid.
- Accidents/trauma/injury or infection may result in secondary lymphoedema if the lymph nodes in the affected area are damaged.
- Obesity: there is some evidence that links obesity with secondary lymphoedema. This is believed to be caused by fatty tissue compressing the lymphatic vessels, causing them to malfunction (Mehrara and Greene, 2014).
- Reduced mobility/paralysis of the lower limbs: muscles which contract during exercise or general activity help to move the lymph fluid through the lymphatic system. This is the reason that wheelchair-bound patients often have swollen lower legs.
- Venous insufficiency: oedema occurs when there is a disruption to normal venous return (Williams and Keller, 2005). One of the major causes is chronic venous insufficiency, where the flow of venous blood from the lower legs back to the heart is impaired (Todd, 2012). The high pressure in the veins forces fluid out of the venous system into the interstitial tissues, resulting in oedema (Figure 3).

**Lipoedema**

Lipoedema is a condition that is frequently confused with lymphoedema and is a result of an uneven distribution of fat cells in the subcutaneous regions, generally in the legs, abdomen or thighs (see Table 3). The cause is unknown, but it is considered to be genetic.

Lipoedema generally affects females and results in the body type often referred to as ‘pear-shaped’. Unfortunately, this condition is not curable and dieting has little impact on the lipoedema as the fat cells will not allow themselves to be starved.

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**Table 2: Clinical differentiation between lymphoedema and lymphovenous disease**

<table>
<thead>
<tr>
<th>Lymphoedema</th>
<th>Oedema due to lymphovenous disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present for more than three months</td>
<td>Can be acute or chronic</td>
</tr>
<tr>
<td>Does not respond to overnight elevation or diuretics</td>
<td>Responds temporarily to overnight elevation but appears again during mobilisation. May respond to diuretics depending on cause</td>
</tr>
<tr>
<td>Initial soft pitting oedema which progresses to non-pitting but then development of distinctive skin changes — hyperkeratosis and papillomatosis</td>
<td>May develop blisters full of fluid and/or pitting oedema</td>
</tr>
<tr>
<td>Skin conditions, such as hyperkeratosis, skin folds (Figure 1), papillomatosis, lymphangiomata, lymphorrhoea (‘wet legs’)</td>
<td>Varicose veins, ankle flare, hyperpigmentation (staining) in the gaiter area, venous dermatitis, induration</td>
</tr>
<tr>
<td>Tends to affect entire limb and foot</td>
<td>Tends to be confined to ankles and lower extremities</td>
</tr>
<tr>
<td>Bilateral in 30% of cases (Figure 2)</td>
<td>Initially unilateral but may progress to bilateral</td>
</tr>
<tr>
<td>Positive Stemmer’s sign (inability to lift skin fold at the base of the second toe)</td>
<td>Stemmer’s sign not present</td>
</tr>
<tr>
<td>Square toes and oedematous dorsum of feet</td>
<td>Some foot swelling may or may not be present</td>
</tr>
<tr>
<td>Patients report having ‘heavy’ limbs, but not usually pain</td>
<td>Pain may be present</td>
</tr>
</tbody>
</table>

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**Table 3: Distinguishing between lymphoedema and lipoedema (Keast, 2013)**

<table>
<thead>
<tr>
<th></th>
<th>Lymphoedema</th>
<th>Lipoedema</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>May involve limbs and trunk</td>
<td>Usually lower limbs only</td>
</tr>
<tr>
<td>Gender</td>
<td>Male and female</td>
<td>Predominantly female</td>
</tr>
<tr>
<td>Foot/hand involvement</td>
<td>Yes</td>
<td>Tends to stop at ankle or wrist</td>
</tr>
<tr>
<td>Pain</td>
<td>Possible</td>
<td>Prominent feature, especially on touch</td>
</tr>
<tr>
<td>Cause</td>
<td>Disordered lymph transportation</td>
<td>Unknown: excessive amount of subcutaneous fat deposition</td>
</tr>
</tbody>
</table>
Instead, the patient will lose weight from other parts of the body initially, but not from the limbs affected by lipoedema. This is an unfortunate condition that cannot be cured; however, it can be maintained by the use of compression hosiery to prevent the affected limbs increasing in size over time (www.lipoedema.co.uk/about-lipoedema/treatment/).

CONCLUSION

This article has given an overview of the causes of common conditions that affect the lower limb, which will help community nurses to differentiate and diagnose appropriately. Although not within the scope of this article, a full patient assessment must be performed before treatment is initiated. If a community nurse is unsure as to the cause of oedema, further advice from a specialist should be sought.

Part two of this series will outline the different treatment options, which currently include skin care, management of ‘wet legs’ and compression therapy using bandages, hosiery and wrap systems.

REFERENCES


Figure 3.
Lymphoedema secondary to venous disease.

Having read this article, reflect on:

- Your knowledge of the different types of lower limb conditions.
- How you would distinguish lipoedema from lymphoedema.
- The causes of oedema and lymphoedema.

Then, upload the article to the free JCN revalidation e-portfolio as evidence of your continued learning: www.jcn.co.uk/revalidation

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