

THE CAUSES, PRESENTATION AND MANAGEMENT OF CHRONIC OEDEMA

Oedema is the swelling of tissues due to excess extracellular fluid in the body, usually caused by a disturbance in the lymphatic circulation. This article looks at the multidisciplinary approach needed to combat this trying condition.

The human body is comprised primarily of water, approximately 50–70%, and it is the solvent in which almost all physiological processes take place. Water is contained within all of the cells of the body (intra-cellular) and outside the cells, there is the extracellular fluid, which is in the blood, in the lymphatic circulation and bathes the organs. The balance of water within the body is vital, hence the need to record input and output on fluid balance charts when an individual is unwell and this balance becomes disturbed.

Oedema is the swelling of tissues due to excess extracellular fluid in the body, usually caused by a disturbance in lymphatic circulation. It is the role of lymphatic circulation to absorb and circulate fluid, proteins and bacteria within lymph fluid. It also propels the lymph fluid into the lymph nodes, where it is re-circulated into the blood supply, while bacteria are moved into the lymphatic nodes where they are destroyed by phagocytes cells. Lymphatic circulation relies upon muscular body movement to circulate lymph fluid, hence, once an individual becomes immobile and sits for long periods with their legs down, oedema begins to form (*Figure 1*).

Any disease which interferes with the normal physiological processes of the body involving the heart, lungs, kidneys, liver, and vascular or

lymphatic circulation, can cause an imbalance in the fluid circulation and lead to oedema of the lower limbs – gravity causes fluid to settle at the furthest part of the body.

Chronic oedema

Chronic oedema is a persistent, abnormal swelling of the legs, which does not completely reduce overnight or with elevation, and which has been present for more than three months (Williams and Craig, 2007).

Fluid accumulates in the extravascular tissues and is a symptom of many different clinical conditions, developing due to an imbalance between the hydrostatic pressure gradients of blood vessels and the tissues (European Wounds Management Association [EWMA], 2003).

Chronic oedema is a poorly recognised problem, affecting at least 100,000 people within the UK (Moffatt et al, 2003). Individuals suffering from chronic oedema are at risk from infection. Bacteria that would normally have been transported via lymph fluid to the lymph nodes and destroyed, accumulate, trapped within soft tissue where they can cause inflammation and infection.

This can then necessitate hospital admission for intravenous antibiotic therapy (British Lymphology Society/

- ▶▶ Chronic oedema
- ▶▶ Lymph nodes
- ▶▶ Multidisciplinary approach
- ▶▶ Immobility

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Lymphoedema Support Network [BLS/LSN], 2006).

Specific causes of oedema/ chronic oedema

Poor mobility/immobility

If the individual spends long periods of time sitting in a chair with their legs dependent (hanging down), then dependent oedema may form, often known as 'gravitational oedema'. This is due to increased pressure in the venous circulation of the leg, which leads to increased capillary blood vessel permeability and fluid leaking out of the vessel and into the tissues (Moffatt, 2007). Individuals with mobility problems due to motor-neurone disease, cerebral vascular accident, Parkinson's disease or simply extreme age and its natural reduction in mobility, may suffer from chronic oedema.

Obesity

Poor mobility, sitting immobile for long periods or even sleeping in a chair due to sleep apnoea, together with the weight of abdominal folds compressing the thighs against a chair, causes back pressure on the venous and lymphatic vessels, leading to oedema. If the situation is not resolved, chronic oedema or even lymphoedema develops (Todd, 2009).

Cardiac disease

Acute cardiac failure can lead to sudden acute lower limb oedema, associated with erythema (redness) and large blisters, which, if not promptly managed, may lead to ulceration. Slow onset cardiac failure, associated with hypertension or atrial fibrillation, leads to the gradual onset of chronic oedema.

Venous hypertension

Any damage caused to the venous circulation that inhibits venous flow, such as deep vein thrombosis or venous pump failure, trauma to the lower leg or varicose veins, will lead to a rise in the venous circulation, known as 'venous hypertension'. The

rise in pressure within the venous circulation causes the capillary walls to become more permeable, allowing proteins and fluid to leak out into the surrounding tissues and causing oedema (Moffatt, 2007).

Renal failure

Patients with renal disease and suffering from fluid overload due to their kidneys' inability to filter out sufficient fluid, may develop lower limb oedema and this is a warning sign that their renal disease is not being sufficiently managed. This is usually an acute condition, which may produce large bullae (blisters) and oedema, however, as the renal problems are controlled, the oedema subsides and the skin recovers.

Presentation of chronic oedema

Initially, the patient may present with swollen legs during the day, which resolves during the night due to the legs being elevated in bed. This may persist for some time, but can be an early warning sign of cardiac or renal problems, which should be investigated by a GP.

The oedema is often known as pitting oedema as fingertip pressure leaves an indentation in the leg as fluid is displaced, which slowly refills. The patient may complain of heavy legs and tension in the skin. These symptoms are resolved overnight, but worsen if left untreated.

Chronic oedema is a progressive condition, which produces further symptoms as it worsens. Progressive oedema may produce a positive Stemmers sign — the inability to pinch the soft skin at the base of the second toe. There may also be skin changes, which can cause the patient great discomfort and distress.

Skin symptoms associated with chronic oedema include:

- ▶▶ Ankle flare
- ▶▶ Swollen ankles

- ▶▶ Skin folds and creases
- ▶▶ Fibrosis, due to poor clearance of toxins, scarring within tissues
- ▶▶ Bacterial and fungal infections
- ▶▶ Lymphorrhoea — leaky, wet legs with no definite ulceration
- ▶▶ Maceration of skin due to lymphorrhoea.

As the problems persist, skin and tissue changes within the lower leg become more severe until lymphoedema results in the following:

- ▶▶ Lymphangioma — bulging lymph vessels
- ▶▶ Cellulitis — inflammation of tissues due to bacterial and toxin build up within the skin
- ▶▶ Papillomatosis — hard, bulging lesions usually in the foot and ankle region
- ▶▶ Hyperkeratosis — hard, woody lesions
- ▶▶ Ulceration.

Diagnosis of chronic oedema

Diagnosis may be made as part of a whole patient assessment, discovered when a patient presents with dyspnoea (breathlessness) or orthopnoea (breathlessness at night, when lying down), to their GP. Investigation may reveal a cardiac problem, such as atrial fibrillation, where cardiac output is reduced due to ineffective cardiac muscle contraction. Oedema often forms as one of the symptoms of reduced cardiac output and once this is rectified by medication, the oedema spontaneously resolves.

However, there are many patients suffering from progressive diseases that limit mobility, or even cause wheelchair dependence, such as Parkinson's disease and, as a consequence, the individual ceases to use their calf muscle pump, which leads to oedema developing.

If not managed promptly, this may develop into chronic oedema, and early identification of the problem leads to much quicker resolution (Brennan and Muller, 1998).

Diagnosis of chronic oedema should be made as part of a holistic assessment by an expert practitioner, so that no underlying medical causes are missed, and failure to do so may result in progressive deterioration of both the medical problem and the patient suffering from progressive chronic oedema (Billingham, 2007).

Assessment should include:

- ▶ Comprehensive medical history, including any symptoms noted by the patient/carer
- ▶ Interviews with patients to discover how their problem affects their lives, and what their daily routine entails
- ▶ Physical examination of the patients limbs:
 - a) Skin: is it dry, moist or even wet due to lymphorrhea; are there signs of infection — inflammation, hotness, fungal infection between toes or skin folds, signs of injury, ulceration?
 - b) Toes nails — healthy or dry and cracked, fungal infection
 - c) Size of the limb — is the oedema unilateral or bilateral. Is the whole leg affected or the lower leg?
 - d) Shape of the limb — are there skin folds or an abnormal shape?
- ▶ Mobility — is this reduced due to



Figure 1. Oedema in the lower legs, note the tight, shiny appearance of the skin. At this stage, it is easily resolved with appropriate elevation and treatment of the underlying cause.

underlying disease or due to the weight of oedematous legs. Has the patient undergone recent surgery, e.g. orthopaedic surgery, which could have caused the oedema

- ▶ Vascular assessment — since part of the treatment for the oedema may include some form of compression therapy, it is vital that any arterial disease is detected before commencing treatment. Due to the presence of oedema, the use of a 5MHz probe is vital to avoid Doppler signal distortion due to the oedema in an ankle/brachial pressure index. However, it may be necessary to use a toe cuff and to perform a toe/pressure index instead (Doherty et al, 2006).

Following diagnosis of chronic oedema, it is vital that a management plan is devised between the patient/carer and the clinician, and there must be an element of compromise by all those involved. In order to achieve success, the patient must recognise that there will be some disruption to their usual daily routine and that this can be resumed once the oedema has been reduced and is managed.

Meanwhile, the clinician must recognise that in order to achieve success they may have to commence treatment gradually and not rush the patient into treatment. This is because the disruption caused to their routine may lead them to rebel against treatment. It is, therefore, vital that each respect the other and patient and clinician work together in order to achieve success (Anderson, 2012).

Management of chronic oedema

Management often involves a multi-disciplinary approach as it is vital that the underlying medical problems are treated, while physiotherapy may be required to enable rehabilitation, or at least optimise mobility.

Elevation of the limbs

The patient/carer needs to understand

the need for elevation and how this can be achieved safely and comfortably for the patient, in order that they comply with treatment. Poor practice in elevation may result in pressure damage to the heels and aching legs, causing the patient to be non-compliant (*Figure 2*).

Compression therapy

Compression therapy may be achieved by using inelastic (short-stretch) bandaging or hosiery, provided the clinician has first ascertained that the patient does not have underlying arterial problems. If the limb is large and has ulceration or lymphorrhea, then bandaging must first be applied to reduce the size of the limb and heal the ulcer (EWMA, 2003).

How the compression bandaging is applied depends upon how much of the leg is affected. If the whole leg is oedematous then below-knee bandaging will be insufficient and may cause further problems. If the toes are oedematous then they too may require bandaging. It is essential that the clinician has had sufficient training in toe and whole leg bandaging since poor bandaging can result in a grossly misshapen limb and further distress to the patient. When inelastic bandaging is applied to the leg, the vein is compressed and damaged valves are closed, preventing the backflow of blood due to gravity and improving lymphatic drainage (Osbourne, 2009).

The most significant reduction of oedema occurs in the first weeks of treatment and, as the oedema reduces, the bandages will slacken and will require reapplication. Initially, the clinician must reapply bandaging frequently to maintain the shape of the limb and prevent 'bunching' of the bandage, which may cause trauma to the skin. Once the oedema has been reduced and/or ulceration resolved, the patient will require compression hosiery to prevent the oedema recurring.

It is important that the patient/carer realises this from the onset of

treatment to prevent disappointment when they think treatment is complete. Chronic oedema is managed, not healed as it is a lifelong condition. Some patients may require made-to-measure hosiery, depending on the size and shape of their limbs, although the majority will fit into stock sizes and can use a circular knit stocking.

Skin care

While some patients may have robust skin, others will experience dryness, hyperkeratosis and even ulceration. All patients will require effective washing, drying and emollient therapy to lubricate their skin. Emollients soothe, smooth and lubricate the skin and are indicated when dryness or scaling/hyperkeratosis is present (Stephen-Haynes, 2007).

All patients should be advised to avoid the use of soap, since it causes further dryness, but there are emollients available, which act as soap substitutes, e.g. Epaderm® (Mölnlycke), Hydromol® (Alliance Pharmaceuticals) and aqueous cream. Patients/carers should be advised to use a disposable cloth rather than the same wash cloth, to avoid the risk of infection (Wingfield, 2009). If products containing petroleum are used, the patient should be advised to avoid naked flame due to the risk of ignition (British Medical Association [BMA] and Royal

Pharmaceutical Society [RPS], 2007). Patients/carers need to understand that skin care must continue after the oedema is reduced and the patient is in compression hosiery.

Conclusion

Oedema and chronic oedema can be miserable conditions for patients, affecting their mobility and quality of life. Management involves a robust and comprehensive assessment, treatment of underlying medical conditions and a multidisciplinary approach, which includes the patient/carer in decision making and managing their individual problem. **WE**

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Figure 2. Poor practice: The patient's legs have been elevated on a footstool, with pressure to the heels and no support under the leg.