

Lower limb lymphoedema and obesity: a much-neglected association

Introduction

Obesity and lower limb lymphoedema are commonly associated conditions, but their direct relationship is infrequently discussed. They have the potential for serious complications but do not receive adequate attention in the health-care setting and have significant cost implications for a country's health-care system. Obesity is thought to predispose to the development of lymphoedema through several complex mechanisms including increased capillary pressure in congestive heart failure, increased capillary permeability causing recurrent lower limb infections, accumulation of fatty tissue, loss of mobility and dependency syndrome. This article presents a case of lower limb lymphoedema and discusses its complex association with obesity.

Discussion

Lower limb lymphoedema is a chronic, irreversible and non-fatal disease. It is caused by the inability of lymphatic drainage to keep up with lymphatic production over a period of time. It differs clinically from other forms of chronic oedema, often presenting with peau d'orange skin texture, and brawny subcutaneous tissue with lack of pitting (Burns et al, 2004). This patient was classified in the obese class 3 category and experienced obesity-related comorbidities. To the authors' knowledge obesity has not been demonstrated in the literature as a direct cause of lower limb lymphoedema. The prevalence in the UK has been cited as 1.33 per 1000 population, higher in women, and it

increases with age (Moffatt et al, 2003). There are currently no standardized diagnostic or management criteria for lower limb lymphoedema (International Society of Lymphology, 2013).

Obese people tend to be less physically active. Lymphatic drainage requires intermittent local compression generated by movement and muscle contraction to initiate lymphatic flow. Immobility encour-

ages swelling, especially if limb position and gravitational forces favour fluid filtration and retention resulting in functional lymphoedema. Fat distribution in the body varies from person to person and most obese people will have increased deposition of adipose tissue in the lower limbs. Accumulation of fat around the lymphatic system has been cited as a potential factor influencing lymphatic flow in the same way as it impairs venous drainage (Greene et al, 2012).

Figure 1. Posterior view of the oedematous and inflamed left lower limb with fissures.



Figure 2. An erect frontal view of the bilateral lower limb lymphoedema.



Case Report

A 36-year-old man with a history of morbid obesity, obstructive sleep apnoea, hepatic steatosis and an undifferentiated gammopathy presented to the emergency department with acute left lower limb swelling and erythema, on the background of longstanding gross oedema of the lower legs bilaterally. His body weight was 180 kg and body mass index was 60 kg/m². Cellulitis was diagnosed and the patient was commenced on flucloxacillin 2 g four times a day. Swabs taken from the superficial ulcer on the left lower leg gave a moderate growth of *Streptococcus pyogenes* (Group A) and scanty growth of *Staphylococcus aureus*, both of which were sensitive to flucloxacillin. Bilateral oedema of the lower legs was noted on examination (Figures 1 and 2).

Magnetic resonance imaging of the left lower leg revealed extensive thickening and induration of the subcutaneous adipose tissue in keeping with lymphoedema, with no evidence of abscess or fluid collection. The patient's cellulitis improved on intravenous antibiotics and he was discharged with a further 2 weeks of intravenous antibiotics in the ambulatory care unit. Lower limb lymphoedema persisted despite resolution of erythema and pain.

Dr Daniel L Ching is House Officer in the Department of Breast Surgery, Kingston Hospital, London, **Dr Austen Anderson** is Dermatology Registrar and **Professor Sujith P Kumarasinghe** is Consultant Dermatologist in the Department of Dermatology, Royal Perth Hospital, Perth 6000, WA

Correspondence to: Professor SP Kumarasinghe (prasadkumarasinghe@yahoo.com)

Lower limb lymphoedema-associated venous insufficiency is caused by increased capillary filtration arising from venous hypertension. Long-term venous insufficiency leads to swelling and localized skin changes. Swelling of the limb and obesity cause overlapping skin folds and stretching of the skin. The overlapping skin folds serve as sites for bacteria to colonize, and stretching skin results in microfissures compromising the function of the skin as a barrier to infection. Bacteria from external sources and skin commensals, combined with impaired wound healing as a result of comorbidities, result in chronic recurrent cellulitis. Most cases are caused by streptococcal infection but despite having knowledge of the causative organism, owing to the complex aetiology of the problem most infections tend to respond poorly to standard antibiotics. Some studies recommend the use of prophylactic antibiotics, but their effects are considered temporary as recurrences are common upon withdrawal (Vignes and Dupuy, 2006). Recurrent infections may lead to intraluminal obliteration of lymphatic vessels through lymphangitis and lymphangiothrombosis, further worsening the existing lymphoedema (Burns et al, 2004). Hence, infection is identified as a cause and consequence of lymphoedema.

Obesity is directly linked to diabetes, cardiovascular and respiratory diseases. Obesity-associated obstructive sleep apnoea can lead to bilateral lower limb lymphoedema (Blankfield et al, 2000). The presence of congestive heart failure increases fluid accumulation and worsens peripheral

oedema which exacerbates lower limb swelling (Levick, 2000). Poorly controlled diabetes has significant neurovascular complications leading to ulcers, poor wound healing, impaired sensation and deformed joints. Coexistence of lymphoedema and diabetes further compromises the viability of the lower limbs (Mcintosh and Green, 2009).

Conclusions

Most of the underlying causes of lower limb lymphoedema are not completely reversible, hence management primarily involves partial improvement, delaying progression and maximizing quality of life. The authors suggest the use of conservative measures through education and lifestyle modifications such as exercise, weight loss and dietary control, routine skin care, limb massaging, compression stockings, timely administration of antibiotics and control of associated comorbidities as important tools in preventing and minimizing adverse outcomes in these patients (Burns et al, 2004; London Lymphoedema Framework, 2006; Green, 2007). The literature assessing the relationship between the two conditions is sparse. This article raises awareness of the

significance of obesity-related lower limb lymphoedema. **BJHM**

- Blankfield RP, Hudgeal DW, Tapolyai AA, Zyzanski SJ (2000) Bilateral leg edema, obesity, pulmonary hypertension, and obstructive sleep apnea. *Arch Intern Med* **160**: 2357–62
- Burns T, Breathnach S, Cox N, Griffiths C (2004) *Rook's Text of Dermatology*. Blackwell Publishing, West Sussex
- Green T (2007) Leg ulcer management in patients with chronic oedema. *Wound Essentials* **2**: 46–58
- Greene AK, Grant FD, Slavin SA (2012) Lower-extremity lymphedema and elevated body-mass index. *N Engl J Med* **366**(22): 2136–7 (doi: 10.1056/NEJMc1201684)
- International Society of Lymphology (2013) The diagnosis and treatment of peripheral lymphedema: 2013 Consensus Document of the International Society of Lymphology. *Lymphology* **46**: 1–11
- Levick JR (2000) *An Introduction to Cardiovascular Physiology*. Arnold, London
- London Lymphoedema Framework (2006) *Best Practice For The Management Of Lymphoedema*. Medical Education Partnership Ltd, London
- Mcintosh C, Green T (2009) An overview of lower limb lymphoedema and diabetes. *J Lymphoedema* **4**(1): 49–58
- Moffatt CJ, Franks PJ, Doherty DC et al (2003) Lymphoedema: an underestimated health problem. *Q J Med* **96**: 731–8
- Vignes S, Dupuy A (2006) Recurrence of lymphoedema-associated cellulitis (erysipelas) under prophylactic antibiotherapy: a retrospective cohort study. *J Eur Acad Dermatol Venereol* **20**: 818–22

LEARNING POINTS

- Chronic lower limb lymphoedema and morbid obesity are both debilitating conditions that are commonly associated and can lead to significant complications, but their direct relationship is infrequently discussed.
- A mix of any or all of the causative factors can lead to a self-perpetuating vicious cycle of uncontrolled lower limb lymphoedema with long-term physical and psychological complications.
- Patients in this subgroup should be identified early to ensure multidisciplinary team input for treatment, including early referral to a dedicated lymphoedema specialist.

Forthcoming case reports

Anaplastic large cell lymphoma with axial skeletal lesions portends a poor prognosis

Cardiac failure associated with McCune-Albright syndrome

Amyloidosis presenting in the head and neck: a report of two cases

Sensory neuronopathy as a possible paraneoplastic neurological syndrome associated with pancreatic neoplasia

Timing of surgery following recent ischaemic stroke

Renal tubular acidosis type 1 leading to hypokalaemic periodic paralysis in autoimmune hypothyroidism

