Bilateral Lower Limb Lymphedema Secondary to Morbid Obesity: Barriers to Optimal Care and How to Overcome Them

BY
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Introduction

This paper addresses the need for increased awareness of bilateral lower limb lymphedema (BLLL) and the benefits of BLLL education for both patients and wound care practitioners.

To understand lymphedema, it is important to understand the lymphatic system. Lymphatic structures throughout the body run parallel to the venous and arterial systems. The circulatory system pumps blood around the body. In the capillaries, fluid, nutrients, by-products and oxygen pass from the blood to the tissues, while by-products of metabolism are exchanged from the tissues into the blood. Even when this exchange is working optimally, more fluid stays outside of the circulatory system than returns to the circulatory system. This means there is a net accumulation of fluids, proteins and wastes outside of the circulatory system, resulting in a small increase in fluid pressure. This elevated tissue pressure pushes fluids into the lymphatic vessels, which act as a collection system for this excess fluid to other wastes.

The lymphatic system contains heart-like structures called lymphangions, which pump fluid along the system. Lymphatic vessels have thin walls that rely on movement from the surrounding muscles to pump fluids along the lymphatic system to the thoracic duct and back into the circulatory system. A healthy lymphatic system will reabsorb up to eight litres of fluid per day, as well as 240 g of protein.[1]

As the forces that propel the lymphatic system are weak and lymphatic structures are quite delicate, the flow of lymphatic fluids can easily become obstructed. When sufficient fluids accumulate in superficial tissues, swelling is visible and palpable. This accumulation can lead to inflammation, which eventually causes the skin to become fibrotic and fragile. The protein-filled fluids may also leak from the skin and cause weeping.[2] When the body becomes overwhelmed with adipose tissue, it can press against the fine structures of the lymphatic system, thus occluding fluid movement and decreasing tissue oxygenation, exacerbating the stagnation of fluids managed by the lymphatic system.

The causes of lymphedema vary greatly. First, some patients develop lymphedema secondary to surgery. For example, breast cancer surgery and other related therapies sometimes damage the lymphatic system, causing unilateral arm edema on the affected side. Second, some patients develop lymphedema from parasitic infection; this is mostly seen in endemic regions. Third, lymphedema can be congenital. In this case, it often presents in childhood or during the teenage years. Fourth, BLLL is secondary to morbid obesity and is assumed to be increasing in prevalence

as obesity rates around the world rise. These increased obesity rates have been attributed to factors such as decreased activity and an abundance of inexpensive, calorie-dense food.

Regardless of the cause, early diagnosis and treatment are crucial for the prevention of late-stage disease (Table 1).[3,4] Education brings the hope of earlier diagnosis and treatment of patients. This is paramount, as late-stage lymphedema can be very difficult to manage and has a profound negative impact on patient well-being.

TABLE 1

The International Society of Lymphology Staging for Lymphedema[4]

Stage	Description
Stage 1	Mild pitting edema, at which point lymphedema is reversible
Stage 2	Pitting is often absent and fibrotic changes are noticeable
Stage 3	Characterized by elephantiasis

The Need for Education

Helping patients with BLLL due to morbid obesity is a challenge that must be addressed by wound care practitioners. BLLL patients often have complicated histories and complex problems. The link between obesity and BLLL has not been well described in the literature. Some theories postulate that the sheer volume of fluid found in the morbidly obese state overwhelms the lymphatic system, causing increased fluid volumes in tissues.[4] Both the low overall activity that is common in morbidly obese patients and gait changes that decrease the efficacy of the calf muscle pump cause fluids to stagnate in extracellular tissues, leading to a chronic inflammatory state and fibrosis.[3] It is also assumed that morbid obesity itself may cause an inflammatory state that damages the delicate lymphatic system.[5]

Patients with BLLL can present to the wound care practitioner with either a history of varied treatments or a complete lack of treatment. Some patients will have been told that nothing can be done to help them. Others may have been told that surgery is an option; however, simple debulking surgeries may injure or remove the delicate lymphatic vessels remaining in the patient's tissues.[6] Some patients may be taking diuretics to treat their lymphedema. Unfortunately, diuretics may exacerbate the negative symptoms of lymphedema by increasing the osmolarity of the lymph fluid. Indeed, diuretics can draw excessive lymph fluid away, leaving behind proteins that then become concentrated. The concentration of these osmotically active molecules only serves to draw more fluid out of the circulatory system to equilibrate pressures in the tissues, thus perpetuating the problem.[6] Many patients are not aware that morbid obesity can cause lymphedema and that weight reduction may improve their symptoms.

Patients suffering from BLLL are particularly difficult to treat due to the complexity of their medical conditions. Morbidly obese patients often present with comorbidities such as type 2 diabetes, hypertension, hyperlipidemia, coronary artery disease and osteoarthritis. Social factors related to morbid obesity, such as higher rates of depression, lower income and decreased mobility,[3,7] can also complicate treatment.

With the dramatic increase in morbid obesity in Canada and around the world,[7] it is highly likely that the wound care community will see many more cases of BLLL. It is therefore now more important than ever that the wound care community understands BLLL.

Barriers to Optimal Care

Ideal wound care for these patients should focus on shifting fluid from the limbs. The cornerstone of treatment, as described by the European Wound Management Association and the National Lymphedema Network (Table 2), is multilayer compression bandages, with an intensive initial course of manual lymph drainage by a qualified therapist. Maintaining excellent skin hygiene and exercise therapy are also important to prevent further deterioration.

The treatment regimen suggested in Table 2 is comprehensive and requires a great deal of patient "buy-in" to be successful. Treatment regimens can also be difficult to follow if patients do not fully understand their benefits. These regimens require patients to devote a great deal of time to their condition. Home visits by nurses usually occur three times a week for bandage application, and patients must also visit other healthcare professionals. Bandages can be itchy and uncomfortable and frequent trips to see therapists can be taxing and expensive. In addition, finding manual drainage help for patients with BLLL can be difficult and the costs are often prohibitive. A great deal of patient education is needed in order to achieve patient buy-in to such a laborious treatment plan.[8]

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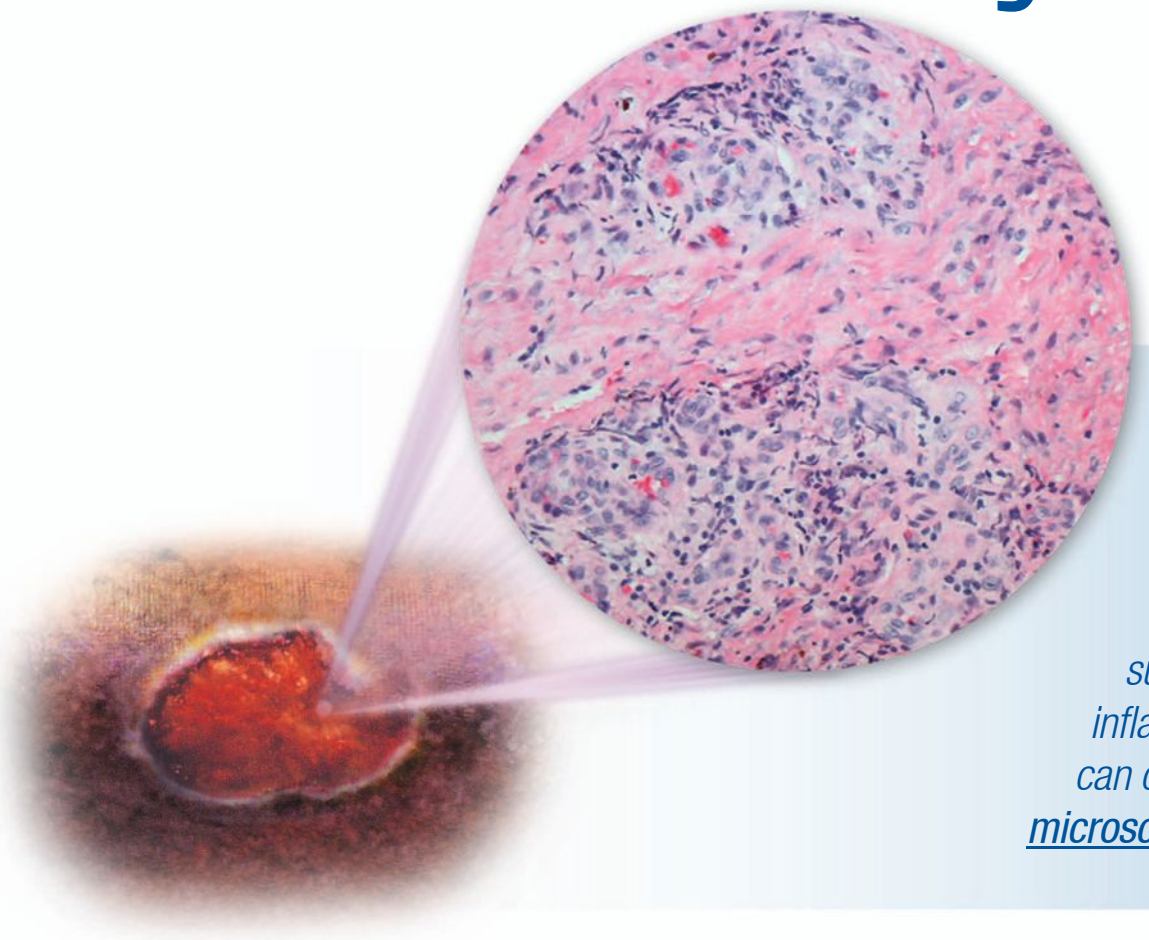

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INDICATIONS: Santyl® (collagenase) is a sterile ointment indicated for the debridement of dermal ulcers or severely burned areas.

CONTRAINDICATIONS: Application is contraindicated in patients who have shown local or systemic hypersensitivity to collagenase.

WARNINGS: Debilitated patients should be closely monitored for systemic bacterial infections because of the theoretical possibility that debriding enzymes may increase the risk of bacteremia.

PRECAUTIONS: The enzyme's optimal pH range is 6 to 8. Significantly lower pH conditions have a definitive adverse effect on the enzyme's activity, and appropriate precautions should be carefully taken. The enzymatic activity is also adversely effected by detergents, hexachlorophene and heavy metal ions such as mercury and silver that are used in some antiseptics and by cobalt, magnesium and manganese. When it is suspected such materials have been used, the site should be carefully cleansed by repeated washings with normal saline before Santyl® (collagenase) ointment is applied. Soaks containing metal ions or acidic solutions such as Burrow's solution should be avoided because of the metal ion and low pH. Cleansing materials such as hydrogen peroxide or Dakin's solution followed by sterile normal saline do not interfere with the activity of the enzyme. The ointment should be confined to the area of the lesion in order to avoid the possible risk of irritation or maceration of normal skin; however, the enzyme does not damage newly forming granular tissue. A slight erythema has been noted occasionally in the surrounding tissue particularly when the enzyme ointment was not confined to the lesion. This can be readily controlled by protecting the healthy skin with a material such as zinc oxide paste. Since the enzyme is a protein, sensitization may develop with prolonged use.

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SYMPTOMS AND TREATMENT OF OVERDOSE: Symptoms: To date, the irritation, maceration or erythema reported on prolonged contact of normal skin with Santyl® (collagenase) ointment consititute the only symptoms of overdosage reported. **Treatment:** Santyl® (collagenase) ointment can be rendered inert by the application of Burow's solution USP (pH 3.6 - 4.4) to the treatment site. If this should be necessary, reapplication should be made only with caution.

DOSAGE AND ADMINISTRATION: For external use only. Santyl® (collagenase) ointment should be applied once daily, or more frequently if the dressing becomes soiled (as from incontinence) in the following manner: **(1)** Prior to application the lesions should be gently cleansed with a gauze pad saturated with sterile normal saline, to remove any film and digested material. If a stronger cleansing solution is required, hydrogen peroxide or Dakin's solution may be used, followed by sterile normal saline. **(2)** Whenever infection is present, as evidenced by positive cultures, pus, inflammation or odor, it is desirable to use an appropriate antibacterial agent. Should the infection not respond, therapy with Santyl® (collagenase) ointment should be discontinued until remission of the infection. **(3)** Santyl® (collagenase) ointment should be applied (using a tongue depressor or spatula) directly to deep wounds, or when dealing with shallow wounds, to a non-adherent dressing or film dressing which is then applied to the wound. The wound is covered with an appropriate dressing such as a sterile gauze pad and properly secured. **(4)** Use of an occlusive or semi-occlusive dressing may promote softening of eschar, if present. Alternatively, crosshatching thick eschar with a #11 blade is helpful in speeding up debridement then cleanse with sterile saline. It is also desirable to remove as much loosened detritus as can be done readily with forceps and scissors. **(5)** All excess ointment should be removed each time the dressing is changed. **(6)** Use of Santyl® (collagenase) ointment should be terminated when debridement of necrotic tissue is complete and granulation is well under way.

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Some barriers to optimal treatment for patients suffering from BLLL can be attributed to clinicians. Lymphedema can often run its course undiagnosed, particularly in North America where there is low awareness of the condition. This lack of awareness can be attributed to a number of interrelated factors. For example, many family physicians do not receive extensive training on the diagnosis and treatment of lymphedema. Some healthcare professionals believe there is no benefit to treating BLLL, as negative sequelae seem unavoidable. Moreover, some healthcare professionals believe that treating BLLL is an exercise in futility because morbidly obese people rarely lose weight in a healthy way or achieve long-term weight loss.[9] In

TABLE 2

Treatment suggestions from the European Wound Management Association (EWMA) and the National Lymphedema Network (NLN)

Recommendations for the treatment of lower limb lymphedema	EWMA	NLN
Identify and treat the cause		
1. Assess the type and severity of lymphedema, as well as social and psychological factors that influence treatment	X	
2. Assess ability to tolerate compression therapy:		
Patients with a reduced ABPI (0.5–0.8) should not receive compression >25 mmHg	X	
Untreated cardiac failure or hypertension	X	
Acute infection with local or systemic symptoms	X	
Untreated deep venous thrombosis	X	
Untreated genital edema	X	
3. Discontinue use of diuretics as they may be harmful		X
4. Initiate complete decongestive therapy:		
Manual lymph drainage	X	X
Multilayer, short-stretch compression bandaging applied daily if appropriate, or hosiery and bandaging	X	X
Remedial exercises	X	X
5. Consider adjunctive therapies:		
Surgical treatment of lymphedema (debulking, liposuction, lymphatic reconstruction)		X
Pressotherapy	X	X
Benzopyrones		X
Daflon 500		X
American horse chestnut seed extract		X
Bromalain 5		X
6. Once intensive treatment is complete, develop a maintenance plan including bandaging and hosiery	X	X
Address patient-centered concerns		
7. Provide patient education in lymphedema self-management	X	X
Provide local wound care		
8. Provide a skin care and hygiene regime	X	X
9. Choose appropriate dressings that account for exudates, pain and allergy issues	X	X
Provide organizational support		
10. Gain access to a specialist practitioner to provide advice on how to modify treatments to suit individual patients	X	

ABPI = ankle–brachial pressure index

TABLE 3

Treatment Strategies and Barriers to Implementation

Recommendation	Barriers to implementation	Strategies for implementation
Skin care	Decreased mobility Heavy skin folds Heavy limbs	Include during regular nursing visits Two caregivers needed?
Exercise	Heavy limbs Shortness of breath Decreased stamina Cardiac disease No desire to be active	Encourage group activities where social supports can be developed Try different activities to find one that the patient enjoys Consult an occupational therapist/physiotherapist
Multilayer compression >45 mmHg	Assistance required Discomfort Low self-esteem Reminder of illness	Include during regular nursing visits
Manual lymph drainage	Cost Significant time commitment Lack of trained practitioners	The price is sometimes negotiable Therapy should be delivered at the most convenient location
Weight loss	Difficulty of changing a set lifestyle Insufficient support Cost	Group support Psychological support Consultation with a dietitian Consider a program that includes cognitive behavioural therapy
Patient education	Requires a dedicated healthcare professional Requires a motivated patient	Conduct engaging and ongoing education

addition, healthcare professionals may be reluctant to discuss weight issues with patients as this can be embarrassing for both parties.[9]

Other barriers to optimal care for people with BLLL can be attributed to the patients themselves. Many morbidly obese people are embarrassed by their weight, isolating themselves and retreating from the healthcare community.[10] Others are forced into isolation due to pain, fatigue and limited mobility. Still others are unable or unwilling to change their eating patterns, which are often heavily dictated by complex emotional and social issues. Indeed, many patients suffering from BLLL are unable or unwilling to follow demanding treatment regimens.

Because both clinicians and patients neglect BLLL, there is a desperate need for attention, research and education into lymphedema and its management.

The Obesity Challenge

The need for research and education into BLLL is partially caused by the difficulty of treating the disease. Morbid obesity, the main cause of BLLL, is very challenging to address. Obesity can be caused by many factors, including lifestyle and environment issues, genetics, metabolism, eating disorders and medical conditions such as hypothyroidism.[7] The basic formula for weight loss is to expend more calories than are consumed. Losing weight is a slow and uncomfortable process for people who are marginally overweight and is significantly more difficult for those who are morbidly obese.

A great deal of behaviour modification is required in order to achieve and maintain weight loss. Most morbidly obese people attempt calorie-restriction regimens; however, they often revert to past behaviours. Since weight loss slows the metabolic process, morbidly obese people regain weight very rapidly when they abandon such regimens. This weight gain can be so discouraging that patients will abandon future attempts at weight loss.

Healthcare professionals can provide much-needed support in these cases: cognitive behavioural therapy

has been shown to help long-term weight loss by addressing many of the lifestyle and behaviour issues that contribute to weight gain.[11] Using this approach, healthcare professionals can help patients identify their desires, adopt healthy behaviours and modify unhealthy thought and behaviour patterns. However, clinicians should never underestimate the challenges of embracing and adapting these behaviours.

Education is the Solution

It is evident that patients with chronic diseases benefit from education. Patient education often leads to increased adherence to treatment regimens and better patient outcomes. Education also enables patients to optimize the available treatment options. Positive outcomes for patient education programs include an increased sense of coherence, improved health-related quality of life and decreased disability, symptoms and mortality.[10]

Patient education should be patient-driven. Adult learning is motivated by internal drive and is concerned with problem-centred (rather than subject-centred) approaches.[12] Patients require encouragement and structure to attain their goals. Providing positive feedback is important when helping patients adopt healthier behaviours. However, empty praise should be avoided as it can be construed as condescending and can decrease self-efficacy. Feedback should begin on a positive note and negative feedback should be followed by more positive feedback. This approach prevents patients from becoming defensive at the beginning of the evaluation and leaves them with positive feelings.

Conclusion

The treatment of BLLL is challenging, particularly in patients with morbid obesity (Table 3). Education is the wound care provider's best weapon. Through education, patients become active participants in their treatment and gain a sense of control over their regimen. Education also provides patients with a sense of confidence when facing daily challenges.

Although patients suffering from BLLL are responsible for adhering to their treatment regimen, the wound care community is responsible for providing the necessary tools to help patients make the right choices. Addressing the needs of these patients can be a great challenge for healthcare professionals. However, it is the role of the wound care community to rise to this challenge and create the awareness necessary to promote positive outcomes for patients with BLLL.

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