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Bernadine Cruz
Otterbein University, bernadine.cruz@otterbein.edu

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Lymphedema: Pathophysiology, Diagnosis & Management
Bernadine Cruz, RN, BSN
Otterbein University, Westerville, Ohio

Introduction

Lymphedema is a disfiguring and disabling condition that is progressive, increasing swelling which occurs as a result of the accumulation of protein-rich fluid in interstitial spaces. Those individuals who are affected suffer from either primary lymphedema or secondary lymphedema; the pathophysiology of both conditions is similar. Lymphedema can be a chronic, lifelong condition that leads to a loss of function which can eventually lead to truncation of the limb. An increase in the incidence of lymphedema has also been observed with increases in levels of obesity.

Lymphatic System Pathophysiology

The lymphatic system is a closed network of lymph nodes and lymphatic vessels which function in concert with the immune and circulatory systems to facilitate the body's defense of excess amounts of interstitial fluid and other substances such as proteins and blood cells (National Lymphatic Network [NLN], 2011). Facilitated by valves, lymph drains from interstitial spaces towards the heart, along an intricate network of lymph nodes and vessels to drain the capillary beds and return fluid to the blood. When blood circulates from the heart out to the body, plasma containing proteins, water and waste products can collect in the interstitial spaces from which the lymph system filters the fluid and returns it to the circulation (Nazarko, 2009). An intact lymphatic system can effectively return the lymph fluid to the bloodstream via the mechanisms described earlier; however, any loss of integrity in the lymphatic system can result in lymphedema as well as any severe skin trauma resulting from complete removal (Ridner, 2013). Congenital abnormalities of the lymphatic nodes themselves, either from fibrosis from chemotherapy or radiation treatments or burns or other skin infections (NLN, 2011). With failure of any of the processes which occurs as a result of the accumulation of interstitial tissue spaces. (Fu, Ridner, & Armer, 2009).

Thrombosis: Signs

Inability to pinch a fold of skin at the root of the second finger is usually a sign that further lymphedema is developing. A person with lymphedema may complain of swelling or pain in the extremity, particularly during or after exercise. The following treatment modalities have been found to be effective in reducing lymphedema: (Berner, 2013; NLN, 2011; Narzarko, 2009).

1. Complete Decongestive Therapy – the comprehensive plan of treatment for lymphedema utilizing a combination of exercise, manual lymph drainage, compression garments, education, and support groups.
2. Exercise: A range of exercise options are used to help the lymphatic system move lymph fluid through the lymphatic vessels. The lymph fluid carries immune cells, nutrients, waste products, and lymph nodes.
3. Pharmacological therapy: A combination of oral medication amount of pressure measured in millimeters of mercury. These garments can be customized or ready-made.
4. Weight loss: The risk of lymphedema increases with obesity, weight loss is an integral part of therapy for obese persons with lymphedema.
5. Intermittent Pneumatic Compression - sequential pressure treatments with multiple chambers should be used.
6. Surgical procedures - used for drainage, lymph node or tissue transfers but they are not curative. Pharmacological therapies should be considered on a case by case basis based on co-morbidities.
7. Nursing Interventions

After a valid diagnosis of lymphedema has been established, patient education and teaching play a pivotal role in the success of any treatment modality. Patients must be taught the importance of good hygiene, but teaching about consistency and frequency of therapy must also be provided. In addition, patients who are able to perform manual lymphatic drainage, and application of compression bandages. For those who are unable to perform such interventions, adequate arrangements must be made with either in-home service or out patient service.

Conclusion

Lymphedema can have detrimental effects on the physical and emotional states of its sufferers. In addition, lymphedema has a significant negative impact on a patient’s functional ability and quality of life. Multidisciplinary attention must be given to self-care in an attempt to compensate for the sometimes devastating effects of the disease. Although lymphedema is characterized as an incurable health alteration, with effective management, existing treatment modalities are usually prevents symptoms of lymphedema from varying degrees and most patients who suffer from lymphedema receive excellent outcomes.

References Cited

King, B. (2006). Diagnosis and treatment of lymphedema. Nursing Times, 102(11), 47-51
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Additional Sources

Hardy, J. (2012). Reducing the risk of lymphedema. Primary Health Care 22(6), 5-11

Diagnosis

As with any health alteration, a thorough history and physical examination is a critical first step to diagnosis of any patient presenting with complaints of chronic swelling – duration, onset, aggravating and relieving factors, medications, and injuries are factors which should be all assessed. (Berner, 2013; NLN, 2011). Other diagnostic methodologies include (NLN, 2011):
1. Soft tissue imaging using MRI, CT, and ultrasound to determine whether there is evidence of tissue swelling.
2. Lymph vessel imaging – lymphangiography to detect any abnormalities of the lymphatic system.
3. Measuring limb volume to detect enlargement of any limb. Measurement is performed using a water displacement, ultrasonic Doppler, or magnetic resonance imaging.
5. Physical examination to investigate any progressive changes in skin texture and changes in skin folds.
6. Genetic testing for those diagnosed with primary lymphedema

Clinical Presentation

In its early stages, lymphedema cannot easily be distinguished from edema. A patient’s initial presentation is usually dismissed as simple swelling or edema until elevation of the extremity, or diuretic therapy prove to be inadequate measures, and do not resolve the swelling. During the beginning stages, pitting is apparent, the skin is soft, and limb volume is increasing. As the disease progresses, pitting is no longer evident, the skin becomes hard, and elevation does not relieve the swelling (King, 2006). Lymphedema can be a restricting condition which can result in the patient developing open, weeping blisters, usually on the affected lower extremities (Figure 2).

Figure 2. Lymphedema with hyperkeratosis (digital image). Retrieved from http://www.vascularconsultancy.com/blog/2010/nov/the

Treatment

Lymphedema does not resolve spontaneously and management of the condition requires continuous treatment. The following treatment modalities have been found to be effective in reducing lymphedema: (Berner, 2013; NLN, 2011; Narzarko, 2009).

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Figure 1. Lymphedema: Pathophysiology, Diagnosis & Management

Figure 1. Normal vs. Lymphedema-associated vasculature. Retrieved from http://jcb.rupress.org/content/193/4/607/F3.expansion.html

Figure 2. Lymphedema with hyperkeratosis (digital image). Retrieved from http://www.vascularconsultancy.com/blog/2010/nov/the

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