Lymphedema and Implications for Oncology Nursing Practice

Joyce Marrs, MS, APRN-BC, AOCNP

Lymphedema (LE) is described as chronic swelling caused by impairment in lymphatic system drainage. The cause of LE is either primary or secondary (Holcomb, 2006). The experience can be disturbing. Patients and healthcare providers often overlook the initial presentation because of subtle changes. With a basic understanding of LE, oncology nurses can monitor for the presence, educate about preventive measures, and assist in treatment of LE.

Primary LE affects one to two million people in the United States (Holcomb, 2006). Causes of primary LE include the following (Holcomb; Story, 2005; Williams, Franks, & Moffatt, 2005).
- Congenital LE presents at birth.
- LE praecox, which accounts for 65%–80% of primary cases, can present from birth through 35 years of age.
- LE tarda develops after age 35 and is the rarest primary form.
- Gender is a factor; women are affected more than men.
- The lower extremities are affected more often than upper extremities.
- LE generally is bilateral.

Secondary LE affects two to three million people in the United States (Holcomb, 2006). Causes of secondary LE include the following (Holcomb, 2006; Story, 2005; Williams et al., 2005).
- Alteration in the lymphatic system
- Trauma, such as burns
- Surgery that dissect or removes lymph nodes
- Radiation therapy
- Infection
- Tumor growth or metastasis to lymph nodes
- Scarring
- Chronic disease such as cerebrovascular accident, rheumatoid arthritis, and spina bifida
- Filariasis—a parasitic infection

Pathophysiology

The lymphatic system is present throughout the body, and its purpose is to remove waste, and foreign material by-products produced when clearing the body of infection and disease (Holcomb, 2006). Fluid in the lymphatic system is composed of protein, water, fats, and cellular waste. The fluid is transported through the lymph vessels to the lymph nodes and empties into the blood vessels. The lymph vessels are thin, allowing larger proteins to filter through easily. When an obstruction develops in the flow of lymphatic fluid, the large proteins filter through the vessels and invade the interstitial tissue, which causes an accumulation of a highly concentrated, protein-filled fluid in an area distal to the blockage. The fluid in the interstitial space causes inflammation that results in skin changes and fibrosis.

Signs and Symptoms

With secondary LE, presentation is either acute or chronic. Acute LE is associated with surgery, radiation, insect bite, or minor trauma (Dell & Doll, 2006; Holcomb, 2006). Generally, acute LE lasts no longer than three months and develops no later than two years after surgery or causative incident. See Figure 1 for LE risk factors and Figure 2 for upper- and lower-extremity prevalence.

Patients with suspected LE may complain of heaviness, aching, weakness,
Upper-Extremity Lymphedema
- Occurs in 15%–28% of breast cancer survivors
- Occurs in 5%–10% of patients who have undergone radical mastectomy
- Most common in patients having axillary lymph node dissection
- Can occur 1–20 years postsurgery

Lower-Extremity Lymphedema
- Commonly misdiagnosed as edema
- Seen in as many as 80% of patients with a history of lymph node dissection of the groin
- Occurs in patients who have compression of pelvic or inguinal lymph nodes

Figure 2. Prevalence of Lymphedema
Note. Based on information from Story, 2005.

Assessment
Nursing assessment should include inspection of the affected limb for color, warmth, texture, and presence of any scars, injuries, wounds, or skin changes. Verify whether swelling is relieved with elevation. The extremity should be measured on a regular basis, comparing the affected limb to the unaffected limb, with results documented in the patient record (Dell & Doll, 2006; Holcomb, 2006; Story, 2005). Measurements of the upper extremity should be done 5 cm and 10 cm above and below the olecranon process (see Figure 3), for a total of four measurements per extremity. The lower extremity should be measured at calf level (Story). See Table 1 for classification of LE stages.

Diagnosis of LE may be made on patient history and a physical examination; however, further testing may be conducted to eliminate other possible causes. Testing that may be performed includes the following (Holcomb, 2006; Petropoulos, 2005).
- Lymphangiography may be used if surgery is being considered.
- The lymph fluid should be evaluated for protein content. From 1–5.5 g/dl indicates LE and from 0.1–0.9 g/dl indicates venous or cardiac edema.
- A venous Doppler ultrasound can be used to check for thrombus formation.
- Laboratory tests may include liver functions, albumin level, kidney function, or urine analysis.

Treatment
Nonpharmacologic interventions useful in the control of LE include the following (Dell & Doll, 2006; Holcomb, 2006; Petropoulos, 2005; Story, 2005).
- Elevate the extremity.
- Complete decongestive therapy, including manual lymph drainage, compression bandaging, and remedial exercises, can be used.
  - Compression bandaging should consist of a pressure application from 50–60 mmHg to the extremity versus 30–40 mmHg for venous disorders.
  - Manual lymph drainage (MLD) is indicated for stage II LE without skin infection or open wounds (Regnard, Allport, & Stephenson, 1997; Smith & Zobec, 2001).
  - MLD is contraindicated in patients with thrombosis or cardiac dysfunction.
- Remedial exercises are completed with the compression bandage in place and under the guidance of a certified therapist (Quan & Petrek, 2004).
- Skin and nail care should be performed daily to reduce infections as a result of fungal or bacterial growth. Apply moisturizer regularly.
- Lymphatic drainage pumps that use gradient pressure or intermittent compression are options; however, if at all possible, MLD is preferred over the use of a mechanical pump (Smith & Zobec, 2001).

Pharmacologic interventions for LE are limited to specific circumstances, which include the following.
- Treat the underlying cause of LE, such as lymphoma, breast cancer, prostate cancer, or filariasis (Petropoulos, 2005).
- Because of the underlying pathophysiology causing LE, diuretics are beneficial only on a short-term basis (Smith & Zobec, 2001). Diuretics remove excess water while proteins remain in the interstitial tissue. Once the diuretic is stopped, the water then will be drawn back into the tissue by the osmotic pressure gradient from concentrated proteins (Holcomb, 2006). Recommended diuretics include the following.
  - Furosemide 40–80 mg daily (Petropoulos, 2005)
  - Hydrochlorothiazide 25 mg daily

Figure 3. Circumferential Measurement
Table 1. Stages of Lymphedema

<table>
<thead>
<tr>
<th>GRADE</th>
<th>DESCRIPTION</th>
<th>MEASUREMENT</th>
</tr>
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<tbody>
<tr>
<td>Stage 0</td>
<td>Patients have no obvious signs or symptoms. Impaired lymph drainage is subclinical. Lymphedema (LE) may be present for months to years before progressing to later stages.</td>
<td>Edema is not evident. Clinical detection of edema does not occur until the normal interstitial volume increases by 30% or more.</td>
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<tr>
<td>Stage I</td>
<td>Swelling is present. An affected area pits with pressure. Elevation relieves swelling. Skin texture is smooth. LE is spontaneously reversible.</td>
<td>&lt; 3 cm difference between extremities</td>
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<tr>
<td>Stage II</td>
<td>Skin tissue is firmer. Skin may look tight and shiny. Pitting may or may not occur. Elevation does not completely alleviate the swelling. Hair loss or nail changes may be experienced in an affected extremity. LE is spontaneously irreversible. Assistance will be needed to reduce edema.</td>
<td>3–5 cm difference between extremities</td>
</tr>
<tr>
<td>Stage III</td>
<td>LE has progressed to the elephantiasis stage. An affected area is nonpitting with a permanent edema. Skin is firm and thick. Hyperkeratosis, fat deposits, and acanthosis are present. Skin folds develop. Patients may be at risk for cellulitis, infections, or ulcerations. An affected area may ooze fluid. LE is irreversible. Elevation will not alleviate symptoms.</td>
<td>≥ 5 cm difference between extremities</td>
</tr>
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Note: Based on information from Dell & Doll, 2006; Holcomb, 2006; Quan & Petrek, 2004; Story, 2005.

- Early treatment of possible cellulitis is indicated (Story, 2005).
  - Penicillin VK 250 mg should be administered four times a day for 10 days, or erythromycin 250 mg can be given four times a day to patients allergic to penicillin (Petropoulos, 2005).
  - Clotrimazole 1% cream should be applied daily between the toes and dried fissures to prevent fungal infections.
  - Pain control measures should be instituted (Smith & Zobec, 2001).

Patient Education

Patients should be instructed to do the following (Dell & Doll, 2006; Holcomb, 2006; Story, 2005).
- Maintain lifelong preventive measures.
- Avoid injury to an affected extremity.
- Ensure that all blood pressure measurements, blood draws, or IV insertions are done in an unaffected extremity.
- Avoid tight clothing, jewelry, or elastic bands on an affected extremity.
- Report any signs of redness, warmth, pain, or swelling in an affected extremity.
- Wear a LE sleeve when traveling by plane.
- Avoid carrying a purse or briefcase on an affected arm.
- If LE is in lower extremities, avoid standing or sitting for long periods and do not cross the legs.

- Use an electric razor to shave an affected extremity or underarm.
- Avoid using sharp objects such as knives, needles, or scissors on an affected side.
- Keep nails clean and short. Avoid cutting the skin when trimming nails.
- Maintain regular exercise and proper weight.
- Use compression bandages, stockings, or devices as instructed by a healthcare provider.

Patient Resources

LE information for patients is available on the National Lymphedema Network’s Web site at www.lymphnet.org or by calling its hotline at 800-541-3259.

Conclusion

Although LE is a lifelong complication of cancer and cancer therapy, the problem can be prevented. With early detection and treatment, LE can be minimized or reversed. Quality oncology nursing care makes a tremendous impact on patient outcomes. Armed with a basic knowledge of LE, nurses can be proactive in patient education, monitor for the presence of LE, and quickly intervene to minimize the extent of LE.

Author Contact: Joyce Marrs, MS, APRN-BC, AOCNP, can be reached at joycemrn@sbcglobal.net, with copy to editor at CJONEditor@ons.org.

References