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A Clinically Useful Method for Evaluating Lymphedema

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Lymphedema can be an unfortunate side effect of cancer treatment. It is a chronic condition that, if ignored, can lead to disfigurement, immobilization, and severe infections. Several methods for assessing lymphedema are used in clinical practice, and some of these methods are reported in the literature. Although these methods can be useful and provide meaningful data, they also can be time consuming, complicated, expensive, or difficult to communicate to patients or other healthcare providers. The comparative circumferential measurement method (CCMM) is easy to perform, requires only a tape measure and a calculator, and allows for use of the contralateral limb as a control. Results can be calculated immediately so that patients can be given prompt feedback. In clinical settings, CCMM is a simple, efficient, and meaningful technique for assessing lymphedema.

Key Words: breast neoplasms, lymphedema

Lymphedema is one of the late effects of cancer therapy that has been understudied. The condition almost always is permanent and often is progressive if left untreated. Lymphedema is defined as "an abnormal accumulation of lymph fluid in the tissues of an extremity or other body part" (Kelly, 2002, p. 29). Lymph fluid collects in the tissue when the lymphatic system is unable to transport the fluid sufficiently. Primary or hereditary lymphedema is a developmental disorder of the lymphatic system that generally shows an autosomal dominant pattern of inheritance with reduced penetrance, variable expression, and variable age at onset (Ferrell et al., 1998). Secondary lymphedema develops when trauma has occurred in an otherwise normal, intact lymphatic system. Such traumas include surgery to remove lymph nodes, radiation therapy, tumor, infection, and filariasis (a disease, caused by worms, that occurs in people living in the tropics) (Clodius, 2001). Primary and secondary lymphedemas are chronic conditions that, if not treated, can worsen over time and become disfiguring and immobilizing as well as lead to skin changes that can result in wounds and infections.

One population of patients with cancer who are vulnerable to the development of lymphedema is women with breast cancer. Approximately 3%–19% of patients with cancer experience lymphedema, and its incidence and extent depend on the type of surgery (e.g., breast conserving versus more extensive), extent of lymph node dissection, and use of additional therapy to the area (e.g., nodal irradiation) (Coen, Taghian, Kachnic, Assaad, & Powell, 2003; Meric et al., 2002; Sener et al., 2001; Swirsky & Nannery, 1998; Tengrup, Tennvall-Nittby, Christiansson, & Laurin, 2000).

An estimated 211,300 women developed breast cancer in 2003 (American Cancer Society, 2003). The large number of women diagnosed with breast cancer, along with the activism of breast cancer survivors, has resulted in a growing awareness of the importance of treating lymphedema. As a result, appropriate treatment is becoming available more readily as more healthcare providers are obtaining specialty training in the assessment and treatment of lymphedema. Growing awareness also has resulted in the realization of the tremendous benefits that early diagnosis and intervention can provide. Some healthcare providers have suggested measuring both arms of women newly diagnosed with breast cancer so that measurements can be compared during and following the treatment course and any lymphedema that occurs can be diagnosed early (Coward, 1999).

Current Assessment Methods

Currently, several methods are used to assess the extent of lymphedema in an extremity. The traditional technique is water displacement, whereby the affected extremity is submerged in a tank of water and the water displaced is measured to determine the volume of the limb. This process is repeated for every reassessment to ascertain results of treatment. The water displacement method has demonstrated inter-rater reliability (Kelly, 2002).

Taking circumferential measurements, another method for measuring lymphedema, is popular in the clinical setting because of its ease of use. Circumferential measurements are taken at given points along the limb, and the same points are measured at each reassessment. The circumferential measurements usually are recorded in a table format (see Table 1).

Another method used to assess the extent of lymphedema is the calculation of the volume using the formula for a truncated cone. Circumferential measurements are taken at specified points along the limb, usually at

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