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Prevention and Treatment of Lymphedema Related to Breast Cancer

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[Authors and Disclosures](#)

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Lymphedema is an abnormal accumulation of protein-rich fluid in an extremity due to a low volume mechanical insufficiency of the lymphatic system. Breast cancer treatment-related lymphedema is caused by disruption of the axillary bed by excision of lymph nodes and/or radiation therapy (RT) to the area. Patients undergoing these procedures are at a lifetime risk of developing edema not only in the upper extremity, but also in the ipsilateral upper quadrant and remaining breast tissue.^[1]

The onset of lymphedema may occur at the time of treatment or may be delayed several decades.^[2] The frequency of upper extremity lymphedema after an axillary lymph node dissection (ALND) and/or RT ranges from 6.0% to 33.5%.^[3-11] Lymphedema of the breast after ALND and RT is reported to be 9.6%.^[9] The occurrence of lymphedema after a sentinel lymph node biopsy (SLNB) is 2.6% to 3.0%.^[7,12] When SLNB is performed, tumor location in the upper outer quadrant has been identified as a risk factor for lymphedema.^[12]

There are two commonly used classification systems for lymphedema. The American Physical Therapy Association (APTA) uses the maximum girth difference between the involved and uninvolved limb to identify the degree of lymphedema. A maximum girth difference less than 3 cm is rated as mild lymphedema; 3 to 5 cm differential is considered moderate; and 5-plus cm differential is considered severe.^[13] The International Society of Lymphology also has devised criteria to grade the degree of lymphedema.^[14] Stage I is referred to as "Reversible Lymphedema." In this stage, the edematous limb will be soft to palpation and will present with pitting edema. This stage is named for the temporary resolution of edema after prolonged elevation. Stage II is "Spontaneously Irreversible Lymphedema." The edematous limb is much firmer to palpation due to increased fibrosis and soft tissue scarring. There is some temporary reduction of edema with prolonged elevation, but not complete resolution. Stage III is "Lymphostatic Elephantiasis," which is characterized by gross enlargement of the limb. There is hardening and thickening of the dermal tissues with the formation of polyps on the skin. Swelling is not reduced with prolonged elevation of the limb.

Prevention of Lymphedema

The management of lymphedema should always begin with preoperative evaluation and education. This should include recording baseline girth and volume measurements of bilateral upper extremities, educating the patient about arm/hand care guidelines, and noting any factors that may put the patient at an additional risk for the development of lymphedema.

Having baseline measurements of girth and volume facilitates earlier detection and treatment of lymphedema. There is currently no gold standard for the definition of lymphedema. Proposed definitions include: (a) a 200 mL limb volume difference; (b) 10% difference in limb volume; and (c) 2.0 cm circumferential difference, but these are not equivalent.^[15] It is thus important that healthcare practitioners be aware of signs and symptoms that may be precursors to the clinical diagnosis of lymphedema.

A prospective cohort study tested the predictive and discriminatory validity of using the patient's symptoms related to limb volume change to determine the presence of clinically measurable lymphedema.^[16] The importance of using self-reported symptoms lies in their ability to detect lymphedema at an earlier stage of development. The 2 symptoms that were predictive of a maximal limb difference of 2 cm or more were "heaviness in the past year" and "swelling now."^[16] The findings of this study suggest that a combination of

symptom assessment and limb volume measurements may provide the best clinical assessment data for identifying changes associated with breast cancer-related lymphedema.

Arm Care Guidelines

The patient should be instructed about arm care guidelines to decrease the risk of developing lymphedema. Risk reduction practices include skin care, modification of activity and lifestyle, avoiding limb constriction, using compression garments, and avoiding extreme temperatures.^[17] Ridner^[18] performed a retrospective study that compared patients' recall of lymphedema pretreatment education between women with and without breast cancer treatment-related lymphedema, and identified breast cancer survivors' perceived sources of lymphedema education. The results indicated that individuals with lymphedema consistently recalled receiving less education about risk and prevention. The authors concluded that pretreatment lymphedema education may improve breast cancer survivors' recall of educational information received about lymphedema, and risk reduction education may influence the risk of developing lymphedema.^[18]

Patient Risk Factors

In addition to educating the patient about risk reduction practices, it is also important to note any factors that may put the patient at an additional risk for the development of lymphedema. Patient risk factors include the stage of cancer at diagnosis, age, obesity, hypertension, and whether the patient received chemotherapy.^[19] Patients with more advanced nodal disease are likely to have more extensive axillary surgery along with axillary radiotherapy, which increases the risk of lymphedema.^[19] Older age has been found to be associated with an increase in the risk of lymphedema subsequent to RT.^[19] Obesity is a strong predictor of arm edema, and hypertension is also noted to increase the risk of arm lymphedema after axillary surgery and RT.^[19] Chemotherapy has been reported in some series to increase the complication rate associated with breast RT, including arm edema.^[19]

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If lymphedema is diagnosed, early intervention is necessary. Although there is no cure for the pathology/pathophysiology of breast cancer treatment-related lymphedema, treatment can decrease and maintain the size of the limb.

Complete decongestive therapy (CDT) is a 2-phase program that consists of a treatment phase and a maintenance phase. The use of CDT is becoming much more widely accepted and is now considered the standard of care by the International Society of Lymphology.^[20] The treatment phase involves 4 components: (a) skin and nail care, (b) manual lymph drainage, (c) compression bandaging, and (d) therapeutic exercise. Manual lymph drainage (MLD) is a manipulative technique used to facilitate lymph flow by increasing the pumping rate of the superficial lymph vessels. The treatment is performed daily with reassessment of limb girth occurring at the end of each week. If the patient's limb girth and volume measurements indicate a reduction when compared to those of the previous week, then the patient continues for another week of therapy. If the patient's limb measurements plateau as compared to the previous week, then the patient begins the maintenance phase. The maintenance phase consists of (a) continued skin and nail care, (b) self-MLD, (c) compression garments worn during the day, (d) self-compression bandaging performed at night, (e) a home exercise program, and (f) reassessments of limb girth and volume, as well as replacement of the compression garments every 6 months.

During the treatment phase, it is important that the patient adhere to all 4 components of the program and, more importantly, maintain the compression bandages on the limb. A prospective study examined the effects of low stretch compression bandaging alone and in combination with manual lymph drainage on arm lymphedema after treatment for breast cancer.^[21] The results of the study determined that volume reduction between the compression bandaging group and the compression bandaging plus MLD group was not significant, although the percent reduction was significantly different. Both groups reported a reduction in the feeling of heaviness and tension in the arm, but only the compression bandaging and MLD group experienced a significant decrease in pain. This study concluded that compression bandaging is an effective treatment for volume reduction of slight or moderate breast cancer treatment-related lymphedema, and MLD adds a positive effect. Our group has reported a prospective trial demonstrating that MLD/CDT provided beneficial response in terms of pain and quality of life persisting through 12 months of follow-up.^[22]

There is some controversy about the role of resistive exercise in this setting, since some speculate that resistive exercise may exacerbate lymphedema. A randomized controlled trial was performed to examine the effects of supervised upper and lower body weight training on the incidence and symptoms of breast cancer treatment-related lymphedema.^[23] Circumferential measurements and self-reported symptoms were assessed at baseline and at 6 months. The results of the study indicate that none of the subjects experienced a change in the arm circumference after the 6-month intervention exercise program. The self-reported symptoms also did not vary. This study concluded that a 6-month intervention of resistance exercise did not increase the risk for or exacerbate symptoms of lymphedema.

Some lymphedema therapists may be averse to performing manipulative therapy in patients with metastatic disease, or with existing disease in the draining anatomic bed. We have maintained that metastatic disease is a function of the underlying cancer, and not of lymphatic pressure differentials within the patient.^[24] Furthermore, we have published that patients who undergo MLD/CDT with disease in the draining lymphatic bed require significantly more treatments to plateau, but achieve similar results as patients without such disease.^[25] Similarly, while a history of RT will increase the likelihood of lymphedema, its use does not make the lymphedema any more difficult to treat, or success any less likely.^[26]

Once the treatment phase is completed, the patient begins the maintenance phase. The maintenance phase is a lifelong self-care program. It is therefore important that the patient have an understanding of lymphedema and

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the importance of the maintenance program. A qualitative study was performed by Radina and colleagues^[27] to determine the accuracy of patient knowledge about lymphedema. An evaluation of the participants' lymphedema chronic condition representations and management choices revealed that these women had a fairly clear understanding of lymphedema. The participants were able to discuss the causes and management strategies of their condition. Despite the high knowledge level of these participants, they still seemed confused about the simultaneous roles of exercise as a lymphedema cause and management strategy. The patient should therefore be educated about proper exercise techniques to avoid confusion and ensure adherence to the maintenance program. Compliance with the maintenance phase has been shown to be related to better outcomes.^[28]

There is currently no cure for lymphedema; therefore, once a diagnosis of lymphedema is made, it must be monitored over the course of the patient's life span. The patient should undergo reassessments of limb girth and volume every 6 months to monitor the condition and modify or redirect therapy as appropriate. A qualitative study was performed to describe the experience of managing lymphedema in breast cancer survivors.^[29] The study determined that the participants came to the realization that their arms could get bigger if they did not continue taking care of their lymphedema. They also realized that not taking care of their lymphedema would intensify their physical sensations, such as discomfort and/or pain, soreness, aching, burning sensations, and the feeling of heaviness, rigidity, or tiredness in the affected upper quadrant. The study suggested that instead of merely evaluating breast cancer survivors' degree of compliance with treatment, practitioners should also assess the impact of the presence or absence of the patient's intentions to manage their lymphedema, to determine the patient's consciousness of actions toward lymphedema management.

Conclusion

In conclusion, the recommended guidelines for lymphedema management should include preoperative assessment and patient education for lymphedema prevention; early detection through symptom and limb measurement assessment; early intervention with a comprehensive treatment program once lymphedema is diagnosed; and continued assessment and maintenance, with patient education every 6 months.

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