Lymphedema Therapy During Adjuvant Therapy for Cancer

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Question: What is the rationale for whether patients should receive lymphedema therapy during adjuvant cancer treatment?

Answer: Until recently, active or incompletely treated cancer was considered a contraindication for lymphedema therapy, and lymphedema therapy schools warned against the practice. This dictate was not based on research or anecdotal evidence but rather was inferred from the known effects of therapy. Because lymphedema therapy increases the lymph transport rate and restores lymph transport to the blood vasculature, the therapy was theorized to potentially promote metastasis and disease progression (Feltman, 1995). Consequently, well-trained, well-intentioned therapists have declined to treat patients who had not completed adjuvant therapy, had not achieved remission, or whose cancer had recurred. "First do no harm" was the guiding principle. Therapists who did treat this group of patients gave careful warnings of the potential risk, which frequently discouraged frightened patients from pursuing therapy. The following will explain the principles that support the suspicion of metastatic risk and the current endorsement of therapy (Cheville, 2002; Forbes-Kirby, 1998). Theoretical and practical considerations will be addressed.

Anatomic and Therapeutic Principles

The peripheral lymph transport vasculature is divided into five major sections (the head and four quadrants) and subsections, called territories. Watersheds at the midline and waist are the boundaries of the quadrants. Each quadrant is comprised of the anterior and posterior trunk and the adjacent extremity. Lymph is transported through territories and from the watersheds toward the axillary and inquinal lymph node basins. Anastamoses between the watersheds and territories allow interquadrant and interterritory transport. Under normal conditions, little, if any, lymph flows across these boundaries (Szuba & Rockson, 1997). However, when lymph production exceeds lymph transport capacity, causing quadrant congestion or swelling (lymphedema), these anastamoses are activated. These alternate pathways provide "overflow relief" and are exploited by certain lymphedema therapies. Proceeding from the nodal basin, lymph is transported through lymph deeper vessels and emptied into the blood vasculature (see Figure 1).

Surgery and/or radiation to a nodal basin compromise lymph transport within the entire quadrant, potentially causing lymph stasis, vessel hypertension, quadrant congestion, and lymphedema (Szuba & Rockson, 1997). Congestion limits the quadrant's capacity to receive lymph from the extremity, contributing to lymphedema and limiting the effectiveness of therapeutic limb compression (Boris, Weindorf, & Lasinski, 1998; Ko, Lerner, Klose, & Cosimi, 1998). Although usually found in the extremity, lymphedema also may occur in other areas within the quadrant, as seen in breast swelling following lumpectomy, axillary dissection, and radiation.

Manual lymph drainage (MLD) and limb compression are two components of comprehensive decongestive therapy (CDT). MLD ("massage" is its frequent misnomer) decongests the quadrant by stimulating lymph transport across territory and quadrant boundaries, creating negative pressure in the vessels of the affected quadrant. This "vacuum" pulls fluid from the extremity into the quadrant. Thus, the decongested quadrant has greater capacity for lymph transported from the extremity (Foldi, Foldi, & Weissleder, 1985; Ko et al., 1998). Even in the absence of MLD, therapeutic limb compression does transport some lymph into a congested quadrant, thus increasing the congestion. To relieve the pressure, the interquadrant anastamoses allow lymph transport across watersheds, albeit to a lesser degree than that achieved with MLD. By strict interpretation, therefore, MLD and limb compression each holds the potential to transport malignant cells to distant sites.

Metastatic Principles

The lymphatic and blood vasculatures are known routes of metastasis (Scanlon, 1985). Barriers between quadrants may be interpreted as limiting the distribution of lymph constituents (e.g., bacteria, malignant cells). Thus, the fluid mobilization described previously would appear to overcome these protective barriers. However, physiology indicates the opposite: The purpose of lymph transport is to deliver lymph constituents to nodes for destruction by lymphocytes and natural killer cells (Guyton & Hall, 2000). Further, no reports of unusually aggressive disease progression exist among patients with active malignancy who received CDT.

Experts in lymphology and oncology have weighed in against the theory of therapy-aided metastasis. Cheville (2002) reported about MLD studies that failed to demonstrate the transport of radiotracer across quadrant boundaries. Citing the tenuous nature of the metastatic process, Weissleder and Schuchhardt (1997) argued that therapy has no impact on metastatic spread or growth: "Less than 0.1% of embolized tumor cells survive or become clinically manifested" (p. 189). Casley-Smith and Casley-Smith (1997) pointed out that tumor emboli transported to nodes are destroyed there and that "the condition of metastatic disease is the danger to the patient, *not the manipulation of peripheral lymphatic fluid* [author's emphasis]" (p. 101). The International Society of Lymphology (1995) concurred: "Only diffuse carcinomatous infiltrates which have *already spread* [author's emphasis] to lymph collectors as tumor thrombi could be mobilized by mechanical compression. At this stage, the long-term prognosis is already poor. Mobilization of dormant tumor cells [after breast cancer treatment] by arm compression remains speculative and thus far unconvincing or unfounded" (p. 116).

Principles of Palliation

Lymphedema compromises quality of life through pain and pressure, limb bulk, distorted posture, and altered self-image (Carter, 1997; Mirolo et al., 1995). These symptoms are accentuated in end-stage disease. Cheville (2002) asserted that effective

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