

Lymphedema After Breast Cancer

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Among medical and healthcare practitioners, we all have our preferred biases and specialties. Our modalities and specialties color our view on certain body systems and their importance on maintaining or attaining health. For example, chiropractors may see health through the central nervous system and the spine, or a cardiologist may see health through the heart and circulatory system; whereas, a decongestive therapist sees health through our lymphatic system.

The lymph system is a network of organs, lymph nodes, lymph ducts, and lymph vessels that make and move lymph from tissues to the bloodstream. The lymph system is a major part of the body's immune system.

Lymph is a clear two white fluid made of:

- White blood cells, especially lymphocytes, the cells that attack bacteria in the blood.
- Fluid from the intestines called Chyle, which contain proteins and fats.

Lymph nodes are soft, small, round or bean shaped structures. They are located in clusters in various parts of the body, such as the neck, armpit, groin, back of the knee, and inside the center of the chest and abdomen. Lymph nodes make immune cells that help the body fight infection. They also filter the lymph fluid and move forward material such as bacteria, toxins, and cancer cells. When bacteria are recognized in the lymph fluid, the lymph nodes make more infection fighting white blood cells, which causes nodes to swell. The swollen lymph nodes are sometimes felt in the neck, armpits, behind the knee, and groin. The lymphatic system also includes tonsils, thymus, spleen and adenoids, lymphocytes, Lymph vessels and Peyer's patches (aggregations of lymphoid tissue in the small intestine).

When the lymph system is malfunctioning, we see the disease called lymphedema.

Lymphedema is broken up into two categories: primary and secondary lymphedema.

Lymphedema is the buildup of protein rich fluid, which causes significant swelling in a part or parts of the body. Primary lymphedema is a congenital disease in which symptoms may be present at birth or develop later on in life, such as at puberty or even into adulthood. On the other hand, secondary lymphedema is a disease you acquire via trauma to the lymphatic system. Secondary lymphedema is often seen after cancer treatment. Treatment for cancer usually includes surgery, chemotherapy, and radiation; all of which may impair lymphatic function and may lead to secondary lymphedema. In the United States secondary lymphedema is the most common among breast cancer patients. This is largely due to the damage that occurs to the many lymph nodes in the axillary (underarm) region during treatment.

Surgery for breast cancer was first introduced in 1882 by Dr. William Halsted, performing a radical mastectomy by removing pectoralis major and minor, axillary content, and all axillary nodes. With medical advancements today, doctors try to conserve much of the breast when possible; despite current advancements in cancer treatment, more than 200,000 women in the United States are treated for invasive breast cancer each year. This puts them at risk for a lifetime of lymphedema¹.

The axillary lymph nodes are comprised of three levels that can be biopsied or removed due to possible cancer. The sentinel lymph nodes are the first level of nodes in the axillary area that would receive the cancer cells. A Sentinel Lymph Node Biopsy (SLNB) removes the fewest lymph nodes in the axilla by injecting radioactive blue dye into the sentinel lymph nodes to detect for possible removal. This procedure predicts whether the cancer has metastasized to the axilla, and if results are deemed negative the patient may avoid axillary dissection.

The strongest predictors for lymphedema after breast cancer treatment are axillary dissection and axillary radiation therapy. Axillary dissection is the strongest predictor for lymphedema risk after breast cancer treatment. The incidence of lymphedema after axillary dissection is directly correlated with the extent of the dissection. The greater the amount of axillary lymph nodes removed the greater the risk of developing lymphedema. Axillary radiation therapy is another significant risk factor for lymphedema development. Damage to lymphatic tissue not only occurs during axillary radiation, but lymph nodes in both levels 1 and 2, may also become irradiated with breast radiation. However, the highest incidence for lymphedema occurs when axillary dissection and axillary radiation are combined for treatment.

There are other risk factors one must be aware of other than specific types of treatment. Obesity and a high BMI has been a factor which comes up. It has been studied, that factors related to patient size, such as body mass index, were strongly associated with both frequency and severity of arm edema². Other risk factors include how advanced the disease was at diagnosis and how aggressive treatment, post-surgical drainage/seroma, and venous and arterial blood flow abnormalities³.

What are someone's chances of developing lymphedema after breast cancer treatment?

The answer, unfortunately, is that it varies from person to person. The National Cancer institute has reported 50%-70% risk of developing lymphedema after axillary treatment, with 10% risk of severe cases. They also reported an 8%-56% overall incidence of arm lymphedema two years post surgery.

Although lymphedema has no set cure, early detection and treatment help decrease the progression. The usual signs and symptoms can vary patient to patient, but there are generalities.

Lymphedema is a progressive disease, if there is no treatment the swelling DOES continually get worse; however, the rate of the swelling is dependent from person to person. Pitting occurs to the skin tissue. "Pitting" of the skin are indentations that happen on the swollen extremity that do not resolve right away and may become permanent if the condition worsens. Swelling of lymphedema often starts distally. One may see squaring of the toes, a positive Stemmer's Sign (cannot lift or fold skin on the dorsum of the digit), asymmetrical, and loss of anatomical contours. As lymphedema progresses, it becomes more difficult to differentiate areas of the extremity, like foot from ankle from knee, almost like a tree trunk. Patients with lymphedema often complain of discomfort in the affected area. Many describe heaviness, achiness, the feeling of skin stretching or bursting, and sometimes pain. In the later stages skin tissue also changes, developing hyperkeratosis (dry crusty skin) or papillomas (worty skin).

Lymphedema has four stages associated with its progression.

Stage 0- Latency: no visible, measurable, or palpable swelling. but there is lymphatic impairment.

Stage 1-Reversible: visible and palpable swelling but reverses/decreases with elevation (of the extremity)

Stage 2-Spontaneously irreversible: condition is becoming more chronic. Swelling does not always decrease with elevation. As the protein-rich fluid increases in the extremity, fibrotic tissue forms, and dry hard skin begins to develop.

Stage 3- Lymphostatic elephantiasis: Swelling increases and is not reversible with just elevation. Connective and scar tissue form, hardening of the dermal tissue occurs, and papillomas begin to develop.

A diagnosis of lymphedema may create many questions regarding your course for treatment. Often, patients may have been given simple exercises or self lymph massage to perform and some general contraindications or cautions to look out for; however, we can't stress enough that patients diagnosed with lymphedema should seek out certified complete decongestive therapists. While oncologists are aware of Lymphedema, and are certainly a wealth of information regarding treatment for cancer, they usually have limited knowledge in complete decongestive therapy to treat Lymphedema. To be clear, always follow the course of action you and your M.D. lay out, but once diagnosed with Lymphedema, both you and your M.D. should be looking for a skilled Complete Decongestive Therapist (CDT).

Complete Decongestive Therapy (CDT) involves 5 principles to working with Lymphedema.

- Manual Lymphatic Drainage or MLD. MLD is a very gentle skin stretching manual therapy. It should not be confused with Massage Therapy, as MLD works with the

lymphatic system opposed to massage, which is applied to the muscles and connective tissues. When a patient is receiving MLD, they may be positioned in many different positions- seated, side lying, prone or supine. Positions vary due to the direction in which lymph needs to drain. For example, if one was diagnosed with lymphedema of the head neck and face, the therapist would utilize the seated position most, allowing for gravity to aide with lymph drainage. The touch is extremely gentle or light not exceeding much more than the weight of a nickel unless accessing some over the deeper nodes and structures within the body (abdomen, sternum etc). Therapy sessions vary from 30 minutes up to an hour depending on a patient's severity and should include measuring of limbs before and after, if applicable.

- □Skin, nail, and hygiene care. Often times, lymphedema patients seek help after stages 1 and 2. As the lymph system is unable to remove lymph in particular areas fats and proteins build up to unacceptable levels further impairing lymph function and decreasing immunity to fight infections within the affected body part or parts. A simple nick, scratch or cut could lead to an infection called cellulitis. This is often dangerous to the individual if left untreated, and can lead to amputation or worse- death. Many times patients who are in stage 3 or 4 lymphedema are unable to reach to perform simple tasks such as cutting nails or even bathing. It is the therapist's job to take care of these situations that would improve the patients' quality of life and condition. It should be stressed that MLD is contraindicated while a patient presents him or herself with an infection.
- Compression Therapy. Compression Therapy is always utilized throughout a patient's treatment plan after stage 1. A CDT will work a gradient compression system to decompress and/or remove fluid from a body part. Therapist's use compression in conjunction with MLD and therapeutic exercise to help decrease the amount of fluid from an area. Compression may consist of short-stretch bandages with foam underlying to help breakdown fibrosis which may be present. As the limb decreases its circumference, a certified decongestive therapist will resize limb and fit the patient with a factory made, medical grade compression garment. Compression garments should be measured by an individual trained and experienced in fitting compression garments for lymphedema and should be at least Class I compression for the upper extremity. Higher classes may be required for more severe cases and for lower extremity lymphedema.
- Therapeutic Exercise. Muscles move lymph. Being that one way that our lymph moves within and throughout the body is due to the "muscle pump." Muscular contractions

literally pump lymph through the body. Given this wonderful association, it is very important to teach patients safe and functional movement to help decrease and maintain lymph volume. A number of studies have shown that aerobic and resistance exercises are safe and beneficial for people with lymphedema.

- Patient Education. Last but not least is patient education. Patient education envelopes the previous four principles. As CDTs, it is important to help patients help themselves; including, self manual lymph drainage, proper hygiene to prevent infections and complications, self-bandaging as well as, donning and doffing compression garments, and safe effective therapeutic exercise.

We have focused on secondary lymphedema in regards to breast cancer, but it doesn't just affect breast cancer survivors. Lymphedema has been the result of other forms of cancers, illnesses, and traumas. However the cause of the disease, know that hope is not lost. If a friend or a loved one has been diagnosed with lymphedema many advanced treatment options are available, and together with their health care provider, they can persevere.