Edema, Lymphedema and Comorbidities

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Swelling (edema) can be one of the most misunderstood symptoms presenting to the medical care provider since it is so common and the causes are myriad. Edema can represent benign swelling related to gravity or be a marker for serious vascular or malignant disease. Sometimes patients have more than one reason for edema. As our understanding of the complexity of swelling disorders has advanced, so the treatments have become more complex, from interventional vascular procedures to pharmacologic agents for inflammatory edemas, and to a myriad of stockings, pneumatic devices and decongestive therapy. As people live longer with chronic illnesses, even true lymphedema can be complicated by other medical conditions that cause or exacerbate edema.

Standard lymphedema treatment, known as Complete Decongestive Therapy (CDT), was developed for lymphedema but is effective for many edemas. It is important for lymphedema therapists to know the actual cause of the patient’s edema and not to label all edemas as lymphedema. The terminology can be confusing. Patients with many causes of edema are sent to lymphedema therapists and these patients may think they have lymphedema when they do not. Another problem of terminology is that patients with edemas that might benefit from decongestive therapy are not sent to lymphedema therapists because providers do not recognize the benefits of lymphedema therapy for other forms of edema.

Edema is a symptom, not a diagnosis, and diagnosis is essential to treatment. By the time edema is severe enough to trigger a referral for lymphedema therapy, the cause of edema should not be assumed, but rather should prompt a thorough medical evaluation. The lymphedema therapist or the patient himself or herself may be the first to recognize the necessity of a referral to a physician specialist. Lymphedema therapists should not hesitate to request an appropriate medical diagnostic evaluation by a Lymphedema MD specialist prior to subjecting the patient to time consuming, difficult and expensive CDT, garments or equipment. When no Lymphedema MD specialist is available in certain geographic locations, the lymphedema therapist will know physicians in their locale who can assist with an appropriate medical evaluation.

The application of lymphedema therapy techniques (CDT) without determination of cause and associated medical conditions will lead to poor results, wasted time and resources. At worst, edema treatment without diagnosis can be dangerous and critical diagnoses missed. Edema is rarely pure in etiology. Patients may present with a variety of underlying and associated conditions that need to be addressed as a part of the overall edema care plan.

Sudden onset arm or leg edema with pain will prompt an evaluation for deep venous thrombosis, a blood clot that is treated with anticoagulation and compression bandages or stockings. For slower onset chronic leg swelling, the initial primary medical approach may be elevation, low compression stockings (TEDs) and diuretics since the vast majority of leg edemas presenting to a primary care clinic will be orthostatic (gravity related) and mild venous insufficiency. When these measures are not successful or not well tolerated, patients are often referred to a lymphedema therapist or a Lymphedema MD specialist.

Deep Vein Thrombosis (DVT): Acute DVT is managed with anticoagulation. Manual lymphatic drainage is contraindicated in acute DVT since it might be mistakenly assumed that propagation of clot was due to MLD. In fact, it is extremely unlikely that MLD would propagate a deep clot. However, to protect the therapist and make sure that all appropriate acute care strategies are undertaken, MLD should be delayed in acute DVT. Persons with acute DVT should be placed in immediate compression and begin ambulation. There is no evidence that ambulation in compression will lead to propagation of clot or pulmonary embolus. There is evidence that the opposite is true, that bed rest and further stasis is more likely to propagate a clot. Short stretch compression bandaging and high compression (at least 40 mmHg) stockings reduce the incidence of post thrombotic syndrome. Usually compression is all that is necessary for acute DVT. If there are other causes of edema concurrently present, full CDT may be necessary when the acute phase has subsided.

Obesity: Obesity is epidemic and lymphedema clinics are increasingly receiving referrals of patients with a primary problem of obesity. Obesity can lead to secondary lymphedema, however many patients presenting to the lymphedema clinic have obese extremity folds and not swelling. Obesity is associated with a number of serious medical conditions including heart failure, lung failure,
cancer, diabetes and arthritis. The lymphedema clinic treating obese patients must follow height, weight and BMI to determine effectiveness of treatment and monitor associated swelling related conditions, such as heart failure. Education of the patient regarding the association of lymphedema and obesity is essential. CDT should be applied along with obesity education and an exercise program. Referral to an obesity specialist may be appropriate. Often the lymphedema therapist will become a trusted provider and has an opportunity to suggest these measures in a non-judgmental way. Successful lymphedema therapy requires that the patient can assume self care after treatment and also understand the management plan for the underlying medical condition causing the edema. The obese patient receiving CDT who is continuing to gain weight is not responding to therapy. Treatment should be discontinued until the patient obtains appropriate medical care. Many lymphedema therapists have had to restrict patients according to size due to inability to safely physically perform CDT or due to lack of bariatric equipment. If a patient is too large to be safely treated or have a realistic expectation of phase II self care, then the patient needs medical attention and weight loss prior to intensive CDT. If safe to do so, these patients may be issued temporary compression wear such as abdominal binders for large leg folds until they are able to receive full treatment.

**Lipedema:** Lipedema and other lipodystrophies may be associated with edema. CDT can be effective in reducing the edema; however it does not change the body habitus or underlying lipodystrophy. The diagnosis should be clearly documented and patient education provided so patients with lipodystrophies have realistic expectations of lymphedema treatment. Lipedema is not equivalent to lymphedema or obesity. But both lymphedema and obesity can occur in conjunction with lipedema. Many lipedema patients are erroneously given a diagnosis of lymphedema by providers unfamiliar with the diagnosis of lipedema. Patients presenting to the lymphedema therapist with a referring diagnosis of lymphedema, who have characteristic features of lipedema, should be referred to a lymphedema MD specialist before being labeled with a diagnosis of lymphedema. Lipedema presents with excess fat tissue in the lower body, appearance of swelling of the legs due to fatty deposits that can be tender and feel lumpy (cellulite). There is often a cuff of tissue that looks like swelling at the ankle but the feet are not swollen. A clear diagnosis differentiating lipedema from lymphedema will help the lymphedema treatment provider to set appropriate course of treatment, goals, expectations and appropriate Phase II compression garments. The patient may need to undergo lymphoscentigraphy for a correct diagnosis. Whether the patient has lipedema, lymphedema or both, the patients should be cautioned regarding the risks of obesity and sedentary lifestyle. Proper treatment will include access to resources for exercise and weight control along with CDT.

**Vascular Malformations and Venous Disorders:** The most common form of venous edema is venous insufficiency, or valvular incompetence in the veins of the legs. Severe venous insufficiency leads to venous hypertension, wounds, infections and pain. Some patients will have been told they have venous insufficiency without adequate diagnostic testing. Some of these patients may have other types of edema such as orthostatic (gravity related) edema, right heart failure, obesity, or chronic cellulitis (skin infections of the legs). Bluish, cyanotic or red/brown discoloration of legs can be confusing and does not connote any one etiology.

Longstanding venous insufficiency can lead to secondary lymphedema, known as phlebolymphedema. Unless phlebolymphedema has developed, most early venous edemas are best treated with moderate to high compression (20-40 mmHg) stockings and calf exercise. Since high level compression stockings are very difficult for many patients to manage, the diagnostic workup becomes important to compliance and education. Routine Doppler ultrasound studies can detect deep vein blood clots (DVT) but not venous insufficiency. To diagnose venous insufficiency, a standing doppler ultrasound must be done, specifically looking for valvular incompetence at any point in the superficial or deep venous system. Some types of venous incompetence are amenable to minimally invasive vascular procedures including radiofrequency ablation and sclerotherapy.

Consideration for cardiac causes of edema is also important for any patient presenting with edema. The legs of patients with right heart failure or diastolic dysfunction can look just like venous insufficiency. Neuropathic venous capacitance diseases, such as poliomyelitis, have cyanotic appearance to the legs and cool temperature, mimicking venous insufficiency. Since there are many elderly polio survivors around the world, it is important to consider the variety of etiologies of legs with bluish discoloration. Vascular malformations, especially venous, can be mistaken for venous insufficiency and therefore may go undetected and untreated. The standing doppler US will also screen for venous malformations. If there is an indication that proximal incompetence is present, the patient may require CT or MR venography. Proximal (upper thigh or pelvic) DVT found on these studies may lead to finding an occult blood clotting disorder and the clot might be amenable to interventional thrombolysis (“clot buster” therapy). For venous malformations, surgery or sclerotherapy or a combination of procedures may be of benefit. Patients with venous disorders amenable to vascular or medical intervention and high compression stockings may not need CDT, so the diagnosis is important prior to subjecting these patients to CDT treatment. Patients with persistent edema after vascular procedures, or who have phlebolymphedema, may benefit from adjunctive CDT.

Patients with an underlying malignancy who present with upper or lower extremity edema should be considered for evaluation of the venous system as well as for lymphedema. Acute DVT is common in cancer patients. Patients who
have had abdominal or pelvic malignancies, especially with radiation, should not be assumed to have lymphedema without a diagnostic workup that includes a venous evaluation. DVT and venous insufficiency are common in the general population as well as in cancer patients and can masquerade as lymphedema. Addressing venous abnormalities caused by cancer or its treatment may have significant benefit for management of any additional lymphatic component to the edema.

**Arterial:** Many lymphedema clinics, especially associated with major vascular centers or wound clinics, will see patients with atherosclerosis (hardening of the arteries). Patients who present to the lymphedema clinic with a history of diabetes mellitus, coronary bypass, stroke, aortic aneurysm, renal failure and/or a history of smoking may have associated peripheral arterial disease. The lymphedema therapist should always try to palpate pulses in the feet before considering CDT to the legs of any patient regardless of the diagnosis. Sensory exam should also be done. Patients with cognitive impairment in settings where there is inadequate supervision should not be treated if they have significant arterial disease or sensory loss. Palpation of pulses can be difficult with a large amount of edema and skin thickening. If the feet are warm and have good capillary refill, this is an indication of probable adequate arterial supply. When equivocal, or in a patient with cold discolored feet and a history of claudication (calf pain with exercise), the therapist should not treat further until the patient has been evaluated medically including arterial Doppler ultrasound and ankle brachial indices (ABIs), the tests that screen for arterial blockage in the legs. Patients with ABIs <0.8 should not undergo short stretch multilayer compression bandaging or semirigid dressings by lymphedema therapists unless directly under the supervision of a vascular surgeon or MD edema specialist. In patients with borderline ABIs, but lacking good sensation, compression bandaging should be used with great caution and with the supervision of a physician specialist. Layers and tension should be reduced and patients monitored closely. Reperfusion edemas, in patients who have undergone vascular bypass surgery, can be very difficult to treat. These edemas occur after a surgery has opened a blockage. These patients are at risk for skin breakdown from excessive compression. They might have wounds and infections that preclude MLD. They can have associated cardiac and renal disease that causes fluctuating volume. Reperfusion edemas should be treated with MD supervision and close MD follow up. Due to volume fluctuations and wounds, Velcro or adjustable systems of compression are recommended. Velcro closure garments allow rapid release of excessive compression and allow for easy wound cares.

Arm edema can occur in kidney dialysis patients after AV shunt procedures. AV shunt edema is a special form of vascular edema. The AV shunt produces a high pressure system with increased filtration pressure due to loss of peripheral resistance of the arterioles, capillaries and venules taken out of the circuit. For many patients, the edema eventually resolves and a new steady state without edema is reached. For some patients, edema persists and develops into a secondary lymphedema. Workup should be undertaken for cellulitis, clot on the venous side or stenosis on the arterial side of the shunt. When these are not present, CDT can be beneficial but rarely eliminates the edema in these patients. Arm compression garments for dialysis patients require great creativity on the part of lymphedema therapists since the garments will, of necessity, cover the shunt. Garments present a problem for dialysis access and the several hours after dialysis that pressure dressings are applied. Therapists will need to work with their MD specialists to design the best system of either bandages or garments for the individual situation.

**Renal:** Renal failure patients can also have an unusual form of leg edema associated with skin hardening known as nephrogenic sclerosing dermopathy (NSD). This condition may or may not be part of a systemic condition known as nephrogenic systemic fibrosis where there is hardening of other tissues of the body. Dialysis patients commonly have leg edema that can fluctuate with volume changes. For patients with NSD, the edema can be masked by the sclerosis that acts as a sort of cast. These patients can benefit from moisturizing lotion and short stretch compression bandages to the legs that are the most affected area. Topical steroid and anti-itch agents may also be necessary with the compression. These patients may have hypersensitivity of the skin and neuropathy, so long term garments are challenging. It can be very painful for these patients to pull on compression stockings and they often require an adjustable garment or a soft low compression garment.

**Cardiac:** Cardiac edema and volume overload edemas are common. They occur in association with other vascular and renal edemas. Medications, such as calcium channel blockers, can increase edema. Patients with these conditions, referred to lymphedema therapists, are not candidates for CDT until the underlying conditions are adequately addressed. Diagnosis of all contributing factors to the edema must be evaluated and treated. Medical management alone can sometimes eradicate this type of edema. Diuretics are indicated for this type of edema including lymphedema patients who carry these associated cardiovascular or renal diagnoses. When medical management is not successful in removing peripheral edema, CDT can be beneficial as an adjunct to medical management of cardiovascular and renal edemas. Velcro adjustable closure garments are beneficial in the population of patients who have frequently fluctuating limb volume and limitations to exertion that make it difficult to use compression stockings.

**Inflammatory edemas:** Patients who have edema associated with erythema (redness of the skin), dermatitis, pruritis (itchiness), with or without joint pain, should be evaluated for an underlying inflammatory condition. Many patients
presenting with this constellation of symptoms will be treated for presumed cellulitis (skin infection). Once cellulitis has been ruled out or treated, persistent erythema, pain and swelling should prompt a medical workup for an underlying inflammatory dermatologic or rheumatologic condition. Diagnosis and appropriate treatment with anti-inflammatory or disease-modifying agents will often eradicate the edema. When edema persists after adequate medical management of these conditions, CDT can be a beneficial adjunct. Edema of severe osteoarthritis, due to hypertrophic joints and swelling, can sometimes be mistaken for lymphedema. At the knee, a Baker’s cyst will further confuse the edema picture. Appropriate x-rays, MR scans and Doppler ultrasound studies will clarify the diagnosis. Treatment for the orthopedic condition can spare the patient unnecessary lymphedema therapy.

A number of other medical conditions are associated with edema including malnutrition, diuretic abuse, laxative abuse, liver disease, endocrine disorders, paralysis, medications and genetic syndromes. All of these entities must be considered in patients with chronic edema, especially those with a number of medical conditions and a long list of medications.

Minor persistent edema after CDT is common and does not need to be completely eliminated. After 3-4 weeks of CDT, the patient should have shown significant response. A change in response, lack of response or worsening volume should lead to referral for medical assessment of other medical conditions and a diagnostic reassessment. Active, occult or recurrent cancer, worsening heart failure, blood clotting disorders and drug related causes are of particular concern and must be subjected to medical evaluation before continuation of treatment.

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References: