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The NLN Mission Statement

The mission of the NLN is to create awareness of lymphedema through education and to promote and support the availability of quality medical treatment for all individuals at risk for or affected by lymphedema.

The NLN is dedicated to:

- ◆ promoting research into the causes, prevention and treatment of lymphedema;
- ◆ securing adequate insurance coverage for medically necessary, safe and effective treatment;
- ◆ expanding the number and geographical distribution of lymphedema treatment facilities and certified therapists.

To achieve these goals, the NLN disseminates information about lymphedema to health care professionals so they can appropriately counsel their patients on its avoidance, and prescribe safe, effective treatment for those affected by this condition. The NLN also provides this information to the general public.

The Importance of Differential Diagnosis For Proper Medical Management of Edemas

By Jan Weiss, PT, MHS, CLT-LANA

Since the early '90s, the U.S. has experienced a surge in medical practitioners trained in the management of edemas and lymphedema.¹ These practitioners largely consist of physical and occupational therapists and assistants, massage therapists, and nurses from a variety of clinics and hospital settings. In many cases, lymphedema therapy performed by these individuals represents a valuable and overdue service not previously provided by their institution, or even available in their region. Many of these therapists have realized tremendous growth in their practices due to the effectiveness and success of treatment for edema/lymphedema. Greater numbers of patients are being referred for treatment of swelling following years of unavailable or unsuccessful management.

Unfortunately, it is the experience of some lymphedema therapists that patients are referred to clinics for evaluation and treatment of their swelling without the necessary diagnosis to inform the therapist about the etiology of the edema. This results in difficulty providing the optimal medical management and can put the patient at risk. It is essential that practitioners working with such patients have an understanding of the importance of differential diagnosis in order to provide the most effective and safe treatment.

Edema and lymphedema both manifest as swelling, however, their etiologies differ. Most edemas are symptoms of a disease process, whereas lymphedema represents a clinical diagnosis. Pure edema, lymphedema, or a combination of both may exist. Some treatments are common to both lymphedema and edema, but there also are treatments unique to each. Clinically, it is often difficult to distinguish one from the other, and only by understanding capillary and interstitial fluid dynamics can one truly appreciate the various etiologies of edemas and the appropriate treatment for each.

Starling's equilibrium refers to the balance of pressures existing between the capillaries and interstitium allowing fluid homeostasis. This balance of pressures is largely dependent on four forces:²

- 1) **Capillary pressure** – the pressure which forces fluid out of the capillaries. This averages 30-40 mmHg at the arterial end and 10-15 mmHg at the venous end of the capillary.
- 2) **Plasma colloid osmotic pressure** – the pressure exerted by the tendency of proteins within the plasma to hold water. This pressure prevents significant loss of capillary fluid and approximates 28 mmHg.
- 3) **Interstitial fluid pressure** – the force tending to force fluid into the capillaries when positive and out when negative. This pressure normally is -3 mmHg, tending to draw fluid into the interstitium.
- 4) **Interstitial fluid colloid osmotic pressure** – the pressure exerted by the tendency of proteins in the interstitial fluid

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Differential Diagnosis...

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to hold water. This pressure approximates 8 mmHg (Graph 1).

Under normal conditions, all but capillary pressure tends to remain constant. Capillary pressure changes from approximately 30-40 mm/Hg in the

- II) DECREASED PLASMA PROTEINS
- III) INCREASED CAPILLARY PERMEABILITY
- IV) BLOCKAGE OF THE LYMPHATIC SYSTEM (LYMPHEDEMA)

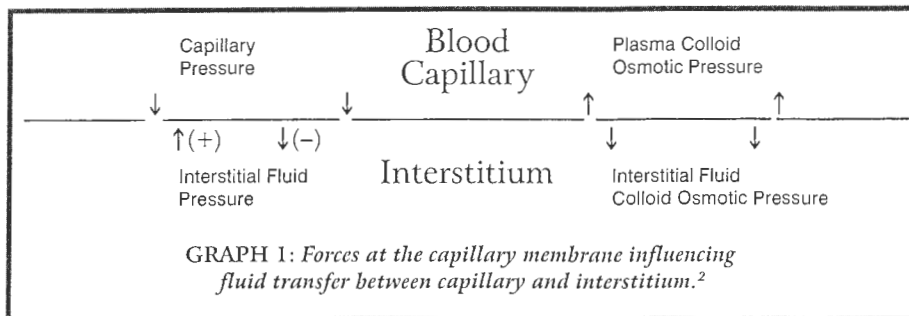
Each of these will be discussed, along with appropriate medical management unique to the etiology of the condition.

Characteristics may include:

Keys to management:

- Edema may be permanent or transient
- Typically bilateral lower extremity edema
- Soft, pitting edema initially; firmer later
- Obesity is common
- Skin hemosiderin staining distal legs (Venous insufficiency)
- Upside down champagne bottle leg shape (Venous insufficiency)
- Recurrent venous stasis ulcers
- Respond well to Compression bandaging but edema is poorly controlled with garments if not adequately diuresed
- Sudden pain/edema may indicate thrombosis
- NO mechanical intervention (MLD or bandaging) prior to anticoagulation

- Key to ulcer control is edema control
- Adequate diuresis
- Leg elevation
- Compression garments
- Diuretics

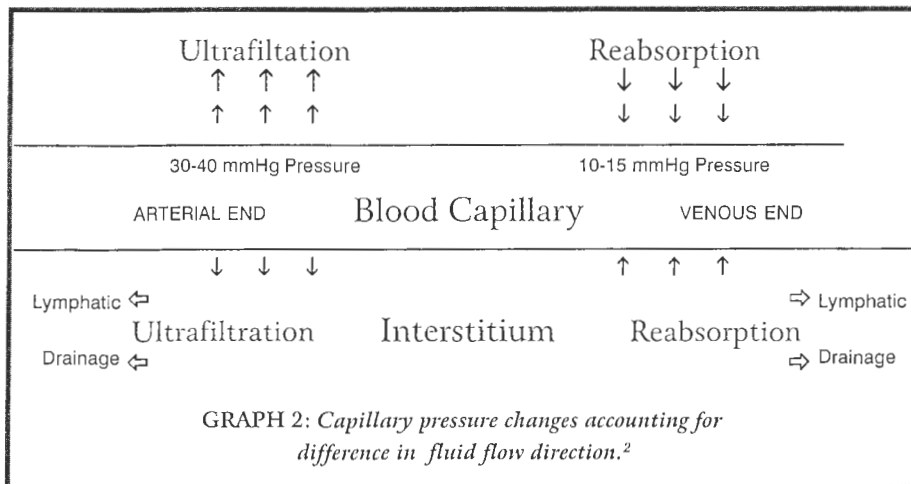


arterial end to 10-15 mm/Hg in the venous end. Capillary pressure in the arteriole end exceeding other combined pressures results in ultrafiltration of fluid from capillary to interstitium. Capillary pressure being lower in the venous end results in reabsorption of fluid back into the capillaries. This process of ultrafiltration and reabsorption, along with adequate lymph drainage, maintains normal tissue fluid homeostasis. Certain pathological conditions, however, may disrupt capillary pressure, colloid osmotic pressure, interstitial fluid pressure, or lymphatic drainage, and upset the fluid equilibrium, leading to the development of edema (Graph 2).

Edema, or excess fluid in the body tissues, occurs primarily in the extracellular compartment, but rarely can involve intracellular fluid as well. Intracellular edema may result from depression of the metabolic system of tissues or lack of adequate cell nutrition leading to increased cell wall permeability. Extracellular edema results from either abnormal leakage of fluid across capillaries from the plasma to interstitial spaces, or from failure of lymphatics to return fluid from the interstitium to the blood. Conditions resulting in extracellular edema include:²

- I) INCREASED CAPILLARY HYDROSTATIC PRESSURE

I. Increased capillary pressure results in increased ultrafiltration of fluid into tissue spaces. This occurs most commonly with elevated central or peripheral venous pressures typical of



that from congestive heart failure, venous obstruction or venous insufficiency. Other contributing conditions may include kidney failure or decreased arteriolar resistance. This is a frequent cause of extracellular edema.

Characteristics may include:

Sudden weight gain from edema

Signs of congestive heart failure (SOB)

Keys to management:

Fluid volume control with diuretics or may require dialysis for kidney failure

Diet and exercise to reduce weight

II. Decreased plasma proteins contribute to edema due to the severe decrease in plasma colloid osmotic pressure. There is increased ultrafiltration and decreased reabsorption whenever plasma colloid osmotic pressure is reduced. This may result from loss of proteins in urine as in nephrotic syndrome, loss of protein in the stool as in lymphostatic enteropathy, or from burns or wounds on the skin. Lack of adequate protein consumption as in severe malnutrition will also contribute to edema.

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Differential Diagnosis...

Continued from page 2

| Characteristics may include: | Keys to management: |
|--|-------------------------------------|
| Edema diffuse, usually bilateral | Adequate nourishment |
| Edema soft, pitting, glossy skin | |
| Edema lasts only as long as plasma proteins are diminished | |
| Fragile skin | Caution in donning/doffing garments |
| Major psychological issues with anorexia | Psychological counseling |

III. Increased capillary permeability

leading to vascular leakage is the major contributor to edema during the inflammatory phase of tissue injury, or from allergen exposure. This chemically mediated response is due to the release of histamines and other immune products. Other causes of increased capillary permeability may be from bacterial infections, toxins, prolonged ischemia, burns, or vitamin C deficiency.

| Characteristics may include: | Keys to management: |
|---|---|
| Localized edema to the area of trauma and possibly distally (trauma, allergy) | Limit inflammatory reaction with ice and anti-inflammatory medications |
| Specific time of edema onset (trauma, allergy) | |
| Edema most likely temporary | Control acute edema with compression May not require long-term compression |
| Edema soft, pitting, regional discomfort | Joint/ muscle pumping assists in dispersing edema |
| Joint movement often limited in area of edema | |

IV. Blockage of lymph return results in edema due to the impaired transport ability of the lymphatic system to carry off excess interstitial fluid. As protein concentration of the tissue fluids increases so does the interstitial colloid osmotic pressure which further reduces reabsorption. This may result from injury to or surgical removal of lymphatics, or from infection or cancerous invasion.

| Characteristics may include: | Keys to management: |
|--|---|
| Edema ranges from mild to severe | Complete decongestive therapy |
| Unilateral or bilateral edema; often affects adjacent trunk quadrants | Manual lymph drainage |
| Induration (hardening) of edematous areas | Fibrose tissue techniques. |
| Deep skin creases + Stemmer signs in toes | Education on skin hygiene/precautions |
| History of multiple episodes of infections | |
| No definitive onset of the edema or connection with injury or surgical event | Patients at risk must know precautions |
| Medical evaluations for cause of edema are often negative | Ensure medical evaluation has ruled serious pathology (DVT, infection, cancer) |
| Edema most likely lifelong | Replace compression garments regularly Education on self-care Low fat, low salt diet Maintain good skin/nail hygiene |

Edema may arise from many medical conditions, diseases, traumas, or surgeries. While conventional therapeutic treatment for edema (decongestive therapy, compression garments, elevation) are effective in managing most edemas, there are some medical conditions in which these are contraindicated. If the source of the edema is unclear, it is always advisable to contact the referring physician to determine which medical evaluations and treatments are being provided and to better understand the therapist's role in management of the edema. Many patients require complex medical and pharmaceutical treatment, exercise, or nutritional counseling, in addition to conventional treatment for their edema, truly making their care a medical team effort.

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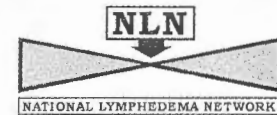
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Emendation

Please note that the lead article in the July-September 2003 issue of *LymphLink*, Andrea L. Cheville, MD's excellent article titled "Non-Western Medicine: Its Role In Lymphedema Management, Part Two," was to have an accompanying bibliography which, unfortunately, was omitted. The full bibliographic reference will appear in the January-March 2003 issue of *LymphLink*.



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The goal of this publication is to provide information specific to the needs of lymphedema patients and health care providers.

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