Lymphedema Treatment for the Multiple Sclerosis Population

Tracy Carrasco, OTR/L, MSCS, CLT
MS Comprehensive Care Center of Central Florida, Orlando Health

Kristine Secrest, OTR/L, CLT-lana
Orlando Health Oncology Rehabilitation

Objectives

• Understand/describe the normal structure and function of the lymphatic system.
• Identify risk factors affecting the normal drainage of the lymphatic system.
• Discuss diseases or procedures that could predispose a patient to lymphedema.
• Explain assessment of a patient with lymphedema.
• Describe interventions to promote lymphatic drainage for a patient with lymphedema.
• Understand the use of exercises to assist with the management of lymphedema.
• Understand the challenges and considerations of the MS patient with lymphedema
What is Lymphedema?

- Lymphedema is caused by an abnormality of the lymphatic system leading to excessive build up of tissue fluid that forms lymph, known as interstitial fluid.
- Lymph fluid contains protein and cell debris and when stagnant, causes swelling.
- Usually seen in the arms and legs but can occur anywhere in the body (NLN, 2011).

Edema vs. Lymphedema

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<th>Edema</th>
<th>Lymphedema</th>
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<td>- Is the abnormal pooling of fluid in tissues, organs, circulatory system</td>
<td>- Excess protein rich fluid in the interstitial tissue</td>
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<td>- Can result from injury, disease, organ failure (heart, kidneys, lungs) burns, medications</td>
<td>- Results from imbalance or damage to the lymphatic system or is congenital</td>
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<td>- Can be treated by fixing the cause, medications or diuretics</td>
<td>- Medications and diuretics do not work</td>
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<td>- Infection is a complication but often also the cause of the edema</td>
<td>- Infection is a complication but more of a direct complication of the condition. Lymphatic limb is considered immuno-compromised</td>
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The lymphatic system filters and collects lymph and large molecules in the interstitial space that come from the intravascular space.

Normally, the heart pumps so strongly that it causes 20-30 liters of plasma per day to leak from the capillaries. This is the interstitial fluid, which the lymphatic system drains, filters, and returns to the heart.

This interstitial fluid contains proteins, lipids, water, and products from cellular breakdown.
The Lymphatic System

The venous system reabsorbs 90% of the water in the interstitial space however, the protein molecules are too large.

The lymph capillary has overlapping epithelial cells that open to allow for the protein, remaining water and cell debris to enter.

Once this *interstitial* fluid is absorbed, it moves through the lymphatic vessels, and is considered lymph fluid.

As lymph fluid moves through the lymphatic system, it passes through lymph nodes. Lymph nodes filter harmful substances and contain lymphocytes that activate the immune system.
### Lymph Nodes

A healthy adult has approximately 600-700 lymph nodes.

The main areas are:
- Supraclavicular and cervical
- Retroperitoneal (deep abdomen and pelvis)
- Thoracic (adjacent to the lung)
- Abdominal (near the intestine)
- Axilla
- Inguinal

### Pathology of Lymphedema

#### Primary

- **Milroy’s disease (congenital lymphedema)** - This disorder begins in infancy and causes lymph nodes to form abnormally.

- **Meige’s disease (lymphedema praecox)** - This disorder often causes lymphedema around puberty or during pregnancy, though it can occur later, until age 35.

- **Late-onset lymphedema (lymphedema tarda)** - This occurs rarely and usually begins after age 35.

#### Secondary

- **Surgery** – Removal or injury of lymph nodes during surgery such as removal to check for cancer.

- **Radiation** - To treat cancer can cause scarring and inflammation to lymph nodes and vessels

- **Cancer** – Cancer cells can grow within the lymph nodes and vessels blocking flow

- **Infection** – Recurrent infections or parasites can cause inflammation leading to lymphedema. Parasitic lymphedema usually only occurs in tropical developing countries.
Stages of Lymphedema

- **Stage 0**
  - Characterized by pitting edema and is reversible with elevation of extremity

- **Stage 1**
  - Known as Elephantine
  - Massive swelling of the extremity
  - Protein-rich fluid
  - Connective and soft tissue
  - Hardening of the dermal tissue

- **Stage 2**
  - Diagnosing Lymphedema
  - Painless swelling of the arms or legs, which may get worse during the day and better at night.
  - Warmth or achiness in the extremity.
  - A feeling of tightness, heaviness, tingling, numbness, or weakness in the affected extremity.
  - Redness of the affected extremity. (infection?)
  - Bracelets, rings, or shoes may become tight. A 2 cm difference between affected extremity and non-affected extremity is a general classification.
  - There can be a 20% increase in interstitial fluid can occur without increase circumference
  - Mechanism of injury and onset
Examination

- **History** – cancer, injury, radiation, surgery
- **Skin** – texture, infection, erythema/ skin color changes, stemmer sign
- **Measurement** – circumferential at designated points, compare to unaffected limb
- **Volumetric** – water tank, volumeter (perometer)
- **Bioimpedence** – electric current resistance, higher resistance, more fluid present

Risk Reduction

No blood draws, IVs, blood pressures on affected side, injections should be taken on the unaffected extremity.
Thiadens, 2005

- **Why?**
  - If any foreign object, such as a needle, is placed in the affected extremity, it can cause an inflammatory response putting the lymphatic system under more stress and may result in swelling. Cole, 2006
Risk Reduction

- Anything that causes constriction
- Tight clothes, socks, waist bands
- Tight jewelry
- BP cuffs
- Ill-fitting compression garments
- All above can constrict the collateral circulation of the lymphatic capillaries

Good skin care:
- Keep the skin clean and dry
- Apply moisturizer daily
- Protect skin with sunscreen and insect repellent
- Use care with razors (electric is best)
- Wear gloves when gardening, to protect the skin
- Keep cuts clean and dry – monitor closely for S & S of infection
- Contact physician immediately for rash, redness, pain, increased swelling, etc.

Thiadens, 2005
- Avoid extreme temperatures.
- Heat may cause vasodilatation, which causes more fluid to move from the blood vessels into the tissues. Avoid hot showers and saunas.
  Dell & Doll, 2006
- Cold may cause rebound swelling or chapped skin
  Thiadens, 2005
Risk Reduction

Air travel > 2 hours increases the risk of swelling because of continuous reduction of cabin pressure.
Dell & Doll, 2006

It is recommended to wear a compression stocking while flying.
Thiadens, 2005

Avoid carrying a purse, briefcase, or other heavy item with the affected extremity.

If the lower extremity is affected, avoid standing or sitting for long periods of time and do not cross legs.
Marrs, 2007

Treatment
Lymphedema Certification

• Four basic schools for certification for PT, OT, RN, and LMT
• 135 hours of course work (CLT)
• Several short introductory courses available as well
• LANA certification – advanced testing for CLT’s

Manual Lymph Drainage

Lymph Drainage Map
Manual Lymph Drainage

- Performed by specially trained therapist
- Massaging connective tissue rather than deep muscles
- Stimulates the weakened lymphatic system and decongests the affected area to encourage pathways to unimpaired lymph nodes to reduce swelling.
- May also be taught to patient to perform on self.

Thiadens, 2005; Dell & Doll, 2006

Compression Bandages

Bandages
- May be applied to increase tissue pressure and counteract the elastic insufficiency of the connective tissue.
  Thiadens, 2005
- Maintains therapeutic results of MLD
- Softens tissues with fibrotic changes
- Has central hemodynamic effects

Foldi
Daytime Compression

- Once a manageable size has been achieved from wrapping, a compression stocking may be worn to maintain the size and prevent increased swelling.
  - Thiadens, 2005

Night Time Compression

- Juxtafit
- Reid Sleeve
Compression Pumps

- Most pumps are not appropriate due to inability to decongest the proximal lymphatics
- Newer pumps work proximal drainage first

Other Treatment Options?

- No medications available at this time to treat lymphedema.
- Diuretics should not be used to help lymphedema because they draw off excess water in the interstitial spaces, not the excess protein. Once the diuretic is out of the system, it pulls more water into the affected area.
- Lymph Node Transfer: promising treatment for primary and secondary lymphedema
  - Holcomb, 2006
Exercise

• Active range of motion, stretching, and low-intensity resistance exercise, cardiovascular exercise is incorporated with manual drainage techniques
• New research: Progressive resistive exercises will not exacerbate or cause lymphedema (Schmitz, 2010)
• Exercises should be performed with compressive bandages or garment
• Deep breathing and relaxation also incorporated

Exercise

• Rationale is that muscle contractions against compression moves fluids through the collecting vessels, keeps joints mobile, and muscles toned.
• Exercises should be performed in a particular sequence to encourage movement of fluid proximal to the affected area first.

• Precautions:
  • Avoid extreme temperatures, be aware of co-morbidities (CHF), blood counts, slow progression
Lymphedema in the MS Population

Challenges and Considerations of MS patients with lymphedema

- Sensory issues
- Heat sensitivity
- Decrease mobility
- Decreased independence in performing self care
- Decreased independence in performing self manual lymph drainage
- Decreased ability to don compression garments
- Decreased tolerance to compression bandages
- Increased burden on caregiver
- Urinary retention after MLD
- Decreased tolerance to surgery for lymph node transfer
Most Common Types Lymphedema Seen in Multiple Sclerosis

- Vascular insufficiency (upper and/or lower extremities)
- Status post Mastectomy
- Primary Lymphedema

Goals Specific to MS

- Increased ankle ROM for increased mobility and balance
- Increase UE ROM to improve function
- Decrease risk of infection which may lead to an exacerbation
- Decrease pain
- Decrease fatigue
- Improve sensation and proprioception
Case study #1

- Patient is a 46-year-old female with history of breast cancer and multiple sclerosis times 10 years. She is an active mom and avid tennis player. She presented to therapy at the MS clinic for evaluation secondary to complaints of RUE weakness. It was noted during her exam that she had a significantly larger RUE. She reported that she had undergone a mastectomy after a diagnosis of breast cancer 5 years prior when she began noticing swelling of her arm. On examination patient's right upper presented with decreased sensation, decreased coordination, decreased grip strength, and decreased gross manual muscle strength. She reports she was told she had lymphedema in the past, but was never treated.
Case study #1

- Treatment:
  - Education was provide about lymphedema and precautions
  - Instructed in manual lymph drainage for her RUE
  - Fit for daily compression arm sleeve
  - Issued sequenced exercises for lymphedema
  - Extra precautions secondary to sensory impairments
  - Home exercise program for stretching, strengthening, and fine motor coordination skills
  - Patient was a good candidate for Lymph node transfer and was seen by surgeon and for pre-op therapy, but decided against surgery at this time.

Case Study # 2
Case study #2

- Patient is a 62-year-old female with a history of multiple sclerosis times 20 years. Ten months prior to her admission to outpatient therapy she underwent reconstructive surgery on her upper thoracic spine. This surgery lead to significant decline in functional mobility and patient has now a full-time wheelchair. She requires moderate to maximal assist for all ADL’s and has a full-time caregiver whom has health issues which limit her physically as well.

- Evaluation revealed significant BLE distal edema, hyperkerotic skin changes, fibrotic tissue, weeping skin, and a small wound.
- Pt is non-ambulatory with only minimal to trace movement in her LE’s.
- BLE’s present with spasticity and active spasms (left > right)
- Decreased sensation noted in BLE’s
- Patient has poor sitting balance
- Mild weakness in BUE’s
- Fatigues easily
Case study #2

- Treatment:
  - Education was provided about lymphedema and precautions (skin care)
  - Instructed in manual lymph drainage for her BLE’s (modified as she could only reach her mid thigh)
  - Fit for daily compression (pt was only able to tolerate light compression and caregiver had to be able to don compression)
  - Issued sequenced exercises for lymphedema (modified secondary to decreased balance and inability to move LE’s actively)
  - Extra precautions secondary to sensory impairments

Compression therapy

- Patient was a good candidate for vasopneumatic compression because of physical limitations and cause of edema. She has an added benefit of a reduction in spasticity s/p treatment.
Case study #3

- Patient is a 73yo male with the diagnosis of MS x30 years. He has a significant cardiac hx including a TIA, MI x2, pacemaker with defibrillator and a left femur fx. Pt has a high fall risk which was reported as daily upon admission. He lives in West Virginia, but winters in Florida and lives in a handicapped accessible hotel room with his wife. He performs ADL’s with modified independence; however, safety is an issue.

Pt was seen refer to OT initially for ADL re-training, UE weakness, and FMC deficits. It was also identified that patient had significant edema in BLE’s and mild edema in his LUE.

- Cardiac clearance obtained prior to initiation of lymphedema treatment.
- Further evaluation of patient’s BLE’s revealed weeping, hyperkerotic skin changes, and fibrotic tissue,
- No open wounds; however, patient reported wounds are common and there was noted scarring over anterior of bilateral lower legs.
Case study #3

- Treatment:
  - Education was provided about lymphedema and precautions
  - Instructed in manual lymph drainage for his BLE’s (modified as she could only reach his knees)
  - Instructed in manual lymph drainage for his LUE
  - Fit for daily compression for his BLE’s (pt was only able to tolerate light compression) which he donned using a sock aid. No compression was needed for his LUE as he was able to manage edema with massage, exercise, and elevation.
  - Issued sequenced exercises for lymphedema

Patient had good results from treatment. Increased ankle mobility lead to zero falls by end of treatment.
Questions?

References


References


