Head and Neck Lymphedema

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Definition & Incidence

- Lymphedema is the swelling that can occur in any part of the body due to non-functional lymphatic vessels or lymph nodes.
- Increased protein-rich fluid in the affected area.
- Mainly affects arms and legs but is also seen in head, neck, face, abdomen, genitals, breast, and back.
- Common side effect of cancer surgeries and radiation therapy.
- Affects 1% of the American population (about 3.5 million people).
- Facial edema in 30-60% cases following bilateral neck dissection.
- Chronic condition, non-curable but manageable.
Lymphatic system

- Lymphatic system is the immune system in our body.
- It is comprised of lymph vessels, lymph nodes, the tonsils, the thymus, and the spleen.
- Lymph fluid is a clear-to-white liquid composed of various substances including protein, salts, glucose, fats, water, and white blood cells.
- The primary function of the lymphatic system is to transport infection-fighting cells throughout the body and remove toxins and waste products from different tissues and organs.
- About 600–700 lymph nodes in the body, of which about 300 are in the neck.

Why Lymphedema?

- Under normal conditions, lymph is collected by lymph vessels and drained into lymph nodes.
- From there, it is eventually returned into the bloodstream.
- When this process is interrupted by removal of lymph nodes or damage to the lymph nodes by radiation, the lymph fluid is collected in tissues.
- This collection of protein-rich fluid in the tissues is referred to as lymphedema.
- About 500–700 lymph nodes in the body, of which about 300 are in the neck.
Types of Lymphedema

Primary Lymphedema:
- Caused by congenital malformation of lymphatic vessels/nodes.
- May be present at birth or develop later in life without any known cause.
- Common in women (87%); 90% sporadic, 10% familial.

Secondary Lymphedema:
- Caused by damage to lymphatic pathways and/or nodes.
- Common reasons include cancer, surgery, radiation, injury, trauma, chronic venous disease, infection, obesity.
- Affects men and women equally.

Primary Lymphedema:
- 1st episode frequently occur in 2nd or 3rd life decades.
- Common age: 17 years.
- Most cases, swelling is unilateral. If bilateral, then swelling is asymmetric.
- Hypoplasia: lymphatic vessels are too narrow.
- Aplasia: insufficient number of lymphatic vessels and nodes.
- Lymphangiectasia: dilatation of lymphatic vessels with resultant valvular insufficiency.
- Primary lymph node fibrosis: some lymph nodes become fibrotic which obstructs lymph fluid.
- Praecox: before age 35.
- Tarda: after age 35.
- Genetic cause is known, approximately 4% of edema.

Secondary Lymphedema:
- Usually a known cause of edema.
- Post Surgical: Axillary lymph node dissection, neck dissection, bladder/prostate surgery, lymphoma, ovarian cancer, joint replacement.
- Post Radiation.
- Post Infection: Erysipelas, Lymphangitis, Lymphadenitis, Filariasis.
- Post Inflammation: Rheumatic disorders, Rheumatoid arthritis.
- Chronic venous insufficiency.
- Obesity.
- Trauma: Whiplash injury, scarring, crush injury.
- Self induced.

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Signs and Symptoms

- Sensation of heaviness / tension
- Restricted motion
- Pitting, degree dependent on stage of edema development
- Pitting may be less or may not be present
- May be associated with thinning of dermis
- Usually will begin at root of limb, base of neck
- May be associated with initial redness
- Continuous dull ache, even severe pain at times
- Skin problems including dryness, flakiness, thickening, excoriation and breakdown
- Positive Stemmer's sign, toes square
- Recurrent infections

Stages of Lymphedema

<table>
<thead>
<tr>
<th>Stages</th>
<th>Description</th>
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<tbody>
<tr>
<td>Latency Stage/Pre-Stage</td>
<td>No visible edema</td>
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<tr>
<td></td>
<td>Subjective complaints of heaviness and aching</td>
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<td>Transport capacity is reduced</td>
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<tr>
<td>Stage 1</td>
<td>Edema is clinically visible but spontaneously reversible</td>
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<tr>
<td></td>
<td>Tissue is soft</td>
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<tr>
<td></td>
<td>Pitting in edematous tissue possible</td>
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<tr>
<td></td>
<td>Fibrosis not developed</td>
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<tr>
<td></td>
<td>Stemmer's sign is negative</td>
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<tr>
<td>Stage 2</td>
<td>Edema is not spontaneously reversible. It can be softened but not completely eliminated.</td>
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<tr>
<td></td>
<td>Edema is harder and pitting hardly possible</td>
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<tr>
<td></td>
<td>Fibrosclerotic change</td>
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<tr>
<td></td>
<td>Stemmer's sign frequently positive</td>
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<tr>
<td>Stage 3</td>
<td>Irreversible skin changes</td>
</tr>
<tr>
<td></td>
<td>Lymphostatic elephantiasis</td>
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<tr>
<td></td>
<td>Hardening and thickening of skin</td>
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<tr>
<td></td>
<td>Disfigurement of the extremity</td>
</tr>
<tr>
<td></td>
<td>Stemmer's sign is positive</td>
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<tr>
<td></td>
<td>Accumulation of protein-rich edema</td>
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</table>
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**MD Anderson Cancer Center Head & Neck Lymphedema Rating Scale**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Exam Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No swelling but a sense of heaviness in the neck</td>
</tr>
<tr>
<td>1a</td>
<td>Visible mild swelling without pitting. Reversible</td>
</tr>
<tr>
<td>1b</td>
<td>Visible mild swelling with pitting. Reversible</td>
</tr>
<tr>
<td>2</td>
<td>Firm pitting swelling that is irreversible. No visible tissue changes</td>
</tr>
<tr>
<td>3</td>
<td>Irreversible tissue changes with scarring and fibrosis.</td>
</tr>
</tbody>
</table>

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**Diagnosis**

- Physical exam and history are the most important.
- Volume measurement: measuring tape, water displacement volumetry, optoelectronic volumetry.
- Direct lymphography: invasive and has certain risks. Justified only when no contraindications exist or no other method can be used.
- Lymphoscintigraphy: minimally invasive, low risk, nuclear imaging method to assess superficial and deep lymphatic vessels.
- CT scan.
- MRI.
- Lymphangiogram: not commonly performed due to lack of clinical importance.

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**Treatment**

- Proper posture at all times and proper positioning while sleeping.
- Scar Management.
- Compression garments.
- Lymph Taping.
- Exercises.
- Skin care.
- Diet.
- Sleep and stress management.
Posture and Sleep Position

- Maintain appropriate head, neck and shoulder posture at all times.
- Strengthen the scapular and neck muscles to maintain good posture during the day.
- Sleep in a semi-recumbent position (about 35 degrees).
- Have the head and neck supported with appropriate size pillow while sleeping.

Manual Lymph Drainage

- Slow, rhythmic stretching of the skin to stimulate the lymph vessels and capillaries and thereby facilitate the lymph flow.
- Movement of the lymph fluid from an area affected by lymphedema to an area that is healthy.
- Utilizes subcutaneous lymph vessels.
- Utilizes lymphatic anastomoses and existing lymphovenous anastomoses.
- Breakdown tissue fibrosis.
- Gentle pressure – never cause redness or pain.
- Soothing and relaxing with stimulation of the PNS.
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Manual Lymph Drainage

- Indications:
  - Lymphedema
  - Phlebolymphedema
  - Lipedema
  - Traumatic edema
  - Post-surgical edema
  - Arthropathy
  - Reflex sympathetic dystrophy
  - Rheumatic disease

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Manual Lymph Drainage

- Absolute Contraindications:
  - Malignant disease, including tumor recurrence or metastases
  - Acute inflammation
  - Acute allergy
  - Acute thrombosis
  - Cardiac decompensation (cardiac insufficiency)

- Relative Contraindications:
  - Low blood pressure
  - Thyroid disorder
  - Pregnancy – during the first couple months or if there are complications

- Possible indications:
  - Local disturbances of lymph flow due to trauma like in Whiplash injury
  - Local disturbances of lymph flow post surgery
  - Lymphostatic encephalopathy
  - Pretreatment for MLD in all other body regions

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Manual Lymph Drainage for Neck Treatment

- Absolute contraindications:
  - Hyperthyroidism
  - Hypersensitive carotid sinus
  - Cardiac arrhythmia

- Relative contraindications:
  - Patients over the age of 60 with possibility of atherosclerosis of carotid artery

- Possible indications:
  - Prevention of lymph flow disturbances, especially in cases of neck surgery
  - Prevention of lymphostatic encephalopathy
  - Pretreatment for MLD in all body regions
Scar Management

- Scar massage to soften and flatten the scar tissue
- Gentle pressure
- Prolonged stretch
- Release the scar tissue from underlying muscle, bone, and fascia
- Promote lymphatic regrowth and anastomosis
- Scar desensitization

Other methods:
- Elastomer molds, gel sheet
- Compression garments

Compression Garments

- Preferably applied right after manual lymph drainage to prevent reaccumulation of fluid
- Helps breakdown the fibrotic tissue
- Provides even compression due to the garment's low elastic material
- Pressure to not exceed more than 10 mm Hg pressure
- Short stretch compression bandages during the initial decongestive phase
- Daytime and nighttime compression garments for long-term management
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Short stretch compression bandages

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Compression Garments
- Jobst Epstein Support
  - Can be used on the neck and over the head
  - Ease of application
  - Can add foam pads underneath to add compression
  - Slit can be created to expose ears

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Compression Garments
- Nighttime compression garment – The Chin Strap
  - Designed to address edema of the neck, mandible, and anterior and lateral aspects of the face
  - Velcro straps at the neck and top of the head
  - Can be used as a daytime/nighttime garment
  - Comes without the padding
Compression Garments

- Used as a nighttime garment for facial and peri-orbital edema management

Foam neck collar for tracheostomy

- Provides support and some compression
Lymph Taping

- Cure Tape - similar to KT tape
- Applied in accordance with the lymphatic system of the body
- Effectively lifts the skin a little through which the lumen of the lymph capillaries are opened
- Stimulates lymph drainage 24 hours a day
- Tape usually requires replacement every 5-6 days depending on the sweat production

Exercise

- Muscle contraction helps pump fluids away from the swollen area
- Improves circulation
- Prevents adhesion formation by gliding of tissue
- Increases mobility & flexibility of tissue
- Reduces tension on neck muscles
- Improves neck movement which will prevent neck pain long term
- Strong muscles will pump fluids out of the area
- Helps maintain normal cervical alignment through proper posture
- Important to exercise neck, face and shoulder muscles
  - Cardio/Aerobic exercise 30 minutes/day, 5 days per week
Skin care

- Very important to wash skin daily without using harsh soaps
- Can use natural boar bristle dry brush to remove dead skin and promote lymph circulation
- After brushing, use non-fragrant soap (Dove, Ivory, Cetaphil, etc.) to clean your skin
- Gently dab your skin dry with a clean towel
- Do not rub vigorously
- Apply non-fragrant and non-pore blocking body lotion (Eucerin, Aquaphor, Cetaphil, etc.)
- Important to keep skin soft and supple to keep it healthy
Diet
- Watch sodium intake
- Manage weight
- Stick with plant-based diet rich in omega-3 with rainbow-colored fruits and vegetables
- Drink 64-80 ounces of water daily (unless on fluid restrictions)

Sleep and Stress Management
- Make sleep a priority
- Need 7-8 hours of sleep every night
- Be on a fixed sleep schedule
- Do not watch television before going to bed at night
- Listen to soothing/relaxing music, meditate or simply focus on your breath while in bed
- Focus on deep diaphragmatic breathing
- Seek medical attention if you need assistance managing stress

What happens if lymphedema is left untreated?
Complications of lymphedema & General information

- Pronounced postsurgical lymphostasis of the neck and head
- Swelling of cutis, subcutis and mucous membrane leading to cerebral functional deficiency
- Lymphostatic encephalopathy
  - Depressed mood
- Ophthalmopathy
  - Impaired vision
- Lymphedema that develops after a long edema free interval is a strong indicator of recurrent tumor growth.
- Intensive diagnostic examination
- Avoid exposure to sunlight, bug bites, and injuries sustained during dental treatment.

Patient Resources
- American Cancer Society
  - 1-800-227-2345; Donate, Volunteer and support
- National Lymphedema Network
  - www.lymphnet.org
  - Can find a local lymphedema therapist
- Lymphatic Education & Research Network (LE&RN)
  - www.lymphaticnetwork.org
- American Head and Neck Society
  - (310) 437-0559; Email: admin@ahns.info
- Nat’l Cancer Institute: Treatment of Lymphedema
  - 1-800-4-CANCER
- Lymphology Association of North America (LANA)
  - www.clt-lana.org
References

- Lymphedema following therapy of head and neck malignancies, Weissleder, H and Schuchhardt, C; Lymphedema Diagnosis and Therapy, 4th Ed; 264-274.