Objectives

- Discuss Complete Decongestive Therapy (CDT) treatment for lymphedema inpatients
- Briefly discuss educational resources MSK provides to patients at risk for lymphedema
- Explain how lymphedema concepts and techniques have been utilized, modified, and applied to assist with goals of care for patients with various diagnoses
- Review goals and guidelines for each of these approaches
- Examine common challenges
Goals of Service

1. Provide effective CDT to patients referred with lymphedema

2. Facilitate achievement of plan of care goals for patients with other diagnosis such as:
   - Renal insufficiency
   - Capillary leak syndrome
   - Hypoalbuminemia
   - Amyloidosis
   - Autonomic instability
   - Nephrotic dysfunction

Goals of Service

3. To provide effective treatment for patients with planned large vessel removal/ligation (Inferior vena cava, Sarcoma) utilizing a team approach to pre-operative garment fitting and follow-up

4. To provide education to at-risk populations via:
   - Lower extremity lymphedema prevention group
   - Breast surgery rehabilitation group (BSRG)

International Society of Lymphology (ISL)
Lymphoedema Staging\(^1\)

Stage 0
- A subclinical state where swelling is not evident despite impaired lymph transport. This stage may exist for months or years before edema becomes evident.

Stage I
- This represents early onset of the condition where there is accumulation of tissue fluid that subsides with limb elevation. The edema may be pitting at this stage.

Stage II
- Limb elevation alone rarely reduces swelling and pitting is manifest. Late Stage II
  - There may or may not be pitting as tissue fibrosis is more evident.

Stage III
- The tissue is hard (fibrotic) and pitting is absent. Skin changes such as thickening, hyperpigmentation, increased skin folds, fat deposits and warty overgrowths develop.
Lymphedema Team

- Incorporate CDT
- Challenges
- Advantages

- Precautions
  - Hemoglobin
  - Albumin
  - Platelets
  - Blood Urea Nitrogen (BUN)
  - Creatine
  - Brain Natriuretic Peptide (BNP)
- Supplies
Educational Programs at Memorial Sloan-Kettering Cancer Center

Lower Extremity Lymphedema Prevention Group
Breast Surgery Rehabilitation Group

Evidence Based Education

Preventative Measures for Lymphedema: Separating Fact from Fiction

Evidence Supporting

Strong:
- Participation in a supervised exercise regimen both in patients with lymphedema and in those at risk for developing lymphedema

Good:
- Maintaining normal body weight or avoiding weight gain in patients who are at risk for developing lymphedema

Limited:
- Venipuncture should be avoided in patients with a history of lymph node surgery
- Preventative measures regarding limb constriction, elevation, heat and cold, and air travel and use of compression garments when flying

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Summary of Evidence²

- Risk Factors
  - Greater body weight
  - Higher BMI
  - Infection or injury in the ipsilateral arm since surgery

- Education
  - All patients should be educated about lymphedema based on the individual risk associated with the surgical procedure, not the amount of nodes removed

- Resistance Training³
  - No limit on the resistance level (gradual/progressive)
  - Not contraindicated

MSKCC Axillary Procedure Guidelines⁴¹³

- Objective
  - To guide clinical practice and patient education on lymphedema risk associated with upper extremity axillary surgery

- Strength of Evidence
  - Level A (randomized controlled trial/meta-analysis)
Summary of Evidence\textsuperscript{4-13}

- **Arm Morbidity**
  - SLNB < ALND

- **Quality of Life**
  - SLNB > ALND

- **SLNB**
  - No correlation between # of nodes removed and change in UE circumference or incidence of lymphedema

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**Increased Risk of Lymphedema?**
- (+) Mastectomy
- Larger Extent of ALND
- (+) XRT
- Presence of (+) axillary nodes

**Who Develops Lymphedema?**
- SLNB 0-7%
- ALND 15-25%

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**How We Teach**

- **LE Lymphedema Prevention Group**
  - This program is appropriate for patients who have undergone a pelvic lymph node sampling/dissection
  - We review:
    - Differences Between Edema and Lymphedema
    - Risk Factors
    - Early signs of Lymphedema
    - Exercise Guidelines
    - Compression
    - Skin Care
    - Precautions
Breast Surgery Rehabilitation Group

Edema Specific Protocols

ACTIVE TREATMENT

PALLIATIVE CARE
Referral Criteria

- Patients with SYMPTOMATIC autonomic and nephrotic dysfunction in the setting of amyloidosis WITH OR WITHOUT THE PRESENCE OF EDEMA
- Nephrotic range proteinuria (>3gm/24hours)
- Urine output > or equal to 150cc/day
- Patients with hypoalbuminemia (< or equal to 3.5g/dl serum albumin)
- Patients with decreased fluid mobilization as determined by the primary medical team

Referral Criteria

- Patients with volume overload or capillary leak syndrome
- Patients with SYMPTOMATIC orthostatic hypotension
- Patients potentially avoiding dialysis intervention
- Intact cognition, communication, and sensation
- Medically stable to participate in compressive therapy sessions

Exclusion Criteria

- Anuric (<150cc urine/day)
- Impaired cognition, communication, or sensation
- Cellulitis, arterial ulcerations, moderate to severe PVD as documented by ankle brachial index (ABI), and skin macerations
- Not medically stable to participate in compressive therapy sessions
Considerations of Rehabilitation Parameters

- Standard lymphedema precautions and contraindications DO NOT NECESSARILY apply
- Hematologic, renal, and cardiac functions ARE NOT NECESSARILY contraindications for bandaging
- Sound clinical judgment on a case-by-case basis
- Communication with physician critical

Bandaging Guidelines

- Patient comfort and adaptation
- The highest level of compression tolerated is ideal, 20-30mmHg
- Placement?
- Progressed to a 24-hour wearing schedule

Large Vessel Resection/Ligation
Large Vessel Resection/Ligation

Background:
- Retroperitoneal sarcomas
- Significant compression/compromise
- Often, re-collateralization of the vasculature has already begun

Large Vessel Resection/Ligation

Referral Criteria:
- Large vessel ligation/resection
- Sarcoma with or without LND or biopsy
- Melanoma with or without LND or biopsy

Our Role:
- Pre-operative measurements
- Post-op edema service consult for bandaging and MLD
- Referral for outpatient therapy

Measuring for Compression Stockings

Measure widest thigh
Measure widest calf
Measure smallest circumference proximal to malleoli

Please circle patient's size and write script accordingly for Juzo or Jobst garments. Contact Jean Kotkiewicz, kotkiewj@mskcc.org or Ron Lee, leer12@mskcc.org with questions.
Large Vessel Resection/Ligation

Objective Measures to Determine Improvement:

- Patient Adherence With Schedule
- Maintenance of Measurements at Follow Up
- Long-Term Garment Use

Amyloidosis

Background:

- Extracellular deposition of amyloid in one or more organs:
  - Heart, Kidneys, Nervous System, Liver, Soft Tissue
  - Chemotherapy and Stem-Cell Transplant
  - Nephrotic Dysfunction\(^{15}\)
    - Proteinuria
      - Lose protein through urine
    - Brain Natriuretic Peptide (BNP)
Amyloidosis
Objective Measures to Determine Improvement:
- Weight
- Circumferential Measurements
- Orthostatic Changes
- Creatinine
- BNP
- Urine Production
- Kidney Function
- Albumin
- Tolerance of Therapies

Renal Insufficiency

Background:
- Decreased Blood Flow to the Kidneys
- Decreased Perfusion
- Limits a Patient's Ability to Respond to the Use of Diuretics
- Defined by the Presence of:
  - Heavy Proteinuria (Protein Excretion Greater Than 3.5 g/24 Hours)
  - Hypoalbuminemia (Less Than 3.0 g/dL)
  - Peripheral Edema
Renal Insufficiency – Our Role

- Decreased Blood Flow to Kidneys
- Decreased Perfusion
- CAD? Renal Failure?
- Not Responding to Diuretics
- Need Dialysis

- EXTERNAL COMPRESSION
- INCREASED PRE-LOAD AND PERFUSION
- DIURETICS WORK, NO DIALYSIS

Renal Insufficiency

Objective Measures to Determine Improvement:
- Stabilized Blood Pressure
- Decrease in Weight
- Decrease in Creatinine
- Decrease in BUN
- Overall Improvement in Kidney Function
  - Acceptable Urine Output

Example: Orders Received

**AMYLOID**
- Transfusion dependent Myelodysplastic Syndrome (MDS)
- Allogenic Transplant
- Iron Overload
- Liver Dysfunction
- Restrictive Cardiomyopathy

**RENAL INSUFFICIENCY**
- Cannot Diurese
- Kidneys Suffer
- No Intravascular Fluid
- Low Albumin
- No “forward flow”
Capillary Leak Syndrome

- Growth Factors
- Very Rare
- Sudden Drop in Blood Pressure

Capillary Leak Syndrome

- Change in Capillary Wall Pressure
- No Known Cause
- "Watch Platelets"

Multifactorial Edema
Multifactorial Edema
Decreased Functional Participation?  Extensive Surgery?

Low Albumin?

Non-Specific Edema

We are able to assist with goals of care and edema reduction using appropriate CDT techniques?

Increased Functional Ability / Decreased Discomfort

Case Study

Case Study

- Mr. S
  - Diagnosis?
  - Medical History?
  - Treatment?
    - Referred for physical and occupational therapy
    - Lymphedema service consulted
Most Common Inpatient Lymphedema/Edema Challenges?

Scrotal Edema/ Lymphedema

Difficult to bandage in real life
- Slides off with movement
- Risk of tourniquet
- Increased time
- Patient cannot duplicate
- Decreased compliance after urination
- Easily soiled
- Moisture levels
- Skin integrity
Labia Edema/ Lymphedema

- Not possible to bandage in real life
- Difficult area in general
- Easily soiled
- Moisture levels
- May slide with movement
- Decreased compliance after urination
- Skin integrity
- Abdominal compression may not be tolerated
Hard to Treat Areas

- Chest
- Head
- Neck
- Chin
- Side of Breast
- Side of Abdomen
- Dorsum of Foot
- Dorsum of Hand
- Brachioradialis
- Lateral Thigh
- Side of Trunk
- Under Eye Area

Solutions

- Swell Spots/ Foam Chips
- Be Creative
- Add to any Area
- Cut / Modify
- Sew to Garment for More Security

Head and Neck Lymphedema
Solutions

- Swell spots to fabricated garments
- Elastic
- Wound care netting

Wounds or Weeping Edema

- Wound Care Service Consult?
- What is moisture level?
- Location?
- Pain?
- Goals of Care?
- Prognosis?
### Solutions - Define It First

**Arterial**
- Punched out lesion
- DRY
- Usually lateral leg
- NO COMPRESSION

**Venous**
- Irregular borders
- WET, increased drainage
- Usually medial leg
- ONLY COMPRESS BASED ON ABI SCALE

Hydrocolloid

Alginate

### Review of Objectives

- Discuss CDT treatment for lymphedema inpatients
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- Review goals and guidelines for each of these approaches
- Examine common challenges

### References

References

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Resources

- www.lympho.org/resources.php
- www.woundworld.org

QUESTIONS?

Thank you