Management of Lower Extremity Edema

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Relevant Disclosure

Under the Oklahoma State Medical Association CME guidelines disclosure must be made regarding relevant financial relationships with commercial interests within the last 12 months.

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I have no relevant financial relationships or affiliations with commercial interests to disclose.

Outline

- Epidemiology
- Causes of edema
- Approach to patients with edema
- Sorting out the culprits
- Primary vs. Secondary Lymphedema
- Diagnostics
- Treatment plans
- Follow up

Objective

- Understanding the epidemiology of edema.
- Be able to differentiate different causes of edema.
- Be able to order appropriate diagnostic testing.
- Be able to advise treatment plans accordingly.

Epidemiology

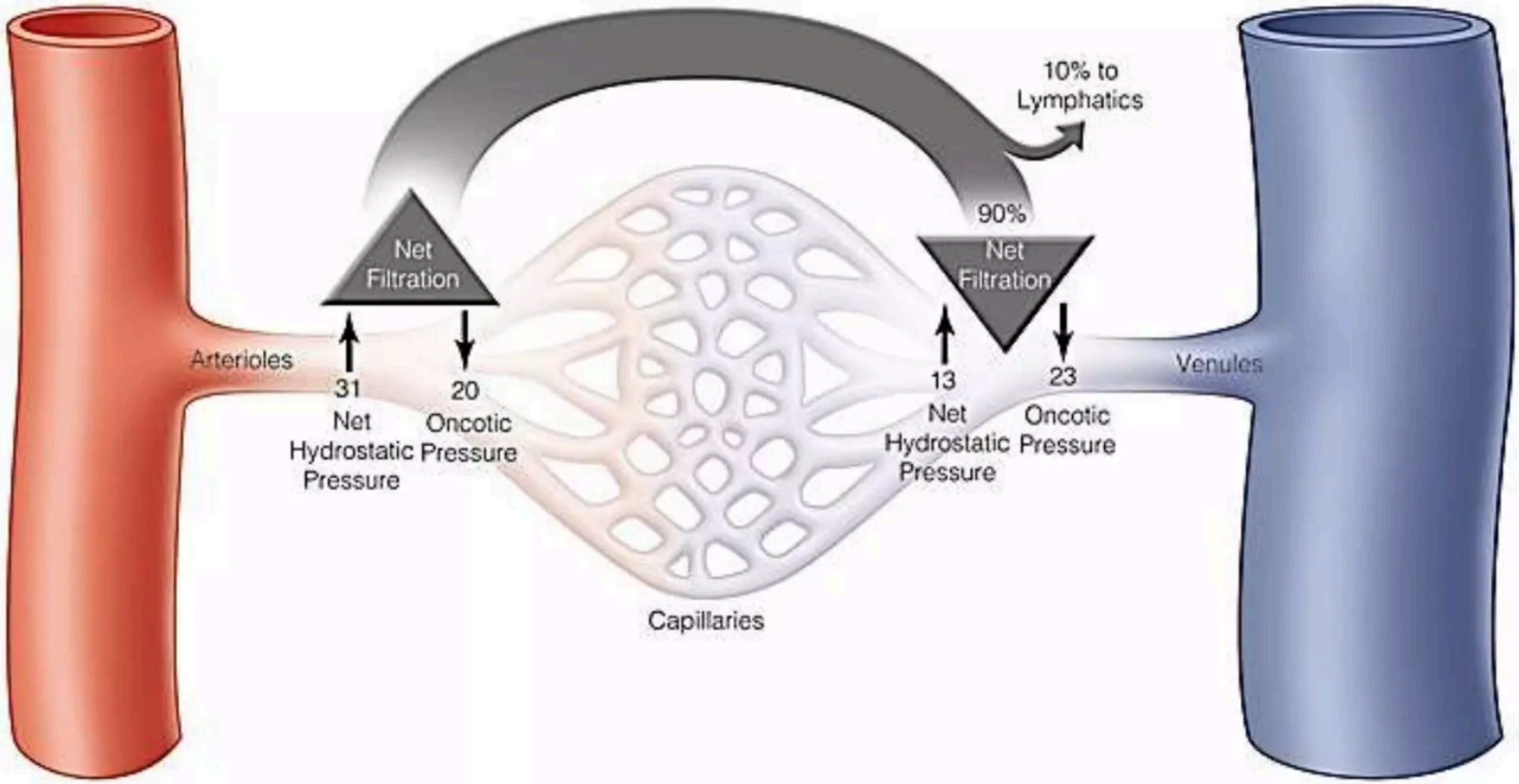
- Edema: Abnormal collection of fluid in the interstitium.
- Can occurs anywhere in a human body: generalized edema, ascites, pulmonary edema, cerebral edema.
- Most common: lower extremity edema.
- Common causes:
  - Chronic venous disease
  - Lymphatics
  - Medications
  - Venous thrombosis
  - Heart failure
  - Chronic kidney disease
  - Cirrhosis
  - Pregnancy

Up To Date

Edema

- 60% of our body's weight is water.
- 2/3rd of it is Intracellular, 1/3rd is Extracellular.
- Extracellular fluid is divided into Intravascular, Interstitial, and Transvascular.
- Fluid movement is a balance of "Vascular Hydrostatic Pressure" and "Plasma Colloid Osmotic Pressure"
- Small residual amount of excess interstitial fluid is drained by lymphatic network back thoracic duct.
- Impairment of the drainage system would lead to accumulation of interstitial fluid resulting in EDEMA.

National Library of Medicine: Edema Physiology


10% to
Lymphatics
90%
Net
Filtration
Net
Filtration
Arterioles
31
Net
Hydrostatic
Pressure
20
Oncotic
Pressure
13
Net
Hydrostatic
Pressure
23
Oncotic
Pressure
Venules
Capillaries

Cellular Level Causes

- 1. Increased hydrostatic pressure (1 > 2).
- 2. Reduced plasma oncotic pressure.
- 3. Increased blood vessel wall permeability (inflammation).
- 4. Obstruction of fluid clearance in lymphatic system.
- 5. Changes in water retaining properties of the tissues themselves (water and sodium retention causes increased hydrostatic pressure).

National Library of Medicine: Edema Physiology

The Effects of Diuretics

- Increase in sodium and water excretion.
- Increase in plasma osmolality and oncotic pressure.
  - "Hemoconcentrates blood"
- Increase in reabsorption of lymphatic fluid to vascular system.
- Results: Reduce swelling.
- Side effects: leg cramps, urinary urgency, renal insufficiency, hyponatremia, dizziness, etc.

Up To Date

Approach to Patients with Edema

- Unilateral vs. Bilateral leg edema.
- Pitting vs. Non-pitting edema.
  - Rapid pitting (< 40 sec) vs. Slow pitting (> 40 sec)
- Systemic vs. Regional edema.
  - Systemic or generalized edema (CHF, cirrhosis, nephrotic syndrome, systemic infection, etc.).
  - Localized edema - lower extremity edema.

Sorting Out Edema

Unilateral	Bilateral
Venous compression	Obesity
Venous insufficiency	Heart/liver/renal failure
Post Thrombotic Syndrome	Cyclic idiopathic
Deep venous thrombosis	Hypoproteinemia
Lymphedema	Venous obstruction
Angiodysplasias	Pregnancy
Baker cysts	Drugs
Cellulitis, arthritis	Lipedema

Unilateral/Asymmetric Edema

- Most common - Chronic Venous Disease
  - Preceded by thrombophlebitis, pigmentary changes, skin ulceration, varicosities.
- Secondary lymphedema, pelvic venous compression, complex regional pain syndrome, phlebolymphedema.
  - Lymphedema: lymph node resection, radiation therapy, cutaneous fibrosis.
  - Pelvic venous compression: mass effect, iliac vein compression.
  - Complex regional pain syndrome: 4-6 weeks after limb trauma, pain, edema and alteration of skin color and temperature.

Bilateral Leg Edema

- Medications: Norvasc, Actos, Lyrica, Neurontin.
- Heart, lungs, kidneys, thyroid, and liver failure.
  - Heart - look at EF and diastolic dysfunction
  - Lung - sleep apnea, pulmonary hypertension
  - Kidneys - nephrotic syndrome, CKD
  - Liver - ascites, NASH
  - Thyroid - pretibial myxedema (thyroid dermopathy).
- Blood clots (bilateral DVT, IVC thrombosis).
- Lymphedema - secondary causes: Obesity (common) vs. Filariasis (rare).

Pit ng

- Non-pitt xedema.
  - Do n
- Pitting e
  - Rapi >40 sec)
    - L
  - Resp

Primary vs. Secondary Lymphedema

- Primary: Lymphedema Praecox (onset before age 35).
  - Meige disease (puberty), Milroy disease (birth)
- Secondary: Lymphedema Tarda (onset after age 35)
  - Everything else: lymph node resection, malignancy, obesity, pelvic surgeries, organ failure, venous obstruction, venous insufficiency.

Mehrara et al. Principle and Practice of Lymphedema Surgery 2nd Ed.

Diagnostics

- Venous duplex
  - DVT scan
  - Insufficiency study
- Echocardiography
- Lymphoscintigraphy
- CT Venography
- MR Venography
- Direct Venography

Treatment Principles

- Reduce fluid collection
  - Decongestive therapy
  - Diuretic therapy, discontinuation of offending medications
- External compression
  - Elastic vs. Inelastic
- Remove obstruction
  - Remove DVT and venous obstruction
  - Treat venous insufficiency
- **Weight loss really works!!!**

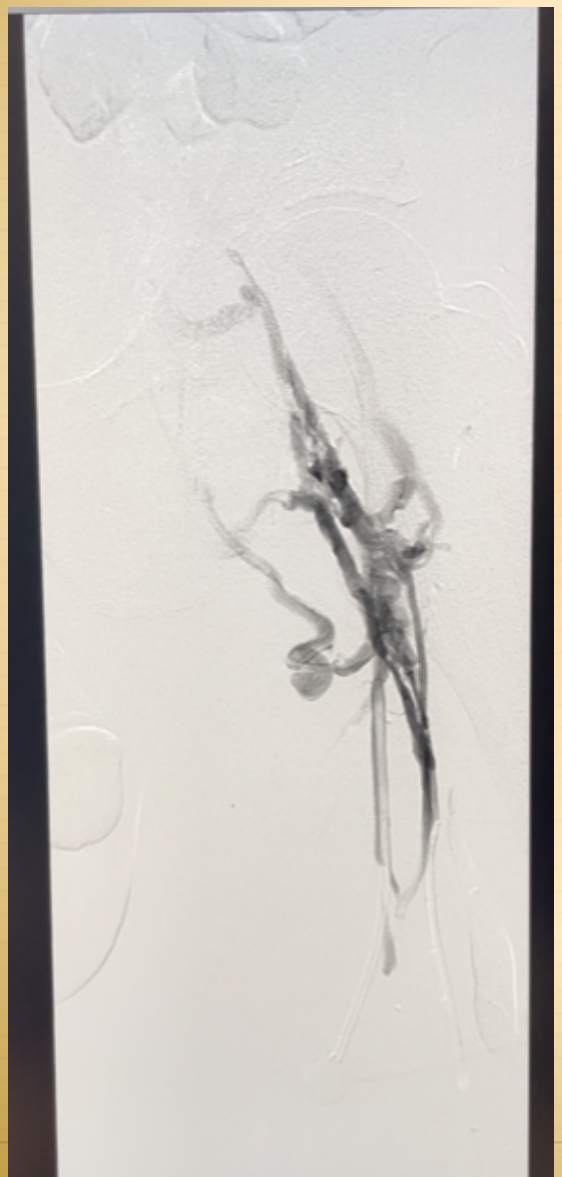
Elastic Compression Stockings

- Proper fitting is needed for better tolerance.
- Not all stockings are created equal.
- Generic cheap stockings can hurt.
- Graduated stockings are better but patient depending.
- Most can only tolerate 20-30 mmHg compression.
- Older patients with arthritic grips, obesity, limited mobility/ flexibility, are a challenge.
- Creative solutions: Tubigrip, diabetic stockings, inelastic wraps.


Mölnlycke®
Tubigrip®
Elasticated tubular support bandage
10m

Superficial Venous Treatment

Deep Venous Treatment



Follow Up

- Usually 3 months after initial assessment
- Further testing or treatment to be determined at follow up
- Imaging is needed after endovenous treatments.
- Compressive garment and medication adjustment.
- Periodic follow up for flare ups.
- Long-term routine appointments are usually not needed.

Thank you !!!