Practical Approach to Lower Extremity Edema
Not Everything that Swells is Heart Failure
A common challenge for primary care physicians and cardiologists alike

Goal is to determine the cause and find an effective treatment for leg edema

Despite the prevalence, no formal existing practice guidelines at present
Edema is defined as a palpable swelling caused by an increase in interstitial fluid volume.

Edema, other than localized edema, does not become clinically apparent until the interstitial volume has increased by 2.5 to 3 liters.
Etiology of Edema

- Increase in intravascular pressure
- Increase in capillary vessel wall permeability
- Decrease in the intravascular osmotic pressure
- Excess bodily fluids
- Lymphatic obstruction
- Local injury
- Infection
- Medication effect
Anatomy and Pathophysiology

Lymph Capillaries in the Tissue Spaces

- Lymph capillary
- Tissue cells
- Tissue spaces
- Arteriole
- Venule
- Tissue fluid
- Lymphatic vessel
Anatomy and Pathophysiology

Starling's Law of Capillaries

- Blood flow into capillary
- Larger hydrostatic pressure = 35mm
- Smaller hydrostatic pressure = 25mm
- Smaller osmotic pressure = 15mm
- Larger osmotic pressure = 25mm

Net flow out of capillary into tissues = 10mm
Net flow into capillary = 10mm
Anatomy and Pathophysiology

**KEY**

- CHP = Capillary hydrostatic pressure
- BCOP = Blood colloid osmotic pressure
- NFP = Net filtration pressure

- 24 l/day moves out of capillaries
- No net fluid movement
- 20.4 l/day reabsorbed
- 3.6 l/day reabsorbed into lymphatic capillaries
- NFP = +10 mm Hg
- NFP = 0
- NFP = -7 mm Hg
- CHP > BCOP: Fluid forced out of capillary
- CHP = BCOP: No net movement of fluid
- BCOP > CHP: Fluid moves into capillary

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Introduction

- The most likely cause of leg edema in patients over age 50 is venous insufficiency
  - Venous insufficiency affects up to 30% of the population
  - Heart failure affects only approximately 1%
Introduction

- The most likely cause of leg edema in women under age 50 is idiopathic edema (formerly known as cyclic edema).
Most patients can be assumed to have one of these diseases unless another cause is suspected after a history and physical examination.

However, there are at least 2 exceptions to this rule:

- pulmonary hypertension
- early heart failure

Both conditions can both cause leg edema before they become clinically obvious in other ways.
Classification

- There are two types of leg edema:
  - **Venous edema** consists of excess low-viscosity, protein-poor interstitial fluid resulting from increased capillary filtration that cannot be accommodated by a normal lymphatic system.
  - **Lymphedema** consists of excess protein-rich interstitial fluid within the skin and subcutaneous tissue resulting from lymphatic dysfunction.

- A third type, **lipidema**, is more accurately considered a form of fat maldistribution rather than true edema.
Key elements of the history include:

- What is the *duration* of the edema (acute [<72 hours] vs. chronic)?
- If the onset is acute, deep vein thrombosis should be strongly considered (the 72-hour cutoff is commonly cited but arbitrary).
# Common Causes of Leg Edema in the United States

<table>
<thead>
<tr>
<th>Unilateral</th>
<th>Bilateral</th>
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<tbody>
<tr>
<td><strong>Acute (&lt;72 hours)</strong></td>
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<tr>
<td>o Deep vein thrombosis</td>
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<tr>
<td><strong>Chronic (&lt;72 hours)</strong></td>
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<tr>
<td>o Venous insufficiency</td>
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<td></td>
<td>o Pulmonary hypertension</td>
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<td></td>
<td>o Heart failure</td>
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<td></td>
<td>o Idiopathic edema</td>
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<td></td>
<td>o Lymphedema</td>
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<td></td>
<td>o Drugs</td>
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<td>o Premenstrual edema</td>
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### Less Common Causes of Leg Edema in the United States

<table>
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<tr>
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<tr>
<td>- Ruptured Baker's cyst</td>
<td>- Bilateral deep vein thrombosis</td>
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<tr>
<td>- Ruptured medial head of gastrocnemius</td>
<td>- Acute worsening of systemic cause (heart failure, renal disease)</td>
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<tr>
<td>- Compartment syndrome</td>
<td>- Chronic (&lt;72 hours)</td>
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<tr>
<td><strong>Chronic (&lt;72 hours)</strong></td>
<td>- Renal disease (nephrotic syndrome, glomerulonephritis)</td>
</tr>
<tr>
<td>- Secondary lymphedema (tumor, radiation, surgery, bacterial infection)</td>
<td>- Liver disease</td>
</tr>
<tr>
<td>- Pelvic tumor or lymphoma causing external pressure on veins</td>
<td>- Secondary lymphedema (secondary to tumor, radiation, bacterial infection, filariasis)</td>
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<tr>
<td>- Reflex sympathetic dystrophy</td>
<td>- Pelvic tumor or lymphoma causing external pressure</td>
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<td>- Dependent edema</td>
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<td>- Diuretic-induced edema</td>
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<td></td>
<td>- Preeclampsia</td>
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<td>- Anemia</td>
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# Rare Causes of Leg Edema in the United States

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<tr>
<td>- Primary lymphedema (congenital lymphedema, lymphedema praecox, lymphedema tarda)</td>
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<tr>
<td>- Congenital venous malformations</td>
<td>- Protein losing enteropathy, malnutrition, malabsorption</td>
</tr>
<tr>
<td>- May-Thurner syndrome (iliac-vein compression syndrome)</td>
<td>- Restrictive pericarditis</td>
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<td></td>
<td>- Restrictive cardiomyopathy</td>
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</tbody>
</table>
Key elements of the history include:

- What is the *duration* of the edema (acute [<72 hours] vs. chronic)?
- If the onset is acute, deep vein thrombosis should be strongly considered (the 72-hour cutoff is commonly cited but arbitrary)
- Is the *edema* painful?
  - Deep vein thrombosis and reflex sympathetic dystrophy are usually painful.
  - Chronic venous insufficiency can cause low-grade aching.
  - Lymphedema is usually painless.
History

Painful swelling?

Reflex Sympathetic Dystrophy

Acute Deep Venous Thrombosis
Key elements of the history include:

- What *drugs* are being taken?
  - Calcium channel blockers, prednisone, and anti-inflammatory drugs are common causes of leg edema.
<table>
<thead>
<tr>
<th>Medications</th>
<th>Hormones</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antihypertensive drugs</td>
<td>Corticosteroids</td>
<td>NSAIDs</td>
</tr>
<tr>
<td>Calcium channel blockers</td>
<td>Estrogen</td>
<td>Monoamine oxidase inhibitors</td>
</tr>
<tr>
<td>Beta blockers</td>
<td>Progesterone</td>
<td>Rosiglitazone</td>
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<tr>
<td>Clonidine</td>
<td>Testosterone</td>
<td>Pioglitazone</td>
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<td>Hydralazine</td>
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<td>Minoxidil</td>
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<td>Methyldopa</td>
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History

Key elements of the history include:

- What *drugs* are being taken?
  - Calcium channel blockers, prednisone, and anti-inflammatory drugs are common causes of leg edema.
- Is there a history of *systemic disease* (heart, liver, or kidney disease)?
- Is there a history of pelvic/abdominal *neoplasm* or *radiation*?
Key elements of the history include:

- Does the edema *improve overnight*?
  - Venous edema is more likely than lymphedema to improve overnight.

- Is there a history consistent with *sleep apnea*?
  - Sleep apnea can cause pulmonary hypertension, which is a common cause of leg edema.
  - Findings that may increase suspicion of sleep apnea include loud snoring or apnea noted by the sleep partner, daytime somnolence, or a neck circumference >17 inches.
Physical Examination

- **Body mass index.**
  - Obesity is associated with sleep apnea and venous insufficiency.
Physical Examination

- **Distribution of edema:**
  - *Unilateral* leg edema is generally due to a local cause such as deep vein thrombosis, venous insufficiency, or lymphedema.
  - *Bilateral* edema can be due to a local cause or systemic disease, such as heart failure or kidney disease.
  - *Generalized* edema is due to systemic disease.

  - The dorsum of the foot is spared in lipidema but prominently involved in lymphedema.
Physical Examination

- **Tenderness:**
  - Deep vein thrombosis and lipidema are often tender.
  - Lymphedema is usually nontender.

- **Pitting:**
  - Deep vein thrombosis, venous insufficiency, and early lymphedema usually pit.
  - Myxedema and the advanced fibrotic form of lymphedema typically do not pit.
Physical Examination

- **Varicose veins:**
  - Leg varicosities are often present in patients with chronic venous insufficiency, but venous insufficiency can occur without varicose veins.
Physical Examination
Physical Examination

- **Kaposi-Stemmer sign:**
  - Inability to pinch a fold of skin on the dorsum of the foot at the base of the second toe is a sign of lymphedema
Physical Examination

- **Skin changes:**
  - A warty texture (hyperkeratosis) with papillomatosis and brawny induration are characteristic of chronic lymphedema.
Physical Examination

- **Skin changes:**
  - A warty texture (hyperkeratosis) with papillomatosis and brawny induration are characteristic of chronic lymphedema.
  - Brown hemosiderin deposits on the lower legs and ankles are consistent with venous insufficiency.
Physical Examination

- Skin changes: Venous Stasis Dermatitis
Physical Examination

- **Skin changes:**
  - A warty texture (hyperkeratosis) with papillomatosis and brawny induration are characteristic of chronic lymphedema.
  - Brown hemosiderin deposits on the lower legs and ankles are consistent with venous insufficiency.
  - Reflex sympathetic dystrophy initially leads to warm tender skin with increased sweating. Later the skin is thin, shiny, and cool. In the chronic stage, the skin becomes atrophic and dry with flexion contractures.
Physical Examination

- Reflex Sympathetic Dystrophy:
Physical Examination

- **Signs of systemic disease:**
  - findings of heart failure (especially jugular venous distension and lung crackles)
  - liver disease (ascites, spider hemangiomas, and jaundice) may be helpful in detecting a systemic cause
Diagnostic Studies

- Laboratory Tests
  - Most patients over age 50 with leg edema have venous insufficiency, but if the etiology is unclear, a short list of laboratory tests will help rule out systemic disease:
    - complete blood count, electrolytes, creatinine
    - urinalysis
    - blood sugar
    - thyroid-stimulating hormone
    - albumin
Diagnostic Studies

- Laboratory Tests
  - A serum albumin below 2 g/dL often leads to edema and can be caused by:
    - liver disease
    - nephrotic syndrome
    - protein-losing enteropathy
Additional tests are indicated depending on the clinical presentation:

- Patients who may have a cardiac etiology should have an electrocardiogram, echocardiogram, and chest radiograph.
- Dyspneic patients should have a brain natriuretic peptide (BNP) determination to help detect heart failure.
- The BNP is most helpful for ruling out (rather than ruling in) heart failure because the sensitivity is high (90%).
Diagnostic Studies

- Additional tests are indicated depending on the clinical presentation:
  - *Idiopathic edema* can be diagnosed in young women without further testing if there is no reason to suspect another etiology based on history and physical examination.
  - However, tests to confirm idiopathic edema have been described and may be helpful in difficult cases.
Additional tests are indicated depending on the clinical presentation:

- In patients with *acute edema* (<72 hours)
  - A normal D-dimer will essentially rule out deep vein thrombosis if the clinical suspicion is low because false negative D-dimers are rare.
  - However, an elevated D-dimer should be followed up with a Doppler examination because false positive D-dimers are common.
Diagnostic Studies

- Additional tests are indicated depending on the clinical presentation:
  - Patients with possible nephrotic syndrome should have serum lipids in addition to the basic laboratory studies listed above.
Imaging Studies

- Patients over age 45 with edema of unclear etiology should have an echocardiogram to rule out pulmonary hypertension.
Imaging Studies

- Patients over age 45 with edema of unclear etiology should have an echocardiogram to rule out pulmonary hypertension.
- Lymphoscintigraphy can be helpful to distinguish lymphedema from venous edema and to determine the cause of lymphedema.
- Lymphoscintigraphy is performed by injecting a radioactive tracer into the first web space and monitoring lymphatic flow with a gamma camera.
Imaging Studies

Lymphoscintigraphy
Treatment

- **Venous Insufficiency**
  - Chronic venous insufficiency is treated with leg elevation and knee-high compression stockings that provide 30 to 40 mm Hg pressure at the ankle.
  - If arterial insufficiency is a concern, an ankle-brachial index should be performed because compression stockings are contraindicated in arterial insufficiency.
  - Patients who are refractory to compression stockings may improve with intermittent pneumatic compression pumps.
Treatment

**Venous Insufficiency**
- Horse chestnut seed extract (300 mg, standardized to 50 mg of escin, twice a day) has been found to be effective in several studies and can be obtained in health food stores.
  - Horse chestnut seed extract contains escin, which inhibits the activity of elastase and hyaluronidase.
  - These enzymes are thought to play a role in the pathophysiology of chronic venous insufficiency.
  - However, the benefits are modest and the agent has not gained widespread acceptance.
Treatment

- **Venous Insufficiency:**
  - Horse chestnut seed extract
Treatment

Venous Insufficiency
- Diuretics (e.g., furosemide 20 to 40 mg once a day with supplemental potassium) can be used for short periods in severely affected patients.
  - However, venous insufficiency is not a volume overload state, and long-term use of diuretics can lead to adverse metabolic complications.
**Treatment**

- **Idiopathic Edema**
  - Spironolactone is considered the drug of choice for idiopathic edema because of the secondary hyperaldosteronism found in patients with this disorder.
  - The starting dose is 50 to 100 mg daily (maximum 100 mg, 4 times daily).
  - If spironolactone is not effective, low doses of a thiazide diuretic (e.g., hydrochlorothiazide, 25 mg daily) can be added with close monitoring of the serum potassium.
  - It is best to avoid loop diuretics.
Treatment

- **Idiopathic Edema**
  - The diuretic should be given in the early evening because fluid retention is most noticeable at the end of the day.
  - Other measures include intermittent recumbency, avoiding environmental heat, low-salt diet, avoiding excessive fluid intake, and weight loss for obese patients.
  - It may be helpful to ask about depression, eating disorder, and surreptitious diuretic or laxative use.
  - Compression stockings are usually not helpful and not tolerated.
Treatment

- **Idiopathic Edema**
  - Many patients with idiopathic edema are already taking diuretics when first seen and may have "diuretic-induced edema."
  - Chronic use of diuretics may lead to a state of mild hypovolemia with resulting stimulation of the renin-angiotensin-aldosterone system.
  - When the diuretics are withdrawn, a rebound worsening of edema occurs and patients believe they must continue.
Treatment

- **Idiopathic Edema**
  - However, the treatment of suspected diuretic-induced edema is to withdraw diuretics for 3 to 4 weeks after warning the patient that her edema will probably worsen initially and reassuring her that the diuretic can always be restarted.
  - If the edema does not improve after 4 weeks, spironolactone can be initiated at a dose of 50 to 100 mg daily and increased to a maximum of 100 mg, 4 times daily.
Treatment

- **Lymphedema**
  - Nonspecific treatment of lymphedema includes exercise, elevation, compressive garments, manual lymphatic drainage, intermittent pneumatic compression, and surgery (excisional procedures, microsurgery).
  - Tinea pedis should be controlled, and prophylactic antibiotics may be indicated for recurrent cellulitis.
  - Diuretics are generally not helpful.
  - Treatment of lymphedema is often disappointing, and psychosocial support is important in such patients.
Treatment

Deep Vein Thrombosis

- An acute deep vein thrombosis is generally treated with heparin initially.
- Warfarin can be initiated simultaneously with heparin, starting with 5 to 10 mg daily for 2 days with subsequent dosage based on a target international normalized ratio range of 2.0 to 3.0.
- Xarelto (rivaroxaban) has recently been approved for the treatment of DVT.
Deep Vein Thrombosis
- If anticoagulation is contraindicated, an inferior vena cava filter may be an option.
- Thrombolytic agents are generally reserved for patients with phlegmasia cerula dolens, which is manifested by severe pain, bullae formation, and skin discoloration.
Summary

- In the approach to leg edema of unclear etiology, the physician should first rule out lipidema (fat maldistribution with sparing of feet) and lymphedema (marked foot and toe involvement, verrucous thickened skin, nonpitting when chronic) because subsequent evaluation and treatment are different for these disorders.

- If systemic disease is considered unlikely, the most common causes of bilateral leg edema are idiopathic edema (in young women) and chronic venous insufficiency (in older patients).
Summary

- In patients with chronic bilateral edema, the physician should consider the most common systemic causes (cardiac, renal, hepatic) and decide, based on history and physical examination, which of them need to be ruled out with further testing.

- Pulmonary hypertension is a common cause and should be suspected in patients who may have sleep apnea (e.g., neck circumference >17 inches, loud snoring, or apnea noted by sleep partner).
If the patient presents with sudden onset (<72 hours) of leg swelling, a deep vein thrombosis should be ruled out using a Doppler examination.
Questions
Figure 1. Algorithm for leg edema

Note: The cause of leg edema is often multifactorial. Thus, more than one path in the algorithm may be relevant.

Leg edema without apparent cause

- History and physical exam

Unilateral edema (Figure 4)

Bilateral edema

- Are there any red flags?
  - Acute onset (<72 hours)
  - Age > 45 (consider pulmonary hypertension)
  - Clinical suspicion of systemic cause (heart, liver, kidney)
  - History or clinical suspicion of pelvic malignancy or treatment for malignancy (surgery, radiation)
  - Symptoms of sleep apnea
  - Medications (Table 4)

  Yes → Systemic evaluation (Figure 3)

  No → Consider most common causes (Figure 2)
Figure 2. Common causes.

Is the patient an adolescent or adult female who is <50 years old and has no signs of venous insufficiency or systemic disease?

No

Does the patient have prominent signs of venous insufficiency (varicosities or hemosiderin deposits) without signs of systemic disease?

Yes

Treat for idiopathic edema

No

Evaluate for systemic cause (Figure 3)

Yes

Treat for venous insufficiency
Figure 4. Unilateral edema

- Acute (<72 hours)
  - D-Dimer
    - <500 ng/ml AND low suspicion of DVT
    - >500 ng/ml OR moderate to high suspicion of DVT?
      - Doppler exam
        - Etiology not apparent
          - Venogram if high suspicion of DVT. Consider abdominal/pelvic CT to rule out malignant obstruction
        - Findings consistent with musculo-skeletal cause: Ruptured medial head of gastrocnemius (may have history of sudden foot dorsiflexion, may have sunken area medial midafoot on standing). Ruptured Baker’s cyst (may have history of rheumatoid arthritis, osteoarthritis, or meniscal injury)
      - Findings consistent with deep vein thrombosis
        - Pain control, leg elevation
        - Enoxaparin 1 mg/kg subcutaneously every 12 hours until oral anticoagulation established
    - Chronic (>72 hours)
      - (Figure 5)
Figure 5. Chronic unilateral edema.
- Systemic evaluation:
  - Complete blood count
  - Urinalysis
  - Electrolytes
  - Creatinine
  - Blood sugar
  - Thyroid stimulating hormone
  - Albumin
  - Other tests for specific indications

Specific indications:
- Acute edema: d-Dimer, follow with Doppler exam if d-Dimer elevated OR clinical suspicion of DVT high
- Age >45 years: echocardiogram to rule out pulmonary hypertension, heart failure
- Suspicion of heart disease: ECG, echocardiogram, chest radiograph, brain natriuretic peptide
- Suspicion of liver disease: ALT, AST, total bilirubin, alkaline phosphatase, prothrombin time, serum albumin
- Suspicion of kidney disease: urinalysis with exam of sediment, serum lipids
- Suspicion of malignancy: abdominal/pelvic CT scan
- Suspicion of sleep apnea: sleep study, echocardiogram
- Lymphedema: abdominal/pelvic CT scan
- Medication known to cause edema (Table 4): consider reducing dose or changing medication
Common Causes of Leg Edema

- **Venous Insufficiency**
  - The diagnosis is usually made clinically but can be confirmed with a Doppler study.
  - Although chronic venous insufficiency is thought to result from previous deep vein thrombosis, only one third of patients will give that history.
  - "Dependent edema" is a variant of venous insufficiency and often occurs in patients following stroke who sit in wheelchairs for long periods.
Common Causes of Leg Edema

- **Pregnancy**
  - Increased venous pressure resulting from an enlarging uterus near term commonly leads to lower extremity edema and varicosities.
  - Edema is commonly present in patients with preeclampsia but is no longer considered a factor in making the diagnosis.
Common Causes of Leg Edema

- **Heart Failure**
  - Patients with congestive heart failure complain of dyspnea, dependent edema, and fatigue.
  - On physical examination they may have elevated jugular venous pressure, basilar crackles on chest auscultation, gallop rhythm, and pitting edema.
  - BNP may be helpful in diagnosing heart failure among dyspneic patients.
Common Causes of Leg Edema

- **Pulmonary Hypertension**
  - Pulmonary hypertension commonly results from sleep apnea and is under-recognized as a cause of edema.
  - Other causes of pulmonary hypertension include left heart failure and chronic lung disease.
  - Echocardiography can help in assessing pulmonary pressures.
Tests for Idiopathic Edema

- **Morning and Evening Weights:**
  - Patients should weigh themselves nude and with an empty bladder before food or fluids in the morning and at bedtime.
  - A mean weight gain >0.7 kg is consistent with idiopathic edema.

- **Water Load Test:**
  - After avoiding diuretics for at least 10 days, the patient drinks 20 mL/kg body weight (maximum 1500 mL) uniced water over 20 minutes, sometime between 7:30 AM and 9:00 AM.
  - The patient collects urine every hour, starting 1 hour before the oral fluid load and ending 4 hours after.
  - On the first day, the patient should be walking slowly or standing during this 4-hour period.
  - On the second day, the patient repeats the fluid load and urine collection, but should be recumbent during the 4-hour period.
  - In patients with idiopathic edema, less than 55% of water load is excreted in the upright position and more than 65% in the recumbent position.
Common Causes of Leg Edema

- **Pulmonary Hypertension**
  - Treating sleep apnea might improve the leg edema that results from pulmonary hypertension, but this also is unknown.
  - An echocardiogram is recommended in patients who are at risk for pulmonary hypertension and in patients over age 45 with leg edema of unclear etiology.
Common Causes of Leg Edema

- **Idiopathic Edema**
  - Idiopathic edema occurs only in menstruating women and is most common in the 20s and 30s.
  - Synonyms include fluid-retention edema, orthostatic edema, cyclical edema, and periodic edema.
  - However, if symptoms persist throughout the menstrual cycle, idiopathic edema should be distinguished from premenstrual edema.
  - Idiopathic edema leads to pathologic fluid retention in the upright position, and women typically notice a weight gain of >1.4 kg as the day progresses.
Common Causes of Leg Edema

- **Idiopathic Edema**
  - Patients often complain of face and hand edema in addition to leg swelling. Several confirmatory tests are available, but the diagnosis is usually made clinically after ruling out systemic disease by history and physical examination.
  - The confirmatory tests in are indicated only when there is significant doubt about the diagnosis.
  - Obesity and depression can be associated with this syndrome, and diuretic abuse is common.
Common Causes of Leg Edema

- **Drugs**
  - Calcium channel blockers and nonsteroidal anti-inflammatory drugs (NSAIDs) are most commonly implicated.
  - The incidence of edema in patients taking NSAIDS is approximately 5%.
  - Up to 50% of patients on calcium-channel blockers develop edema.
    - Dihydropyridines (amlodipine, nifedipine) may be more likely to induce edema than phenylalkylamines (verapamil) or benzothiazepines (diltiazem).
Common Causes of Leg Edema

- **Primary lymphedema** is a rare disorder that is divided into 3 types according to age of presentation.
  - *Congenital lymphedema* may be present at birth or becomes manifest by age 2 years. The familial form of congenital lymphedema is an autosomal dominant disorder known as **Milroy disease**.
  - *Lymphedema praecox*, the most common form of primary lymphedema, has its onset between age 2 and 35 and has a female to male ratio of 10:1. Lymphedema praecox is usually unilateral and is limited to the foot and calf in most patients. The familial form of lymphedema praecox is an autosomal dominant disorder known as **Meige disease**.
  - *Lymphedema tarda* presents after age 35.
Common Causes of Leg Edema

- **Secondary lymphedema**
  - Is much more common than primary, and the cause is generally apparent from the history.
  - The most common causes of leg lymphedema are:
    - tumor (e.g., lymphoma, prostate cancer, ovarian cancer)
    - surgery involving lymphatics
    - radiation therapy
    - infection (bacterial infection or filariasis)
Common Causes of Leg Edema

- **Venous Insufficiency**
  - Venous insufficiency is characterized by:
    - Chronic pitting edema, often associated with brown hemosiderin skin deposits on the lower legs.
    - The skin changes can progress to dermatitis and ulceration, which usually occur over the medial maleoli.
    - Other common findings include varicose veins and obesity.
    - Most patients are asymptomatic but a sensation of aching or heaviness can occur.
Common Causes of Leg Edema

- **Secondary lymphedema:** Filariasis
Common Causes of Leg Edema

- **Secondary lymphedema**
  - Chronic lymphedema is usually distinguished from venous edema based on characteristic skin changes, absence of pitting, and history of an inciting cause.
  - The skin becomes thickened and darkened and may develop multiple projections called lymphostatic verrucosis.
  - The dorsum of the foot is prominently involved and may have a squared-off appearance.
  - The examiner is unable to pinch a fold of skin on the dorsal aspect of the base of the second toe (Kaposi-Stemmer sign).
Common Causes of Leg Edema

- **Obesity**
  - Obesity itself does not cause leg edema but obesity can lead to many other causes such as chronic venous insufficiency, lymphedema, idiopathic edema, and obstructive sleep apnea.

- **Premenstrual Edema**
  - Most women experience some premenstrual edema and weight gain. The edema tends to be generalized, occurs a few days before the beginning of menses, and resolves during a diuresis that occurs with the onset of menses.
  - The etiology is poorly understood.
Common Causes of Leg Edema

- **Deep Vein Thrombosis**
  - Deep vein thrombosis classically results in an acutely swollen, painful leg that may be discolored.
  - However, the presentation can be more subtle with mild, painless, asymmetric edema.
  - The physical examination is often unreliable and patients with acute edema usually require further evaluation, which may include a D-dimer determination and a Doppler study.
  - Risk factors for deep vein thrombosis include cancer, immobilization (especially following surgery or an injury), and a hypercoagulable state.