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ELDER CARE

A Resource for Interprofessional Providers

Pedal Edema in Older Adults

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Pedal edema is the accumulation of fluid in the feet and lower legs. It is typically caused by one of two mechanisms. The first is venous edema, caused by increased capillary filtration and retention of protein-poor fluid from the venous system into the interstitial space. The other mechanism is lymphatic edema, caused by obstruction or dysfunction of lymphatic outflow from the legs resulting in accumulation of protein-rich interstitial fluid. These two mechanisms can operate independently or together.

Regardless of the mechanism, chronic bilateral pedal edema is detrimental to the health and quality of life of older adults. Besides alterations in cosmetic appearance or the discomfort it may cause, older adults with pedal edema often experience gait disturbance with decreased mobility and increased risk of falls, impairment of sensation in the foot, and cutaneous ulcers in the lower leg.

Evaluation

When evaluating a patient with pedal edema, it is important to distinguish between unilateral and bilateral disease. Unilateral pedal edema suggests an obstructive process, such as venous thrombosis or cancer. Bilateral pedal edema, which is more common in older adults, is often multifactorial and may reflect a systemic process. Treating the underlying cause can often lessen the edema. Table 1 lists common and less common causes of bilateral pedal edema.

In addition to seeking evidence for the conditions listed in Table 1, certain clues in the patient's presentation might point to a particular cause of edema. In particular, the duration of edema and presence of pain should be noted. Acute onset and presence of edema for less than 72 hours suggests the possibility of venous thrombosis and steps should be taken to exclude that diagnosis. Edema due to chronic venous insufficiency is often associated with a dull aching pain. In contrast, lymphedema, which is often due to obstruction, is usually painless.

If the cause of edema is not identified with the history and physical exam, further studies should be performed. To rule out systemic disease, a complete metabolic panel, complete blood count, thyroid stimulating hormone, and urinalysis should be obtained. An albumin level of less than 2 g/dl will often cause edema and if present, suggests

Table 1. Frequent Causes of Bilateral Pedal Edema in Older Adults

More Common	Less Common
• Heart failure • Hypothyroidism • Lymphedema • Medications - Calcium channel blockers - Non-steroidal anti-inflammatory drugs - Steroids • Obesity • Pulmonary hypertension (often associated with sleep apnea) • Venous insufficiency	• Anemia • Gastrointestinal disorders (e.g., hypoalbuminemia from protein-losing enteropathy or chronic malnutrition) • Liver disease • Medications - Diuretics (with long-term use) - Estrogens - Thiazolidinediones • Renal disease • Venous outflow obstruction (e.g., tumor, previous surgery or radiation to abdomen or pelvis)

TIPS FOR DEALING WITH PEDAL EDEMA IN OLDER ADULTS

- Check to see if the patient takes a medication that causes edema. Reduce the dose or stop the medication if possible.
- If diuretics are used to treat pedal edema, they are most appropriate for short-term use for initial reduction of edema. In the long term, it is more important to address and reverse the process causing the edema.
- When external compression stockings are used, they should be graded. Consider zippered stockings if patients have difficulty putting on non-zippered stockings, and use liners to prevent pinching the skin.
- Only prescribe compression stockings if the patient has an ankle-brachial index $\geq$0.80. Do not rely on pedal pulses to decide if patients with pedal edema have peripheral arterial disease.

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kidney disease, liver disease, or malnutrition as the cause of the patient's edema. If heart failure or pulmonary hypertension with sleep apnea are suspected, an echocardiogram should be obtained.

Treatment

Treatment depends largely on the cause of the edema. Treatments for some conditions may be curative (e.g., discontinuing an edema-causing medication). More commonly, however, a completely reversible cause is not identified, and treatment is aimed at reducing swelling by improving lymphatic drainage and decreasing capillary leakage. This is typically accomplished by non-pharmacologic treatments (Table 2).

Table 2.
Non-Pharmacologic Treatment of Pedal Edema

Treatment	Mechanism of Action
Exercise	Muscle activity stimulates contractility of lymph vessels and encourages cranial movement of lymph
Elevation	Decreases venous filtration by lowering venous pressure
Graded external compression (hosiery)	Opposes capillary filtration, keeping fluid in venous system
Lymphatic massage	Stimulates lymph drainage to flow proximally

If external compression stockings are used, they should be graded (i.e., tighter distally than proximally). If patients struggle with putting on the stockings, stockings that come with a zipper are often easier to apply. Use of non-graded hosiery (e.g., T.E.D stockings) typically does not result in significant improvement in edema. Non-graded hosiery is appropriate, however, for use in patients with a history of deep venous thrombosis to prevent recurrent clot formation.

Compression stockings of either type (graded or non-graded) should not be used to treat pedal edema in patients who have uncontrolled heart failure, severe or oozing dermatitis, advanced peripheral neuropathy, or peripheral arterial disease if the ankle-brachial index is <0.80. Note that the presence of pedal pulses is not adequate to exclude peripheral arterial disease in patients being considered for treatment with compression stockings.

Lymphatic massage, also called manual lymphatic drainage, is an integrative medicine technique in which sites in the lymph system are stimulated with the hands, either by a therapist or by patients themselves. It was developed for treatment of lymphedema and may have some limited benefit, but is less likely to be effective for venous edema.

Preventive measures should be employed to reduce complications of chronic edema. In particular, patients and their caregivers should be taught how to lower the risk of cellulitis/erysipelas through good skin hygiene, and how to recognize the signs of infection early should they occur.

Modification of sodium or protein intake is sometimes recommended. There is little evidence to support its benefit, however, unless part of the treatment regimen for a systemic condition causing the edema.

Pharmacologic treatments also have a role in treating pedal edema. However, the first step in drug treatment is, if possible, to decrease or stop current medications that may be contributing to edema (Table 1).

If diuretics need to be administered as a treatment for pedal edema, they are most appropriate for short term use to aid in initial excretion of excess fluid. Longer-term administration of diuretics may, however, also be appropriate if their use is aimed at treating the underlying cause of the edema (e.g., heart failure). They should not, however, be the mainstay of therapy for treating edema itself in the long term. Furthermore, patients receiving diuretic therapy should be monitored for dehydration and electrolyte disturbances, both of which are potential risks when diuretics are taken by older adults.

References and Resources

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