Chronic Venous Insufficiency

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Abstract:

Chronic Venous Insufficiency (CVI) is a common medical condition but often overlooked by the medical community. Manifestations of CVI are a result of longstanding venous hypertension due to chronic venous obstruction or venous valvular reflux. Most patients present with symptoms of leg heaviness, aching, cramps, itching, tingling, restless leg, swelling, fatigue, pruritus and skin changes. Skin changes in the extremities range from dilated veins (small reticular veins, telangiectases and varicose veins) to edema, hyperpigmentation, fibrosis and ulceration. Complications include cellulitis and venous ulcers. Treatment is aimed at reducing venous pooling, either with conservative measures initially, or with endovascular interventions if disabling symptoms persist. Compression therapy using short-stretch bandages and then graded compression garments are the mainstay of therapy. Skin and wound care is of paramount importance in preventing more serious complications.
eDiscussion Points:

1. What is the role of sclerotherapy in the treatment of chronic venous insufficiency?

2. What is the role of iliac vein angioplasty and stenting in the treatment of chronic venous insufficiency?
Chronic Venous Insufficiency (CVI) is an extremely common disease of the veins of lower extremities affecting 80% of men and 85% of women (1). It is often underreported and overlooked by patients and doctors. It is estimated that more than 2.5 million people in United States have CVI and of those, roughly 20% develop the most troublesome and costly complication, venous ulceration (2). Risk factors for CVI include age, obesity, pregnancy, phlebitis, female sex, obesity, pregnancy, prolonged standing, leg trauma and history of phlebitis or deep venous thrombosis (3).

The veins of lower extremity are divided into the deep and superficial system connected by perforator veins (4). These veins have series of bicuspid valves that ensures that blood moves in antegrade direction towards the head. Incompetent venous valves, venous outflow obstruction and/or muscle pump dysfunction lead to increased venous pressure resulting in vein dilatation and turtuosity (5). Longstanding untreated venous hypertension results in dermal changes associated with CVI.

CVI may be asymptomatic with cosmetically bothersome teleangietasias and reticular veins of the lower extremities or patients may complain of leg heaviness, aching, cramps, itching, tingling, restless legs, swelling, fatigue, pruritus and skin changes to the lower extremity due to inflammation (6). Patients with longstanding edema often develop cellulitis, requiring hospitalization if not recognized and treated early.
The most common clinical manifestations of CVI are dilated cutaneous veins such as teleangiectases also known as spider veins, bluish reticular veins and larger varicose veins. Physical examination may also reveal edema, eczema, hyperpigmentation of the skin and subcutaneous fibrosis known as lipodermatosclerosis. Advanced disease may be present as venous ulceration, commonly seen in the perimalleolar medial ankle (7). The prognosis of venous ulcers is poor, requiring prolonged intensive wound care in some cases. Despite aggressive treatment, delayed healing and recurrent ulcers are often seen (7).

The diagnosis of CVI is based upon the clinical history, physical examination for signs of CVI and use of noninvasive testing to document venous obstruction or valvular reflux. In 2004, the American Venous Forum updated the diagnostic classification of chronic venous disease allowing comparison of the clinical severity of disease (8). This classification is given in Figure 1.

Venous duplex imaging is used to test for reflux in the lower extremity veins and exclude thrombotic obstruction (9). Plethysmography assesses the effectiveness of venous emptying in the presence of residual thrombosis and can quantify the severity of venous reflux (10). Although rarely performed today for diagnostic purposes, venography may be used to confirm valvular reflux or document iliac vein obstruction in advance of an endovascular treatment (11).
The treatment goals for patients with CVI include improvement of symptoms, reduction in edema and prevention of complications such as cellulitis, lipodermatosclerosis and venous ulceration. The initial treatment of CVI involves conservative measures that aim to reduce venous hypertension.

Patients should be encouraged to avoid prolonged standing or sitting that may exacerbate venous insufficiency. Patients should elevate the feet above their thighs while sitting and above their heart when supine for 30 min at least three to four times daily if possible (12). Leg elevation alone is sometimes effective in relieving symptoms in patients with mild venous disease, but usually does not provide adequate relief in more advanced disease. Structured exercise to strengthen calf musculature can have beneficial effects on calf muscle pump function (13). This can be achieved by a walking regimen or even ankle flexion exercises while seated.

The use of compressive therapy is an essential component of conservative treatment of CVI. The objective is to provide external compression to the leg thereby reducing venous volume, preventing venous distension and reducing venous wall tension with improvement of calf muscle pump function (14). While short stretch bandages may be used acutely to reduce edema, graded compression garments donned daily are used for prevention of swelling long-term (15).
Short stretch bandages resist changes in leg circumference, thereby, reinforcing calf pump function during ambulation, but not during rest. These are used for moderate to severe edema in CVI patients to reduce swelling prior to fitting graded compression stockings. Multi-layered bandages may be used for patients with weeping edema or ulceration. Intermittent pneumatic compression therapy may be indicated for patients with massive edema, morbid obesity and/or lipodermatosclerosis to reduce swelling until more durable compression garments can be fitted. Intermittent pneumatic compression therapy is most effective when used several hours per day (16).

Elastic graded compressive stockings are available in a variety of lengths and compression grades. These should be fitted based on limb length and diameter. The level of tension of the stocking is based on the clinical stage of CVI and patient tolerance. Class I (20-30 mmHg) is appropriate for patients with CEAP classes 2-3, Class II (30-40 mmHg) for CEAP classes 4-6 and Class III (40-50 mm Hg) is appropriate for patients with recurrent ulcers (16). Ulcer healing rates are as high as 93% in patients who undergo structured regimen of compression therapy (17). Acute infection, severe peripheral arterial disease (ABI<0.6), diabetic neuropathy and severe congestive heart failure are contradictions to the use of compression stockings. At least two pairs of stocking should be obtained, alternated daily and replaced after 6-9 months of use to avoid loss of tension (16).
Cellulitis can develop and progress quickly and requires systemic antibiotics, often necessitating hospitalization. Statis dermatitis can be treated initially with a topical steroid such as 0.1% triamcinolone cream; however compression therapy is required to prevent recurrence (18). With venous ulcers, aggressive wound care including debridement, local skin care and silver impregnated dressings may decrease infectious complications.

The routine use of diuretics to reduce swelling is not recommended. Small doses may be prescribed for a short duration to reduce massive edema. Patients should be followed carefully for signs of volume depletion and electrolyte imbalance (19).

Although not regulated by the FDA in the U.S., the use of over-the-counter herbal supplements may be effective adjunct treatment in refractory patients. Saponosides containing horse chestnut extract and flavonoids have been used to promote vein health, reduce swelling, and promote venous ulcer healing (20, 21). Further study is needed to document the effectiveness and safety of these products.

If these conservative measures are not effective, more invasive endovascular procedures including incompetent perforator ligation, or iliac vein angioplasty and stenting for relief of venous outflow obstruction, may be helpful in patients with unrelentning pain or recurrent venous ulcers (22,23).
References:


### Figure 1 – Clinical, Etiologic, Anatomic, Pathophysiologic (CEAP) Classification of Chronic Venous Insufficiency

<table>
<thead>
<tr>
<th>Clinical signs</th>
<th>Class 0</th>
<th>No visible or palpable signs of venous disease</th>
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<tbody>
<tr>
<td>Class 1</td>
<td>Teleangiectases or reticular veins</td>
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<tr>
<td>Class 2</td>
<td>Varicose veins</td>
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<td>Class 3</td>
<td>Edema</td>
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<td>Class 4</td>
<td>Skin changes ascribed to venous disease</td>
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<tr>
<td>Class 5</td>
<td>Skin changes as defined above with healed ulceration</td>
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<tr>
<td>Class 6</td>
<td>Leg ulceration, skin changes as defined above</td>
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<thead>
<tr>
<th>Etiologic classification</th>
<th>Congenital, primary, secondary</th>
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<tr>
<td>Anatomic distribution</td>
<td>Superficial, deep, or perforator, alone or in combination</td>
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<tr>
<td>Pathophysiologic dysfunction</td>
<td>Reflux or obstruction, alone or in combination</td>
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