REVIEW ARTICLE

Considerations for the Guidelines of Chronic Venous Insufficiency in Older Individuals

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KEYWORDS

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ABSTRACT

Chronic venous insufficiency is a common condition categorized by ever-increasing incidence, prevalence, and recurrence, despite treatment. Older individuals (adults 65 years of age and older) are most affected in terms of diagnosis and severity. Guidelines discussed include disease characterization and dictation of adequate treatment to prevent ulceration or profound infectious disease. The adjunctive role of OMT is summarized as well with an emphasis on maintaining functional independence of this vulnerable population.

INTRODUCTION

Chronic venous insufficiency (CVI) develops primarily in older individuals due to long-standing chronic disease such as obesity, diabetes mellitus (and associated peripheral vascular disease), chronic systolic heart failure (because of long-standing hypertension or atrial fibrillation), obesity, and other disease states. CVI is characterized by pain, skin discoloration, swelling, varicosities, and, if inadequately treated, venous stasis ulcerations.[1] Though most prevalent in older individuals, a tremendous 150,000 patients are newly diagnosed each year.[2] Venous insufficiency is most commonly due to venous valve incompetence, but may also be due to obstructed or regurgitated blood flow. Risk increases with increasing age, female gender, tobacco abuse (former or current), pregnancy history, ethnicity (whites and Hispanics most affected), obesity, and family history.[3] The most affected body region is the lower extremities, with venous leg ulcers (VLUs) showing burgeoning prevalence in direct proportionality to age.[4] Such wounds are seen with increasing frequency in older adults with increased functional dependence, particularly those in a skilled nursing or long-term care setting.[5] Despite proper treatment, VLUs have as high as a 50%-70% recurrence rate 6 months after initial diagnosis.

The associated cost burden of CVI is approximately $3.1 billion per year,[6] representing >2% of the annual healthcare budget in the United States.[6] In addition, CVI progresses to VLU in up to 3% of Americans 65 years of age and older. These costs are compounded by high rates of recurrence and wound mimics that make prevention, diagnosis, and treatment cumbersome.[7] Diagnosis is most often made using a bilateral lower-extremity venous duplex ultrasound in addition to a physical examination.[8] The physical examination is best performed with the patient standing to assess for positional fluid changes, superficial venous dilation, and any other obvious signs of venous valvular incompetence. If VLUs are identified, further differentiation between arterial, venous, lymphatic, and other mixed-vascular ulcer types is necessary. Diagnosis may be complicated in individuals with darker skin tone due to physician unfamiliarity with disease presentation in this setting. However, signs of precursors to VLU should be noted, such as varicosities, telangiectasias, and edema.

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Even if properly diagnosed and treated, VLUs have a high recurrence rate.[10]

The Vein Consult Program found that of 99,359 participants, clinically significant chronic venous disease (CVD) was found in 63.69% of participants; the highest severity of CVD was found in patients aged 65 and older.[11] Additionally, the Bonn Vein Study concluded similar age-related CVD findings.[12] Of those with CVI, over 20,000 patients a year develop venous stasis ulcers.[5]

DIAGNOSIS OF CVI IN OLDER ADULTS

Diagnosis of CVI requires a lower-extremity venous duplex ultrasound. Reflux is measured in both superficial and deep veins. Though ultrasound is best obtained in the standing position (like ideal positioning for physical examination), it may be performed in the reverse Trendelenburg position if necessary; this modification often yields less accurate results, however. Tools developed to classify and stage CVDs include the Classification, Etiology, Anatomy, and Pathology (CEAP) Classification of Venous Disorders, the Venous Clinical Severity Score (VCSS), and the Short Physical Performance Battery (SPPB).

The CEAP Classification of Venous Disorders is the standard for grading levels of venous disease; it was last updated in 2020,[7] with stages ranging from telangiectasias (C1), varicose veins (C2), edema (C3), stasis changes (C4), and venous stasis ulcers (C5 and C6). (Figure 1)

Under Classification, or C, C0 represents no visible or palpable sign of venous disease. Next, C1 is telangiectasias and reticular veins. Following, C2 is varicose veins, which are visibly enlarged and twisted. As disease progresses, C3 shows leg edema, indicating advanced disease. Ultimately, C4 is identified by one of three scenarios: (1) changes to skin or subcutaneous tissue, especially hyperpigmentation due to hemosiderin deposition and superficial skin layer reactions with cytokine (particularly interleukin-6); (2) lipodermatosclerosis, inflammation leading to fibrosis or skin induration; or, (3) corona phlebectasia, dilated veins at the ankle. End-stages of CVI lead to VLU, characterized by C5 as a healed ulcer and C6 as an active or recurrent ulcer.[7] The remaining components of CEAP include etiology, anatomy, and pathology. Etiology, E, may be congenital, primary, or secondary. The most common etiology of CVI is valve incompetence. Site and depth of venous reflux are captured in anatomy, A. The downstream effect is addressed by pathophysiology, P, as obstruction; reflux; both; or neither.[7] Interestingly, using the CEAP classification, Sinikumpu et al concluded that CVD affects one in two individuals over age 70 years and with increasing severity.[13] The risk of disability and immobility due to CVD in older adults is magnified when superimposed with immobility, multiple comorbid disease states, and decreased wound healing ability, all of which precipitate the development and progression of both venous disease and chronic leg ulcers.[13]

The VCSS grades severity of venous insufficiency by incorporating variables such as pain; edema; varicose veins; skin pigmentation; inflammation; induration; the number, size, and duration of active ulcers; and the use of compression therapy, by scoring from 0 to 3. These scores indicate no absent, mild, moderate, and severe disease, respectively.[14,15] (Table 1)

The SPPB evaluates lower-extremity functionality.[13] The three activities assessed are standing from a chair, holding a post of slightly precarious balance, and gait speed. Each activity is scored from 0 to 4, with 0 being poor and 4 being the best. Results are summed with the maximum score being 12.[13]

FIGURE 1: Classification, etiology, anatomy, and pathology classification of venous disorders[7]

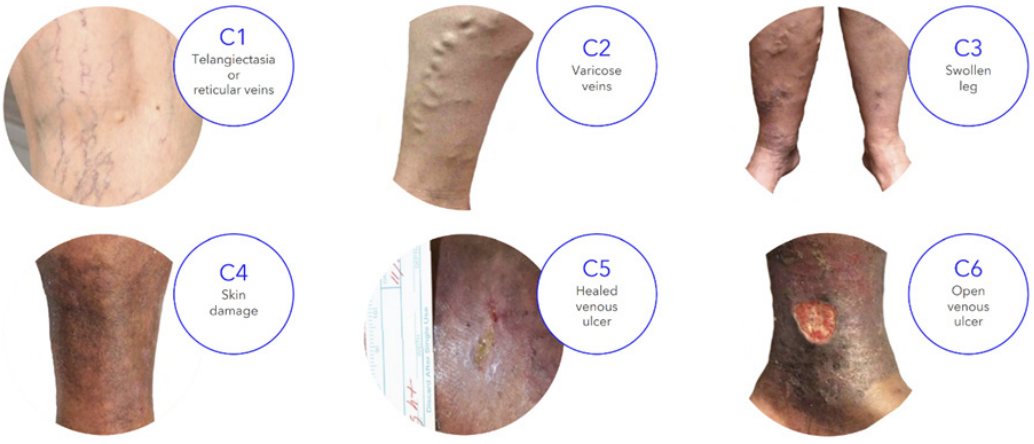

TABLE 1: Venous clinical severity score[14,15]

(GSV = greater saphenous vein; LSV = lesser saphenous vein)

Attribute	Absent (score = 0)	Mild (score = 1)	Moderate (score = 2)	Severe (score = 3)
Pain (frequency, limitations, analgesic use)	None	Occasional pain, not limiting activities, no analgesics	Daily pain, moderate limitation, some analgesics	Daily pain,severe limits, frequent analgesics
Varicose veins	None	Few, scattered; branched varicose veins	Multiple: GSV varicosity to calf or thigh	Extensive: GSV/LSV and calf/thigh
Venous edema	None	Evening ankle edema only	Midday edema above ankle	Morning edema above ankle
Pigmentation	None	Mild cellulitis; marginal area around ulcer	Moderate cellulitis, most of lower half	Severe cellulitis lower half and up; venous eczema
Inflammation	None	Focal (<5 cm), circummalleolar	Moderate cellulitis, most of lower half	Severe cellulitis lower half and up; venous eczema
# of active ulcers	0	1	2	>2
Active duration	None	<3 months	>3 months/<1 year	>1 year
Active size	None	<2-cm diameter	2- to 6-cm diameter	>6-cm diameter
Compression	Not used or non-compliant	Intermittent use	Most days	Full compliance (+ elevation)

GUIDELINES FOR THE TREATMENT OF CVI AND RECOMMENDATIONS FOR OLDER INDIVIDUALS

For older individuals, nonpharmacologic interventions are preferred to pharmacologic whenever possible to minimize the potential for drug-drug interactions or drug-disease interactions. Conservative nonpharmacologic therapy for CVI and VLU consists of elevation, compression therapy including stockings, and skin care.[10] For patients for whom conservative therapy is indicated, compression provides modest improvement in the healing process, but does not correct the underlying pathology, enabling recurrence and compliance issues. Furthermore, compression is not indicated for patients with venous ulcers with comorbid arterial insufficiency with an ankle-brachial index <0.05.[10] The Society of Vascular Surgery, American Venous Forum, and American Vein and Lymphatic Society have published new guidelines regarding the proper diagnosis, management, and treatment of CVI. These guidelines, published by Glovicki et al, are available open-source in the January 2024 issue of *Journal of Vascular Surgery: Venous and Lymphatic Disorders*. Summarizing this extensive document, the guidelines outline indications and contraindications for conservative management while emphasizing moving toward surgical management for more definitive management of CVD.

However, considerations of older adults are not explicitly addressed. Specific factors to consider include standing times in venous reflux studies, functional status (independence of activities of daily living and instrumental activities of daily living), ambulation status, the ability to lay prone or supine for procedures, arterial status, and other comorbidities. Due to the potential for hypertension and obesity to cause venous distension and eventual stasis as well as CVI, management of these conditions should also be incorporated as a concurrent treatment of CVD.

For symptomatic varicose veins with axial reflux, surgical management such as phlebectomy is recommended over conservative approaches, unless the patient has a clear contraindication due to a comorbidity.[16] The REACTIV trial showed that surgical therapy produced better results in cost-effectiveness, quality of life, and patient satisfaction than compression stockings.[16,17] Compression stockings in both older adults and the population in general pose a compliance issue and the guidelines confirm with strong level 1 evidence that surgical management is therefore preferred.[16,17] For accessory veins, concurrent phlebectomy with ablation is recommended, unless medically contraindicated.[16] This caveat affects older individuals and necessitates the need to undergo two separate procedures. Unless there is axial reflux and CEAP grade C3 or higher, ablation may not be necessary.[16] Endovenous ablation of a refluxing axial vein is recommended over chemical ablation due to long-term improvement and reduced recurrence.[16] This distinction may be less relevant in older individuals in whom long-term outcomes are less noticeable.

Non-FDA therapies may also potentially be recommended for those with CVD. Micronized purified flavonoid fraction (MPFF) or Ruscus extractions were shown to alleviate some edema and pain in the RELIEF trial.[18] Medical management for CVI-related pain includes venoactive agents such as flavonoids, calcium dobesilate, and red vine leaf extract.[3,16] Exploration and further studies for older individuals of medical management are needed both in terms of interactive medicine and the possibility of a medical approach. As effects of drug-drug interactions must be considered, any use of supplements should be advised with utmost caution.

TABLE 2: Summary of osteopathic manipulation treatments for lymphatic treatments

Technique	Direct or Indirect	Active or Passive	Mechanism of Action	Absolute Contraindications	Relative Contraindications
Myofascial release (MFR)	Direct or indirect	Passive	· Light, moderate, or heavy force, which engages fascia vs deeper tissue with constant pressure; piezoelectric changes relax and release restricted tissues (direct) · Guiding fascia along the path of least resistance until free movement is achieved (indirect)	· Treatment directly over fracture or dislocation · Serious vascular compromise · Local malignancy or infection	· Vascular compromise · Malignancy · Infection · Severe osteoporosis or osteopenia · Acutely injured muscles
Lymphatics (extension of MFR)	Direct	Passive	· Mechanical compression via physician's force leads to mobilization of lymphatic fluid	· Necrotizing fasciitis · Inability to make urine	· Acute hepatitis · Mononucleosis · Malignancy · Deep venous thrombosis · Severe heart failure

TABLE 3: Summary of osteopathic manipulation modalities for lymphatic treatments[21]

Lymphatic-directed treatment techniques

- Diaphragm opening – thoracic inlet/outlet opening, doming of the abdominal/respiratory diaphragm, presacral diaphragm release, and popliteal diaphragm release
- Pedal pump
- Effleurage/petrissage

Autonomic-directed treatment techniques Lymphatic-directed treatment techniques

- Occipitoatlantal (OA) release – myofascial release
- Occipitomastoid (OM) suture release – myofascial release
- Associated tender points – counterstrain
- Tissue texture changed over transverse processes in axial spine – postisometric muscle energy treatments

OSTEOPATHIC MANIPULATIVE TREATMENT OF CVI

While this is not mentioned in any guidelines, osteopathic manipulative medicine (OMM) is a safe and effective adjunctive modality from which patients with CVD may benefit. Osteopathic treatment that specifically targets the lymphatic system has been linked to improved wound healing.[19] A pilot study from 2018 demonstrated a clinical reduction in wound size (P = 0.15) of lower-extremity venous leg ulcerations. During the intervention phase, individuals received two 10-minute OMM sessions a week for 6-8 weeks.[20] However, due to a lack of larger more generalizable studies, OMT should be employed cautiously and in addition to standard-of-care treatments. A summary of lymphatic treatment techniques is provided in Table 2.

Specific treatment techniques that may be utilized include opening of diaphragms in a head-to-toe sequence (thoracic inlet/outlet, abdominal/respiratory diaphragm, presacral diaphragm, and popliteal diaphragm), pedal pump, and effleurage and petrissage techniques to mobilize fluid back to the lymphatic system and ultimately returned to the right side of the heart. These techniques are described in outside sources, such as *Nicholas Atlas of Osteopathic Techniques*, 4th ed.[21]

In addition to treating the lymphatic components of any underlying somatic dysfunction, autonomic contributions should also be addressed. Increased tone from parasympathetics occurs via vagus nerve inputs. This can be addressed with OA release as well as evaluation and treatment of compressed occipitomastoid sutures. Sympathetic innervation from T10-L2 due to increased tone leads to dilated arterioles of the muscles mediated by both cholinergic and adrenergic receptors of the lower extremities.

The authors are currently in the process of acquiring data for a project entitled "Effectiveness of the Osteopathic Pedal Pump in Reducing Lower Limb Volume in Older Adults With Chronic Leg Lymphedema," which is sponsored by an American Osteopathic Association grant; the goal is to publish findings and show the benefit derived by performing OMT in the appropriate settings as described.

CONCLUSION

Overall, the management of CVD in older individuals presents a multifaceted challenge that necessitates a nuanced approach. This paper expounds on the need for potential modifications to better serve the aging population. The complexities inherent in older individuals present unique challenges, such as functional and mobility limitations, comorbidities, and potential intolerance to specific procedures as well as adjustments to their VCSS scores to accommodate ongoing pain syndromes not related to venous disease. These factors must be carefully considered when applying guidelines. The management of older adults requires collaboration, ongoing research, and a commitment to improving their quality of life. Adhering to established guidelines while acknowledging the unique needs of older individuals provides more effective and compassionate care for the treatment of CVD. Osteopathic treatment that specifically targets the lymphatic system has been linked to improved wound healing and offers a nonpharmacologic treatment option without risk associated with adverse drug events. Further research with larger sample sizes and statistically significant outcomes remains ongoing, including by the authors of this manuscript.

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