

Managing venous stasis ulcers

Compression therapy, local wound care, dressings, antibiotics, surgery, and adjunctive methods play a role in management.

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Venous disease, which encompasses all conditions caused by or related to diseased or abnormal veins, affects about 15% of adults. When mild, it rarely poses a problem, but as it worsens, it can become crippling and chronic.

Chronic venous disease often is overlooked by primary and cardiovascular care providers, who underestimate its magnitude and impact. Chronic venous insufficiency (CVI) causes hypertension in the venous system of the legs, leading to various pathologies that involve pain, swelling, edema, skin changes, stasis dermatitis, and ulcers. An estimated 1% of the U.S. population suffers from venous stasis ulcers (VSUs). Causes of VSUs include inflammatory processes resulting in leukocyte activation, endothelial damage, platelet aggregation, and intracellular edema. Preventing VSUs is the most important aspect of CVI management.

Treatments for VSUs include compression therapy, local wound care (including debridement), dressings, topical or systemic antibiotics for infected wounds, other pharmacologic agents, surgery, and adjunctive therapy. Clinicians should be



able to recognize early CVI manifestations and choose specific treatments based on disease severity and the patient's anatomic and pathophysiologic features. Management starts with a full history, physical examination, and risk-factor identification. Wound care clinicians should individualize therapy as appropriate to manage signs and symptoms.

Compression therapy

Treatment focuses on preventing new ulcers, controlling edema, and reducing venous hypertension through compression therapy. Compression therapy helps prevent reflux, decreases release of inflammatory cytokines, and reduces fluid leakage from capillaries, thereby controlling lower extremity edema and VSU recurrence. Goals of compression therapy are to reduce symptoms, prevent secondary complications, and slow disease progression.

In patients with severe cellulitis, compression therapy is delayed while infection is treated. Contraindications for compression therapy include heart failure, recent deep vein thrombosis (DVT), unstable medical status, and risk factors that can cause complications of compression therapy. Ultrasound screening should be done to rule out recent DVT. Arterial disease

must be ruled out by measuring the ankle-brachial index (ABI). Compression is contraindicated if significant arterial disease is present, because this condition may cause necrosis or necessitate amputation.

High compression levels should be used only if the patient's ABI ranges from 0.6 to 1.0. With an ABI between 0.9 and 1.25, the patient likely can tolerate treatment with four-layer compression or a long-stretch compression wrap. For patients with an ABI between 0.75 and 0.9, use single-layer compression with cast padding and a Coban wrap in a spiral formation.

Keep in mind that use of a compression wrap depends on the patient's comfort level and degree of leg edema. In patients who have mixed venous and arterial insufficiency with an ABI between 0.5 and 0.8, monitor for complications of arterial disease. Don't apply sustained high levels of compression in patients with ABIs below 0.5. (See *Comparing compression levels*.)

Pneumatic compression

The benefits of intermittent pneumatic compression are less clear than those of standard continuous compression. Pneumatic compression generally is reserved for patients who can't tolerate continuous compression.

Local wound care

Wound debridement is essential in treating chronic VSUs. Removing necrotic tissue and bacterial burden through debridement enhances wound healing. Types of debridement include sharp (using a curette or scissors), enzymatic, mechanical, biologic (for instance, using larvae), and autolytic. Maintenance de-

Comparing compression levels

Compression stockings should exert a pressure of at least 20 to 30 mm Hg at the ankle to be effective. Antiembolism stockings exert a pressure of 8 to 10 mm Hg at the ankle, making them inadequate and not recommended for treating venous insufficiency. Use of graduated compression stockings varies with patient factors, including signs and symptoms. For latex-sensitive patients, compression stockings without elastic are available.

Description of pressure	mm Hg (range)
Very light	7 to 15
Low	16 to 20
Moderate	20 to 30
High	30 and higher

bridement helps stimulate conversion of a chronic static wound to an acute healing wound.

Dressings

Dressings are used under compression bandages to promote healing, control exudate, improve patient comfort, and prevent the wound from adhering to the bandage. Vacuum-assisted wound-closure therapy can be used with compression bandages.

A wide range of dressings are available, including:

- hydrofiber dressings
- acetic acid dressings
- silver-impregnated dressings, which have become more useful than topical silver sulfadiazine in treating VSUs
- calcium alginate dressings
- proteolytic enzyme agents
- synthetic occlusive dressings
- extracellular matrix dressing
- bioengineered skin substitutes. Several human-skin equivalents created from

Other drugs used to treat VSUs

Besides antibiotics, pharmacologic agents used to treat venous stasis ulcers (VSUs) include the following:

- *Pentoxifylline* is a useful adjunct to compression bandaging and may be effective even without compression. It works by reducing platelet aggregation and thrombus formation. The drug also can be used as monotherapy in patients who can't tolerate compression bandaging. However, it's not the preferred treatment for VSUs.
- *Calcium-channel blockers*, such as diltiazem, nifedipine, and verapamil, are particularly effective against large-vessel stiffness and venous hypertension.
- *Aspirin* combined with compression therapy speeds ulcer healing and reduces ulcer size, compared to compression therapy alone. Adding aspirin therapy to compression bandaging generally is recommended in patients with VSUs, unless contraindicated.
- *Dermatologic topical corticosteroids*, such as triamcinolone, fluocinolone, and betamethasone, may reduce erythema, inflammation, pruritus, and vesicle formation.

Be aware that oral zinc, a trace metal, has potential anti-inflammatory effects. But recent studies found it has no benefit in treating VSUs. Also, diuretics may be prescribed for patients with other medical conditions that exacerbate lower-extremity edema (such as heart failure).

human epidermal keratinocytes, human dermal fibroblasts, and connective tissue proteins are available for VSU treatment. These grafts are applied in outpatient settings.

Antibiotics

Common in patients with VSUs, bacterial colonization and infection contribute to poor wound healing. Oral antibiotics are recommended only in cases of suspected wound-bed infection and cellulitis. I.V. antibiotics are indicated for patients with

one or more of the following signs and symptoms of infection:

- increased erythema of surrounding skin
- increased pain, local heat, tenderness, and leg swelling
- rapid increase in wound size
- lymphangitis
- fever.

Progressive signs and symptoms of infection associated with fever and other toxicity symptoms warrant broad-spectrum I.V. antibiotics. Suspected osteomyelitis requires an evaluation for arterial disease and consideration of oral or I.V. antibiotics to treat the underlying infection.

Other pharmacologic agents

A wide range of other drugs also can be used to treat VSUs. (See *Other drugs used to treat VSUs*.)

Surgery

Surgery can reduce venous reflux, hasten healing, and prevent ulcer recurrence. Surgical options for treatment of venous insufficiency include saphenous-vein ablation, interruption of perforating veins with subfascial endoscopic surgery, and treatment of iliac-vein obstruction with stenting and removal of incompetent superficial veins by phlebectomy, stripping, sclerotherapy, or laser therapy.

Patients should be evaluated early for possible surgery. An algorithm based on a review of literature indicates that patients whose wounds don't close at 4 weeks are unlikely to achieve complete wound healing and may benefit from surgery or other therapy.

To help determine if surgery may be warranted, assess venous reflux using duplex ultrasonography, which can reveal

Skin care for CVI patients

Adequate skin care with emollients or barrier preparations (such as petroleum jelly or zinc oxide cream, ointment, or paste) helps avoid skin irritation and maintain intact skin. Teach patients to apply moisturizer to the affected skin once or twice daily. However, caution them not to use lanolin-based moisturizers. Be aware that stasis dermatitis, an intense manifestation of advanced chronic venous insufficiency (CVI), can cause blistering and skin irritation with oozing.

CVI, assess physiologic dysfunction, and identify abnormal venous dilation. Consider a vascular consult for surgical management of patients with superficial venous reflux disease or perforator reflux disease.

Surgery aims to correct valve incompetence leading to increased intraluminal pressures. (Venous valve injury or dysfunction may contribute to CVI development and progression.) Surgical reconstruction of deep vein valves may be offered to selected patients with advanced severe and disabling CVI who have recurrent VSUs.

The literature shows that surgical vein stripping isn't superior to medical management. Endovenous laser ablation (EVLA), a minimally invasive procedure, yields greater benefits than vein stripping and other types of surgery.

Skin grafting

Skin grafting may be done in patients with large or refractory venous ulcers. It may involve an autograft (skin or cells taken from another site on the same patient), an allograft (skin or cells taken from another person), or artificial skin (a human skin equivalent). Skin grafting generally isn't effective if the patient has persistent edema (common with venous insufficiency) unless the underlying venous disease is addressed.

Adjunctive therapies

Adjunctive therapies, such as ultrasound, pulsed electromagnetic fields, and electrical stimulation, can aid in treating VSUs that fail to close despite good conventional wound care and compression therapy.

Patient education

Be sure to teach patients with VSUs about treatment and prevention to promote successful management. Advise them to:

- elevate their legs above heart level for 30 minutes three to four times daily (unless medically contraindicated), to minimize edema and reduce intra-abdominal pressure. Increased intra-abdominal pressure in severely and morbidly obese patients can increase iliofemoral venous pressure, which transmits via incompetent femoral veins, causing venous stasis in the legs.
- perform leg exercises regularly to improve calf muscle function
- use graduated compression stockings as ordered to prevent dilation of lower-extremity veins, pain, and a heavy sensation in the legs that typically worsen as the day progresses
- minimize stationary standing as much as possible
- treat dry skin, itching, and eczematous changes with moisturizers and topical corticosteroids as prescribed. (See *Skin care for CVI patients*.)

Also help patients identify risk factors for CVI (such as smoking and overweight), which can affect management. Teach them about therapeutic compression stockings, including their use, benefits, and care instructions. Remind them

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wound care nurse at the head, would help ensure proper assessment and interventions. The ideal team would include representatives from physical therapy, occupational therapy, dietary therapy, and nursing.

Finally, any time a provider or agency decides to no longer provide full care, the patient must be given options for where alternative care can be provided and a detailed “handoff” of the patient to the new provider needs to be made.

Improved care

Ultimately, Ms. Smith left the wound clinic and was evaluated by other physicians. Since leaving the clinic and no longer having daily debridements, her wound has decreased in size and new epithelial tissue is forming at the wound base. Two of her

three specialists have agreed that the leg can be saved, and Ms. Smith underwent a skin graft to promote additional healing. ■

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to wear stockings every day to prevent venous edema and VSU recurrence. Finally, urge them to adhere to the plan of care and get regular follow-up care. ■

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