ELSEVIER

Case Report

Surgical Scarring after Arterial Bypass, an Etiology of Venous Hypertension

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Venous ulcers can be a chronic debilitating condition with a high rate of recurrence. Herein, we describe a case of a patient who successfully underwent an arterial bypass for rest pain but returned with lower extremity swelling and venous ulcers. Venography demonstrated a focal common femoral vein stenosis due to scarring from the surgical exposure. This was treated with endovenous stenting and resulted in resolution of the swelling and ulceration.

Venous ulcers are the end stage of chronic venous disease and can be a chronic debilitating condition with a high rate of recurrence. Healing can require a combination of repeated debridements, antibiotic therapy, and compression. Surgical correction of venous disease might be required in severe cases of venous ulcerations. This may involve the use of superficial venous closure, sclerotherapy, skin substitutes, and even skin grafting. Risk factors for developing chronic venous diseases include primary valve insufficiency, post thrombotic syndrome after deep vein thrombosis or an obstructive state.[1] Other risk factors for the development of chronic venous disease include advanced age, family history, ligamentous laxity, prolonged standing, high body mass index, smoking, sedentary lifestyle, lower extremity trauma, prior venous thrombosis, arteriovenous shunt, high estrogen states, pregnancy, and May-Thurner syndrome.[2–17] Venous hypertension secondary to femoral vein stenosis subsequent to scarring after a groin exposure has not been previously described.

Herein, we describe a patient with peripheral arterial disease who underwent repeated arterial bypass grafts and then presented with lower extremity swelling and chronic, nonhealing venous ulceration. Despite adequate compression and superficial debridements, the wound recurred, and venography was performed. Lower extremity venogram revealed a focal common femoral vein stenosis at the level of prior surgical exploration. Endovenous stenting was performed, and the patient had resolution of the ulceration at 3 months after the procedure.

CASE REPORT

We present a 64-year-old man with a history of bilateral femoral-popliteal bypasses for rest pain who presented for evaluation of a nonhealing left lateral calf venous ulcer with heavy exudate (Fig. 1). On evaluation, he was noted to have an ankle-brachial index of 0.7 bilaterally with a left great toe pressure of 48 mm Hg. Wound cultures were positive for methicillin sensitive *Staphylococcus* aureus, Pseudomonas, and Klebsiella, and he was treated with antibiotics. Venous duplex study demonstrated significant reflux in the greater saphenous vein. He underwent radiofrequency ablation of his great saphenous vein to treat the reflux. His wound was further treated with multiple allografts without improvement. A follow-up angiogram at 4 months from presentation demonstrated an occluded bypass graft. To improve the arterial flow to facilitate wound healing, he underwent a left femoral tibioperitoneal trunk

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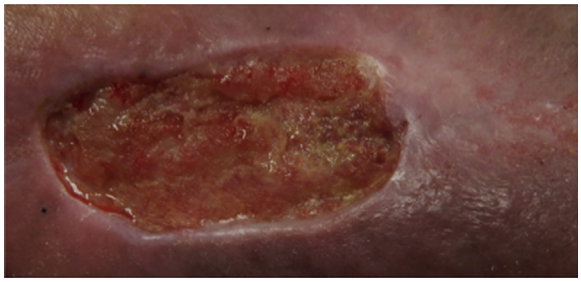

Fig. 1. Venous stasis ulcer on the left lateral calf.

bypass with polytetrafluoroethylene. He was discharged on anticoagulation and antiplatelet therapy.

The wound recurred after 1 year. During this time, he also developed edema of the left lower extremity. Reflux study demonstrated reflux into the deep veins in addition to the smaller, remnant greater saphenous vein and perforators. Venogram demonstrated a patent inferior vena cava, common and external iliac vein. It further exhibited severe focal stenosis at the common femoral vein with surrounding collateralization (Fig. 2A). This stenosis was at the level of the prior surgical scar. The stenosis was further confirmed by intravascular ultrasound (IVUS). Measurement by IVUS demonstrated severe stenosis with 65% reduction in surface area from 135 mm^2 at the proximal common femoral vein to 47.4 mm^2 at the area of focal stenosis (Fig. 3). A 16 mm diameter stainless steel, self-expanding intravascular stent (Wallstent, Boston Scientific, Marlborough, MA) was deployed into the common femoral vein proximal to the bifurcation. Post dilation performed with a 14 mm balloon. Completion venogram demonstrated good flow through the stent with disappearance of the collaterals (Fig. 2B). The patient was discharged to home on postoperative day 1 on aspirin, Plavix, and Coumadin. In the interim, the patient was managed with conservative local wound care. By 2 months after procedure, the patient's leg swelling had resolved, and at 3 months, there was a complete resolution of the venous ulceration.

DISCUSSION

In the United States, treatment of chronic venous disease carries an overall cost of more than $1 billion in health-care expenditure.[18] The prevalence of lower extremity ulceration is reported to be between 0.18% and 5% in patients more than the age of 65 years.[19] Lower extremity ulceration is a debilitating phenomenon and consumes a significant amount of health-care resources to treat, prevent, or decelerate the progression of the disease. Chronic venous disease is the seventh most common indication for medical referral in the United States.[3]

Venous ulcerations are the most common form of lower extremity vascular ulcers and account for 2/3 of all lower extremity ulcers.[20] Pathophysiology behind venous ulcer formation involves reflux and, or outflow obstruction. These mechanisms combined with increased ambulatory venous pressure transmitted to the capillaries of the subcutaneous tissue result in inflammation. This inflammation causes skin damage and ulcer development.[21–23] In our patient, there was a combination of these etiologies, and they were treated accordingly.

Here, we describe a patient with history of multiple arterial bypass grafts that presented with persistent nonhealing venous ulcers, despite standard management. Venography demonstrated a focal common femoral vein stenosis in the area of the prior surgical exploration and was treated with endovenous stenting.

Adjunct treatment options for varicose veins include endovenous ablation techniques that induce thermal damage to the endothelial lining of the vein and results in occlusion of the saphenous vein.[24] Open surgical options include venous thrombectomy and veno-venous bypass, but these options are associated with risk of lymphatic leaks, wound infections, thrombosis, and further scarring.[25]

Today, an endovascular approach is preferable in the treatment of proximal deep venous disease as it is minimally invasive and associated with a lower morbidity. In looking at the data for deep venous revascularization, much of this work is performed in the iliocaval and iliofemoral segments. Iliac vein stenting is associated with resolution of venous claudication at a rate of 87%[26] and venous ulcer resolution at a rate of 60% as well as an overall improvement in quality of life.[27] There is also a shorter hospital length of stay and earlier return to baseline functional status with these minimally invasive therapies. Iliofemoral venous stents are associated with a 68% primary and 83% assisted primary patency at 1 year.[26] The advantages of an endovenous approach include avoidance of a groin incision and subsequent infections as well as the avoidance of lymphatic leaks or the use of prosthetic graft material.[28] This is especially true in reoperative fields with significant scarring.

Limitations of an endovascular approach include the risks of stent stenosis, thrombosis, and migration, all of which can have devastating consequences for the patient. Other limitations involve the risk of vessel perforation and hemorrhage and the need for large caliber sheaths in the venous system, which can result in thrombosis and bleeding at the puncture site as well.

Herein, we presented a patient who had arterial insufficiency who developed venous complications due to scar tissue formation at the surgical site that