Venous Insufficiency: The Changing Paradigm in Vascular Disease

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ABSTRACT: Venous insufficiency is the most common vascular disorder today, and it is underdiagnosed and misdiagnosed. Until recently, venous stripping was the only available therapy. This commentary, with the aid of a case example, aims to enhance understanding of venous insufficiency and the current treatments available.

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Venous insufficiency is the most prevalent vascular disorder in medicine today. It has been documented in sculptures uncovered in Greece that date back several centuries B.C. Up until a little over a decade ago, medicine had at best offered venous stripping as the only approach to the definitive treatment of venous insufficiency. This treatment proved to be anything but definitive. Despite significant advancement in its treatment options, venous insufficiency remains the most prevalent yet underdiagnosed vascular disorder today. It is estimated that over 30 million Americans suffer from symptomatic venous insufficiency, yet fewer than 2 million actually seek treatment. To put this in perspective, venous vascular disease is 5 times as prevalent as peripheral arterial disease and 2.5 times as prevalent as coronary artery disease. The following case study aims to better elucidate venous insufficiency and this underdiagnosed as well as misdiagnosed condition.1

CASE REPORT

In 2013, a 48-year-old female presented to our clinic in response to direct-to-consumer advertisement because of troubling and long-standing symptoms involving her lower extremities. Specifically, she had complained for over 20 years of pain and discomfort in her lower extremities described as aching and throbbing that worsened throughout the day. She also complained of severe bilateral lower-extremity edema. Particularly bothersome were symptoms consistent with tingling and paresthesias, which had previously been diagnosed as neuropathy. This diagnosis was made despite no history of diabetes or other factors known to cause peripheral neuropathy. She had numerous other symptoms including heaviness in her legs as well as very bothersome restless leg syndrome and severe nocturnal cramping, both of which affected her ability to sleep. Her previous treatments consisted of a number of different medications that she had tried for her “neuropathy” as well as numerous unspecified...
medications for her dermatologic complaints of pruritus including a fair share of steroid-based creams. She was also empirically on high-dose diuretics and potassium replacement for her lower-extremity edema of unknown etiology.

On physical examination we confirmed edema, large varicosities, and severe stasis dermatitis. The varicosities were particularly dramatic and disfiguring and involving her entire thighs and calves. She had dark discoloration in the ankles bilaterally consistent with stasis dermatitis and numerous superficial spider varicosities.

A venous ultrasound in our practice revealed severe superficial venous reflux and evidence of extensive distribution of varicose veins. No evidence of deep venous thrombosis was observed. After several weeks of compression therapy, she noted no improvement and underwent successful radiofrequency ablation of her superficial venous reflux. She then underwent adjunctive therapy with both foam sclerotherapy and microphlebectomy of the residual varicose veins. Her clinical response to treatment resulted in significant cosmetic improvement but above all complete resolution of not only the physical findings described above but her entire symptomatology including restless legs, dermatitis, edema, and previously diagnosed neuropathy. We discontinued duloxetine (Cymbalta), prednisone-based creams, and furosemide as well as potassium replacement. She had no further symptomatology and was discharged from our clinic.

**DISCUSSION**

Venous insufficiency is defined as the inability of the veins mainly in the lower extremities to transport blood back to the right side of the heart. The secret to venous return resides in unidirectional valves that are located in the veins of the lower extremities. Muscle contraction, as in walking, results in compression of the veins and these valves when functioning normally direct the blood back to the heart against the effect of gravity. Venous insufficiency occurs as a result of damage and dysfunction of these one-way valves. Incompetent valves can no longer keep the blood from flowing backwards as a result of gravity and this results in reflux, the hallmark of venous insufficiency.

From the pathophysiology standpoint, this reflux of blood leads to venous hypertension. As we know, the veins drain the capillary system and this resulted high blood pressure impedes that drainage. This results in congestion and capillary hypertension as the resulting hydrostatic pressure is increased at the level of the microcirculation. This congestion hampers flow through the capillary system leading to entrapment of both red and white blood cells. The death of the white blood cells leads to the release of their lysosomal enzymes resulting in damage to the capillary basement membrane. The integrity of the capillary basement membrane is lost with the resultant protein leakage into the interstitium with deposition of the protein around the exterior of the capillary wall. This phenomenon is referred to as “protein cufing.” This results in increased thickness for barrier of the capillary wall and the delivery of oxygen is made difficult with resultant hypoxia and tissue damage manifested as stasis dermatitis and lipodermatosclerosis. Further progression leads to the development of nonhealing ulcers and risk of limb loss.

Clinically, the manifestations as were seen in our patient include edema, varicose veins, and skin changes
including stasis dermatitis and leg ulceration. The symptoms in most patients are chronic and frustrating. The spectrum of symptoms is somewhere between mild discomfort and, more commonly, significant and debilitating symptoms that can severely affect quality of life. Symptoms may consist of heaviness in the lower extremities frequently described as throbbing and aching and more commonly toward the end of the day after the patient has been sitting or standing for a prolonged period. Severe pain of different types is not uncommon leading to numerous empiric approaches including narcotics. Itching can be seen as can numerous paresthesias and other symptoms frequently misdiagnosed as neuropathy. Nocturnal cramps and restless legs are also quite common in patients with venous insufficiency.

Treatment consists of diagnosing the disorder with a complete ultrasound and treating the culprit refluxing vein through a process called venous ablation. Numerous modalities exist, including chemical techniques as well as heat-generating technologies that include laser and radiofrequency ablation. In the hands of competent and skilled interventionalists, these procedures can usually be performed in a matter of minutes and are entirely ambulatory. In most cases and in our center we use absolutely no sedation or premedication. The patients tolerate it well and there is no downtime other than avoiding traveling or lifting heavy weights for a total of 2 weeks post therapy.

Cardiologists or cardiovascular specialists are trained in disorders of the heart, including ischemic disorders as well as issues related to heart failure including the cardiomyopathies. A selective group of cardiologists seek additional treatment in the field of electrical conduction abnormalities and specifically electrophysiology. Others seek training in the field of peripheral arterial disease but few if any have actual formal training in the recognition, diagnosis, and treatment of venous vascular disease. This is evident as 1 in 4 adults in the United States suffers from venous insufficiency yet less than 10% are actually diagnosed or treated.

To better understand this unfortunate situation it is important to recognize the factors that lead to the undertreatment and quite frankly mistreatment of the disorder. The majority of medical specialties if not all of them lack formal training at the fellowship level with respect to venous disorders and venous insufficiency. This lack of training is once again evidenced by the undertreatment described above by not only general physicians but quite frankly vascular specialists as well.

Another factor leading to the undertreatment of the disorder is that it has been considered a cosmetic problem by patients and providers alike. It has long been believed that the only treatment option is venous stripping, a surgery that I believe can today best be described as archaic, barbaric, and for the most part obsolete, especially when considering the new modalities. Most patients affected by venous insufficiency have had the surgery or know of a friend or relative that has had venous stripping and understandably want no part of it. In my experience, I find it surprising that most patients and their providers are unaware of their patients’ covered medical insurance benefits. Treatment is covered by most insurance plans if the patient remains symptomatic after failed conservative measures including prescription grade compression...
therapy.

What is important for interventionalists to understand is that varicose veins are not normal structures in the lower extremities and their presence warrants further investigation at least via a thorough history and physical examination. If the patient is symptomatic, further work-up should include a venous ultrasound, and compression stockings should be prescribed if there are no contraindications to their use. Several months of conservative measures should be recommended. Urgent intervention should be considered in cases of large nonhealing ulcers, which represent a risk of limb loss, or other immediate threats including systemic infection. In the remainder of cases however, the patient should be evaluated to assess response to conservative measures. Patients that have failed conservative measures and have a significant burden of symptoms should be offered venous ablation treatment as a definitive treatment option.

Venous ablation is safe and effective in experienced hands, with over a 90% cure rate and a very small incidence of complications or recurrence. The complications include the risk of DVT in less than 1% of cases. It is for this reason that an ultrasound is performed within the first few days of the procedure to document the effectiveness of treatment and rule out DVT.²⁻⁴

It has been my experience that patients are severely symptomatic and frequently respond to direct-to-consumer advertisement regarding the symptoms of venous insufficiency. This reflects the lack of awareness among medical providers regarding the magnitude of the problem of venous insufficiency as well as the medical alternatives to successful elimination of the problem altogether. The lack of understanding of the problem can be reflected in our patient example by the numerous misdiagnoses and empiric treatment, all of which were ineffective with significant frustration and cost to the patient and her insurance plan. Empiric treatment can result in side effects, some of them serious. It is not uncommon for patients to be prescribed a significant dose of diuretics for lower extremity edema, as in our patient’s case. This was prescribed despite the absence of renal dysfunction, hypoalbuminemia, RV/LV dysfunction, or other factors known to produce edema.

Many of these patients are on other medications including narcotics and agents for neuropathic pain because of an empiric diagnosis of neuropathy, as in our patient’s case. Many of these patients have been visiting wound care centers for years and are on other medications including medications for restless legs and unnecessary “electrolyte replacements” for nocturnal cramps. It is my experience that many of these patients have been evaluated by cardiologists, who also are unaware of the treatment modalities and as a result simply ignore the issue altogether. In the end, I find it tragic and sad to see decades of quality of life that have been kept from these patients because of a lack of awareness and proper channeling of their care.

As we look at the present situation, it is imperative that we as health care providers involved in the care of the patient with venous insufficiency work hard to correct these misunderstandings and increase awareness. This will require significant coordination between the different disciplines that currently are involved in the treatment of venous disorders as well as their respective societies. Physicians training in the field of cardiac and vascular disease should consider formal fellowship training in venous disorders.

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Looking toward the future in venous disease, I believe that our current approach of improving care through education and awareness is a good first step. It is important however that to extract the most out of this “new” and interesting field of medicine, we perform diligent analysis and research. To do so it will require changing the paradigm of vascular medicine today and the way we look at the “blue side” of the circulation. Along these lines, our center is currently involved in looking at a number of issues including anecdotal reports of improved sleep patterns, better stamina and endurance, better blood pressure control, and in some cases improvement in erectile dysfunction. It is also my firm belief that this abnormal venous circuit that resides between the muscle fascia and the skin harbors trapped blood that is not filtered by the kidneys, detoxified by the liver, oxygenated by the lungs, or cleared of old dying red blood cells by the spleen.

As our research efforts collect data and information, we hope to change the way we look at total vascular care today. It is my sincere hope that through this exploration, some of the mysteries of hypertension, sepsis, and why we benefit from exercise to name a few, can be uncovered. Our current preliminary stage of research in this otherwise virgin field will hopefully provide a steep information curve. As a result, I can only feel optimistic and excited regarding information these efforts may uncover.

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REFERENCES
2. Covidien. Endovenous radiofrequency ablation (RFA) catheter (with 3 cm and 7 cm heating elements) instructions for use.