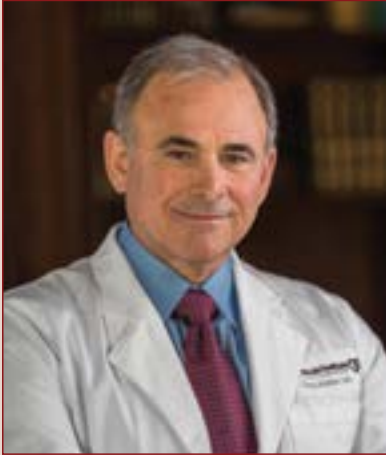


Thermal Imaging Positioned to Become the Best Tool in the Evaluation of Superficial Venous Insufficiency



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Thermal imaging demonstrated excellent sensitivity and specificity in evaluating superficial venous insufficiency with a quick, one-minute, non-contact study utilizing inexpensive equipment.

Welcome to the March 2021 edition of *Vascular Disease Management*. There are many articles of great interest in this month's edition. I have chosen to comment on Dr. Ariel Soffer and colleagues' article "Sensitivity and Specificity of Thermal Imaging When Used to Detect Superficial Venous Reflux as Compared to Duplex Ultrasound."

I have chosen to comment on this article as lower extremity venous insufficiency is a common circulatory disorder with associated symptoms ranging from truly asymptomatic to severely symptomatic with pain and ulceration. This disorder affects more than 80 million Americans. Unfortunately, the majority of individuals with venous insufficiency are not diagnosed. While some patients have large visible varicosities, dramatic venous stasis skin changes, or venous ulceration, many have more subtle symptoms such as restless leg syndrome, aching leg pains typically worsened by prolonged standing, or unilateral or bilateral lower extremity edema. Others are inappropriately diagnosed as having neuropathy. Many of these individuals do not recognize that they have edema unless it is pointed out by an observer. Even when physicians suspect the diagnosis of venous insufficiency and obtain a venous duplex, the overwhelming majority of studies are reported only as to whether or not there is deep venous thrombosis with no assessment of venous insufficiency.

Making an appropriate diagnosis of venous insufficiency is important not only in patients with clear signs or symptoms but in all patients with this circulatory disorder. Many patients have either no symptoms at all, or only subtle symptoms which are attributed to other etiologies. Even when there are truly no symptoms referable to venous insufficiency, important clinical parameters utilized to follow patients with congestive heart failure or renal insufficiency, such as daily weights, are not a reliable indicator of increased vascular volume as daily weights do not reflect an accurate assessment of intravascular volume. Many of these patients are treated inappropriately with aggressive diuresis. When the diagnosis of superficial venous insufficiency is made, conservative medical therapy including compression hose, weight loss, and walking programs often alleviate symptoms and may help to prevent progression of symptoms.

Duplex ultrasound is presently the gold standard at this time in making an accurate diagnosis of venous insufficiency but it has significant limitations as an ideal screening tool. The diagnosis of venous insufficiency has historically mandated having highly experienced ultrasound technicians performing contact studies lasting up to one hour. Expensive ultrasound machines are required. Many patients, particularly those presenting with severe leg pains, experience significant discomfort during the performance of these exams as technicians have to apply pressure to enhance visualization. In patients who have had a prior venous duplex in a hospital or clinic where no assessment of venous insufficiency was performed, repeat studies required to evaluate the presence and extent of venous insufficiency, may not be compensated. As anatomy varies from patient to patient, a standard extensive examination may inadvertently miss significant venous insufficiency particularly in accessory veins.

In Dr. Soffer and colleagues' article in this issue of VDM, thermal imaging demonstrated excellent sensitivity and specificity in evaluating superficial venous insufficiency with a quick (approximately one minute) non-contact study utilizing

inexpensive equipment. This study did not require highly trained technicians. As the study is non-contact there was no patient discomfort. If these findings continue to be confirmed by others, thermal imaging could potentially become an excellent and practical cost-effective screening tool in the evaluation of superficial venous insufficiency as it is quick, painless, and inexpensive. Thermal imaging has several clear limitations. It does not have a means to assess vessel size. It does not determine the severity of insufficiency. It may not give clues about possible deep venous insufficiency.

Thermal imaging may lessen the need for many expensive and time consuming venous duplex studies and may help direct the ultrasound technicians to evaluate special areas of interest. The images submitted in this publication would seem to be easily interpretable by healthcare providers and easily comprehended by patients.

Superficial venous insufficiency is a significant and extraordinarily common vascular disorder that is under-diagnosed and often misdiagnosed. It is often regarded by many practitioners as only a cosmetic disorder. While much of the attention that was initially directed to venous insufficiency was related to cosmetic issues, venous insufficiency in my opinion deserves far more attention than it has historically received. Highly symptomatic patients, despite conservative measures, often obtain dramatic pain relief, improved exercise capacity, and ulcer healing with directed therapies to occlude a critically insufficient culprit vein. Making the diagnosis can help patients to understand the etiology of symptoms and help to guide appropriate medical therapy. Patients with venous insufficiency are often diagnosed as having cellulitis and are treated with antibiotics. Others are diagnosed as having neuropathy and are treated with medications that have the potential to alter mental state. Some are treated with chronic pain medications.

Appropriate medical therapy requires accurate diagnosis of the etiology of a problem. Once appropriately diagnosed, there are effective low risk treatment modalities available for patients with venous insufficiency. As healthcare providers, we must improve our skills in diagnosing and treating venous disorders. Thermal imaging may become an effective and efficient tool in improving diagnostic accuracy if further studies confirm the findings reported in this article.