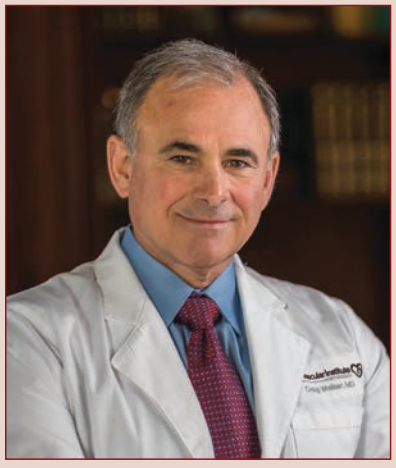
The Potential of Thermography as a Practical Screening Tool for Superficial Venous Insufficiency



Craig Walker, MD, FACC, FACP
Clinical Editor
Interventional Cardiologist
Founder, President, and
Medical Director
Cardiovascular Institute of the South;
Clinical Professor of Medicine
Tulane University School of Medicine
Louisiana State University School
of Medicine

Thermography, which requires less time and technical expertise, has great potential as a cost-effective screening tool in patients where superficial venous insufficiency is suspected.

Hello and welcome to the November 2020 edition of *Vascular Disease Management*. I have chosen to comment on Dr. Ariel Soffer and colleagues' article "Thermal Imaging of Superficial Leg Circulation Improves Venous Diagnostic Efficiency and Completeness."

In this report, the authors utilized an infrared thermal camera capable of detecting a temperature difference of 0.1 degrees centigrade at the skin surface. This was connected to an iPhone or iPad to create permanent photographic images from multiple angles in patients with suspected superficial venous insufficiency. The authors first removed clothing from the lower extremities then had the patient stand upright for at least a minute prior to taking the pictures. Following this, photographic images were taken from anteroposterior (AP), posteroanterior (PA), lateral, and medial angulations. The images were obtained at the speed of a standard iPhone photograph. The images required no processing and could be analyzed immediately.

It is theorized by the authors that the blood in insufficient superficial veins is warmer than the skin, resulting in images that demonstrate areas of increased heat where there is significant superficial venous insufficiency. The authors noted that the detection of significant venous insufficiency in the greater saphenous vein (GSV) and the small saphenous veins (SSV) was the same as duplex ultrasound but was superior to duplex ultrasound in detecting anterior and posterior accessory thigh vein insufficiency.

I have chosen to comment on this article as I believe thermography has great potential as a screening tool in patients where superficial venous insufficiency is suspected. Superficial venous insufficiency is common. It may be asymptomatic or may be associated with significant symptomatology. Even when venous insufficiency is asymptomatic, the detection is important in patients being treated for congestive heart failure where the edema may be treated with diuretics resulting in intravascular volume depletion. Detection of venous insufficiency in symptomatic patients may allow for appropriate therapeutic options to control symptoms.

The detection of superficial venous insufficiency by duplex ultrasound remains the gold standard of diagnostic studies. Venous duplex studies that evaluate venous insufficiency are extraordinarily time consuming and require expert sonographers. The overwhelming majority of ordered venous ultrasound studies, therefore, do not evaluate for venous insufficiency. These studies are reported as either having evidence of deep venous thrombosis or not, missing an opportunity to diagnose venous insufficiency, which may be of importance in explaining presenting symptoms. Subsequent diagnostic testing to evaluate venous insufficiency is often denied by insurers as prior venous duplex was performed.

Venous insufficiency is far more than a cosmetic disorder. It is associated with leg swelling, leg discomfort, restless leg syndrome, and in advanced stages venous ulceration. If other studies confirm the diagnostic accuracy of thermal imaging, which takes far less time and technical expertise, then this could become a cost-effective screening tool. This could also potentially improve the diagnostic accuracy of ultrasound by highlighting areas of interest for the technician to evaluate.