Duplex ultrasonography has changed the landscape of venous disease. Color flow duplex imaging, has enabled the accurate evaluation of chronic venous disease (CVD) and enhanced our understanding of its development. Réflux is most often a local process that develops in any part of the lower limb venous system, particularly in the superficial veins and in the below-knee segment of the GSV. This suggests reflux is characterized by ascending progression, multicentric progression, or both, in addition to or separate from gravitational retrograde development.

It should be emphasized that ultrasound technicians are often unfamiliar with superficial venous anatomy and its many variations. The treating physician must therefore be self-sufficient with duplex scanning techniques and recognize the nuances of venous anatomy prior to entering the endovenous arena. Caggiati and Min and colleagues have written comprehensive reviews of contemporary venous nomenclature, which was standardized at a consensus conference in Rome.

A normal GSV is typically 3 to 4 mm in diameter and ascends from the medial ankle along the anteromedial aspect of the calf, knee and thigh to terminate at the saphenofemoral junction (SFJ). The GSV is usually contained within the saphenous compartment, which is bounded superficially by a hyperechoic saphenous fascia and deeply by the muscular fascia. Visualization of this fascial envelope is an important landmark in identifying the GSV with duplex ultrasonography. Accessory saphenous veins are venous segments that ascend parallel to the saphenous veins. They may exist anterior, posterior, or more superficial to the main saphenous trunk. The small saphenous vein (SSV) originates in the lateral foot and passes posterolaterally in the lower calf. The SSV lies above the deep fascia in the midline as it reaches the upper calf, where it pierces the popliteal fascia and deeply by the muscular fascia. Visualization of this fascial envelope is an important landmark in identifying the GSV with duplex ultrasonography. Accessory saphenous veins are venous segments that ascend parallel to the saphenous veins. They may exist anterior, posterior, or more superficial to the main saphenous trunk. The small saphenous vein (SSV) originates in the lateral foot and passes posterolaterally in the lower calf. The SSV lies above the deep fascia in the midline as it reaches the upper calf, where it pierces the two heads of the gastrocnemius muscle and enters the popliteal space. In approximately two-thirds of patients, the SSV drains entirely into the popliteal vein in the lateral foot and passes posterolaterally in the lower calf.

Intraoperatively, duplex ultrasonographic imaging is used for percutaneous venous access, catheter placement and positioning, and placement of tumescent anesthesia. Postoperatively, duplex scans should be obtained at 2 days, 1 month, 6 months, and annually to ensure adequate vein closure and absence of deep vein thrombosis. Ultrasonic disappearance of the GSV trunk marks complete vein wall involution. There is no tendency to recanalize once this stage is reached.

Since duplex imaging plays a vital role for preoperative planning, intraoperative treatment, and postoperative follow-up treating physicians should not rely on studies performed at outside laboratories.

References