

# Radiofrequency Ablation of Varicose Veins: A Word of Caution

NOTES

Alan B. Lumsden, MD, FACS, Houston, TX; Peter Lin, Houston, TX; Ruth L. Bush, Houston, TX;  
Eric Peden, MD, Houston TX

---

**R**adiofrequency (RF) ablation of the refluxing greater saphenous vein has now become well established for the management of varicose veins. Long-term follow-up data is now available demonstrating that the closure of the greater saphenous vein is durable. Endovenous temperature-controlled RF obliteration of the saphenous vein was introduced in 1998, and over 35,000 procedures have been performed worldwide. The RF energy is delivered to the vein wall via specially designed bipolar electrodes, causing resistive heating of the vein wall that leads to immediate collagen contraction and later fibrotic occlusion of the vein. The electrodes are deployed via a catheter (Closure catheter, VNUS Medical Technologies; San Jose, CA) through percutaneous vein access under ultrasound guidance. The RF obliteration procedure has been shown to result in a persistent occlusion of treated veins in 88.7% of the limbs at 2 years.

Several new developments promise to expand the utilization of this technique by making it faster and broadening the indications for its use: faster pull back rates, short saphenous closure, and perforator ablation.

1. Increasing the probe temperature to 90°C allows a faster pullback time with equal efficacy. This will further increase the appeal of this technique to the vascular surgery community: thereby providing similar speed to the laser techniques, while maintaining the high efficacy
2. RF ablation of the short saphenous system is being increasingly applied when short saphenous reflux and varicosities are present. The technique for short saphenous ablation presents several differences from GSV ablation:
  - Patient has to be prone on the interventional table
  - Total closure length is shorter
  - Higher incidence of neuralgia from the proximity of the sural nerve
  - Ultrasound imaging of the sapheno-popliteal junction is more difficult because the short saphenous vein dives more directly anteriorly
3. RF perforator ablation is an emerging technique being studied as an adjunct for venous stasis ulcers. Careful duplex mapping and identification of perforators permits direct perforator puncture with a micropuncture needle percutaneously. A sheath is then inserted through which a specially designed RF catheter is introduced. Catheter position is confirmed and closure performed with external compression over the perforating vein.

The VNUS closure system has also been used to treat incompetent perforating veins. Whiteley and colleagues reported the results from a transluminal occlusion of perforator technique (TRLOP) using Closure catheters. Among 82 treated IPVs, 93% remained closed at 1 year. The potential advantage of using radiofrequency perforator treatment is that the intervention is truly a minimally invasive procedure. No tissue dissection is needed. The IPVs are accessed through a percutaneous approach. Unlike SEPS, the approach is not limited by perforating vein location and the physician can access IPVs at various positions including the more proximal Boyd's, Dodd's, the mid-thigh Hunterian, laterally located perforators, as well as perimalleolar located vessels. The procedure also allows the flexibility of treating newly developed IPVs with minimal invasion, when it is necessary. The procedure may significantly reduce morbidity and improve patient recovery following the surgery.

## Controversies

There is widely disparate reporting of the incidence of DVT following RF ablation of the saphenous vein. A recent report of a 26% incidence following use of the 8F catheter is significantly different from that reported in most series. We routinely perform ultrasonography at 3 to 5 days postprocedure and do not use prophylactic anticoagulants. We have detected three thrombi (of 320 cases) forming in the saphenous stump, with minimal extension into the common femoral vein. All three have disappeared within 2 weeks of initiating low molecular weight heparin therapy.

## References

1. Merchant RF, Kabnick LS. Endovenous obliteration of saphenous reflux: a multicenter study. *J Vasc Surg* 2002;35:1190-6.
2. Whiteley MS, Holdstock JM, Price BA, et al. Radiofrequency ablation of refluxing great saphenous systems, Giacomini veins and incompetent perforating veins using VNUS closure and TRLOP technique. *Phlebology* 2003;18:52.
3. Hingorani AP, Ascher E, Markevich N, et al. Deep venous thrombosis after radiofrequency ablation of greater saphenous vein: a word of caution. *J Vasc Surg* 2004;40:500-4.