Endovenous laser treatment of the small saphenous vein

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Purpose: Endovenous laser treatment is a minimally invasive technique for ablation of the incompetent great (GSV) and small saphenous vein (SSV). Compared with the GSV, fewer data are available on SSV laser ablation and are not validated. This multicenter prospective study evaluated the feasibility, safety, and efficacy of endovenous laser ablation to treat SSVs. Methods: Between January 2003 and January 2007, 204 patients (229 limbs) with CVD and incompetent SSVs (evaluated by the CEAP classification) who were eligible for surgery underwent consecutive laser ablation procedures. Many required additional treatment for varicose tributaries and perforator veins with phlebectomy and foam sclerotherapy. Energy was delivered to the vein wall by a 600-μm optical fiber using 810-nm or 980-nm diode laser. Ablations were performed with duplex ultrasound (DU) guidance and tumescent anesthesia. Follow-up was with clinical examination and DU imaging.

Results: DU imaging showed immediate occlusion of the SSV with no thrombosis in the proximal veins. No complications occurred intraoperatively. All patients had postoperative ecchymosis, but it was minimal. Three patients had distal thrombotic complications. Superficial phlebitis after complementary surgery occurred in three cases. Complete occlusion with absence of flow ≤2 months of follow-up was detected in 226 SSV (98.7%). It occurred 22 in patients with large SSV diameter. Recanalization was found in one patient at 12 months and in two patients at 24 months. Seven limbs had reflux in previously treated areas, treated segments, and segments in continuity with them. Three underwent an intervention to correct symptomatic reflux. The other four had no symptoms. After 1 year, eight limbs developed reflux in new locations and four underwent treatment. Symptoms resolved in most patients soon after the operation. The mean follow-up was 16 months (range, 2-39 months). After 8 to 12 months postoperatively, the laser-treated veins were fibrotic and almost indistinguishable on DU imaging from the surrounding tissues. In five patients (2.25%) postoperative pain occurred >2 to 3 days postoperatively and persisted in the follow-up. No pain occurred in our last series whenever a larger amount of tumescent cold saline was infused around the vein.

Conclusion: Endovenous laser ablation of the SSV has excellent early and midterm results. The prevalence of thrombosis and paresthesia is very low. Symptom relief is very good. (J Vasc Surg 2009;49:973-9.)

Conventional surgery for small saphenous vein (SSV) reflux is associated with high recurrence rates (up to 50%), many resulting from technical and tactical failures. Nerve injury during ligation and stripping of SSV is also high, so most surgeons avoid stripping the vein and perform only a high ligation and resection of the incompetent junction. Sclerotherapy is a low-risk procedure for treating vein reflux but has failure rates of 14% for SSV diameter <5 mm and 23% for SSV diameter >5 mm. There has been significant progress in the use of minimally invasive techniques with thermal energy in treating incompetent veins. The results of endovenous ablation techniques have been shown to be at least equal to treatment with stripping, but with fewer adverse events, reduced recovery time, and increased quality of life scores. After the clinical experience of endovenous laser ablation of the great saphenous vein, we started the laser ablation of the SSV on April 2002. When enough experience was developed (9 months) on the treatment of SSV, a prospective clinical study was designed to test the feasibility, safety, and efficacy of the endovenous laser ablation.

METHODS

Patients. During a 4-year period, from January 2003 to January 2007, 229 symptomatic limbs with incompetent SSV in 204 patients underwent laser ablation. Patients were enrolled in four centers in Italy (Ferrara Day Surgery, Ferrara; Casa di Cura, Santa Maria Maddalena, Ravigo; Policlinico San Marco, and Cittadella Socio Sanitaria, Venice) and one center in France (Henry Mondor Hospital, Paris). A total of 179 limbs were operated on in the four Italian centers and 50 limbs in the French center. Operations were done by two specialists (D. K., J. L. G.). There were 158 women and 46 men, and their mean age was 59 years (range, 24-93 years).

All patients were studied before the operation by clinical examination and duplex ultrasound (DU) imaging to assess vein patency. Reflux was determined in the standing position using manual compression, followed by sudden