Technical Aspects of Saphenous Vein Ablation

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There is a growing body of literature to support the efficacy, safety and durability of endovenous saphenous vein ablation as an alternative to surgical ligation and stripping. The obvious advantages include the avoidance of general anesthesia, minimized recovery period and early return to ambulation compared with standard surgical approaches. The less obvious advantages which have become apparent are the lower rate of complications and higher success and durability of the procedure relative to surgery. This presentation will focus on the technical aspects of the Endovenous Laser Treatment (EVLT) of the incompetent saphenous vein. Many of the technical aspects of EVLT are similar for endovenous RF treatment.

The key to success with EVLT is making the correct diagnosis and careful patient selection. I would like to make a few points about careful patient selection at this point. We will review the clinical exam and Duplex exam of the patient in the "Managing Varicose Veins" workshop later in this meeting.

The straighter the vein the easier it will be to pass the laser fiber across the length of the segment which requires therapy. Tortuosity, often very focal, often occurs in the Greater Saphenous Vein (GSV) and can occasionally cause difficulty in accessing the more portions of this vein. The anterolateral tributary (ALT) of the GSV and the Vein of Giacomini can also be treated with EVLT if a sufficiently straight segment of vein exists. These veins frequently have tortuous venous segments. Pre-procedural identification of vein tortuosity is important. Most of the time mildly tortuous segments can be traversed expeditiously but occasionally a second access will need to be made just above the tortuosity and this will be discussed in the lecture. Very tortuous veins are generally not suitable for these techniques.

It was thought that the larger diameter saphenous veins should not be treated since it would be very difficult to cause sufficient circumferential vein injury to induce permanent vessel lumen obliteration. However, this has not been borne out in the EVLT data. This is because when a patient with a large diameter vein in the erect position lies flat, the vein markedly decreases in diameter. In addition, most veins will go into spasm very soon after the vein segment has been accessed. Finally, when adequate tumescent anesthesia (TA) is utilized the vein is usually compressed so that its lumen is nearly obliterated prior to the delivery of thermal energy. As it turns out, the larger veins are usually the easiest to treat particularly since they are the easiest to access percutaneously.

Percutaneous therapy begins with marking of the vein segment to be treated. In the erect position and using ultrasound, the SFJ (or SPJ in the case of Short Saphenous Vein {SSV} treatment) is marked on the skin and a line is traced over the course of the

saphenous vein down to the level of the vein entry. In general, it is best to access the saphenous vein directly just above the take-off of the last large tributary; tributary veins are more prone to spasm on direct needle puncture and often the guidewire will not pass freely around the angle between the tributary and saphenous vein. Occasionally very large straight large diameter tributaries with obtuse angles with the parent saphenous vein can be accessed as low as possible to allow treatment of the tributary as well as the saphenous vein.

Once the treated vein segment and entry site is marked the patient is prepped and draped. As will be reviewed in the workshop the entry site is generally in the region around the knee for the GSV and mid-calf for the SSV. Treatment of the entire vein including the normal segments is generally not necessary and will result in a higher level of complications. Local anesthetic (0.2% Lidocaine) is administered at the puncture site and a small skin nick made with an 11 blade. Access can be made with any single wall needle using US guidance. It is important to move very quickly from the time the patient lies flat to the time the vein is accessed since it will be getting smaller. Difficulty with vein access, even by operators with a large experience with venous access at other sites, is the most common cause for technical failure. Reverse Trendelenberg positioning may help but is no substitute for good technique and efficient access.

Once the vein is accessed successfully, a guidewire should be advanced through the entire vein to be treated. This should be confirmed with US. Then, a sheath (5F 45 cm long with EVLT) is placed through the treated segment and confirmed with US. Finally, the EVLT 600 micron fiber is inserted through the sheath and positioned at or just below the SFJ with US guidance. The importance of accurate positioning can not be underscored. This is another part of the procedure where experience will improve the confidence and the speed of accurate positioning. The use of the red aiming beam is a good way to confirm an US impression. Ultimately after TA, the fiber will be re-positioned 10-15 mm below the junction before treatment begins.

TA is performed with 100-200 ml of 0.2% Lidocaine. Some operators have used up to twice the volume of 0.1% lidocaine with success. We do not use epinephrine to limit any potential untoward cardiovascular effects. We also very rarely require any pre-procedural sedation or anxiolysis. The technique of TA and its importance to the success and safety of the procedure will be emphasized during the lecture. Suffice it to say that the TA is critical to insulated, anesthetize and compress the vein.

After successful TA the laser fiber tip position is re-confirmed with US and the use of the red aiming beam. With the Diomed 810 nm generator, 14 watts in the continuous mode is the suggested energy setting. The reverse Trendelenberg position may be used but supine is generally adequate and preferred by the patients. A small burst of energy is then applied to the laser fiber while watching the tip with US. This is to allow identification of the tip (where gas creation is always seen) as well as to confirm that adequate TA had been supplied to the proximal vein segment (often patients will feel the first few millimeters of treated vein). The laser fiber is then withdrawn at 2-3 mm/sec along the entire vein down to the puncture site is treated.

Five minutes of digital compression is applied to the puncture site and then in the supine position a Class 2 (30-40 mm Hg) compression stocking (with open toes if possible) is applied. This should be used for the next week by the patient except when sleeping or showering. Some operators will then proceed to ambulatory phlebectomy after endovenous ablation. We generally wait until 1 month after the procedure and utilize compression sclerotherapy. Further details and clinical anecdotes will be discussed during the presentation. Subsequent treatment with compression sclerotherapy will be discussed in the next lecture.