An Improved Method for Saphenous Vein Harvest Using Thermal Welding Technology

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Clinical Background

The saphenous vein graft has traditionally been used in coronary bypass surgery with good results. Over the years, numerous harvesting techniques have been developed in an attempt to reduce complications associated with the procedure. Most recently, minimally invasive endoscopic procedures have been introduced and have proven to decrease leg wound complications, lessen postoperative pain and lead to a faster return to normal activities. We have further improved minimally invasive vein harvesting by developing a technique that offers the same benefits of other approaches without the need for costly visualization equipment.

Technical Background

The Starion Thermal Ligating Shears (Starion Instruments, Corp., Saratoga, CA) uses Thermal Welding, an innovative technology that combines heat and pressure to simultaneously coagulate and divide tissue (Figure 1). Thermal Welding provides minimal thermal damage to surrounding tissue while providing a hemostatic surgical field.


Figure 1.

Saphenous Vein Harvest Technique

We begin the procedure by accurately locating the saphenous vein using a phonological device. Once the saphenous vein is located, we make a one-inch incision over the saphenous vein just above the knee on the medial aspect of the upper leg. A careful blunt dissection with Metzenbaum Scissors leads to the vein, and a circumferential digital dissection forces up all other soft tissue from the vein. At this time, the Genzyme SaphLITE® Saphenous Vein System, an independently lit traction device, is introduced. This system offers the benefits of retracting thick subcutaneous tissue while brilliantly illuminating our harvest tunnel (Figure 2).

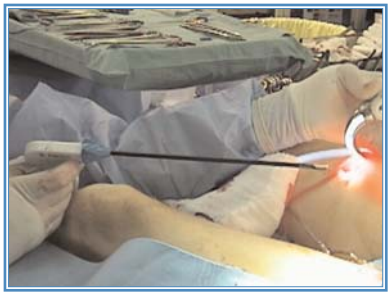
Figure 2.

Once the SaphLITE retractor is in place, the Starion Thermal Ligating Shears (23 cm, Straight Tips) are introduced. These shears coagulate and divide in one easy step, avoiding the need for the costly and time consuming application of clips. Because heat is confined within the jaws of the Starion Thermal Ligating Shears, we are able to weld the branches very close to the vessel without the threat of thermal injury. Furthermore, use of the shears significantly minimizes smoke and water vapor, which subsequently leads to improved visibility and reduces the need for additional suction apparatus (Figure 3).


Figure 3.

After all saphenous vein branches visible within the harvest tunnel are sealed and divided, another one-inch incision is made just below the groin area. Again the SaphLITE System is placed into this incision to illuminate the tunnel in which the Starion Thermal Ligating Shears will be utilized. When all the vein branches are ligated, the vein itself is ligated proximally and removed. As a precautionary measure, the larger sealed branches of the saphenous vein graft are tied with 4.0 vicryl ties.

If an additional length of saphenous vein is required, we make a third one-inch incision just below the knee and the ligating/shearing process is continued down the lower leg.

Clinical Experience

The Starion Thermal Ligating Shears are a relatively new device introduced to facilitate and expedite the harvest of the saphenous vein. We have used this thermal welding/direct vision harvesting technique utilizing the Starion Thermal Ligating Shears in conjunction with the SaphLITE Saphenous Vein System in several cases. Its benefits are clear. Not only is operating in a virtually bloodless, well-retracted, and well-lit field optimal, but it increases the viability of the graft. For these reasons, this saphenous vein harvesting technique is becoming increasingly popular at our institution (Figure 4).

Figure 4.

Conclusion

We have found this thermal welding/direct vision technique to be as minimally invasive as the most popular but expensive harvesting techniques employed at our practice. By using this technique, we are able to create a virtually bloodless operating field, keep operating time to a minimum, and avoid the use of costly visualization equipment. At this time, we have had no incidence of hematoma, vessel trauma or wound healing complications associated with saphenous veins harvested in this manner. If our postoperative results, including patient satisfaction, remain at this high level, it is likely that this minimally invasive harvesting technique will be our institution's operative technique of choice.