

Varicose Vein Treatment (Endovenous Ablation of Varicose Veins)

This information is reviewed by a physician with expertise in the area presented and is further reviewed by committees from the American College of Radiology (ACR) and the Radiological Society of North America (RSNA), comprising physicians with expertise in several radiologic areas.

What is Varicose Vein Treatment (Endovenous Ablation of Varicose Veins)?

Varicose vein treatment, or endovenous ablation, is a minimally invasive treatment that uses radiofrequency or laser energy to cauterize (burn) and close abnormally enlarged veins in the legs, a condition called varicose veins.

Normally, blood circulates from the heart to the legs via arteries and back to the heart through veins. Veins contain one-way valves which allow blood to return from the legs against gravity. If the valves leak, blood pools in leg veins which can become enlarged or varicose.

Endovenous ablation is an image-guided procedure that uses heat generated by radiofrequency or laser energy to seal off these faulty vessels, diverting blood flow immediately to nearby healthy veins.

What are some common uses of the procedure?

Although this procedure may be used for cosmetic purposes, it is more commonly used to help alleviate symptoms. Symptoms are typically due to enlarged nonfunctional veins that cause circulatory problems (venous insufficiency). Leg symptoms can include:

- aching pain
- swelling
- skin irritation or sores (ulcers)
- discoloration
- inflammation (phlebitis)

How should I prepare?

You should report to your doctor all medications that you are taking, including herbal supplements, and if you have any allergies, especially to local anesthetic medications, general anesthesia, or to contrast materials (also known as “dye” or “x-ray dye”). Your physician may advise you to stop taking aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs) or a blood thinner for a specified period of time before your procedure.

You should wear comfortable, loose-fitting clothing. You will need to remove all clothing and jewelry in the area to be examined.

You should plan to have a relative or friend drive you home after your procedure.

You may be asked to wear a gown during the procedure.

What does the equipment look like?

In this procedure, an ultrasound machine, catheter, laser fiber or radiofrequency electrode, and laser or radiofrequency console are used.

Ultrasound scanners consist of a console containing a computer and electronics, a video display screen and a transducer that is used to scan the body and blood vessels. The transducer is a small hand-held device that resembles a microphone, attached to the scanner by a cord. The transducer sends out high frequency sound waves into the body and then listens for the returning echoes from the tissues in the body. The principles are similar to sonar used by boats and submarines.

The ultrasound image is immediately visible on a nearby screen that looks much like a computer or television monitor. The image is created based on the amplitude

(strength), frequency and time it takes for the sound signal to return from the patient to the transducer.

A catheter is a long, thin, hollow plastic tube, about as thick as a strand of spaghetti.

Laser fibers (fiber optics) or radiofrequency electrodes carry laser or electrical energy from their respective power generators into the body.

How does the procedure work?

Using ultrasound to visualize the enlarged vein, a catheter or vascular access sheath is inserted through the skin and positioned within the abnormal vein. A laser fiber or radiofrequency electrode is then inserted through the catheter and advanced to the desired location. Laser or radiofrequency energy is then applied, heating the vessel and causing it to close. Following the procedure, the faulty vein will shrink and “scar down.”

How is the procedure performed?

Image-guided, minimally invasive procedures such as endovenous ablation are performed by a specially trained interventional radiologist.

This procedure is often done on an outpatient basis.

Your physician may use a topical anesthetic cream over the abnormal vein area before the procedure in order to reduce discomfort.

Your physician will numb the area where the catheter will enter into the abnormal vein with a local anesthetic and use the ultrasound transducer or wand to study the vein and track its path.

The leg being treated will be cleaned, sterilized and covered with a surgical drape.

A very small nick is made in the skin at the site.

Using ultrasound guidance, the catheter is inserted through the skin into the vein and positioned within the abnormal vein. The laser fiber or radiofrequency electrode is inserted through the catheter and the tip of the fiber or electrode is exposed by pulling the catheter back slightly.

Local anesthetic is injected around the abnormal vein with ultrasound guidance. Laser or radiofrequency energy is applied as the catheter is slowly withdrawn.

Pressure will be applied to stop any bleeding and the opening in the skin is covered with a bandage. No sutures are needed.

This procedure is usually completed within an hour.

What will I experience during the procedure?

You will be asked to wear protective glasses if and when lasers are in use.

An area of your leg will be cleaned and numbed.

You will feel a slight pin prick when the local anesthetic is injected.

The area will become numb within a short time.

You may feel slight pressure when the catheter is inserted but no serious discomfort.

Injection of local anesthetic around the abnormal vein is the most bothersome part of the procedure because it usually requires multiple injections along the vein. Actual closure of the vein with laser or radiofrequency is usually not painful.

Following the procedure, you will need to wear a gradient compression stocking to help reduce bruising, tenderness, and minimize the rare possibility that blood clots may form.

You may resume your normal activity immediately, with the exception of air travel or prolonged sitting (such as a long car trip). You should remain active and not spend too much time in bed during the recovery period since this increases the chance of complications.

Who interprets the results and how do I get them?

A follow up ultrasound examination is essential in order to assess the treated vein and to check for adverse outcomes. Within one week, the target vein should be successfully closed. Additional procedures (such as sclerotherapy or phlebectomy) may be necessary to treat associated veins.

What are the benefits vs. risks?

Benefits

- No surgical incision is needed—only a small nick in the skin that does not have to be stitched closed.

- When compared with traditional vein stripping techniques, endovenous ablation is more effective, has fewer complications, and is associated with much less pain during recovery.
- Endovenous ablation is generally complication-free and safe.
- This procedure leaves virtually no scars because catheter placement requires skin openings of only a few millimeters, not large incisions.
- Endovenous ablation offers a less invasive alternative to standard surgery.
- Most of the veins treated are invisible even to ultrasound 12 months after the procedure.
- Most patients report symptom relief and are able to return to normal daily activities immediately, with little or no pain.

Risks

- Any procedure where the skin is penetrated carries a risk of infection. The chance of infection requiring antibiotic treatment appears to be less than one in 1,000.
- Any procedure that involves placement of a catheter inside a blood vessel carries certain risks. These risks include damage to the blood vessel, bruising or bleeding at the puncture site and infection.
- Some postoperative bruising and tenderness may occur, but may be alleviated by wearing a compression stocking.
- Some instances of thermal (heat) damage to nerves have been reported. This is rare and generally goes away in a short time.
- Thrombophlebitis (inflammation of the vein) is not uncommon and may cause pain and redness over the treated area, but generally responds well to nonsteroidal anti-inflammatory drugs (NSAIDs). Blood clots that formed in the veins can travel to the lungs (pulmonary embolism); however, this is an extremely rare occurrence.

What are the limitations of Endovenous Ablation of Varicose Veins?

Ablation catheters cannot be easily passed through a tortuous vein, or a vessel with many turns and bends. Consequently, the procedure is typically used to treat larger varicose veins, such as the great saphenous vein, which extends from the groin down the inside of the thigh into the inner calf.

Endovenous ablation is successful at closing the abnormal target vein almost 100 percent of the time, but small dilated branches that persist in the skin often require additional treatment with phlebectomy (minor surgical procedure to extract them) or sclerotherapy (injection of a liquid medication to seal them off). Subsequent treatments are usually scheduled after an ablation procedure.

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