

Varicose Veins and Venous Disease

Before discussing the more common disorders of the veins, it is helpful to understand the function of the veins in our circulatory system. The heart pumps oxygen-rich blood through thick-walled arteries to all the tissues of the body. The veins return the blood to the heart. These thin-walled structures contain a series of unidirectional (one-way) valves that keep the blood flowing from the superficial veins located close to the skin's surface to the deep veins found in the muscles of the arms and legs and towards the heart. Blood is propelled forward or antegrade by muscle contraction (squeezing), through the open valves which allows the blood to flow upwards to the heart. When the muscles relax, normal (competent) valves snap shut, preventing blood from flowing backward (retrograde).

There are three sets of veins in your legs. The superficial veins lie just under the skin and carry 10-15% of the blood back to the heart. Superficial veins connect via the communicating veins to the deep veins which lie within the muscles (responsible for pumping) and carry 85-90% of the blood back to the heart.

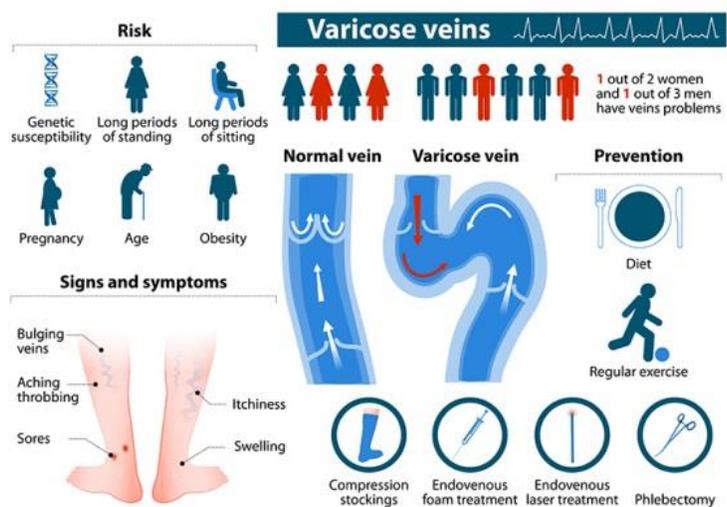
If the vein walls are weak and damaged, or if the valve is stretched or injured, the system becomes incompetent and blood is allowed to collect and flow in a retrograde (backward) fashion when the muscles relax. This creates unusually high pressure buildup in the veins, resulting in more stretching and twisting, increased swelling, more valve incompetence, sluggish blood flow, and potential blood clot formation. Over time, this phenomena contributes to a variety of disorders known as venous disease including varicose veins, deep venous thrombosis (DVT) or "blood clots in the deep veins", and chronic venous insufficiency (chronically swollen or edematous legs).

Venous disease is quite common. Simple varicose veins affect at least 15% of the population in the United States and, generally, do not pose a threat to your health or life. Deep venous thrombosis (DVT), however, occurs in over 2½ million people annually, resulting in 200,000 deaths from pulmonary embolism (blood clot that travels to the lung). Deep venous thrombosis also leads to incompetent valves, resulting in crippling chronic venous insufficiency. Therefore, it is essential that patients with suspected deep vein thrombosis be promptly diagnosed and aggressively treated in order to avoid these complications.

Risk Factors of Venous Disease

Certain risk factors may lead to the development of venous disease. These include:

- Family history
- Obesity
- Pregnancy
- Prolonged standing
- Prior episodes of blood clot formation
- Trauma
- Illness
- Surgery
- Medication
- Lifestyle



Diagnostic Testing

If you are suspected to have problems with your veins, specific tests may be done to determine the extent of venous disease. These tests are often performed on an outpatient basis. The most common noninvasive test is a venous duplex scan, in which sound waves are used to create a picture of the veins to determine the presence or absence of blood flow and the direction of flow. Duplex scanning can be reliably used to diagnose

venous clot formation and to investigate the function of the venous valves. A venogram is an invasive examination that is occasionally necessary to further investigate venous disease. During a venogram, contrast dye is injected directly into the veins to visualize flow.

Varicose Veins

Varicose veins are dilated, twisting, bulging, discolored superficial veins. They tend to be familial, most commonly occur in women, and are worse during pregnancy. Varicose veins may cause no symptoms or may cause a dull, heavy ache, itching, burning, fatigue, and cramping, particularly after standing for a long period of time. Some dilated veins may be tender to touch and occasionally, ankle swelling may develop as the day progresses. Some individuals are most concerned about the negative cosmetic appearance of varicose veins. Many women have small spider veins or web-like reddish-purple clusters of tiny veins on the legs, particularly the thighs. Rarely are spider veins a cause of pain.

Asymptomatic varicose veins that cause no symptoms require no therapy unless there is a desire to improve the aesthetic (cosmetic) appearance of the leg. Discomfort caused by varicose veins can be controlled by elevating the legs and/or wearing knee-length elastic compression stockings. If more aggressive therapy is being considered to eliminate the veins, several surgical options are available. You may resume normal daily activities shortly after intervention; however, varicose veins require lifelong attention and care.

Stab Avulsion: This newer technique, also known as Ambulatory Stab Phlebectomy, has gained wide popularity at USC. Stab avulsion results in removal of the varicose veins through incisions that are 2-3 mm in length. The veins are hooked with a tiny hook-like instrument and pulled out. The wounds are closed with tapes, not sutures, and the leg is wrapped in elastic compression support. Once healed, the incision sites are almost invisible. This procedure is also done as an outpatient surgical procedure with the use of anesthesia, and may be performed in conjunction with ligation and stripping.

Venous Thrombosis

Thrombosis refers to blood clot forming in a blood vessel which can occlude the vessel. Two types of thrombosis commonly occur in the veins of the arms and legs.

Superficial Thrombophlebitis: This occurs in the superficial veins just beneath the skin and may cause severe pain within the vein and adjacent tissues. The surrounding tissues are warm and tender to the touch, reddish in color, firm, and swollen. The vein might feel like a hard cord. Superficial thrombophlebitis can occur after an injury, in a varicose vein, or after irritating intravenous fluids have been infused into the vein. It responds readily to therapy with warm, moist heat applied to the area, non-steroidal anti-inflammatory medications, and elevation of the extremity if swelling is present. Superficial thrombophlebitis is rarely life-threatening; these clots do not break loose and cause a pulmonary embolism.

Deep Vein Thrombosis (DVT): This is a potentially life-threatening process which is due to a blood clot forming in a deep vein in the leg. It can totally occlude one or more of the major leg veins, resulting in impaired blood return to the heart and massive leg swelling. Occasionally the clot, or a portion of the clot, can break loose and travel to the heart and lungs, occluding blood flow, resulting in a fatal pulmonary embolism.

Conditions that cause the blood flow in the veins to become sluggish increase the risk of clot formation. These risk factors include prolonged bed rest, surgical procedures, pregnancy, obesity, injury to the veins, prior episodes of DVT, or a family history of DVT. Because DVT can exist without causing symptoms, patients undergoing high-risk surgery, or those who have prolonged illness, bed rest, or trauma, will be prescribed anticoagulant or blood thinning medications to prevent clot formation.

Signs and symptoms suggestive of DVT include: sudden unilateral swelling of an extremity; presence of pain or aching of an extremity; low-grade fever; and possibly discoloration. If DVT is suspected, anticoagulation therapy will be promptly started and aggressively managed. Hospitalized patients may be started on intravenous anticoagulation until an oral anticoagulant pill takes effect. If the extremity is swollen, bed rest, elevation, and elastic compression support (e.g. Ace bandages, elastic stockings) will be ordered. Depending on the cause of the DVT and other risk factors, oral therapy will be continued for at least 3 months. Lifelong therapy with elastic stockings may be indicated in order to prevent or treat a major DVT complication, post-phlebitic syndrome.

Chronic Venous Insufficiency

Following an episode of DVT, the valves in the affected veins may become injured, scarred, and thickened, preventing them from closing properly and maintaining normal flow. When the legs are dependent (hanging down), blood pools in the veins and fluid may leak out into the surrounding tissue, resulting in ankle swelling. The legs feel heavy and ache. Symptoms are worse during the day while the patient is upright. At night, if the legs are elevated, there is some relief from the aching and the swelling may subside. This condition is referred to as postphlebitic syndrome or chronic venous insufficiency. Unfortunately, this syndrome cannot be cured. If the swelling is not controlled, inflammation occurs in the skin and the tissues beneath the skin in the area of the ankle. With constant swelling, the skin may develop reddish-brown spots and gradually thickens, becoming hard and leathery. This area is dry and itchy. Eventually, a break in the skin occurs and a shallow, painful venous ulcer or chronic sore will develop. The ulcers can become infected and require hospitalization and antibiotic therapy.

Once ulcers develop, they might take months to heal. Treatment of venous ulcers includes meticulous wound care, elevation of the foot of the bed at least 4 inches so that gravity assists the return of blood to the heart while the patient is sleeping, wearing special elastic stockings during the day, if necessary, taking antibiotics to fight infection and other medications to rid the body of extra fluid. Eventually, most ulcers heal without the need for surgical intervention. However, after healing, the ulcers will recur if swelling of the leg is not prevented.

Like other venous diseases, a venous duplex scan may be required to determine the extent of the problem and whether or not surgery could correct the problem. The most common procedure is stripping or removing an incompetent saphenous vein. Some patients with incompetent communicating veins will require division of these veins to decrease reflux from the deep veins to the superficial veins. In highly selected patients, an operation may be done to reconstruct a valve and restore its ability to maintain forward flow. These operations do not eliminate the need for lifelong elastic compression support, but, if successful, make it easier to control the persistent swelling.

Conclusion

Venous disease can be sudden and serious or chronic and long-term. A vascular surgeon can advise you on the appropriate medical treatment and surgical options that are available for you.