Knowledge of Venous Diseases: Not in vain!

Venous diseases of the lower limb are very common. Half the adult population consult their doctors about problems with their leg veins at some stage during their life time. Patients with venous disease of the legs have specific symptoms. Tired, aching legs are usually best in the morning and worsen during the day, especially after prolonged standing or sitting. People with venous disease often have an intolerance to exercise. They may have leg discoloration, thickening and ulcers that are difficult to heal.

Early and proper diagnosis by the primary care physicians are particularly important for the quality of life and working ability of those 90% of patients with progressive venous disorders.

Small varicosities and dermal flares may cause only cosmetic complaints. However, larger varicosities may cause pain in the leg. Patients who suffer deep vein thrombosis may experience painful edema of the limb. Varicose veins are enlarged tortuous veins seen under the skin and caused by incompetent valves. The symptoms caused by incompetent veins are variable. Some patients with large varicose veins may have no symptoms. Others with only small varicosities may complain of discomfort. Patients with severe venous valvular incompetence may suffer ulceration of the leg. Varicosities of veins in the spermatic cord leads to varicocele.

To understand how and why venous diseases occur, we must first understand the venous system in legs and how does the venous system work?

Dr CH Asrani DNB
Sainath Clinic
Kalina,
Mumbai 400 098
Tel.: 26652348
email: chasrani@vsnl.com

We all know that the heart pumps blood into the arterial system → travels to the legs under pressure through arteries that becomes smaller and smaller as it progresses towards the tissues. The blood is then returned through tiny veins which grow progressively larger as they move away from the tissue and drain towards the heart. Just as the heart pumps blood out → blood is moved through the veins by contraction of the muscles around them. As each vein is compressed, the blood moves in the direction towards heart. As walls of veins have no musculature, and the blood has to travel against gravity, they require indirect pumping action and at the same time ensure that it does not flow back with gravity. This one-way flow is maintained by valves located at intervals along the vein. The valves only allow the blood to flow one way, back towards the heart for recirculation.

Venous Systems in the Legs:

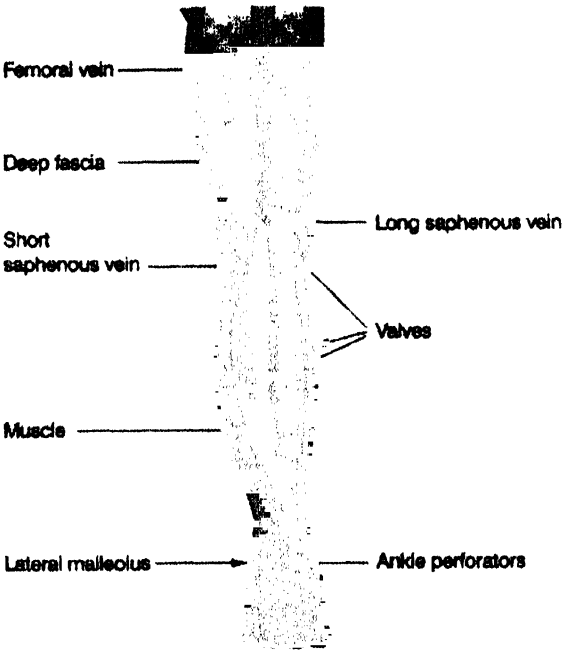
There are two systems in the legs, the superficial veins and the deep veins. (Fig 1) The superficial veins are the ones that we see just under the skin. They are the ones that become varicose veins. The deep veins lie deep in the muscles of the leg. They are connected to the superficial veins by short veins called perforator veins, so called as they perforate the thick coating around the large leg muscles to reach the deep veins. Blood from the skin drains through perforator veins into the deep veins. When we walk or exercise, the calf muscle squeezes these large veins and pump the blood towards the heart. Each perforator vein has an important valve that allows blood to flow from the skin into the deep veins. This valve snaps shut when the deep vein is squeezed, to prevent backflow of high pressure blood to the delicate skin veins. Valves in the deep veins keep the blood flowing in one direction. The venous system of the legs is particularly well designed to overcome the effects of gravity and pump blood out of the legs. It functions well as long as the veins are not damaged.

What Causes Venous Disease?

Most of the problems occur due to increased pressure in the venous system. This is actually high blood pressure of the veins located under the skin. This increased pressure is caused by malfunction of the valves that lie within the veins. Dilation of the veins is the main problem. When the veins become dilated, the valves, which are attached to the sidewalls, are pulled apart. They are no longer able to maintain one-way flow and prevent blood from draining back toward the feet.

Treatment of venous disease depends upon which veins are affected and accurate diagnoses. Correct treatment is based on proper investigation and understanding of the anatomy and pathology of the problems experienced by a particular patient.

Mild symptoms may be treated by compression hosiery alone. Severe symptoms may result in surgery, compression therapy or a combination of both.



More about Varicose Veins

Varicose veins are enlarged, twisted, painful superficial veins resulting from poorly functioning valves. Varicose veins affect 15% of the population, and are twice as common in women as in men

Symptoms

- Pain in the legs: fullness, heaviness, aching
- Visible, enlarged veins
- Mild swelling of ankles
- Skin at the ankle discolored brown
- Skin ulcers near the ankle

What Are Risk Factors For Incompetent Veins?

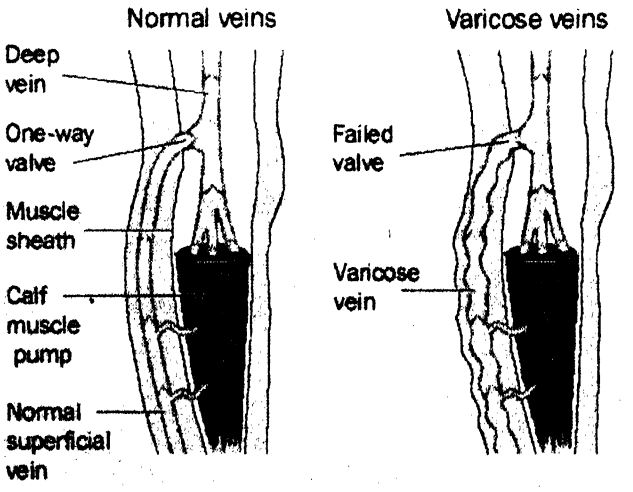
There are many reasons why veins dilate and become incompetent.

- **Age** is a primary factor. With age, the elasticity of veins slowly wear out. It is also damaged by overstretching. If a vein is dilated beyond a certain point, the elastic is weakened and the vein wall is no longer able to function correctly.
- Certain **occupations** that require standing for prolonged periods of time. Eg nurses, conductors, auto mechanics, store personnel and waitresses. These occupations make high demands on the venous system.
- **Pregnancy** - the increased pressure of a gravid uterus during pregnancy, does not permit normal venous drainage and creates backpressure in the leg veins. This backpressure dilates the veins and is responsible for the varicose veins that are often seen during and after pregnancy. Incidence increases with multiple pregnancies.
- **Lack of movement**
  - o Occupations with prolonged periods of sitting or standing
  - o Confinement to bed
  - o Long flights or car journeys with bent legs

- o Long evenings spent watching television
- o Immobility, even of only one limb (plaster cast)
- Sports and activities that induce high abdominal pressure
- o Extreme physical exertion at work, leisure or sport, with or without the induction of high abdominal pressure (eg playing a wind instrument, weight lifting, etc)
- **Obesity** - While obesity is not a confirmed contributory factor in venous diseases, overweight people tend not to exercise, which promotes venous stasis. However, obesity undoubtedly favors the occurrence of thrombosis.
- **Clothing**
- o tight clothing
- o high heels (the calf muscle pump does not operate if heels are higher than 6-8 cm)
- o sloppy footwear

Why should Incompetent Veins Cause Swelling, Ulcers and Infection?

When a vein becomes incompetent, gravity works to reverse the flow of venous blood towards the feet. Generally while one is walking or exercising, the blood flow is normal through the incompetent vein and blood is moved out of the leg. However, when one stands without exercising, the flow in the incompetent vein reverses and blood backfills the lower leg. This restricts venous drainage and results in high blood pressure of the superficial veins of the leg. This is also caused by dysfunctional valves in the perforator veins that connect the superficial veins with the deep pumping veins located in the calf. Each perforator vein has a valve within (fig 2) it to prevent this from happening. When these valves become incompetent, high-pressure blood from the deep system flows towards the skin and produces high blood pressure of the superficial veins. High blood pressure of the superficial veins produces major negative changes. It causes the veins to distend over time producing varicose veins. It also increases the pressure in the smaller veins causing them to stretch and become very prominent. When these are just under the skin, they are known as spider veins. The increase pressure causes the small veins to leak fluid into the surrounding tissues resulting in swelling or oedema followed by discoloration. The high pressure is also transmitted to the smallest veins that lie near the capillary beds. This makes it difficult for blood to flow across the smallest vessels or capillaries, thus disrupting the exchange of nutrients and wastes in this area. The tissues of the leg respond by thickening of the skin and finally by ulceration. Infection of the skin or cellulitis often occurs.



DIAGNOSIS:

A complete assessment of a patient with varicose veins should be based on the history, examination and doppler assessment (uses ultrasound to examine the blood flow in the major arteries and veins in the arms and legs). The history will highlight cosmetic concerns, pain and possible night cramps. Other important factors are - periods of immobilization, lower limb fractures. On examination of the distribution of the varicose veins might suggest the site of valvular incompetence. This can be confirmed clinically by the use of percussion or tourniquet tests. The site of valvular incompetence can also be identified by the use of a hand-held doppler probe. When placed over the sapheno-femoral or saphenopopliteal junction, calf compression produces an identifiable forward flow. On release of the compression a transient (<1 second) retrograde flow signal is normally identified. In patients with valvular incompetence a prolonged retrograde signal is audible. There is a "swishing" sound on the Doppler if the venous system is normal. Both the superficial and deep venous systems are evaluated.

TREATMENT:

Treatment is usually conservative. The patient is asked to avoid excess standing, elevate the legs when resting or sleeping, and to wear elastic stockings.

The treatment of varicose veins varies from case to case. In a proportion of patients with minor varicosities and no features of venous hypertension (varicose eczema or ulceration) reassurance might be all that is required. Compression hosiery with a pressure of 40, 30 and 20 mm Hg at the ankle, mid-calf and knee respectively, will reverse venous hypertension and prevent complications. However, most patients find stockings uncomfortable and are often not satisfied with them as a long-term treatment option. The role of sclerotherapy, injection of a chemical (sclerosant) that causes aseptic necrosis of the vein, is controversial. It often fails in the presence of major valvular incompetence but may be useful for the treatment of small residual varicosities after surgery. Complications of sclerotherapy include pain, ulceration, thrombophlebitis and skin staining.

Surgery is the mainstay of treatment for varicose veins in many patients and the approach varies between surgeons. Long Saphenous Vein varicosities are often treated by sapheno-femoral flush ligation, LSV stripping and avulsions. Adequate ligation of all tributaries of the sapheno-femoral junction, beyond their first branch reduces the risk of recurrence. Small incisions, from 1-2cm, are made and the veins are gently removed. Nowadays, veins are not being stripped, as this often results in more pain after the surgery and also as it may be needed in the future for heart surgery.

Most surgeons will strip the LSV to the knee. Whether it should be stripped proximally or distally is unproven. Stripping to the ankle is associated with an increased risk of damage to the saphenous nerve resulting in a persistent saphenous neuralgia. Stripping increases the risk of haematoma formation, but reduces the risk of recurrent varicose veins. As mentioned above, saphenopopliteal ligation requires preoperative marking. Open ligation of perforator vessel is performed rarely today as it often results in delayed wound healing. Recent interest has been shown in endoscopic sub-fascial ligation of these vessels. New laser technology is now available in western countries. Lasers can only obliterate small varicose veins and spider veins by focusing on the increased pigmentation in these veins. Laser energy causes these veins to close down so that they can no longer contain blood. Veins without blood in them are clear.

Experience is that marvelous thing that enables you recognize a mistake when you make it again....
James Franklin P.

Endoscopic Surgery for Varicose Veins

"It's a chronic, nagging problem that doesn't go away" Instead of the one-size-fits-all approach to varicose vein surgery, doctors at Hinduja hospital are now customizing treatments, zeroing in on abnormalities, and plotting their correction before making the first cut.

For years, surgical removal of the veins, or "stripping," was the primary treatment for varicose veins. This process, however, often left many patients with noticeable scars.

Refinements in operating techniques and new technology allow surgeons to do the job with just a few small incisions, using an endoscope or laparoscope. This results in minimal scarring and a much shorter recovery time.

Mr Mansukhlal Jhamnagri, a 45-year-old salesman, admitted with complicated varicose veins and an ulcer at the ankle, which had recently bled profusely, underwent endoscopic surgery of the varicose veins as his treatment. Drs Manoj Bharucha and Amrita Verma used this new technique for the first time in India, at the P D Hinduja hospital, Mumbai.

The abnormal communicating veins in the area between the knee and ankle were successfully divided through 2 tiny incisions, using an endoscope. The advantages of this technique are that since a big incision is avoided, the scars are tiny, the patient's hospital stay is short and pain is minimal. Mr Jhamnagri was a very happy man when he was able to walk on the next day after the surgery.

Compression Therapy

Compression therapy is the most important conservative treatment of peripheral venous diseases. It acts by increasing venous flow to the heart, thus influencing the main factor in the removal and prevention of complications.

Conservative treatment alone, without compression therapy, will never be successful as compression therapy affects the hemodynamics of venous flow in the following ways:

1. External compression reduces the pathological distension of the veins.
2. Compression can approximate the insufficient venous valves and restore their functional effectiveness.
3. The rate of blood flow in them is increased, by reducing the volume of the veins.

Compression bandaging is also indicated for the initial treatment of complications. Once the diagnosis has been confirmed, compression hosiery allows considerable advantages over elastic bandages in preventing the recurrence of symptoms and further deterioration. Most importantly the different pressures required at different parts of lower limb can never be achieved by elastic bandage.

Venous diseases tend to show progression and therefore require a consistent compression therapy treatment program.

Compression Hosiery

The main purpose of medical compression hosiery is to maintain the results of treatment and to avoid further complications. The disappearance of swelling and pain of the affected leg is prolonged by compression hosiery and relapses are prevented.

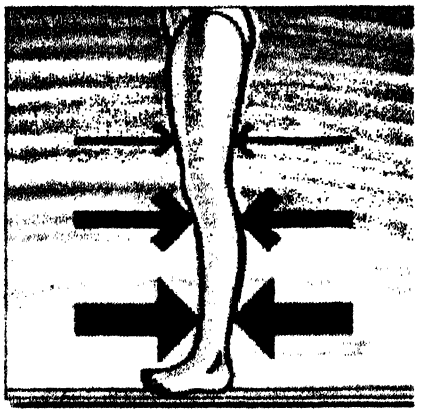
At working pressure, the leg "works" against the garment, at resting pressure, the garment "works" against the leg.

Medical compression stockings apply external pressure to the leg (fig 3). The pressure provided is great-

est at the ankle, gradually decreasing up to the thigh. The effect is to increase blood flow velocity and counteract raised venous pressure. This prevents oedema and venous hypertension.

Compression hosiery is better tolerated and easier to put on than compression bandages. Compression hosiery is therefore generally more acceptable to the patient.

Compression hosiery, when properly and regularly cared for, retains its therapeutic compression effect for at least six months.



What is DVT?

DVT is a serious condition where a thrombus forms inside one of the deep veins, usually of lower limbs (calves) or lower part of the abdomen. It must be distinguished from blood clots in superficial varicose veins in the legs, called phlebitis, which is much less serious. It blocks flow of blood either completely or partially. DVT affects all ages, but is more common in women (persons) over 50.

One in every hundred people who develop DVT dies. The cause of death is usually a blood clot, traveling from the legs to the lungs. This is called pulmonary embolism and when PE is severe it causes the lungs to collapse and heart failure.

WHO IS AT RISK OF DVT?

The risk of DVT is greater in people

- over 40 years of age
- smoker
- prolonged immobilization
- recent history of blood clots
- family history of blood clots
- on cancer chemotherapy
- being treated for heart failure and circulation problems
- who have had recent pelvic surgery or surgery on the hips or knees
- who have an inherited clotting tendency.

DVT is also more common in women who

- are pregnant
- have recently had a baby
- are taking the contraceptive pill
- are on hormone replacement therapy or HRT.

These groups make up 90 to 95% of all those who get DVT.

THE RISK OF DVT FROM AIR TRAVEL

Long-haul flights, especially when passengers have little or no exercise, may increase the risk of developing DVT. Although, it is not easy to decide whether the flight itself caused the DVT or whether these people were at risk for other reasons. This is because, while it is difficult to be certain what the exact causes of travel related DVT are, experts agree that lack of exercise or immobility are major underlying risks.

SIGNS & SYMPTOMS

- Swelling and pain in the area drained by the vein, usually the ankle, calf or thigh. Swelling in the leg involves everything below the clot, extending to the toes.
- Tenderness and redness of the affected parts.
- Soreness or pain when walking. The soreness does not disappear with rest.
- Pain when raising the leg and flexing the foot (sometimes).
- Fever (sometimes).

- Tachycardia (sometimes).

CAUSES

- Pooling of blood in the vein, which triggers blood-clotting mechanisms. The pooling may occur after prolonged bed rest following surgery, or from debilitating illness, such as heart attack, stroke or long bone fracture.

TREATMENT

General Measures

The following suggestions apply after hospitalization or if the condition can be treated safely at home:

- Must wear properly fitted elastic stockings or wrapped elastic bandages
- Not to cross legs or ankles while sitting, lying in bed or traveling.
- To elevate the feet higher than the hips when sitting for long periods.
- If possible elevate the foot end of the bed.

MEDICATION- these patients are generally hospitalized for strict rest and observation. They are give anticoagulant drugs (injectable initially and then oral). To minimize the danger of pulmonary embolism, blood tests (Prothrombin time) to monitor the anticoagulant level are mandatory. Oral anticoagulants may be necessary up to 6 months or more.

WARNING SIGNS: FOR A PATIENT UNDER TREATMENT:

- Unexpected bleeding anywhere.
- Chest pain (Pulmonary Embolism)
- Hemoptysi
- Shortness of breath.
- Continued or increased swelling and pain, despite treatment.

Varicocoele

Varicocele is the dilation of the veins along the spermatic cord in the scrotum. It is caused by incompetent or inadequate valves within the veins along the spermatic cord. The abnormal valves obstruct normal blood flow causing a backup of blood, resulting in dilation of the veins. Varicoceles usually develop slowly and may be asymptomatic. The incidence is higher in men between 15 and 25 years old.

Varicoceles have been found to be the cause of infertility in 39% of the males who were treated for infertility.

SYMPTOMS

1. Visible and enlarged twisting (tortuous) veins in the scrotum
2. Infertility
3. A painless, scrotal swelling, or bulge within the scrotum, more common on the left side

EXAMINATION

A non-tender, tortuous mass is noted along the spermatic cord (feels like a bag of worms). The mass may not be palpable if patient is examined lying down. The testis on the side of the varicocele may or may not be atrophied as compared to the other side.

INVESTIGATION

With the advent of venous Doppler (discussed on pg ** in this issue) confirming the diagnosis and noting the severity of a varicocele has become possible.

TREATMENT Varicoceles may be managed conservatively with the use of a scrotal support. However, if pain continues despite conservative treatment, or if infertility or testicular atrophy is the presenting symptom, surgical ligation of the varicocele may be required. ❑

Our greatest glory is not in never falling, but in rising every time we fall.... Confucius.