



Venous Thrombosis

A blood clot in a vein is known as a venous thrombosis, and the most common type of venous thrombosis is a **deep-vein thrombosis** (DVT) in the leg.

If the DVT blocks all the blood vessels, all the tissues drained by the vein can become swollen and painful due to the blood being unable to escape.

A major concern is that someone with venous thrombosis may develop a **pulmonary embolism**. When this happens, part of the clot (an embolus) may break off, travel up the body and through the heart to the lungs, blocking an artery. This is a potentially life-threatening condition and up to one in 10 people who suffer a serious pulmonary embolism will die if it is not treated.

The incidence of venous thrombosis

In the UK up to one in every 1,000 people are affected by venous thrombosis each year. Many of those affected already have risk factors such as having had a serious illness or major surgery. Two-thirds have recently been in hospital (hospital-acquired thrombosis). However, a few have no known risk factors and can develop apparently spontaneously.

Around 30% of people who have had a venous thrombosis develop further problems within the next 10 years, despite treatment. In nearly one-third of cases, they develop **post-phlebotic syndrome**.

Venous thrombosis and pregnancy

This risk of venous thrombosis is significantly higher for pregnant women. About one in every 1,000 women develops thrombosis during pregnancy, which is about five times greater than the risk for non-pregnant women of the same age. In the UK, venous thrombosis and pulmonary embolism are still a cause of death during pregnancy.

Deep-vein thrombosis

A deep-vein thrombosis (DVT) is a blood clot in the deep veins, usually in the leg, although it can happen elsewhere in the body. These veins go through the muscle and cannot be seen beneath the skin.

A DVT can happen in the calf, behind the knee, in the thigh or very high in the leg veins within the pelvis. Most DVTs happen in the calf veins, except during pregnancy, when they tend to be within the thigh and pelvis.

Pulmonary embolism

When someone has a thrombosis such as DVT in the leg, they are at risk from a pulmonary embolism. When this happens, part of the clot breaks off (an embolus) and travels up the leg through the right side of the heart and lodges in an artery in the lung (a pulmonary artery).

The blocked artery restricts the blood supply to the lung, causing that part of the lung to die. It also affects the supply of oxygen to the lungs, resulting in breathlessness and pain.

Sometimes, over a period of time, many small particles may break off and cause many pulmonary clots.

Post-thrombotic syndrome

Deep-vein thrombosis may damage the valves in the deep veins, causing long-term complications such as post-thrombotic syndrome.

Normally the valves in the deep veins prevent blood from travelling back down the leg. In post-phlebotic syndrome, damage to valves higher in the leg causes increased pressure in the veins of the lower calf and ankle.



Risk factors for venous thrombosis

The main risk factors for venous thrombosis include:

- a recent stay in hospital for surgery, especially on hips or knees;
- getting older (but it can and does affect younger people); not being able to move around much;
- obesity;
- having a deep-vein thrombosis or pulmonary embolism in the past;
- someone in your family having a thrombosis;
- having cancer and its treatment;
- being pregnant;
- using the combined oral contraceptive pill and hormone replacement therapy;
- having thrombophilia; and
- long-distance travel.

If you have a venous thrombosis, it is usually because more than one risk factor is present at any one time. This is known as multi-hypothesis.

For example, someone may have been born with an **inherited thrombophilia**, but will not have a thrombosis until they have other risk factors which increase the risk.

Symptoms of deep-vein thrombosis

Unfortunately 80% of people with DVT may not have any obvious symptoms at all. The most common symptoms include pain, tenderness and swelling of the leg, usually in the calf. Sometimes this is accompanied by discolouration where the leg may be pale, blue or a reddish purple colour. This is a less common symptom.

If you get a thrombosis in the thigh vein, which is common during pregnancy, the whole leg may be swollen.

Symptoms of pulmonary embolism

The main symptoms of pulmonary embolism are shortness of breath and chest pain. The symptoms of deep-vein thrombosis may also be present. Occasionally patients may look grey, feel clammy, dizzy or panicky or have a persistent cough.

Symptoms of post-thrombotic syndrome

The symptoms of post-thrombotic syndrome include swelling of the ankle and leg and a heavy ache in the calf and ankle. This is particularly noticeable after standing or walking and tends to get better by resting the leg in an elevated position.

In the long term there is also a small risk of venous ulceration - ulcers on the legs that are hard to heal.

Diagnosing a deep-vein thrombosis

If a DVT is suspected, two different sets of tests are used to make a diagnosis.

The first is a simple blood test, called a D-dimer test. This measures the activity of the system for breaking down a blood clot. When a clot forms, this system starts automatically. So, when the test is negative, it is unlikely that you have a clot.

However, the system can also be activated by other conditions, such as a heart attack, stroke or chest infection.

If the D-dimer is positive, a further test is carried out to confirm that you have a DVT. This involves detecting the clot through imaging, either by using ultrasound or by carrying out a venogram.

Ultrasound

A doppler ultrasound scan can detect a clot with reasonable accuracy, especially if it is behind the knee or in the thigh. However, it is not reliable for detecting a thrombosis in the calf.

Venogram

Dye is injected into a vein in the foot and then travels up through the leg veins. The dye is then seen using an X-ray. If there is a thrombosis, the dye will not flow through the vein and will appear as a gap in the pattern of the dye.

The term thrombophilia covers a range of conditions that result in a person having sticky blood, and so an increased risk of thrombosis. Thrombophilia can be either inherited at birth or acquired during life.

Magnetic resonance imaging

Safer and more accurate methods are constantly being devised. One technique, magnetic resonance direct thrombosis imaging (MRDTI), provides an accurate picture of the clot.

MRDTI uses magnetic resonance imaging to detect a venous thrombosis, without the need to use dyes or X-rays.

Diagnosing pulmonary embolism

If a pulmonary embolism is suspected, diagnosis involves the same combination of tests as for a deep-vein thrombosis.

A D-dimer test is taken and, if negative, it is unlikely that you have a pulmonary embolism.

If the D-dimer is positive, a further test is carried out to examine the pulmonary embolism. This is usually either a ventilation or perfusion scan or a CT pulmonary angiogram.

Ventilation/perfusion scan

A ventilation/perfusion scan uses small amounts of radioactive materials to create pictures of the lungs. If you have a pulmonary embolism, this will show up as a missing area on the perfusion scan.

The ventilation scan measures how much of the lung is being aerated (provided with air). If there is a pulmonary embolism, there will be an area of lung that is aerated but has no blood flowing through it.

CT pulmonary angiogram (CTPA)

In a CT pulmonary angiogram, dye is injected into the bloodstream. The chest is examined using computerised tomography (CT). If you have a pulmonary embolism, this will show up as an area where there is no dye.

Treating venous thrombosis

If you have a deep-vein thrombosis or a pulmonary embolism, you will be given anticoagulant drugs. These aim to prevent the clot growing any larger and to prevent or stop an embolism. Until recently there were only two main forms of anticoagulant drugs: heparin and warfarin.

Heparin

Heparin is given first, as it provides immediate anticoagulation. Heparin is often given before an imaging test is carried out, as it is vital to provide treatment immediately.

Heparin can be given into a vein or under the skin by injection, but not by mouth. The advantage of using heparin is that it has an immediate anticoagulation effect.

Unfractionated or standard heparin includes a number of different-sized molecules. This means that the same dose of heparin produces a different effect in different individuals. Because of this, it needs monitoring.

Low-molecular-weight heparin is a type of heparin that has been purified and the small molecules chosen. These smaller molecules have a specific anticoagulant action, and produce a longer lasting and more reliable result.

Because of these advantages and a lower incidence of side effects, most doctors now give low-molecular-weight heparin.

Warfarin

Warfarin is usually given at a later date, for three to six months or longer, and it can be taken by mouth. After the first treatment it takes at least three days to reach adequate anticoagulant levels.

A major problem with warfarin is that each person needs a different dose to thin the blood. Also, its effects are altered by how well someone's liver functions, their diet, and other medication they are taking. This means that people taking warfarin need to regularly go to an anticoagulant clinic to have their blood levels checked.

Other anticoagulants

Some people will have an adverse reaction to warfarin and are given other anticoagulant drugs that have a similar effect, such as phenindione. Many new anticoagulants you can take by mouth that do not need monitoring have been tested and are becoming available. Hopefully they will be more widely available over the next 12 months.

Preventing venous thrombosis

The risk of venous thrombosis is generally low unless you have more than one risk factor. As a result, prevention tends to focus on individuals with an increased or high risk, for example those with a thrombophilia or a family history of venous thrombosis.

A huge effort has been made to reduce the risk of hospital-acquired thrombosis and there is currently a national drive in England and Scotland to deal with this.

You can find more advice on preventing venous thrombosis at www.doh.co.uk.

Thromboprophylaxis

Thromboprophylaxis is the practice of giving small doses of anticoagulants to people who have an increased risk of developing venous thrombosis in situations that further increase that risk.

For example, patients undergoing hip and knee surgery who have a high risk of developing a deep-vein thrombosis are given small doses of anticoagulants around the time of the operation and afterwards. If you have to stay in hospital or are having surgery, you should be assessed for your risk of suffering from thromboprophylaxis.



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For more information on how to help us, write to:

Thrombosis UK,
PO Box 58, Llanwrda,
Carmarthenshire
SA19 0AD.

Phone: 0300 772 9603,
email: admin@thrombosisuk.org
or visit our website at www.thrombosisuk.org

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