

## Deep vein thrombosis

### Introduction

Deep vein thrombosis (DVT) is a blood clot in one of the deep veins in the body. Blood clots that develop in a vein are also known as venous thrombosis.

DVT usually occurs in a deep leg vein, a larger vein that runs through the muscles of the calf and the thigh. It can cause pain and swelling in the leg and may lead to complications such as pulmonary embolism. This is when a piece of blood clot breaks off into the bloodstream and blocks one of the blood vessels in the lungs.

DVT and pulmonary embolism together are known as venous thromboembolism (VTE).

### Who is at risk?

Anyone can develop it but it becomes more common with age. As well as age, risk factors include:

previous venous thromboembolism

a family history of thrombosis

medical conditions such as cancer and heart failure

inactivity (for example, after an operation)

being overweight or obese

### Warning signs

In some cases of DVT there may be no symptoms, but it is important to be aware of the signs and risk factors of thrombosis and see your DOCTOR as soon as possible if you think you may have a blood clot. DVT can cause pain, swelling and a heavy ache in your leg (see DVT - Symptoms for more information).

### Avoiding DVT

There are several things you can do to help prevent DVT occurring, such as stopping smoking, losing weight if you are overweight and walking regularly to improve the circulation in your legs (see DVT - Prevention for more information).

There is no evidence that supports taking aspirin to reduce your risk of developing DVT.

### Assessing risk

Surgery and some medical treatments can increase your risk of developing DVT. It is estimated that 25,000 people who are admitted to hospital die from preventable blood clots each year.

All patients admitted to hospital should be assessed for their risk of developing a blood clot and, if necessary, given preventative treatment.

This recommendation was made by the National Institute for Health and Clinical Excellence (NICE) in January 2010. For more information, read NICE's 2010 guidelines on Venous Thromboembolism - Reducing the Risk

### Symptoms of deep vein thrombosis (DVT)

In some cases of deep vein thrombosis (DVT) there may be no symptoms, but possible symptoms can include:

pain, swelling and tenderness in one of your legs (usually your calf)

a heavy ache in the affected area

warm skin in the area of the clot

redness of your skin, particularly at the back of your leg, below the knee

DVT usually (although not always) affects one leg. The pain may be made worse by bending your foot upward towards your knee.

If DVT is not treated, a pulmonary embolism (a blood clot that has come away from its original site and become lodged in one of your lungs) may occur. If you

have a pulmonary embolism, you may experience more serious symptoms such as:

breathlessness, which may come on gradually or suddenly  
chest pain, which may become worse when you breathe in  
sudden collapse

Both DVT and pulmonary embolism are serious conditions that require urgent investigation and treatment.

### Causes of deep vein thrombosis (DVT)

Deep vein thrombosis (DVT) sometimes occurs for no apparent reason. However, the risk of developing DVT is increased in certain circumstances.

#### Inactivity

When you are inactive, your blood tends to collect in the lower parts of your body, often in your lower legs. This is usually nothing to worry about because when you start to move, your blood flow increases and moves evenly around your body.

However, if you are immobile (unable to move) for a long period of time, such as after an operation, due to an illness or injury or during a long journey, your blood flow can slow down considerably. A slow blood flow increases the chances of a blood clot forming.

#### In hospital

Because DVT is more likely to happen when you are unwell or inactive, or less active than you usually are, people in hospital are at a higher risk of getting a blood clot.

As a patient, your risk of developing DVT depends on the type of treatment you are having. You may be at higher risk of DVT if any of the following apply:

You are having an operation that takes longer than 90 minutes, or 60 minutes if the operation is on your leg, hip or abdomen.

You are having an operation for an inflammatory or abdominal condition such as appendicitis.

You are confined to a bed, unable to walk, or spending a large part of the day in a bed or chair for at least three days.

If you are much less active than usual because of an operation or serious injury, and have other DVT risk factors such as a family history, you may also be at a higher risk of DVT.

When you are admitted to hospital you will be assessed for your risk of developing a blood clot and, if necessary, given preventative treatment.

### Blood vessel damage

If the wall of a blood vessel is damaged, it may become narrowed or blocked, which can result in the formation of a blood clot.

Blood vessels can be damaged by injuries such as broken bones or severe muscle damage. Sometimes, blood vessel damage that occurs during surgery can cause a blood clot, particularly in operations on the lower half of your body.

Conditions such as vasculitis (inflammation of the vein wall), varicose veins and some forms of medication, such as chemotherapy, can also damage blood vessels.

### Medical and genetic conditions

Your risk of DVT is increased if you have a condition that causes your blood to clot more easily than normal. These conditions include:

cancer (treatments such as chemotherapy and radiotherapy can increase this risk further)

heart and lung disease

infectious diseases such as hepatitis

inflammatory conditions such as rheumatoid arthritis

thrombophilia (a genetic condition that makes your blood more likely to clot) and

Hughes syndrome (when your blood becomes abnormally "sticky")

Pregnancy

Pregnancy makes your blood clot more easily. This is your body's way of preventing too much blood loss during childbirth. Around one in 1,000 pregnant women develops DVT at some point during their pregnancy (see DVT - Helen's story for an example of this).

Contraceptive pill and hormone replacement therapy (HRT)

The combined contraceptive pill and hormone replacement therapy (HRT) both contain the female hormone oestrogen. Oestrogen causes the blood to clot slightly more easily, so your risk of getting DVT is slightly increased. There is no increased risk from the progestogen-only contraceptive pill.

Other causes

Your risk of developing DVT is also increased if you or a close relative have previously had DVT, and if you are:

overweight or obese

a smoker

dehydrated

over 60 (particularly if you have a condition that restricts your mobility)

Diagnosing deep vein thrombosis

If you think that you may have deep vein thrombosis (DVT), see your DOCTOR as soon as possible.

Your DOCTOR will ask you about your medical history and your symptoms. However, it can be difficult to diagnose DVT from symptoms alone, so your DOCTOR may recommend one of the following tests:

D-dimer test

A specialised blood test, known as the D-dimer test, is used to detect pieces of blood clot that have been broken down and are loose in your bloodstream. The

larger the number of fragments found, the more likely it is that you have a blood clot in your vein.

However, the D-dimer test is not always reliable. Blood clot fragments can increase after an operation or injury, or if there is inflammation in your body (when your immune system reacts to an infection or disease).

Therefore additional tests like an ultrasound scan need to be performed to confirm DVT.

If the D-dimer test is negative, it rules out the possibility of a DVT in 95% of cases.

### Ultrasound scan

An ultrasound scan can be used to detect clots in your veins. A special type of ultrasound, known as a Doppler ultrasound, can also be used to find out how fast the blood is flowing through a blood vessel. This helps doctors to identify when blood flow is slowed or blocked, which could be caused by a blood clot.

### Venogram

If the results of a D-dimer test and ultrasound scan cannot confirm a diagnosis of DVT, a venogram might be used.

A special dye is injected into a vein in your foot, which travels up the blood vessels of your leg. An X-ray is taken to see the dye. If there is a blood clot in your leg, the dye will not be able to flow round it and will show up as a gap in your blood vessel.

### Treating deep vein thrombosis (DVT)

If you have deep vein thrombosis (DVT) you will need to take a medicine called an anticoagulant.

### Anticoagulation

Anticoagulant medicines prevent a blood clot from getting bigger. They can also help stop part of the blood clot from breaking off and becoming lodged in another part of your bloodstream (an embolism).

Although they are often referred to as "blood-thinning" medicines, anticoagulants do not actually thin the blood. They alter chemicals within it, which prevents clots forming so easily.

Two different types of anticoagulants are used to treat DVT:

heparin

warfarin

Heparin is usually prescribed first, because it works immediately to prevent further clotting. After this initial treatment you may also need to take warfarin to prevent another blood clot forming.

Heparin

Heparin is available in two different forms:

standard (unfractionated) heparin

low molecular weight heparin (LMWH)

Standard (unfractionated) heparin can be given as:

an intravenous injection - an injection straight into one of your veins

an intravenous infusion - when a continuous drip of heparin is fed through a narrow tube into a vein in your arm (this must be done in hospital)

a subcutaneous injection - an injection under your skin

LMWH is usually given as a subcutaneous injection.

A dose of standard heparin can work differently from person to person, so the dosage must be carefully monitored and adjusted where necessary. You may need to stay in hospital for five to 10 days and have frequent blood tests to ensure you receive the right dose.

LMWH works differently from standard heparin. It contains small molecules, which means its effects are more reliable and you will not have to stay in hospital and be monitored.

Both standard and LMWH can cause side effects, including:

a skin rash and other allergic reactions

bleeding

weakening of the bones (if taken for a long time)

In rare cases, heparin can also cause an extreme reaction that makes existing blood clots worse and causes new clots to develop. This reaction, and weakening of your bones, is less likely to occur when taking LMWH.

In most cases, you will be given LMWH because it is easier to use and causes fewer side effects.

## Warfarin

Warfarin is taken as a tablet. You may need to take it after an initial heparin treatment to prevent further blood clots occurring. Your doctor may recommend that you take warfarin for three to six months. In some cases, warfarin may need to be taken for longer, even for life.

As with standard heparin, the effects of warfarin vary from person to person, and you will need to be closely monitored with frequent blood tests to ensure you are taking the right dosage.

When you first start taking warfarin, you may need to have two to three blood tests a week until your regular dose is decided. After this, you should only need to have a blood test every four weeks at an anticoagulant outpatient clinic.

Warfarin can be affected by your diet, any other medicines that you are taking, and by how well your liver is working. If you are taking warfarin, you should:

keep your diet consistent

limit the amount of alcohol that you drink (no more than three to four units a day for men and two to three units a day for women)

take your dose of warfarin at the same time every day

not start to take any other medicine without checking with your DOCTOR, pharmacist or anticoagulant specialist

not take herbal medicines

Warfarin is not recommended for pregnant women. They are given heparin injections for the full length of treatment.

Compression stockings

Compression stockings help prevent calf pain and swelling and lower the risk of ulcers developing after having a DVT. They can also help prevent post-thrombotic syndrome – damage to the tissue of your calf caused by the increase in venous pressure that occurs when a vein is blocked (by a clot) and blood is diverted to the outer veins (see DVT - Complications for more information).

After having a DVT, stockings should be worn every day for at least two years because symptoms of post-thrombotic syndrome may develop several months, or even years, after having DVT.

Compression stockings should be fitted professionally. They need to be worn all day, but can be taken off before going to bed or in the evening while you rest with your leg raised.

### Raising your leg

As well as wearing compression stockings, you might be advised to raise your leg whenever you are resting. This helps to relieve the pressure in the veins of the calf and stops blood and fluid pooling in the calf itself.

When raising your leg, make sure that your foot is higher than your hip. This will help the returning blood flow from your calf. Putting a cushion underneath your leg while you are lying down should help raise your leg above the level of your hip.

You can also slightly raise the end of your bed to ensure that your foot and calf are slightly higher than your hip.

### Complications of deep vein thrombosis

There are two main complications of deep vein thrombosis (DVT): pulmonary embolism and post-thrombotic syndrome.

#### Pulmonary embolism

This is the most serious complication of DVT. A pulmonary embolism happens when a piece of blood clot (DVT) breaks off and travels through your bloodstream to your lungs, where it blocks one of the blood vessels. This is serious and in severe cases, can be fatal.

If the pulmonary embolism is small, it might not cause any symptoms. If it is medium-sized, it can cause breathing difficulties and chest pain. A large pulmonary embolus can cause the lungs to collapse and result in heart failure.

About one in 10 people with an untreated DVT develops a pulmonary embolism severe enough to cause these severe symptoms or even death.

### Post-thrombotic syndrome

If you have had a DVT, you may develop long-term symptoms in your calf, known as post-thrombotic syndrome. This commonly affects people with a history of DVT.

If you have DVT, the blood clot in the vein of your calf can divert the flow of blood to other veins, causing an increase in pressure that can affect the tissues of your calf. Symptoms include:

calf pain

swelling

a rash

ulcers on the calf (in severe cases)

When a DVT develops in your thigh vein, there is an increased risk of post-thrombotic syndrome occurring. It is also more likely to occur if you are overweight or if you have had more than one DVT in the same leg.

### Preventing deep vein thrombosis

If you are admitted to hospital, or are planning to go into hospital for surgery, your healthcare team will assess your risk of developing a blood clot while you are there.

Surgery and some medical treatments can increase your risk of developing DVT (See DVT - Causes for more information).

If you are considered at risk of DVT, there are various recommendations your healthcare team can make to prevent a blood clot occurring.

Before you go into hospital

If you are planning to have an operation and are taking the combined contraceptive pill or hormone replacement therapy (HRT), you will be advised to stop the drugs temporarily four weeks before you have your operation.

Similarly, if you are taking a drug to prevent blood clots, such as aspirin, you may be advised to stop taking this one week before your operation.

There is less risk of DVT when you have a local rather than general anaesthetic. If it is possible for you to have a local anaesthetic, your healthcare team will discuss this with you.

While you are in hospital

There are a number of things your healthcare team can do to help reduce your risk of DVT while in hospital.

They should make sure you have enough to drink and do not become dehydrated. They should also make sure you start to move around as soon as you are able to.

Depending on your risk factors you may also be offered:

anticoagulant medicine, which helps prevent blood clots

compression stockings or a compression device, to help keep the blood in your legs circulating

Compression stockings are worn around your feet, lower legs and thighs, and fit tightly to encourage your blood to flow more quickly around your body. Compression devices are inflatable and work in the same way as compression stockings, inflating at regular intervals to squeeze your legs and encourage blood flow.

When you leave hospital

You may need to continue treatment with compression stockings or an anticoagulant medicine when you leave hospital. Before you leave, your healthcare team should advise you on how to use your treatment, how long it should continue for, and who to contact if you are having any problems.

## Smoking and diet

You can reduce your risk of DVT by making changes to your lifestyle, such as:

not smoking

eating a healthy balanced diet

getting regular exercise

maintaining a healthy weight or losing weight if you are obese

## Travelling

If you are at risk of getting a DVT, or have had a DVT previously, consult your DOCTOR before embarking on long-distance travel. If you are planning a long-distance plane, train or car journey (journeys of six hours or more), ensure that you:

drink plenty of water

avoid excessive alcohol as it can lead to dehydration

avoid taking sleeping pills as it can cause immobility

perform simple leg exercises, such as regularly flexing your ankles

take occasional short walks when possible

take advantage of refuelling stopovers where it may be possible to get out and walk about

wear elastic compression stockings

## Travel insurance

When travelling abroad, it is very important to make sure that you are prepared, should you or a member of your family fall ill. Make sure you have full travel insurance to cover the costs of any healthcare you may need to receive. This is particularly important if you have a pre-existing medical condition, such as cancer or heart disease, that may increase your risk of developing DVT.

DVT can be a very serious condition and it is important that you receive medical assistance as soon as possible. Prompt treatment of DVT will help to minimise the risk of complications.