

Deep Vein Thrombosis and Pulmonary Embolism: Risks, Prevention & Treatment

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What is a deep vein thrombosis (DVT)?

A DVT is a blood clot that usually forms within a vein deep in the leg, but can occur elsewhere. The clot blocks the normal flow of blood through the leg veins, either partially or completely, and so causes leg swelling and tenderness.

What is a pulmonary embolism (PE)?

If a clot breaks off, it may travel to the lung, blocking a blood vessel there. When this happens it becomes known as a pulmonary embolism. It can occur without any symptoms or signs of a DVT. Pulmonary embolisms are very serious, and occasionally fatal.

Why does a blood clot form in the legs?

Three factors may trigger a clot to form:

1. A reduced blood flow, which allows the blood to clot in the vein (caused by immobility, surgery or long-distance travel over three hours, for example)
2. Changes to the clotting mechanism, which may be inherited, or caused by some drugs or conditions such as pregnancy
3. Damage to the lining of the vein, which allows the blood to clot (caused by trauma, surgery or inflammation, for example)

Who is most at risk?

There are several factors which increase your chance of developing a DVT or PE. These include:

- If you have had a DVT or PE before
- Family history of DVT or PE

- Major surgery, particularly orthopaedic operations such as joint replacement
- Major trauma/lower-limb surgery
- Active heart or respiratory disease
- Inflammatory bowel disease
- Myeloproliferative disease, where the bone marrow produces excess cells
- Acute medical illness
- Paralysis or immobility of lower limbs including prolonged bed rest
- Faulty blood-clotting, which is usually an inherited tendency to blood clots (thrombophilia)
- Active cancer and cancer chemotherapy
- Obesity – Body Mass Index (BMI) of over 30
- You are aged over 40 years
- Travelling on uninterrupted journeys of three hours or more in the six weeks after your surgery
- Pregnancy and recent delivery
- The contraceptive pill or HRT, which contain oestrogen or a 3rd generation progesterone

Women: please consider...

- Because the contraceptive pill and HRT can cause a **small** increase to your risk of developing a DVT or PE, women booked for elective surgery **may** be asked to temporarily discontinue these medications for up to six weeks before surgery, **and** advised (where appropriate) to use an alternative method of contraception until after their operation.
- However, discontinuing oral contraception may increase your risk of an unplanned pregnancy, **and** pregnancy itself increases the risk of DVT/PE.
- If you receive insufficient notice to stop these medications six weeks before your planned operation date, you may wish to reschedule your surgery. However, it should be noted that any increase in risk will, for the majority of patients, be small.
- If any of the above issues relate to you and you need more advice, please discuss with the team at your pre-operative assessment appointment, your surgeon or your GP.

What are the symptoms?

Typical symptoms of deep vein thrombosis in the leg include swelling, associated with pain, calf tenderness and occasionally heat and redness compared to the other leg.

Pulmonary embolism can present with shortness of breath, rapid heartbeat, chest pain and, if severe, coughing up blood or even collapse. PE is not common but can be life-threatening, and requires urgent medical attention.

How is it treated?

DVT is a treatable condition. The aim of the treatment is to prevent the clot spreading up the vein, allowing it to slowly dissolve, and preventing the serious complication of a PE. Once a DVT has been diagnosed, you will be given anticoagulation treatment, usually with tablets to thin the blood.

Your anticoagulation will usually be managed by your GP who will decide how long to continue it for. Treatment is generally between 3 and 6 months but is occasionally required long term if you have had more than one episode of DVT and/or PE.

Occasionally we may refer you to a specialist for an opinion about your care and treatment.

How will DVT/PE be prevented when I am in hospital?

Not all DVTs can be prevented, but the risks can be significantly reduced. You will be assessed to decide what preventative treatment you will need, depending on your risk factors. You **may** also be advised to continue this treatment for a while after you have been discharged.

Treatments include:

- A low dose of blood-thinning medication (heparin, given in a small injection)
- A blood-thinning tablet
- Early mobilisation after surgery
- Bed exercises to keep the blood flow going in your legs
- Maintaining good fluid intake
- Mechanical devices, such as anti-embolism (AE) stockings (also known as compression stockings), AV impulse systems (on orthopaedic wards), and Flowtron machines whilst in the operating theatre

Having an epidural anaesthesia for orthopaedic surgery also reduces the risk of developing a DVT.

How effective is the preventative treatment?

Anti-embolism stockings are made with firm elastic that gives graduated compression to the leg. Most finish below the knee, but occasionally some are thigh-length. The compression has the effect of speeding up the circulation of the blood in your veins, making clotting less likely. They need to be worn day and night until you get back to a normal level of activity. Anti-embolic stockings are not suitable for those who have poor circulation in their legs.

These types of stocking are not used for all hospital admissions, for example, below waist orthopaedic surgery.

The use of a blood-thinning agent such as low molecular weight heparin (LMWH) reduces the DVT (thrombosis) risk by up to 50%, and the risk of pulmonary embolism by up to 65%.

Your nurse or doctor will advise you if you will need to continue any of these treatments at home.

What else do I need to know?

With all medications there are some possible side-effects. Blood-thinning injections and tablets are no different. One possible side-effect is a small increased risk of bleeding. If you have been offered either the injection or the tablet, it is because your doctor considers that, for you, the benefits of DVT-prevention outweigh the risks from any of the possible side-effects. The ward staff will be able to provide you with more information if you require it.

If you have any objections to being given medications that are derived from animals, please tell the ward staff immediately. The doctor will then be able to prescribe you an alternative form of heparin injection.

What can I do at home?

On leaving hospital, we will advise you to take certain precautions.

After you are discharged, you should continue to be as mobile as possible, as this will speed up the blood flow in the calf veins and help prevent a thrombosis.

Drink plenty of water.

If you have been asked to use anti-embolism stockings, please make sure that you follow the instructions below.

If you have been asked to continue other preventative treatments at home, you will be given separate instructions.

If you do not take the precautions that you have been advised to take, your risk of thrombosis and its complications will be higher.

How do I look after my stockings?

If your doctor or nurse has told you to carry on wearing your stockings at home, remember to:

- 1) Put on clean stockings at least every three days (or earlier if soiled).
- 2) Wash stockings by hand or in a machine at no more than 40°C. Do not use bleach.
- 3) Spin or air dry, but do not tumble dry or iron them, as this will damage the elastic. Do not put the stockings on if at all wet.

How do I put on the stockings?

- 1) Put your hand into the stocking as far as the heel.
- 2) Hold the heel and turn the stocking inside out as far as possible.
- 3) Put the stocking over your foot and heel. The centre of your heel should be over the heel pocket of the stocking and the inspection hole on the underside of your foot.
- 4) Pull the stocking up and fit it around your ankle and calf.
- 5) Smooth out any spare material, making sure the heel is in the heel pocket and the inspection hole is under your toes/ball of foot.

If you need assistance in hospital, the nursing staff will help you with this.

Are there any pitfalls to avoid or problems to look out for?

- 1) Don't roll the stockings down, as they will form a tight band around your leg. This can be dangerous as it constricts the blood flow and can cause skin sores.
- 2) The stockings should be taken off once a day for hygiene purposes and to check for any skin discolouration or damage. This would show they did not fit properly.
- 3) Avoid using greasy ointments, oils and lanolin on your skin as this damages the stockings' elastic fibres.
- 4) If a rash develops, it may mean you have an allergy to the elastic fibres in the stockings.
- 5) Be alert to numbness, pins and needles, pain or soreness in the foot or leg. This will be a sign that the stockings are too tight.

If you have any of the above problems and are in hospital, please speak to one of the ward staff. If you are at home, remove the stockings and then please contact your GP surgery.

Further information

If you have any further queries about DVT and PE risks, prevention and treatment, please ask your doctor or nurse.

References

NICE (2018) Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism

NICE (2020) Venous thromboembolic diseases. Diagnosis, management and thrombophilia testing. Available from: <https://www.nice.org.uk/guidance/ng158>

PALS

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'Care Opinion' comments forms are on all wards or online at www.careopinion.org.uk.

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