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Deep vein thrombosis (DVT): Can medication prevent blood clots in immobilised legs?

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Sometimes a leg has to be kept still (immobilised) because of an injury or a leg operation. This could be because the leg is in a cast or splint after a fracture or torn ligament. This means that the person cannot move it or put any strain on it, or only a little bit.

If you do not move a leg for days, though, the risk of developing a clot (thrombus) in a leg or pelvic vein increases (deep vein thrombosis or DVT). The main reason: blood no longer flows through the veins as quickly as it does when you can move your leg normally. This makes it more likely that the blood will "clump together" and form small clots. These can block veins and prevent blood from flowing properly. The signs of DVT are reddening of the skin, swelling in the leg and pain. However, blood clots often do not cause any symptoms at all.

DVT can be dangerous if the clot dislodges and travels through the blood system into the lungs. If it reaches the lungs and lodges in a blood vessel there, it can cause a pulmonary embolism (PE). This can block the flow of blood from the heart to the lungs, which overstrains the heart and can even cause heart failure. As well as this, the lung tissue does not get enough blood and nutrients, so the cells of the body do not get enough oxygen. Symptoms of PE may include sudden breathlessness, chest pain associated with breathing, coughing up blood, dizziness, anxiety and a racing pulse.

Options for preventing thrombosis

There are several ways to lower the risk of DVT. The most important is to get moving again as soon as possible: immobility increases the risk of a blood clot. However, it is also important not to over-burden the leg too soon as this could slow down recovery. When people have to stay in bed for days because of an operation or injury, they often wear compression socks or stockings. These put the leg under light pressure, which aims to help the blood flow back to the heart a little faster.

Various medications are also used to reduce the blood's clotting ability and lower the risk of DVT. These drugs are called anticoagulants. Heparins are among the most established anticoagulant medications. They are injected subcutaneously (under the skin).

There are two types of heparin: low molecular weight heparin (LMWH) and unfractionated heparin. They work in similar ways but they differ, for example, in how long their effect lasts. LMWH only needs to be injected once a day, whereas unfractionated heparin needs to be injected two to three times a day. People who have an immobilised leg usually use LMWH. Many people can inject themselves, which means they can recover at home instead of in hospital.

Some medications from the group of drugs called coumarins are another option. These are taken as tablets. They tend to be used for long-term prevention in people who have a permanently higher risk of thrombosis.

Research on preventive medication

Researchers from the Cochrane Collaboration wanted to know how effective low molecular weight heparin is at preventing DVT and pulmonary embolism in patients who have a leg in a cast or splint following an injury. The Cochrane Collaboration is an international network of researchers which aims to systematically review all of the available information about how well medical interventions work. To do this, they analyse the results of clinical trials.

So-called randomised controlled trials (RCTs) are the most reliable kind of trials. The people who take part in RCTs agree to be randomly divided up into different groups. One of these groups has the treatment being tested, and the people in the other group(s) have a fake treatment (placebo), a different treatment, or no treatment. This approach makes it possible to find out what effect the treatment has on the participants' health.

The Cochrane researchers found six randomised controlled trials involving a total of 1,490 participants who had a leg in a cast or splint. Of these participants, 750 received heparin and the 740 people in the control groups had a placebo treatment.

A different group of researchers from the Isala Clinics in Zwolle, the Netherlands, analysed trials on all the medications that are used to prevent DVT in people with immobilised legs. They found the same randomised controlled trials that the Cochrane researchers did on LMWH, and they did not find any trials on unfractionated heparin or coumarin.

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Low molecular weight heparin can prevent deep vein thrombosis

Both groups of researchers found that people who have immobilised legs are less likely to develop DVT if they take LMWH. However, these drugs do not always prevent DVT. In the group of people who took heparin, 10 out of 100 people (10%) had DVT. By comparison, of the people who did not take these medications, 18 out of 100 (18%) developed DVT. In other words: for every 100 people with immobilised legs who take low molecular weight heparin, DVT is prevented in 8 people.

But thrombosis is not always a problem. It sometimes goes unnoticed and does not have any health consequences. Some types of DVT lead to a higher risk of pulmonary embolism, particularly those that cause symptoms and those occurring higher in the leg and pelvis.

Pulmonary embolism was very rare in the trials. None of the people who took heparin had one, compared to 2 of the 740 people who did not take heparin.

The possible adverse effects of heparins include allergic reactions and more blood loss because these drugs reduce the ability of the blood to clot. However, both of these adverse effects were equally seldom in the treatment and control (comparison) groups. More serious bleeding occurred in 2 out of 750 people in the treatment group, compared to 1 out of 740 people in the control group. The injections can also cause minor bleeding and bruising at the site of injection.

There is an ongoing debate among experts about whether some groups of people benefit more from DVT prevention medication than others. The researchers looked into this matter too, but could not find any differences between particular groups of people. Everyone benefited equally from low molecular weight heparins, regardless of whether they had bone fractures or ligament injuries, wore a cast or a splint, had surgery or other treatment.

There was no difference between the various medications made by different manufacturers either. Although they did not have enough data to be certain, the Cochrane researchers concluded that if there are any differences, they are probably very small. There was also not enough data to be able to say how long people should take the medication to get the best effect. In the trials that were analysed, the patients took LMWH for as long as their leg was immobilised.

Taking medication can reduce the likelihood of DVT developing, but does not always prevent it. The most important thing is to treat the underlying condition so that you can get back on your feet and move around again as soon as possible.

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Glossary

Cochrane Collaboration

The Cochrane Collaboration is an international network of thousands of researchers and others. They work together in teams called Cochrane Review Groups to answer questions about health care by doing systematic reviews of evidence. To achieve this, the members of the Collaboration have developed systems and methods for systematically finding and analysing the results of trials of health care interventions. The goal of the Cochrane Collaboration is to help patients, health care practitioners and others make more informed decisions about health care. You can read more about the Cochrane Collaboration at their website.

breathlessness

Breathlessness, also called shortness of breath or dyspnoea, is when a person temporarily or permanently feels that they cannot get enough air when breathing. In severe breathlessness, people have a sensation of tightness or are even afraid of suffocating. Breathing is labored and it is difficult to breathe deeply. Breathlessness occurs in lung diseases like asthma or pneumonia, but also during a heart attack or in extreme obesity.

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Sources

IQWiG health information is based on research in the international literature. We identify the most scientifically reliable knowledge currently available, in particular, systematic reviews of the effects of health care. You can read more about systematic reviews and why these can provide the most trustworthy evidence about the state of knowledge here (URL: http://www.gesundheitsinformation.de/evidence-based-medicine.61.en.html) . The authors of the major systematic reviews on which our information is based are always approached to help us ensure the medical and scientific accuracy of our research summaries.

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The German Institute for Quality and Efficiency in Health Care (IQWiG)

The German Institute for Quality and Efficiency in Health Care (IQWiG) was established by legislation to provide evaluations of the effectiveness, quality and efficiency of healthcare services. This includes the assessment of medicines as well as the publication of health information for consumers and patients.

Evidence basis of our health information

Our information is based primarily on systematic reviews of the effects of health care. Systematic reviews are necessary to gain an objective picture of health care. In order to do this, a clear question is formulated. Researchers then find all the relevant studies that could answer this question. They then evaluate those studies.

You can find a list of the evidence and other scientific literature on which this information is based at **www.informedhealthonline.org**

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