

Differentiated thrombosis treatment

Recognizing symptoms, preventing complications

Ninety to 130 out of 100,000 people¹ suffer from symptomatic deep vein thrombosis (DVT) every year. The first sign is usually swelling of the affected extremity. Reasons can include immobility and lack of activity, an increase in the blood's tendency to clot because of blood composition abnormalities or autoimmune diseases and malignancies. Experts from the Thrombosis Action Group explain how severe disease and long-term complications, such as post-thrombotic syndrome (PTS), can be prevented.

¹ https://register.awmf.org/assets/guidelines/003-0011_S3_VTE-Prophylaxe_2015-10-abgelaufen_01.pdf

Differentiated thrombosis treatment and prevention

“The best prevention is regular exercise”

If detected early, thrombosis can usually be treated effectively using medication and targeted compression therapy. In her interview, vascular specialist Dr. med. Jutta Schimmelfennig explains key options for diagnosis and treatment.

life: What are the most common causes of thrombosis, and which risk factors play a role?

Dr. Jutta Schimmelfennig: Virchow's triad, discovered by Professor Virchow in the 19th century, is still applicable. It refers to three possible causes of thrombosis in the venous system: firstly, stasis, i.e. reduced flow speed of the venous blood either caused by a blockage of the return flow to the heart due to obesity (abdominal fat) or tumors or caused by failure of the muscle-vein pump, which can happen when a patient is bedridden, requires immobilization of the leg (plaster cast) or is sitting for very long periods. Secondly, an increase in the blood's tendency to clot because of blood composition abnormalities, also known as hypercoagulability. This can be triggered by thrombophilia, congenital problems with the coagulation system, but also by autoimmune diseases or malignancies as well as hormonal influences that occur during pregnancy for example. The third possible cause of thrombosis is damage to the inner layer of vessels, meaning endothelial damage, for example caused by inflammatory or mechanical processes, medication or also malignancies.

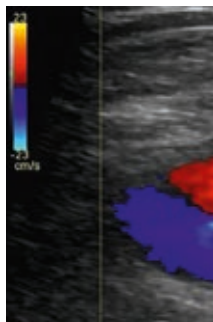
Which symptoms and signs indicate thrombosis, and do symptoms vary depending on the affected body part?

Dr. Schimmelfennig: The signs of visceral thrombosis are different compared to thrombosis in the arm, of course. Both are quite rare. But from the pelvis down to the legs, thrombosis can present with severe symptoms. The first sign is swelling of the affected extremity. The bigger the vein, the more severe the swelling of the leg below the occlusion. Sometimes, it merely starts with a



Until 2016, Dr. med. Jutta Schimmelfennig practiced in her own center for vascular medicine in Bamberg. Today, she runs the Thrombosis Working Group, which is part of the German Society of Phlebology and Lymphology (DGPL), and she is actively involved in the Thrombosis Action Group.

non-localized pulling sensation in the lower leg. There is a little tension, but this is often ignored. But when the skin reddens, becomes hot or shiny and, crucially, the pain doesn't subside when the person is lying down, something may be blocking venous return. The situation becomes dramatic when the popliteal vein closes up, the lower leg swells to a great extent or the pelvic vein is affected. These symptoms may develop within hours of the vein occlusion. In those cases, immediate action is required.



What should physicians look out for during their initial diagnosis?

Dr. Schimmelpfennig: When taking the medical history of a patient, it's important to find out how long the leg pain has been going on, and what could have caused it. This can include a journey or long car trip, exercise or an injury, illness, medication etc. Unfortunately, many people aren't taken seriously at the beginning because problems can be vague. I remember a 90-year-old very mobile lady who was referred to an orthopedist by her family physician after suffering from leg pain for six weeks with the suspected diagnosis: sciatica. Instead, she had leg vein thrombosis at the back of the knee which had moved all the way up to the pelvis. That is why I appeal to physicians: please always ask patients with leg pain to remove sufficient clothes so you can not only look at them but also palpate the affected area. Pain caused by sciatica, for example, radiates from the hip to the outside of the leg and doesn't cause swelling. That can't really be confused with thrombosis.

Which diagnostic procedures are used to identify thrombosis?

Dr. Schimmelpfennig: Compression sonography has become the gold standard. A family physician can take care of this in black and white using an ordinary convex probe to get an initial diagnosis. Color duplex sonography with compression is performed by a specialist. Venography is rarely used now. CT or MRI imaging is used more often in the area of the pelvis or abdomen, or to exclude pulmonary embolism. The Wells Score has become an established tool to make a definitive assessment on how likely it is that a patient is suffering from thrombosis or pulmonary embolism.

How is acute thrombosis usually treated?

Dr. Schimmelpfennig: Acute thrombosis is always treated with anticoagulants. The current standard treatment includes direct oral anticoagulants, or DOACs for short, which are ingested as tablets. But low-molecular-weight heparins (LMWHs) are also used as injections. Treatment is divided into three phases: the initial phase takes up to ten days, depending on the medication, followed by a maintenance phase. This can take three to six months. The physician can then consider extended maintenance therapy

to suit the patient's needs. Depending on the diagnosis, the maintenance therapy has to be reassessed annually, also for patients who have to be treated for their entire lives. The Thrombosis Action Group has developed a clear "traffic light system" to help with classifying patients and the entire treatment duration, all in compliance with official guidelines.

In parallel with medication, compression is always recommended, even if there is only an initial suspicion of thrombosis. After all, the patient's pain may be caused by a cyst or torn muscle fiber. And compression helps reduce pain. The first choice is a compression bandage with short-stretch wraps which can be continually adapted to the degree of swelling in the extremity. In order to fit a

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Dr. med. Jutta Schimmelpfennig

compression stocking, the leg must first be decongested or the swelling must have reduced. Guidelines recommend using medical compression stockings for six months. If problems persist, compression can be continued. If the lower leg no longer swells, no clinically relevant post-thrombotic syndrome has developed.

Is thrombophilia treated the same way?

Dr. Schimmelpfennig: A congenital coagulation disorder is very rare and usually presents at a young age, if at all. The family history therefore plays an important role in young or pregnant patients with thrombosis. That is why it makes no sense to perform thrombophilia screening in patients over 50.

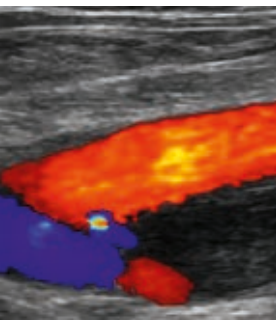
What potential complications may occur if thrombosis is not detected or treated in time?

Dr. Schimmelpfennig: The risk of pulmonary embolism is the highest during the first three weeks. Signs can include coughing, breathlessness, shortness of breath and tachycardia. The earlier the patient is diagnosed with thrombosis, the earlier medication can be started and, most importantly, post-thrombotic syndrome prevented. Once thrombosis has become established, well-adjusted compression may also promote venous return and contribute to decongestion, thus preventing venous leg ulcers. But changes to the vascular walls and the destruction of the delicate venous valves in cases of post-thrombotic syndrome cannot be reversed.

Images: Udo Schönwald, Dr. Schimmelpfennig

When the skin reddens, becomes hot or shiny and, crucially, the pain doesn't subside when the person is lying down, then there is an obstacle to the venous return.

Made visible using compression sonography: thrombosis ascending from the great saphenous vein into the deep venous system.



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>>> *Are there certain lifestyle changes or actions patients can take to reduce the risk of thrombosis?*

Dr. Schimmelpfennig: The first question should be: who typically suffers from thrombosis? After all, it doesn't occur out of the blue but, as mentioned initially, because of certain circumstances: after extended periods of sitting, on a bus, plane or in a car, for example, or after a weekend training course as well as after standing up for a long time, at work or at a trade show. The most crucial risk factors for thrombosis include pronounced varicose veins, a lack of activity and excess weight. Abdominal fat in particular constricts the superior vena cava. Older people with cardiac insufficiency, diabetes or rheumatic illnesses are at risk. Being bedridden also plays a part, even in cases of febrile viral infections, such as flu. In warm temperatures in particular, but not exclusively, exsiccosis, a result of dehydration, can trigger thrombosis, as can the initial and end phase of cancer, chemotherapy, autoimmune diseases, such as ulcerative colitis, or hormonal therapy. And let's not forget smokers who take oral contraception and patients who have previously suffered from thrombosis. So, to answer your question: the best prevention is regular exercise, if possible, weight loss, removal of varicose veins and wearing Ccl1 compression stockings when subjected to strain as well as prophylactic antithrombotic medication for high-risk patients.

What does follow-up care include for patients who have suffered from thrombosis? Are there specific procedures for monitoring the risk of recurring thromboses?

Dr. Schimmelpfennig: Patients who suffered from thrombosis, which was detected early and treated in time, who tolerate the medication and received compression stockings, will have a follow-up after three months – provided that there haven't been any problems in the meantime. With the help of ultrasound, a physician can find out whether the thrombosis has been reabsorbed or has recanalized, which means that anticoagulant therapy can be discontinued. Treatment is often extended by 6 months as prolonged maintenance therapy. Some patients need indefinite treatment, which is checked annually. Patients who have

previously suffered from thrombosis are always considered to have a high primary risk for recurrence. In high-risk situations, they need special preventive care. The guidelines were recently amended to include the recommendation to prescribe a prophylactic dose of DOAC tablets in order to prevent thrombosis. This is considered "off-label" use because this approach has not been officially approved. Up to now, it has only been possible to give prophylactic doses of injected low-molecular-weight heparin. I would also advise wearing medical compression stockings for prevention. If there is no pronounced post-thrombotic syndrome, compression class 1 or 2 below-knee stockings are sufficient.

"Precise, custom fitting of the stockings to match the state of the thrombosis is key."

Dr. med Jutta Schimmelpfennig

How often does post-thrombotic syndrome (PTS) occur after deep vein thrombosis?

Dr. Schimmelpfennig: The guidelines indicate an incidence of about 20 to 50 percent for PTS, with a large proportion of patients suffering from mild symptoms only. Truly severe PTS with chronic congestion and ulcerations is reported in 1.4 to 5 percent only. Depending on the source, the number may be 10 percent of cases. Severe disease is usually seen following pelvic vein, femoral vein or popliteal vein thrombosis. On its own, lower leg thrombosis doesn't usually cause any long-term problems.

Post-thrombotic syndrome includes various symptoms. Could you briefly describe them for us please?

Dr. Schimmelpfennig: In cases of PTS, permanent congestion has become established in the affected extremity because the deep veins are blocked or scarred. Blood can no longer flow freely from the leg back to the heart. Stasis edema will develop, primarily in the lower leg, which may progress into secondary lymphedema in severe cases. The skin changes, and the patient suffers from redness, itching and stasis dermatitis, which

can turn into chronic venous leg ulcers. If the patient also has chronic venous insufficiency, meaning varicose veins, as a compounding factor, stasis problems will increase, and the chances of healing will decrease.

What does a physician have to consider when treating patients with PTS?

Dr. Schimmelpfennig: The guidelines recommend exercise and compression therapy with medical compression stockings. Precise, custom fitting of the stockings to match the state of the congested extremity is key. Before they are put on, the physician should check the foot pulse to make sure there is enough blood flow. Ideally, the physician should discuss the use and wearing of the stocking with the patient to ensure they will consistently wear the stocking. This also includes taking off the stocking during the follow-up visit, looking at the state of congestion and repeatedly checking whether the compression garment still fits. A thigh-high stocking may make sense for lower leg thrombosis because a knee-high stocking may constrict the leg owing to the degree of swelling. A model with an open toe makes donning easier, but isn't suitable in cases of edema at the dorsum of the foot. The material is important too: it mustn't be too thin to make sure it doesn't lose its elasticity too quickly in cases of corpulent legs or problems with congestion. If the patient is suffering from ulcers, a special ulcer compression stocking system with a liner may be a good solution. Sometimes, using compression bandages also makes sense so the treatment can be adapted to the congestive state more effectively. And another tip from my personal experience: if employees at a physician's practice have had additional training in phlebology, they can take care of the follow-up visit and save the physician a lot of time. If a patient suffers from ongoing problems with congestion, despite therapeutic exercise and medical stockings, lymphatic drainage can help, as can intermittent compression therapy (IPC) with a device for the patient's home so it can be used every day, in particular for patients whose work involves a lot of standing, such as in production or sales. An appropriate device can be prescribed for the home with the approval of the MDK (Editors' note: German Health Insurance Medical Service). You can refer



How long should anticoagulation be used after thrombosis?

The duration of anticoagulation treatment should be individually adapted in accordance with current guidelines. In order to categorize patients more effectively, the German Thrombosis Action Group has developed a three-stage matrix – a traffic light system that classifies different indications based on their recurrence risk to then recommend the relevant actions. For more information about the German

traffic light system, please visit:



www.risiko-thrombose.de

VenoTrain impuls: the medical compression stocking for advanced vein problems

Featuring a strong compression thread and breathable microfiber, the VenoTrain impuls combines a high level of effectiveness with unique wearing comfort. The stocking needs exerts the required therapeutic pressure even at very low levels of activity.

Available in compression classes 2 and 3, it is ideally suited for the treatment of phlebotrombosis and post-thrombotic syndrome, advanced chronic venous insufficiency, for the follow-up care of healed ulcers or for early stage lymphedema. The knitted fabric of the VenoTrain impuls contains more than 40 percent microfiber. The silky-soft filaments make the stocking particularly smooth and supple, as well as very easy to care for. The fabric's high microfiber content ensures optimized moisture-wicking properties and temperature control, which makes the stocking comfortable to wear on cold and warm days.

to the S1 Guidelines relating to IPC to help with that. Surgical recanalization is often possible for pelvic vein occlusion. During this procedure, the pelvic vein is opened and a stent is inserted to ensure venous return flow remains unobstructed. This method can help heal chronic ulcers.

What benefits does compression therapy have in terms of preventing PTS?

Dr. Schimmelpfennig: The IDEAL-DVT study conducted in 2018 under the supervision of Dr. Arina ten Cate-Hoek showed, for example, that early initiation of compression therapy can prevent severe disease in case of post-thrombotic syndrome. These findings were included in the German guidelines.

What current research projects or studies are investigating thrombosis? Are there promising new developments relating to treatment or prevention?

Dr. Schimmelpfennig: There haven't been many new discoveries relating to general treatment recently. For the majority of patients, the introduction and establishment of direct oral anticoagulants is a relief because they can take a fixed-dose tablet, rather than getting daily injections or having their blood checked constantly. Accompanying, consistent compression therapy will remain the standard in Germany.

