



## Venous Thromboembolism (VTE):

What you need to know about risk factors, symptoms, and treatment

### What is VTE?

Venous thromboembolism (thrahm-bö-EM-bö-lizm), or VTE, describes two related conditions: deep vein thrombosis (DVT) and a more serious complication called pulmonary embolism (PE), which is an emergency. Both are blood clots in the veins and highly preventable. There are ways to prevent and treat VTE, but you can help identify the warning signs of VTE to save lives.

DVT is a blood clot that usually forms in the veins of the lower leg or calf, and can extend to involve the large deep veins of the upper legs or thighs. Only rarely does DVT occur in an arm and usually occurs because of intravenous (IV) access lines, or in athletic individuals due to repetitive injury.

Your legs and arms have two major types of veins: superficial and deep. The superficial veins are near the surface of the skin where they are sometimes visible, whereas the deep veins are located near the bones and are surrounded by muscle. Contraction or squeezing of the muscles around the deep veins sends blood back to the heart. A blood clot that develops in a deep vein can block this flow of blood and may or may not cause symptoms.

DVT is not usually life threatening, but it can be if the blood clots break loose and go into the lungs. This condition is known as pulmonary embolism (PE) which can be

fatal if the traveling clot, called an “embolus,” clogs the main lung arteries. Many people die in the first hour from a PE, 100,000 in

the United States each year, making it the third most common cause of vascular death.

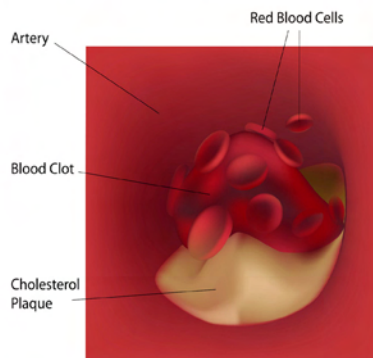
DVT can cause leg swelling that is usually treated with 3-6 months of a blood thinner. A long-term side effect of DVT is the development of the post-thrombotic syndrome (PTS). About one-third of patients who experience a DVT (a higher percentage if the clot goes into the large veins in the pelvis or abdomen) can develop PTS even after treatment with blood thinners. This condition can show up months to years later as chronic pain, swelling and discoloration of the leg, as well as the development of open sores or ulcers, caused by damage that is done by the clot to valves in the veins. The effects of PTS can be long lasting and can lessen one's quality of life.

Are you  
one of 1 million  
Americans  
affected by VTE  
each year?

### Who is at risk?

Many factors can put you at risk for VTE. Some of these factors seem obvious—lengthy surgery (especially orthopedic), pregnancy, being over age 40 and not exercising, cancer, obesity, use of birth control pills, hormone replacement therapy, family history of DVT, long distance travel (especially on airplanes) and spinal cord injuries. Others may not be as obvious such as heart failure, some types of lung disease, kidney disease, infections and other inflammatory diseases increase your risk. Smoking increases clotting risk as do obesity and inherited clotting conditions. These risk factors are additive: the more you have, the greater your risk. If you have several risk factors, such as a planned or a recent surgery, a fracture, been on bedrest, or will be immobilized for any length of time, you may want to discuss VTE with your health care provider and develop a plan for preventing blood clots.

BLOOD CLOT FORMS ON CHOLESTEROL PLAQUE IN AN ARTERY



## What are the signs and symptoms of Deep Vein Thrombosis?

People with DVT may develop pain, swelling and tenderness. Only about half the people with DVT have typical symptoms, so diagnosis is difficult. A big misconception is that there should be something visible with DVT. Most DVTs are associated with leg pain or mild swelling only, and the perception that there should be obvious symptoms has likely resulted in many delayed or missed diagnoses of VTE. It is the combination of risk factors and these symptoms that is important.

### When symptoms do occur the most common are:

- Sudden swelling of one leg
- Pain or tenderness in the calf muscle or groin
- Skin that is warm to the touch on the legs
- Fullness of the veins just beneath the skin (seeing these veins more easily or if they look swollen)
- Changes in skin color (blue, red or very pale)

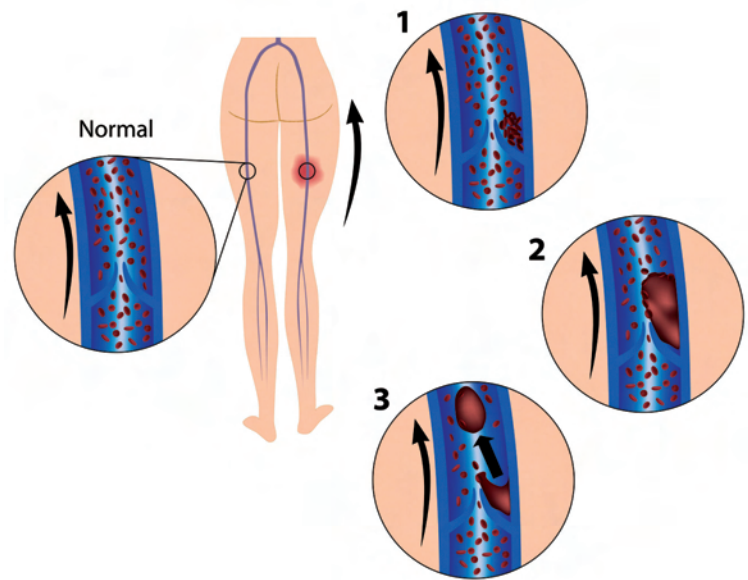
Symptoms like these can develop slowly, but can also develop suddenly. These symptoms are not unique to DVT and can be associated with other conditions. If you have these symptoms you should contact your health care provider immediately.

## What are the signs and symptoms of pulmonary embolism?

Signs and symptoms of pulmonary embolism occur quickly and need prompt attention. The symptoms of PE are different than for DVT. These symptoms include:

- Shortness of breath
- Sharp chest pain usually with breathing in or when taking a deep breath
- A feeling of apprehension
- Sudden collapse or fainting
- Rapid pulse
- Coughing
- Sweating
- Bloody phlegm (coughing up blood)

## Deep Vein Thrombosis



These symptoms are not unique to pulmonary embolism and can be associated with many other conditions. Unfortunately, a majority of people with PE, unlike DVT, will experience uncommon symptoms such as dizziness, back pain or wheezing. However, because pulmonary embolism can be fatal, if you experience these signs or symptoms seek medical attention right away.

## How are DVTs and PEs diagnosed?

The easiest and most reliable method for diagnosing deep vein thrombosis is an ultrasound exam. This test is simple, painless, safe and widely available. A specific blood test may be performed to measure “D-dimer” which is a sign of recent and active clotting. When this test is negative, it is very unlikely that you have suffered a DVT. An invasive test known as a “venogram” (an x-ray test using dye injected into the veins) or an MRI or CT of the legs, chest or abdomen may sometimes be needed. PE may be diagnosed by a special type of chest CT scan, a lung scan or less commonly by an invasive procedure known as a pulmonary angiogram.

## How are DVTs and PEs treated?

Treatment of acute deep vein thrombosis has four goals: 1) to stop the clot from getting bigger, 2) to stop the clot from breaking free in your vein and moving to lungs, 3) to decrease your chance of having another DVT, 4) to minimize the likelihood of developing PTS.

DVTs are treated with medications sometimes called “blood thinners” or anticoagulants, which decrease your blood’s ability to clot. These medications are used to stop clots from getting bigger and to prevent additional blood clots from forming. Giving a blood thinner as soon as a clot is suspected may rapidly improve symptoms and help to prevent complications. Blood thinners do not break up blood clots that have already formed. Your body’s natural clot-breaking system will help dissolve the clot. Blood thinners are usually given as an intravenous medication or injection first, followed by either an injection or a pill. Your doctor will decide what is best for you. To be effective, you may need to take this medication for at least 3-6 months, often for 1-2 years, and sometimes long-term or indefinitely. If you take the pill blood thinner you will be asked to get regular blood tests to monitor the degree of thinning of the blood. There are many medications that can affect your blood test result, so make sure your health care provider knows ALL of your medicines, including over the counter pills and herbal supplements. Carry identification at all times indicating that you are taking a blood thinner and which one it is.

In addition to your blood thinners, you will be asked to wear prescription compression stockings (stockings to help push your blood up your leg). Stockings will help to reduce leg pain, swelling, discoloration and ulcers commonly called the “post-thrombotic syndrome.” These post-thrombotic symptoms are best treated by long-term use of prescription compression stockings. You need to work with your health care provider to prevent additional clots and to treat them if they happen.

PEs are also treated with “blood thinners.” For very large clots in the lungs causing severe symptoms, or large clots in the legs, a medication to dissolve the clot may be needed. This procedure of using a clot-busting drug is called thrombolysis, which is only performed in the hospital. With thrombolysis, clot-dissolving medications are given into an arm vein or by an IV catheter threaded through a leg vein to the clot and medication is injected into the clot through many tiny holes in the catheter, much like a soaker hose. Sometimes a device like a tiny vacuum cleaner cleans out the pieces of clot. For large clots in the legs, an angioplasty (balloon to open the vein wider) or stent may be needed if narrowed areas remain after the clot is dissolved. For some patients, surgical extraction of the clot (thrombectomy), through a small incision in the groin or through surgery may be recommended. There is some additional risk and expense with this procedure. Clot removal, by either technique, is usually recommended only for major clots higher up in the leg, and particularly in active, healthy patients without any serious associated diseases.

Patients with a DVT may or may not be hospitalized for a few days, depending on their health care provider’s preference and the severity of the clot. Patients with a PE are generally hospitalized for a few days. Most patients

with VTE are not on bed rest unless they are receiving thrombolysis.

As with the treatment for DVT, patients with PE will typically take blood thinners for several months, or years, and will be monitored with regular blood tests to be sure the blood thinner medication is properly adjusted. Prescription stockings may also be prescribed, particularly if there is a DVT along with a PE.





## Can VTE be prevented?

Regular exercise will decrease the risk of VTE. Regular stretching and leg movement are important for individuals who sit a lot or when traveling on long trips, particularly air travel. As always, it is important to stop smoking, as smoking increases the tendency of the blood to clot.

Persons who undergo major surgery are at risk to develop DVT, therefore calf and leg exercises before surgery along with resuming physical activity as soon as possible after the surgery will decrease the risk for DVT. In some cases, low doses of blood thinners, elastic stockings, or compression pumps for the legs are used to help prevent VTE after surgery or during hospitalization for another illness. Preventing VTE is the major reason that hospitalized patients are encouraged to be up and walking as soon as possible after surgery.

Prior to any planned procedure that involves cutting the skin, people on blood-thinning medication need to transition safely and effectively using “bridge therapy.” This generally means decreasing or stopping the dose of your blood thinner before surgery, or being put on an alternative blood thinner, such as an injection medication, while the pill is stopped. Some patients may be considered for placing a removable filter into the large vein in the abdomen called the inferior vena cava. Filters do not reduce the risk of DVT, but they do prevent most clots from moving from the legs to the lungs.

This filter can be removed once the risk of VTE decreases. If you are on blood thinner medication and require an invasive procedure, bridging therapy should be discussed with your health care provider.

## What can I do to prevent VTE?

- Stay active. Walking helps with blood circulation and with weight loss.
  - STOP smoking.
  - Maintain a normal body weight and eat a healthy diet.
  - Discuss risks of birth control or hormone replacement therapy with your health care provider.
  - If you are hospitalized for any medical or surgical condition, ask the doctor what he or she is planning to do to decrease your risks of DVTs and PEs.
  - Find out if there is any family history of VTE or abnormal blood clotting. If so, discuss any tests or steps you should take with your health care provider.
  - If you take long airline or auto trips, get up and walk every hour or so, and tighten the calf muscles by flexing your foot and raising on your toes 10-15 times each hour. Additionally, avoid alcohol and drink plenty of fluids.
  - Follow your health care provider’s instructions to keep any medical conditions under best control.
- VTE prevention is an evolving field with exciting research expected to bring new treatments. New oral medications that will require less monitoring are soon going to be more widely available. Discuss all treatment options with your health care provider.