

DVT and PE

A plain-English guide for you and your family

WHAT IS HAPPENING

Normally, blood flows smoothly up from your legs through deep veins back to your heart and lungs, and your body keeps blood liquid when it should flow and solid (clotted) only when you are injured. But when three things go wrong together—blood flow slows down, the vein wall gets damaged, or blood gets stickier than normal (called Virchow's triad)—a clot can form inside a deep vein, usually in the calf or thigh. That clot blocks blood from draining out of the leg, so the leg swells, gets heavy, and hurts on one side only. The real danger is when a piece of that clot breaks loose, floats through the heart, and gets stuck in the lung arteries—that is called a pulmonary embolism (a clot lodging in a lung artery) or PE. When the clot blocks part of the lung, that lung tissue cannot pick up oxygen anymore, so you feel short of breath, your heart races to try to push blood through the blockage, your oxygen level drops, you might feel sharp chest pain, and in severe cases the right side of your heart can get overworked and fail, leading to fainting or even death. Every single symptom—the one-sided swelling, the sudden breathlessness, the racing heart, the low oxygen—is your body's alarm system telling you that blood flow is blocked and oxygen is running low. The good news is that blood-thinning medicine (anticoagulation) stops the clot from growing and gives your body time to slowly dissolve it, and compression stockings or other measures help prevent new clots. The key is to catch it early, treat it fast, and find out why it happened so it does not come back.

What you might feel

- Leg swelling (usually one leg)
- Leg pain or tenderness (often feels like a cramp in the calf)
- Warmth and redness over the swollen area
- Sudden shortness of breath
- Sharp chest pain that gets worse when you breathe in deeply or cough
- Fast heart rate (tachycardia)
- Coughing up blood (hemoptysis)
- Lightheadedness or fainting

Call the doctor right away if...

- Sudden trouble breathing or very fast breathing
- Chest pain that feels sharp or stabbing, especially with a deep breath
- Coughing up blood
- Feeling faint, dizzy, or passing out
- Fast or irregular heartbeat with sweating or confusion

What the care team will do

- Check oxygen saturation with pulse oximeter and apply oxygen to keep SpO2 above 90 percent if the patient has any shortness of breath or chest pain
- Start continuous pulse oximetry and cardiac monitoring to watch for arrhythmias (irregular heartbeat) and a fast heart rate (tachycardia) (fast heart rate)
- Keep the patient on bed rest with the affected leg elevated above the level of the heart
- Do not massage, rub, or apply heat to the swollen leg
- Measure and record the circumference of both calves and thighs at the same spot every shift
- Assess for signs of bleeding (gums, bruising, blood in urine or stool, nosebleeds) every four to eight hours after anticoagulation starts
- Check baseline PT/INR, aPTT, CBC (complete blood count), and creatinine before giving the first dose of anticoagulant
- Teach the patient to report any sudden worsening of shortness of breath, new chest pain, dizziness, or confusion immediately

Medicines you may be given — and why

Apixaban (Eliquis) or Rivaroxaban (Xarelto)

These medicines block one specific step in the clotting chain called factor Xa (say 'ten-A'). Factor Xa is like a foreman that tells the body to build a clot. When you block it, the body can't finish making new clots, so the existing clot stops growing and your own cleanup crew (natural enzymes in the blood) can slowly dissolve it over weeks to months.

Enoxaparin (Lovenox) or Dalteparin (Fragmin)

These are injected under the skin (like an insulin shot) once or twice a day. They boost the power of a natural brake in your blood called antithrombin. Antithrombin normally slows down clotting enzymes, but LMWH makes it work 1,000 times faster, so clotting stops quickly. Because LMWH is predictable and does not need daily blood tests, it is the go-to choice for

pregnant women (safe for baby), cancer patients (works even when cancer makes blood stickier), and anyone who cannot swallow pills.

Warfarin (Coumadin)

Warfarin blocks your liver from using vitamin K to build several clotting factors (II, VII, IX, X). Without those factors, your blood clots much more slowly. It takes 3–5 days to see the full effect because the old clotting factors already in your blood have to wear out first. Warfarin is now used less often (DOACs are easier), but it is still the choice if you have a mechanical heart valve, severe kidney disease, or antiphospholipid syndrome.

Alteplase (tPA, Activase) or Tenecteplase (TNKase)

These medicines are only used in the emergency room or ICU when a clot is so big it is immediately life-threatening (massive PE with low blood pressure or right-heart strain). They turn on plasminogen, a protein already in your blood, into plasmin, which is like scissors that cut the fibrin threads holding the clot together. The clot dissolves in hours instead of weeks, but bleeding risk is high, so doctors use it only when the benefit clearly outweighs the danger.

Inferior vena cava (IVC) filter

An IVC filter is a small cage placed inside the large vein (inferior vena cava) that carries blood from your legs back to your heart. It traps large clots before they can reach your lungs. It is only used when you absolutely cannot take blood thinners (for example, active bleeding in the brain or stomach) but you already have a clot in your leg. Most filters are temporary and should be removed as soon as it is safe to start anticoagulation, usually within weeks to months.

Where this information comes from

- American Society of Hematology (ASH) 2020 VTE guideline
- European Society of Cardiology (ESC) 2019 PE guideline
- American College of Chest Physicians (CHEST) Antithrombotic Therapy guideline
- NEJM Clinical Practice reviews on venous thromboembolism

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