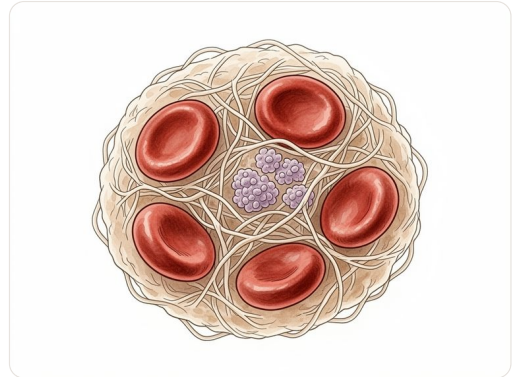


# Blood Thinners Around Surgery

A clot is platelets clumped together and reinforced by a mesh of fibrin threads – the process that blood thinners are designed to interrupt.

Kieran Hirpara 4.0



“Blood thinner” covers two families of medicine that work in completely different ways – and that difference is exactly why some have to be stopped a week before an operation while others only need a day or two. Knowing which one you take, and how it actually works, makes the instructions you’re given far less mysterious.

## First, how does blood actually clot?

To make sense of the different blood thinners it helps to know how your blood normally seals a leak – because each medicine interrupts a different step.

When a blood vessel is cut or damaged, your body plugs it in **two stages**:

- 1. Platelets plug the gap – the fast first responders.** Platelets are tiny cell fragments that circulate in the blood doing nothing until they are needed. The instant they meet a damaged vessel wall they turn **sticky**, pile onto the injury and clump together, forming a soft, temporary plug within seconds to minutes. Think of it as the body’s emergency patch.
- 2. The clotting cascade sets the plug solid.** That platelet plug is fragile on its own. To reinforce it, the blood runs a chain reaction called the **clotting cascade** – a series of proteins called **clotting factors** (most made by the liver, several of them needing **vitamin K**) that switch one another on in sequence, like a row of dominoes. The cascade finishes by turning a protein called fibrinogen into **fibrin**, a mesh of fine threads that weaves through the platelet plug and locks it into a firm, stable clot.

So a finished clot is really **platelets held together by a fibrin mesh**. When it seals a wound that is exactly what you want; but the same process happening *unwanted* inside an artery or vein causes a heart attack, stroke or DVT – and that is what blood thinners are prescribed to prevent.

Here is the key to everything below: the two families of blood thinner each jam a **different stage**. **Antiplatelet** medicines blunt the first step (the platelets); **anticoagulant** medicines interrupt the second (the clotting- factor cascade). That single difference also explains why the timing before surgery is so different – because “undoing” a platelet is not the same as “undoing” a clotting factor.

# Antiplatelet medicines

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(*aspirin, clopidogrel/Plavix, ticagrelor/Brilinta, prasugrel/Effient*)

These stop the tiny blood cells called **platelets** from sticking together to start a clot.

- **Aspirin and clopidogrel** (and prasugrel) work **irreversibly** – once the drug reaches a platelet, that platelet is switched off for the rest of its life. Your body cannot turn it back on. The only way back to normal clotting is to **make brand-new platelets** – and platelets live only about **7–10 days**, with roughly **10% replaced each day**. So after you stop, it takes about **5–7 days** to build up enough fresh, working platelets for safe surgery. That platelet turnover is the whole reason these are usually stopped about a week beforehand.
- **Ticagrelor** is **reversible** – it lets go of the platelet rather than permanently disabling it – so it clears a little faster, but still needs a few days.
- **Aspirin is often continued** for operations with a low bleeding risk, or when it is protecting a heart stent, because the small bleeding risk is outweighed by the clot risk. Your surgeon makes that call.

# Anticoagulants

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These work further down the clotting chain – on the clotting **factors** in the blood, rather than on the platelets.

**Warfarin (Coumadin, Marevan).** Warfarin stops your liver from making several vitamin-K-dependent clotting factors. It does **not** remove the factors already circulating – those have to be used up and cleared naturally, which takes about **5 days**. That's why warfarin is usually stopped about **5 days before** surgery and a blood test (the **INR**) is checked to confirm your blood has returned to normal. If you're at high risk of a clot during that gap, you may be "**bridged**" with short-acting heparin injections that can be stopped much closer to the operation.

**The newer tablets – DOACs (apixaban/Eliquis, rivaroxaban/Xarelto, dabigatran/Pradaxa, edoxaban).** Each blocks a single specific clotting factor and, crucially, the body clears them **quickly – a half-life of around 12 hours**. Because they wash out so fast, they usually only need to be stopped **1–2 days before** surgery. The wait is **longer if your kidneys don't clear the drug well** (especially dabigatran, which leaves mostly through the kidneys) or if the operation has a high bleeding risk. They need no INR monitoring and usually no bridging.

**Heparin / low-molecular-weight heparin (enoxaparin/Clexane) injections.** Short-acting; used to bridge warfarin or to prevent clots. Because they wear off in hours, the last dose is simply timed close to surgery (often around 24 hours before a treatment dose).

# Why the timing is what it is – in one line

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It comes down to **how the drug works and how your body clears it**: irreversible platelet drugs need you to **grow new platelets** (about a week); warfarin needs old **clotting factors to clear** (about 5 days); the DOACs simply **wash out** (a day or two). Every plan then also weighs your personal **clot risk** – which is why two people on the same drug can be given different instructions.

## What you must do

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- Bring an **exact list** of everything you take to your pre-operative assessment – including aspirin and supplements like fish oil, which also affect bleeding.
- Follow the **specific written stop and restart dates** you are given. They are tailored to your drug, your kidney function and your operation.
- **Never stop, start or change a blood thinner on your own**, and don't assume your timing matches a friend's.
- Tell **every** clinician involved that you take one.

## After your operation

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Blood thinners are restarted once the bleeding risk has settled – sometimes within a day, sometimes longer after higher-bleeding-risk surgery. You'll be told exactly when. The clot the medicine prevents doesn't disappear because you've had an operation, so **restarting on time matters as much as stopping did**.

## Call us if

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- You realise you took a dose you were told to skip, or skipped one you were told to take
- You have unusual or heavy bruising or bleeding, blood in the urine or stool, black tarry stools, or bleeding that won't stop
- You are unsure what to do with your blood thinner before your operation – always ask rather than guess