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## Anticoagulants

Anticoagulants are medicines that prevent the blood from clotting as quickly or as effectively as normal. Some people call anticoagulants blood thinners. However, the blood is not actually made any thinner - it just does not clot so easily whilst you take an anticoagulant.

Anticoagulants are used to treat and prevent blood clots that may occur in your blood vessels. Blood clots can block blood vessels (an artery or a vein). A blocked artery stops blood and oxygen from getting to a part of your body (for example, to a part of the heart, brain or lungs). The tissue supplied by a blocked artery becomes damaged or dies, and this results in serious problems such as a [stroke](#) or [heart attack](#). A blood clot in a large vein, such as a clot in a leg vein - a [deep vein thrombosis \(DVT\)](#), can lead to serious problems. For example, it can lead to a clot that travels from a leg vein to the lungs (a [pulmonary embolism](#)). Anticoagulants are used to prevent blood clots as well - the most common condition for this is atrial fibrillation (AF).

Any person who has a head injury while taking any anticoagulant medicine should go straight to hospital for a CT scan, which should be performed within eight hours of the injury, even if there are no other concerns.

### How and why does blood clot?

Within seconds of cutting a blood vessel, the damaged tissue causes tiny cells in the blood (platelets) to become sticky and clump together around the cut. These activated platelets and the damaged tissue release chemicals which react with other chemicals and proteins in the blood, called clotting factors. There are 13 known clotting factors which are called by their Roman numbers - factor I to factor XIII. A complex cascade of chemical reactions involving these clotting factors quickly occurs next to a cut.

The final step of this cascade of chemical reactions is to convert factor I (also called fibrinogen - a soluble protein) into thin strands of a solid protein called fibrin. The strands of fibrin form a meshwork and trap blood cells and platelets, which form into a solid clot.

If a blood clot forms within a blood vessel it can cause serious problems. So, there are also chemicals in the blood that prevent clots from forming and chemicals that dissolve clots. There is balance between forming and preventing clots. Normally, unless a blood vessel is damaged or cut, the balance tips in favour of preventing clots forming within blood vessels. However, sometimes a clot forms within a blood vessel which has not been injured or cut.

### How do anticoagulants work?

Anticoagulants interfere with chemicals needed to make clots or clotting factors.

[Warfarin](#), [acenocoumarol](#) and [phenindione](#) block the effects of vitamin K which is needed to make some clotting factors described earlier. Blocking vitamin K prevents blood clots forming so easily by increasing the time it takes to make fibrin. It usually takes two or three days for these anticoagulants to work fully.

The other group of anticoagulant medicines are the direct-acting oral anticoagulants (DOACs). [Dabigatran](#), [apixaban](#), [edoxaban](#) and [rivaroxaban](#) prevent a blood chemical called thrombin from working, which in turn prevents fibrin from being made from fibrinogen. Dabigatran binds to thrombin. Apixaban and rivaroxaban stop thrombin from being made. All four medicines work quickly - within two to four hours.

### When are anticoagulants used?

Anticoagulants are prescribed if you already have a blood clot, the most common cause being a [deep vein thrombosis \(DVT\)](#) and/or a clot on the lung, called a [pulmonary embolus \(PE\)](#). In these cases, they prevent the clot from becoming bigger. The other reason they are used is if you are at risk of having a blood clot (prevention). Examples of people who are at risk of having a blood clot include anyone who has:

- [A fast irregular heartbeat \(atrial fibrillation\)](#). Having AF is one of the most common reasons for taking an anticoagulant.
- A mechanical heart valve.
- [Infection of the inside of the heart \(endocarditis\)](#).
- [A valve in the heart which does not open fully \(mitral stenosis\)](#).
- Certain blood disorders that affect how your blood clots (inherited thrombophilia, antiphospholipid syndrome).
- Had surgery to replace a hip or knee.

The National Institute for Health and Care Excellence (NICE) changed its guidance in 2021 to recommend that people with AF should be offered a DOAC in preference to warfarin to [reduce their risk of stroke](#). If you are currently taking warfarin because you have AF, your doctor may discuss whether you would prefer to change to a DOAC at your next appointment.

### Editor's Note

Dr Sarah Jarvis, 10th August 2021

#### NICE update on DOACs for atrial fibrillation

NICE has updated its guidance for all the individual DOACs for people who have AF. This is related to its updated guidance AF above, and the recommendation that people with AF should be offered a DOAC rather than warfarin.

The guidance reminds your doctor of the importance of explaining all the pros and cons of the different DOACs, which work slightly differently to each other. Your doctor should also explain all the risks and benefits of swapping from warfarin to a DOAC if you are currently taking warfarin.

## What are the possible side-effects of anticoagulants?

There are a number of possible side-effects with anticoagulants and it is not possible to list all these here. However, the major side-effect of **all** anticoagulant medicines is bleeding. People who take warfarin, acenocoumarol and phenindione need to have regular blood tests to measure how quickly the blood clots. See the leaflet that comes with your particular brand for a full list of possible side-effects and cautions.

Anticoagulants sometimes react with other medicines that you may take. So, make sure your doctor knows of any other medicines that you are taking, including ones that you have bought rather than been prescribed.

## What if I bleed whilst taking an anticoagulant?

One indication that you may be taking too much anticoagulant is that you may bleed or bruise easily. Also, if you bleed, the bleeding may not stop as quickly as normally. If any of the following serious bleeding side-effects occur while you are taking an anticoagulant you should see a doctor urgently and have a blood test:

- Passing blood in your urine or stools (faeces). **Note:** blood in faeces may be bright red. But, if you are bleeding from your stomach or small intestine, your faeces may turn a black or plum colour. This is called melaena. You should seek urgent medical attention if you have melaena.
- Heavy bleeding during a period or other heavy vaginal bleeding (in women).
- Severe bruising.
- Prolonged nosebleeds (lasting for longer than 10 minutes).
- Blood in your sick (vomit).
- Coughing up blood.
- If you cut yourself or have any other bleeding, you should seek medical help as soon as possible if the bleeding does not stop as quickly as you would expect.

## What if I have a head injury while taking an anticoagulant?

Some people who have no other risk factors for brain injury have an increased risk of bleeding after a head injury if they are taking anticoagulants. NICE recommends that people taking anticoagulant treatment should have a [CT head scan](#) within eight hours of their injury.

Therefore, if you have a head injury and are taking anticoagulant treatment, you should go to A&E and inform them of the medication you are taking.

## What else should I be aware of when taking an anticoagulant?

Some other important things to consider on anticoagulants are:

- If you have any medical treatment you should always tell the healthcare professional looking after you that you are taking an anticoagulant. It is important that they know you may take longer to stop bleeding.
- If you take warfarin you should always carry with you the yellow anticoagulant treatment booklet which will be given to you. This is in case of emergencies and a doctor needing to know that you are on warfarin, and at what dose.
- If you have surgery or an invasive test then you may need temporarily to stop taking an anticoagulant.
- Tell your dentist that you take an anticoagulant. Most dental work does not carry a risk of uncontrollable bleeding. However, for dental extractions and surgery, you may need temporarily to stop taking an anticoagulant.
- You should limit the amount of alcohol that you drink to a maximum of one or two units in any day and never binge drink.
- Ideally, try to avoid activities that may cause abrasion, bruising, or cuts (for example, contact sports). Even gardening, sewing, etc, can put you at risk of cuts. Do be careful and wear protection such as proper gardening gloves when gardening.
- Take extra care when brushing teeth or shaving, to avoid cuts and bleeding gums. Consider using a soft toothbrush and an electric razor.
- Try to avoid insect bites. Use a repellent when you are in contact with insects.

## Who cannot take an anticoagulant?

You cannot take anticoagulant tablets if you:

- Are pregnant (if you are pregnant and need anticoagulation, you may be treated with injections of a medicine called heparin).
- Have a [stomach ulcer](#).
- Have had a bleed into the brain (a haemorrhagic stroke).
- Take certain medicines that may interfere with your anticoagulant (these vary between the different anticoagulants - your doctor or pharmacist can advise).
- Have major bleeding and this is not being treated.
- Are going to surgery where you might be at risk of a major bleed.
- Have very high blood pressure.
- Have severely reduced kidney function - the degree of reduced kidney function at which you cannot take anticoagulation varies between different anticoagulant drugs.

For a full list of people who cannot take an anticoagulant, please see the leaflet that comes with your medicine.

### How to use the Yellow Card Scheme

If you think you have had a side-effect to one of your medicines you can report this on the Yellow Card Scheme. You can do this online at [www.mhra.gov.uk/yellowcard](http://www.mhra.gov.uk/yellowcard).

The Yellow Card Scheme is used to make pharmacists, doctors and nurses aware of any new side-effects that medicines or any other healthcare products may have caused. If you wish to report a side-effect, you will need to provide basic information about:

- The side-effect.
- The name of the medicine which you think caused it.
- The person who had the side-effect.
- Your contact details as the reporter of the side-effect.

It is helpful if you have your medication - and/or the leaflet that came with it - with you while you fill out the report.

## Further reading & references

- [Head injury: assessment and early management](#); NICE Clinical Guideline (January 2014, updated September 2019)
- [Atrial fibrillation: diagnosis and management](#); NICE guideline (April 2021 - last updated June 2021)
- Jun M, Lix LM, Durand M, et al; Comparative safety of direct oral anticoagulants and warfarin in venous thromboembolism: multicentre, population based, observational study. *BMJ*. 2017 Oct 17;359:j4323. doi: 10.1136/bmj.j4323.
- [Dabigatran etexilate for the prevention of stroke and systemic embolism in atrial fibrillation](#); NICE Technology Appraisal Guidance - last updated July 2021
- [Anticoagulation - oral](#); NICE CKS, April 2021 (UK access only)
- [Dabigatran etexilate for the treatment and secondary prevention of deep vein thrombosis and/or pulmonary embolism](#); NICE Technology Appraisal Guidance, December 2014
- [Rivaroxaban for the treatment of deep vein thrombosis and prevention of recurrent deep vein thrombosis and pulmonary embolism](#); NICE Technology Appraisal Guidance, July 2012
- [Rivaroxaban for the prevention of stroke and systemic embolism in people with atrial fibrillation](#); NICE Technology Appraisal Guidance - last updated July 2021
- [Rivaroxaban for treating pulmonary embolism and preventing recurrent venous thromboembolism](#); NICE Technology Appraisal Guidance, June 2013
- [Apixaban for preventing stroke and systemic embolism in people with nonvalvular atrial fibrillation](#); NICE Technology Appraisal Guidance - last updated July 2021
- [Apixaban for the prevention of venous thromboembolism after total hip or knee replacement in adults](#); NICE Technology Appraisal Guidance, January 2012
- [Rivaroxaban for the prevention of venous thromboembolism after total hip or total knee replacement in adults](#); NICE Technology Appraisal Guidance, April 2009
- [Andexanet alfa for reversing anticoagulation from apixaban or rivaroxaban](#); NICE Technology appraisal guidance, May 2021

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