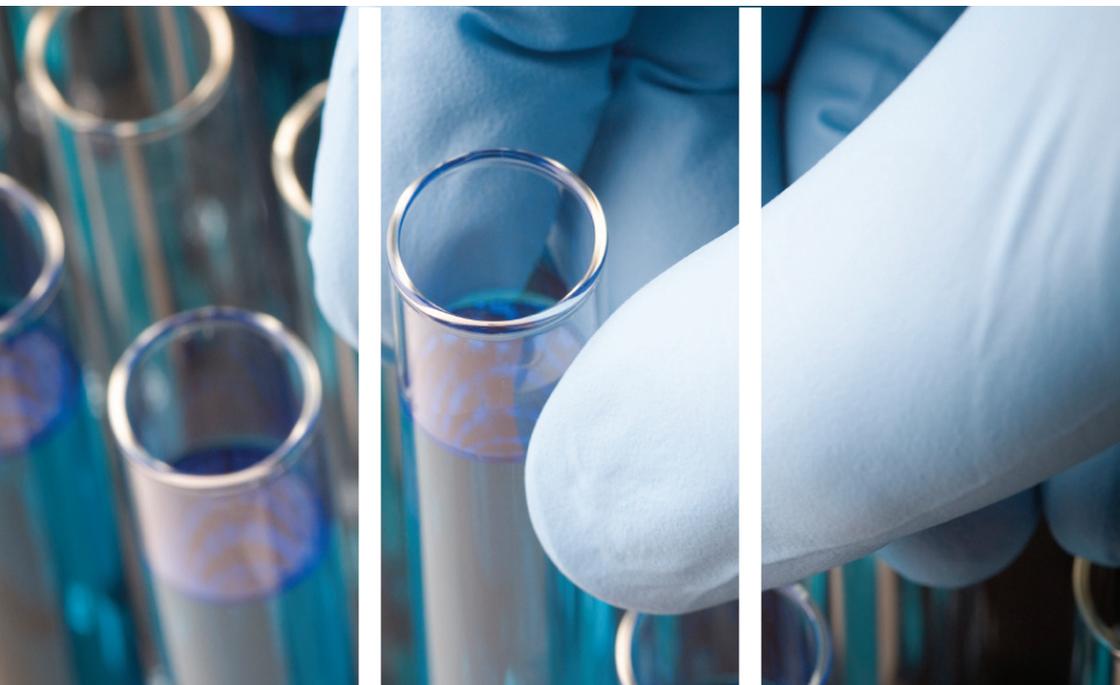


## Blood Thinning in Atrial Fibrillation (AF)



Providing information, support and access to established,  
new or innovative treatments for Atrial Fibrillation

# Glossary

**Antiarrhythmic drugs** Drugs used to restore/maintain the normal heart rhythm.

**Anticoagulant** Drugs which help to thin the blood.

**Arrhythmia** Heart rhythm disorder.

**Atrial fibrillation (AF)** Irregular heart rhythm.

**Cardiologist** A doctor who has specialised in the diagnosis and treatment of patients with a heart condition.

**Catheter ablation** A treatment which destroys a very small area inside the heart causing the AF.

**Electrophysiologist (EP)** A cardiologist who has specialised in heart rhythm disorders.

**Sinus rhythm** Normal rhythm of the heart.

**TIA**s Transient Ischemic Attacks.

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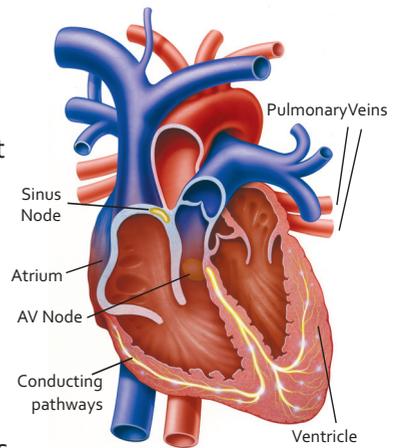
# What is atrial fibrillation?

Atrial fibrillation is the most common heart rhythm disturbance. It is a condition that is more common with advancing age and if untreated can lead to serious complications such as heart failure and stroke.

Atrial Fibrillation results from a disturbance in the normal electrical conduction pathways in the heart (Figure 1). The normal, sequential electrical pathway is interrupted by a disorganised re-entrant circuit, causing a fast and irregular heart rate. This may contribute to symptoms of palpitations, shortness of breath, chest discomfort, light headedness, fainting or fatigue, although some patients have no symptoms.

The goal of treatment in AF is to restore the heart's normal rhythm and if this is not possible then to slow the irregular heart rate to alleviate symptoms and prevent complications of AF related to stroke and heart failure.

## The heart and normal conduction



(Figure 1)

## Why do people with AF need to have their blood thinned?

In AF the top chambers of the heart (the atria) develop chaotic electrical activity which completely dominates the natural pacemaker of the heart, the sino-atrial node. This chaotic electrical activity means that the atria no longer contract in together but instead the muscle quivers like a bag of worms. A lack of efficient contraction means the blood within the atria becomes stagnant and can form clots. These clots can travel anywhere in the body but most worryingly they can travel to the brain and cause a stroke. Indeed the risk of stroke in AF is five times greater than in the normal sinus rhythm (regular heart rhythm). This is why people with AF need to have their blood thinned to reduce the risk of clots forming and thus reduce the risk of strokes.

# What blood thinning options are available for doctors to use?

Clots are made up of two main components from the blood. These are:

- (i) fibrin, a long protein that binds together to form a mesh and
- (ii) platelets, small cell particles that stick to the mesh and help to hold it together once they become active. The blood can be thinned to different degrees by attacking each of these components. Drugs like Warfarin and Heparin act to stop the formation of fibrin and are known as anticoagulants, whilst Aspirin and Clopidogrel are drugs that stop the activation of platelets and are known as anti-platelet agents.

## Anticoagulants

By inhibiting the formation of the fibrin network, Warfarin and Heparin act to thin the blood very efficiently and can reduce the risk of stroke by about two thirds.

## Warfarin

At present only Warfarin is available in tablet form and thus useful for long-term blood thinning. Warfarin acts on the liver to prevent the formation of the proteins that go on to create fibrin. As our bodies have stores of these proteins that last a few days Warfarin will only start to thin the blood efficiently after a few days. In the same way when you stop Warfarin it takes the body a couple of days to replace these proteins and so the blood thinning effect will remain for a few days after you stop. As well as acting on the liver, Warfarin is removed from our bodies by the liver. We are all slightly different in how efficiently our liver removes Warfarin as we are all slightly different in age, size and sex, and we all eat different foods, take different medications and drink different amounts of alcohol. This is why the dose of Warfarin needs to be tailored to each individual and is also why the dose of Warfarin needed can change from time to time, for instance drinking more alcohol when on holiday or taking a course of antibiotics for an infection. The effectiveness of Warfarin is measured by the INR (international ratio) which compares how fast blood clots compared to an international standard. Normal blood clots are 'fast' as the international standard, so has an INR of 1. To prevent the risk of stroke in AF the blood needs to be 2-3 times thinner, so that it takes two to three times longer to clot than the standard i.e. has an INR of 2-3. By measuring the INR, anticoagulant clinics ensure that your blood is thinned to just the right amount. Too little Warfarin (INR<2) won't have

the full benefit of preventing strokes, whereas too much Warfarin (INR>3) thins the blood too much and can put you at risk of bleeding heavily when you cut yourself and of bruising badly when you fall. When you first start taking Warfarin you will need to have your INR measured quite often (every few days) to establish a safe and effective dose of warfarin for you. Most people find once they are established on Warfarin their INR is pretty stable and they need have the INR measured every 4-8 weeks. A number of things can affect the stability of your INR on warfarin. One of these is alcohol. Taking alcohol in itself is not a large problem but changing your average alcohol intake will alter how much warfarin you require. Changing the amount of vegetables in the diet, especially green vegetables, will increase the amount of Vitamin K in your body and the dose of warfarin required. Thus a stable diet is important for maintaining a stable INR. Warfarin therapy can also be affected by many medications including cough remedies, herbal treatments, substances purchased from health food shops. You should seek the advice of your doctor or pharmacist before taking any of these, though it is OK to take just a few paracetamol per day for pain relief.

As your Warfarin level can change without you realising it, you should take care to avoid cuts and bruises; for instance use a thimble if you are sewing, use an electric razor when shaving, etc. This all can sound a bit daunting but the vast majority of people who take Warfarin do so without any problems.

## Heparin

At present Heparin-based products can only be given by injection either into the skin or veins, so are not useful for long-term blood thinning. Heparin thins the blood by blocking the proteins that form fibrin, i.e. it does not affect the production of these proteins but blocks them immediately. This gives Heparin the great advantage of being quick to act (i.e. effective immediately) and quick to stop (hours to half a day dependant on the type). Therefore Heparin is very useful when the level of blood thinning needs to be changed quickly. For example some people when they first develop AF are very much at risk of a stroke and may be started on Heparin to protect them immediately. Another example is in preparation for surgery or other invasive procedures; Warfarin may be stopped and Heparin given instead until the day of the procedure.

## Agents

Aspirin and Clopidogrel act in slightly different ways to prevent the activation of platelets. As they affect the platelets that are circulating in the blood they are effective almost immediately. However, as platelets are not so vital for clot formation in the atria they are less effective than anticoagulants at preventing strokes thus only reducing the stroke risk in AF by 20%. In some people who are at very low risk of stroke this is sufficient. There are not the same problems with dose changes with Aspirin and Clopidogrel so there is not the need to attend regular clinics and not the same worries about taking other medications or injury risks. Although both Aspirin and Clopidogrel do prolong bleeding and thus increase the risk of bruising this may be less than with Warfarin. The main problem with anti-platelet medication is gastric ulcers. This can be reduced by certain acid-reducing medicines. You could discuss this with your doctor.

## Which drug is best for me?

The choice of which drug is best for you depends on:- (i) your personal risk of stroke and (ii) if any interventions such as cardioversion or ablation are planned.

## Personal stroke risk

By looking at large groups of people with AF and seeing who develops stroke it has become possible to identify which things put patients at risk of strokes. A commonly used personal scoring system known as CHADS<sub>2</sub> helps determine risk of stroke depending on age and other clinical factors.

## Assess your personal risk score

Your annual risk of stroke rises from under 2% a year with no risk factors to over 10% a year for five or six. Most experts who have looked at this scoring scheme (the CHADS<sub>2</sub> score) would suggest that the tipping point for your benefits on taking anticoagulation medication (Warfarin) over its risks, is at a score of 2 or above.

However, there are situations where, using the more detailed clinician assessment already shown, that even with a score of below 2, anticoagulation may be recommended.

Question	Score
Are you over 75?	1
Do you have high blood pressure?	1
Do you have diabetes?	1
Do you have heart failure?	1
Have you suffered a stroke (even a mild stroke)?	2
Total	

## How long do I need to take the drug?

As the decision of which blood thinning medication is determined by things other than the presence of AF, patients will usually stay on their blood thinning medication for life. There are a few situations where a patient's blood thinning medication will be changed for a short-period of time, for example if you develop problems with bleeding from somewhere such as an active ulcer, you may well switch onto Clopidogrel whilst your ulcer is cured. If you have a stroke whilst on aspirin you will most likely be switched to Warfarin. Another exception to the rule is interventions that try to return the heart to normal sinus rhythm such as cardioversion or AF ablation.

By returning the heart to sinus rhythm these interventions will allow the atria to start contracting properly. In this situation any clots within the atria are at risk of being dislodged allowing them to travel to the brain and cause a stroke. It is for this reason that patients who are normally at low risk of stroke, and can have their blood sufficiently thinned by anti-platelets, will have to temporarily be switched to Warfarin for cardioversion or AF ablation, and for a while after these procedures have been carried out.

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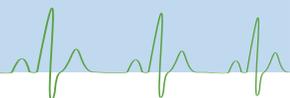
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Please remember that this publication provides general guidelines only.  
Individuals should always discuss their condition with a healthcare professional.  
If you would like further information or would like to provide feedback please contact AF-A.

