

Preventing AF-Related Stroke: Anticoagulation



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.

Anticoagulants Drugs which help to delay the blood clotting process, and so reduce the risk of blood clots in the circulation.

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.

Transient ischaemic attack (TIA) A mini-stroke whose effects are usually temporary

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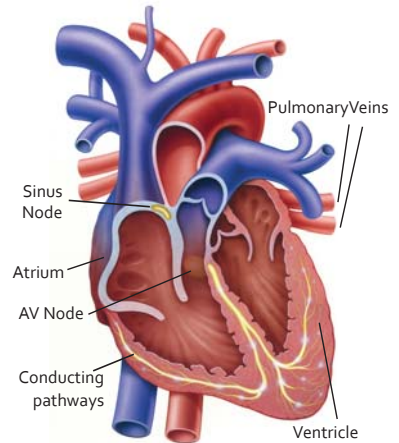
What is atrial fibrillation?

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 electrical conduction pathways in the heart (Figure 1). This leads to an irregular pulse which can often be quite rapid. 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 minimise the symptoms caused by the irregular rhythm and to reduce the significant risk of stroke. In some people minimising the symptoms of atrial fibrillation may require a return to normal rhythm. However this return to sinus rhythm does not remove the risk of stroke which is currently thought to be life long.

The heart and normal conduction



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(Figure 1)

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

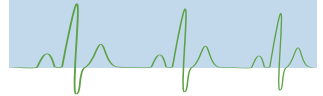
When the heart is in AF, there are changes in the upper chambers (atria) which means that they no longer contract properly. These changes make a blood clot in the atria more likely. Some of these changes can be seen on a heart scan or through other investigations, but others cannot easily be detected.

For everyone with AF these changes mean the blood is more likely to form small clots in the heart. If these clots move out of the heart and in to the circulation then they can block the blood vessels that supply the brain and cause a stroke.

AF increases the risk of stroke by 500%, a fivefold increase.

It is imperative an AF patient is prescribed anticoagulant medication to thin the blood.

Thinning the blood reduces the risk of clots and stroke.



What anticoagulation options are available?

Clots are made up of two main components, platelets and fibrin.

Platelets are small sticky cells that exist in large numbers in the blood. These are involved in forming scabs or suddenly sticking together in coronary arteries as a cause of heart attacks.

Fibrin is a long protein that binds together to form clots. This initially exists in the blood as fibrinogen. Fibrinogen, normally inactive, will only form clots when it is stimulated.

Forming clots at the wrong time is not good for the body. To prevent the fibrinogen being stimulated at the wrong time there is a complex system that needs to be triggered to cause the fibrinogen to be converted in to fibrin. This process is called the 'clotting cascade'.

Antiplatelet drugs such as aspirin and Clopidogrel stop the activation of platelets. Although antiplatelet medication has been used for many years to prevent stroke, NICE no longer recommends the use of aspirin for AF-related stroke prevention. In the rare cases where an antiplatelet may be the only option available, NICE recommend the dual antiplatelet therapy of clopidogrel and aspirin together. However, this is a far less effective strategy than anticoagulation which reduces the risks by at least 65%.

Anticoagulants act to stop the formation of fibrin. In Britain, they currently include warfarin, dabigatran, rivaroxaban, apixaban and heparin.

Heparin is an injectable anticoagulant. It is used in clinical settings because its effects are very immediate and do not last long.

By inhibiting the formation of the fibrin network, anticoagulants act to thin the blood very efficiently and can reduce the risk of AF-related stroke by two thirds.

Anticoagulants

Warfarin

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 afterwards.

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 different in age, size and sex. We all eat different foods, take different medications and drink different amounts of alcohol. This is the reason that the dose of warfarin needs to be tailored to each individual and 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 Normalised Ratio) which compares how fast the blood clots compared to an international standard. An INR of one represents the standard rate at which normal blood clots.

To address the risk of stroke in AF, the blood needs to take from two to three times longer to clot than the standard, i.e. the INR rate should be between two and three. By measuring the INR, anticoagulant clinics ensure that your blood is thinned to just the right amount. Too little warfarin (INR less than two) will not have the full benefit of preventing strokes, whereas too much warfarin (INR more than three) 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 attend the anticoagulant clinic weekly as they adjust your dose to suit you. Most people find once they are established on warfarin their INR is pretty stable and they need only attend the clinic every six to eight weeks. However, you have to watch out for things that can affect your warfarin level to keep it stable. One of these is alcohol.

Taking alcohol in itself is not a large problem, but changing your average intake will alter the affect of the warfarin and thus your INR level. Another thing you have to watch out for is medications including cough remedies, herbal cures and many other over-the-counter products. In short you are fine to have a couple of paracetamol for a headache but anything else you should seek advice from your doctor or chemist.

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. Please see AF-A factsheets 'Warfarin and Diet' and 'Warfarin and Other Medication'.

Dabigatran

This is a novel anticoagulant therapy which has been shown to be non-inferior to - or at least as effective as - warfarin in a large international study. Unlike warfarin it only affects one part of the clotting cascade; the final step as fibrinogen is converted to fibrin to produce a clot.

Unlike warfarin it has a stable dose which is taken twice daily. The dose taken will be discussed and decided by the clinician dependant on your age and other factors such as your kidney function. There is no need for routine monitoring of the anticoagulant effect. At this time there is no known antidote, but on the other hand the drug works its way out of the system more quickly than warfarin does.

Rivaroxaban

This is a novel anticoagulant therapy which has been shown to be non-inferior to warfarin in a large international study. Unlike warfarin it only affects one part of the clotting cascade. However this is higher up the cascade than dabigatran. Unlike warfarin, rivaroxaban is taken once daily and the dose remains constant. The dose taken will be discussed and decided by the clinician dependant on your age and other factors such as your kidney function.

There is as yet no antidote, but half-life of rivaroxaban (the rate at which its effectiveness is low enough to be inconsequential) is a few hours.

Apixaban

Apixaban was approved by NICE in 2013 for preventing clot formation within veins and addresses stroke risk in patients with non-valvular atrial fibrillation. Trials suggest this to be at least as good, and possibly more effective, than warfarin in reducing the risk of an AF-related stroke.

Like dabigatran and rivaroxaban, apixaban requires no blood monitoring because it acts on different areas of the blood thinning process than those which are affected by food, drink or drugs. So unlike warfarin, an INR test is not required because these drugs do not stop the production of Vitamin K in the coagulation process.

Apixaban is taken twice daily. As with Dabigatran and Rivaroxaban compliance with the medication is extremely important. There is, as with all anticoagulants, a slightly increased risk of bleed. There is as yet no antidote for apixaban, but its potency in the body is greatly reduced after a matter of hours.

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 will be started on heparin to protect them immediately. Another example is in preparation for surgery or other invasive procedures; warfarin will be stopped and heparin given instead until the day of the procedure.

Which drug is best for me?

The choice of which drugs is best for you depends on:

- (i) your personal risk of AF-related stroke,
- (ii) if any interventions such as cardioversion or ablation are planned, and
- (iii) existing co-morbidities such as kidney impairment or heart valve disease.

Personal AF-related stroke risk

It is clear that if you are under 65 years with no other risk factors, so called 'Lone AF', then your personal stroke risk is so low that stroke preventative medication is unnecessary and further scoring is not required.

By looking at large groups of people with AF and seeing who develops stroke it has become possible to identify certain things which increase an AF patient's risk of stroke. Some of these factors have been made into scoring systems such as the stroke risk stratification algorithm in the current European Cardiac Society Guideline. In this system patients are assessed with various major risk factors (age over 75 or previous stroke) or several minor factors factors (such as other heart disease, age over 65, etc.). This will determine whether they require anticoagulation.

CHA ₂ DS ₂ -VASc scoring criteria to determine need for blood thinning based on AF-related stroke risk													
Congestive heart disease 1 point Hypertension 1 point Age (75 years +) 2 points Diabetes 1 point Stroke or previous TIA 2 points Vascular heart disease 1 point Age (65-74 yrs) 1 point Sex (female) 1 point SCORE <input type="text"/>	<table border="1"> <thead> <tr> <th>score</th> <th>risk level</th> <th>necessity for anticoagulant</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>low risk</td> <td>anticoagulant not suggested</td> </tr> <tr> <td>1</td> <td>at risk</td> <td rowspan="2">anticoagulant suggested dependent on personal preferences</td> </tr> <tr> <td>2+</td> <td>at risk</td> </tr> </tbody> </table>	score	risk level	necessity for anticoagulant	0	low risk	anticoagulant not suggested	1	at risk	anticoagulant suggested dependent on personal preferences	2+	at risk	
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Assess your personal risk score (CHA₂DS₂VASc)

Your annual risk of stroke rises from 0% a year with no risk factors to over 10% a year for a score of five or more. Most experts would suggest that the benefits of taking anticoagulation medication outweigh the risks for those with a CHA₂DS₂VASc score of two or more and may even apply to patients who have a score of one.

If you are going to undergo a procedure to return your heart to normal rhythm then you will require anticoagulation, for a period before and after regardless of your stroke risk. The anticoagulation will need to be considered again after your procedure.

If your risk score is suggesting you are at risk of stroke and require long-term anticoagulation then procedures to return your heart to its normal rhythm do not reduce this risk. You will often find in this setting that your rhythm specialist will not want to discontinue your anticoagulation after the procedure.

However the decision to use anticoagulation in the long term for stroke reduction in AF is made on each individual case, in discussion with the AF sufferer. This booklet should be seen as an information guide to assist in that discussion.

Although aspirin and clopidogrel have a minimal role in preventing strokes due to atrial fibrillation, they can be very important in people who have suffered a heart attack, undergone angioplasty or have angina. In this situation some people may need to take aspirin plus an anticoagulant, or even on all three agents. This decision would require careful consideration and would be made on each individual case.

How long do I need to take the drug?

Because the decision of the type of blood thinning medication is determined by matters 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 they develop problems with bleeding from somewhere such as an active ulcer, then the medication may be reviewed whilst the ulcer is being treated. In the event of a person suffering a stroke while taking aspirin, blood thinning medication is likely to be changed, at least temporarily, to warfarin. Another exception to the rule is during an intervention that tries to return the heart to normal sinus rhythm, such as cardioversion or AF ablation.

Bleed risk factors

The HAS-BLED system can be used to estimate risk of bleed.

Risk factor		Score
H	Hypertension	1
A	Abnormal renal and liver function	1 point each
S	Stroke and TIA	1
B	Bleeding	1
L	Labile INRs	1
E	Elderly (e.g. age is over 65 years)	1
D	Drugs or alcohol	1 point each

A HAS-BLED score of 3 indicates "high risk". High risk is not necessarily a reason to deny offering oral anticoagulants (OACs), neither is a previous intracranial haemorrhage (ICH), the risk of which decreases with time. The risk of ischaemic stroke from not being prescribed oral anticoagulants is likely to outweigh the risk of ICH from taking them.

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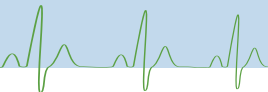
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Please remember that this publication provides general guidelines only. Individuals should always discuss their condition with a healthcare professional. If you would like further information or feedback, please contact AF Association.

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