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Providing information, support and access to
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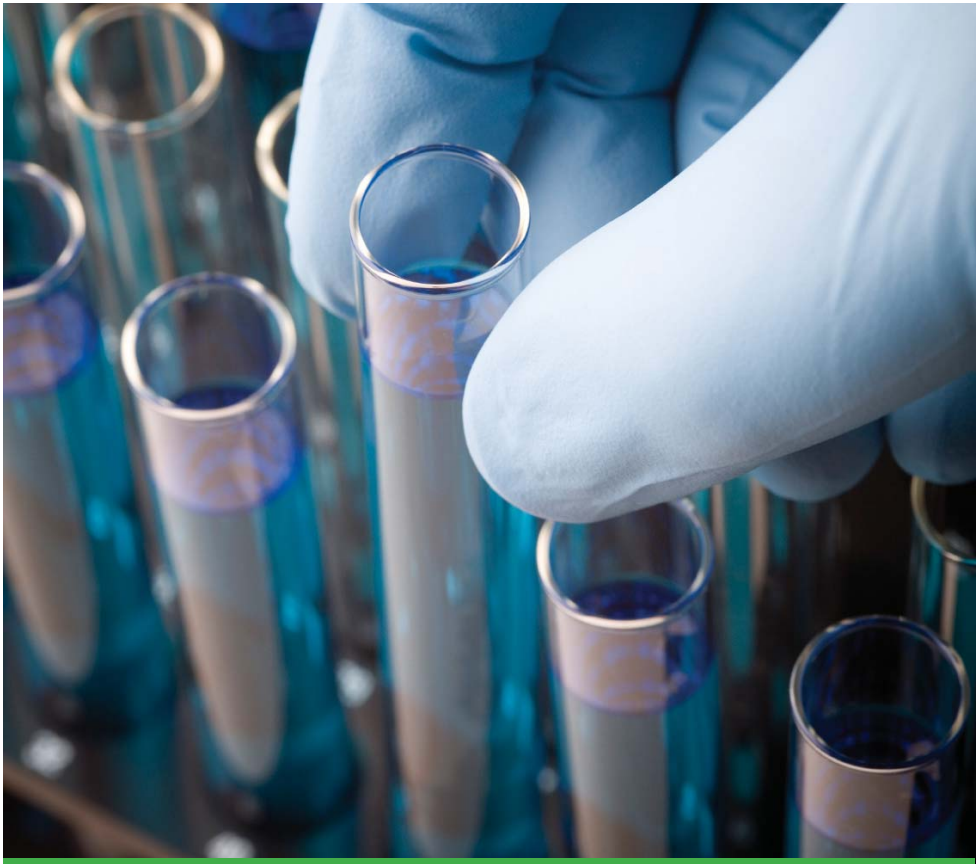
Blood Thinning in Atrial Fibrillation



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Contents

Glossary

Anti-arrhythmic drugs	Drugs used to restore 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
TIAs	Transient Ischemic Attacks

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.

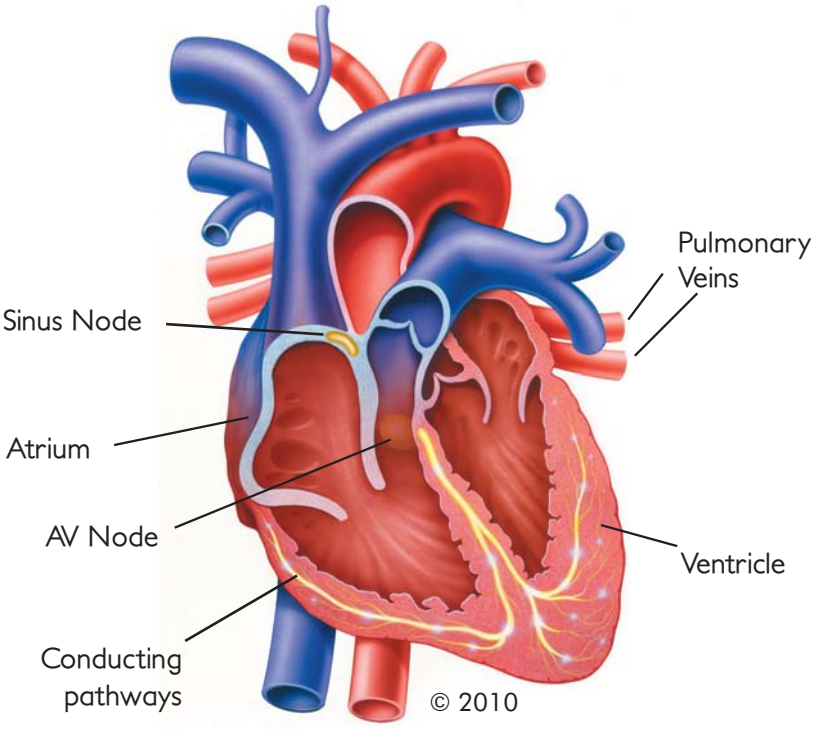

Figure 1: Electrical system of the heart

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 at '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 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 6-8 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 medications. 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.

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.

Anti-platelets

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 anti-coagulants 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 is much less than the risks with Warfarin. The main problem with anti-platelet medication is gastric ulcers. This is only a risk with Aspirin and can be significantly reduced by taking medications that reduce stomach acid like Omeprazole.

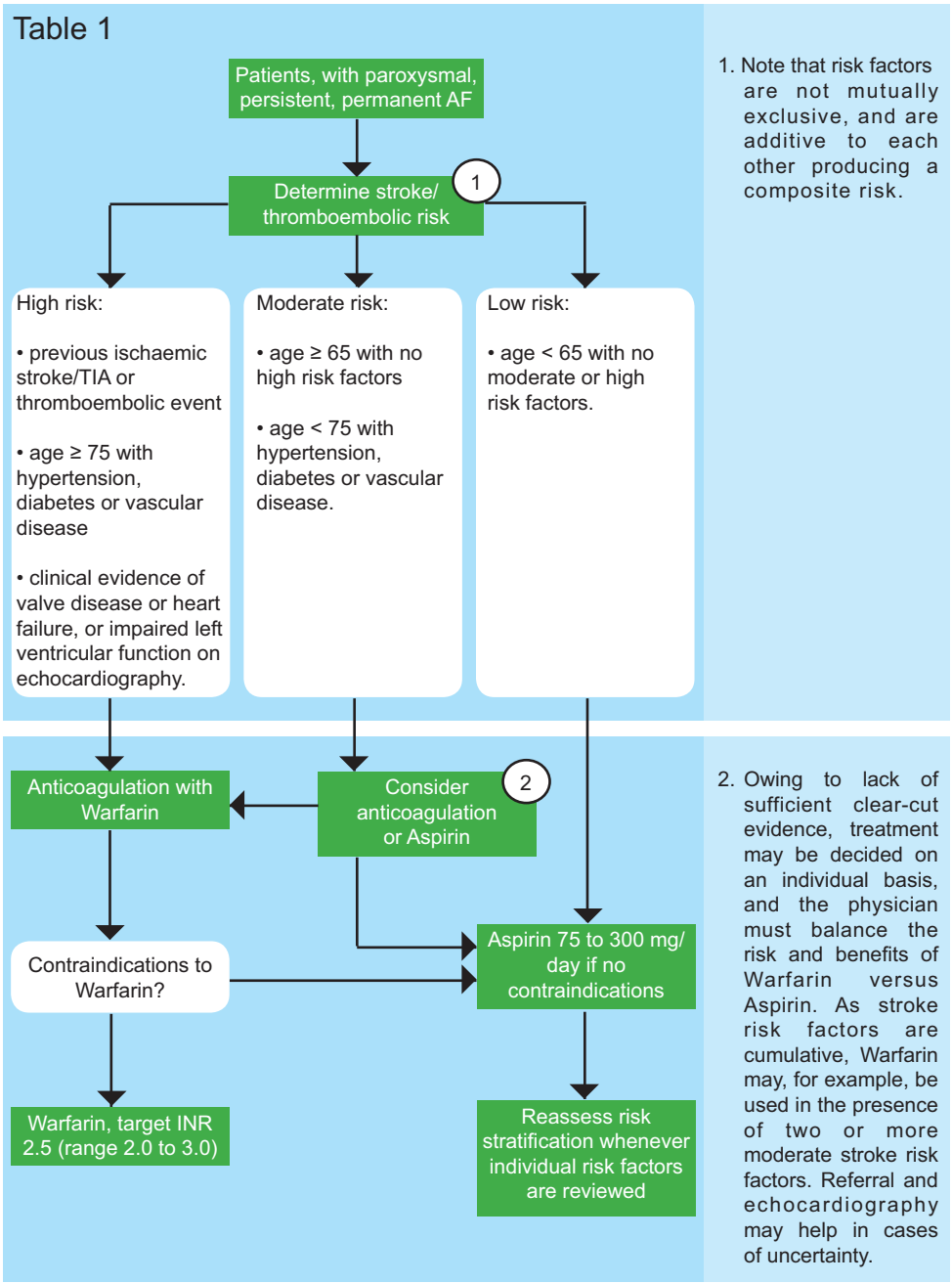

Figure 2 – Stroke risk stratification algorithm taken from current NICE guidelines on AF management. This flow-chart shows the steps in deciding whether a patient should be on Aspirin or Warfarin. Decision as to which medication needs to be discussed with your doctor.

‘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. These have been made into scoring systems such as the stroke risk stratification algorithm in the current NICE guidelines (Table 1). In this system patients are determined to be at high, moderate or low risk of stroke dependant on their age, clinical risk factors and findings on cardiac ultrasound echocardiography.

Assess your personal risk score

Question	Points	Your 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	_	

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 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.

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.

Further information

For further information on Atrial Fibrillation, please contact the Atrial Fibrillation Association.

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Please remember these are general guidelines and individuals should always discuss their condition with their own doctor.

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