

Appendix 1 : Scoring Systems

| CHA₂DS₂VAS_C scoring system for stroke risk in AF | |
|--|---------------------|
| <u>Risk Factor</u> | <u>Score</u> |
| Congestive heart failure | 1 |
| Hypertension | 1 |
| Age 75 and over | 2 |
| Diabetes | 1 |
| Stroke, TIA/ thromboembolism | 2 |
| Vascular disease (e.g. IHD, PVD) | 1 |
| Age 65-74 | 1 |
| Sex category (female) | 1 |

| CHA₂DS₂VAS_C score | Annual Stroke Risk (%) |
|---|-------------------------------|
| 0 | 0 |
| 1 | 1.3 |
| 2 | 2.2 |
| 3 | 3.2 |
| 4 | 4.0 |
| 5 | 6.7 |
| 6 | 9.8 |
| 7 | 9.6 |
| 8 | 6.7 |
| 9 | 15.2 |

Notes on CHA₂DS₂VAS_C

The 2012 QOF payments include the requirement to complete an annual CHADS₂ score. This simpler score does not include the requirement to consider vascular disease, and sex, and places less emphasis on age.

The CHA₂DS₂VAS_C may be more suitable for some patients who have a low CHADS₂ score, such as women between 65-75 who have known vascular disease.

Recent BMJ papers suggest that CHA₂DS₂VAS_C performs better at predicting stroke risk than CHADS₂, at least in a secondary care population; and that no tool performed adequately at predicting risk in those over 75yrs old. The conclusion is that all those >75 with AF should be considered at high risk of stroke, and offered anticoagulation in accordance with European Society guidance

[Expert reviewer's comment: it is important to note that CHA₂DS₂VAS_C only applies to non-valvular AF. *All* patients who have AF secondary to a valve lesion, are high risk].

The HAS-BLED bleeding risk scoring system

| Characteristic | Score |
|---|--------------|
| H Hypertension | 1 |
| A Abnormal renal / liver function (one point each) | 1 or 2 |
| S Stroke | 1 |
| B Bleeding | 1 |
| L Labile INRs | 1 |
| E Elderly (age>65) | 1 |
| D Drugs or Alcohol (one point each) | 1 or 2 |

Notes on HAS-BLED

“Abnormal renal function” is classified as those on renal dialysis or previous renal transplant, or serum creatinine ≥ 200 $\mu\text{mol/L}$. “Abnormal liver function” is classified as those with chronic liver disease, or chronically elevated LFT’s. “Drugs” refers to concomitant use of drugs such as aspirin or NSAIDs

A HAS-BLED score of > 3 is significant.

The online calculator at <http://www.palmedpage.com/AFib/coagcalc.html> is an excellent quick way of doing all the above calculations instantly.

Appendix 2. Anticoagulation Update October 2014

Since this module was written (2012) the use of newer anticoagulants has risen greatly, and the information below is added from www.patient.co.uk (professional reference section) with additions from www.cks.nice.org.uk Clinicians should be aware this is a developing field, and local advice should be sought if uncertainty exists in this clinical area. The patient information leaflet was also updated to the 2014 version.

In patients with AF:

- Anticoagulation may be with apixaban, dabigatran etexilate, rivaroxaban or a vitamin K antagonist (eg, warfarin).
- Offer anticoagulation to people with a CHA₂DS₂-VASc score of 2 or above, taking bleeding risk into account.
- If poor anticoagulation control cannot be improved, evaluate the risks and benefits of alternative stroke prevention strategies.
- Do not offer aspirin monotherapy solely for stroke prevention to people with AF.

Apixaban

Apixaban is recommended as an option for preventing stroke and systemic embolism in people with non-valvular AF with one or more risk factors such as prior stroke or TIA, age 75 years or older, hypertension, diabetes mellitus, and symptomatic heart failure.

Dabigatran etexilate

Dabigatran etexilate is recommended as an option for the prevention of stroke and systemic embolism in people with non-valvular AF with one or more of the following risk factors:

- Previous stroke, TIA attack or systemic embolism.
- Left ventricular ejection fraction below 40%.
- Symptomatic heart failure of New York Heart Association (NYHA) class 2 or above.
- Age 75 years or older.
- Age 65 years or older with one of the following: diabetes mellitus, coronary artery disease or hypertension.

Rivaroxaban

Rivaroxaban is recommended as an option for the prevention of stroke and systemic embolism in people with non-valvular AF with one or more risk factors such as:

- Congestive heart failure.
- Hypertension.
- Age 75 years or older.
- Diabetes mellitus.
- Prior stroke or transient ischaemic attack.

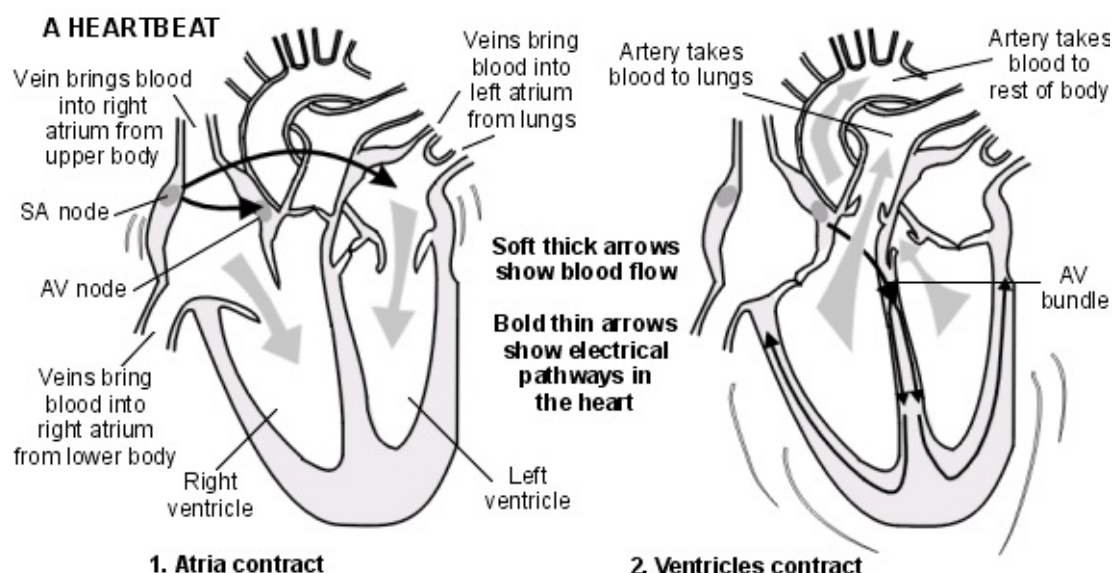
NICE clinical guidance suggests that a decision to start one of these agents needs careful discussion with the patient. Individual medical history, ability to manage INR tests and doses of warfarin, plus the risk of not being able to reverse the new agents with vitamin K, need to be discussed in each case.

Atrial Fibrillation

Atrial fibrillation (AF) causes an irregular heartbeat. There are various causes of AF. Medication can slow a fast heart rate and ease symptoms. Sometimes treatment can restore the heart rhythm back to normal. In addition, a medicine to prevent clots forming is usually advised to reduce the risk of having a stroke.

Understanding a normal heartbeat

The heart has four chambers - two atria and two ventricles. The walls of these chambers are mainly made of special heart muscle. The chambers have to squeeze (contract) in the correct order for the heart to pump blood correctly with each heartbeat.



The sequence of each normal heartbeat is as follows:

- The sinoatrial (SA) node in the right atrium is a tiny inbuilt timer. It fires off an electrical impulse at regular intervals. (About 60-80 per minute when you rest, and faster when you exercise. This controls the heart rate.) Each impulse spreads across both atria. This causes them to contract and pump blood through one-way valves into the ventricles.
- The electrical impulse gets to the atrioventricular (AV) node at the lower right atrium. This acts like a junction box and the impulse is delayed slightly. Most of the tissue between the atria and ventricles does not conduct the impulse. However, a thin band of conducting fibres called the AV bundle acts like wires and carries the impulse from the AV node to the ventricles.
- The AV bundle splits into two - a right and a left branch. These then split into the Purkinje's system (many tiny fibres) which conducts the electrical impulse throughout the ventricles. This makes the ventricles contract and pump blood through one-way valves into large arteries:
 - The artery going from the right ventricle (pulmonary artery) takes blood to the lungs.
 - The artery going from the left ventricle (aorta) takes blood to the rest of the body.
- The heart then rests for a short time (diastole). Blood coming back to the heart from the large veins fills the atria during diastole:
 - The veins coming into the left atrium bring blood from the lungs (full of oxygen).
 - The veins coming into the right atrium bring blood from the body (needing oxygen).

What is atrial fibrillation (AF)?

If you have AF:

- Your heart rate is usually (but not always) a lot faster than normal.
- Your heartbeat is irregular - that is, an abnormal heart rhythm (an arrhythmia).
- The force of each heartbeat can vary in intensity.

What happens is that the normal controlling timer in the heart is overridden by many random electrical impulses that fire off from the heart muscle in the atria. The atria then fibrillate. This means that the atria only partially squeeze (contract) - but very rapidly (up to 400 times per minute). Only some of these impulses pass through to the ventricles in a haphazard way. Therefore, the ventricles contract anywhere between 50 and 180 times a minute, but usually between 140 and 180 times a minute. However, the ventricles contract in an irregular way and with varying force.

Therefore, if you have AF and feel your pulse, you may count up to 180 beats per minute. Also, the force of each beat can vary, and the pulse feels erratic.

Describing AF

AF is commonly divided into the following types:

- **Paroxysmal AF**. The word paroxysmal means recurring sudden episodes of symptoms. If you have paroxysmal AF it means that you have episodes of AF that come and go. Each episode comes on suddenly, but will stop without treatment within seven days (usually within two days). Each episode stops just as suddenly as it starts and the heartbeat goes back to a normal rate and rhythm. The period of time between each episode (each paroxysm) can vary greatly from case to case. Although paroxysmal AF means that it will stop on its own, some people with paroxysmal AF take treatment as soon as the AF develops, to stop it as quickly as possible after it starts.
- **Persistent AF**. This means AF that lasts longer than seven days and is unlikely to revert back to normal without treatment. However, the heartbeat can be reverted back to a normal rhythm with cardioversion treatment (see later). Persistent AF tends to be recurrent so it may come back again at some point after successful cardioversion treatment.
- **Permanent AF**. This means that the AF is present long-term and the heartbeat has not been reverted back to a normal rhythm. This may be because cardioversion treatment was tried and was not successful, or because cardioversion has not been tried. People with permanent AF are treated to bring their heart rate back down to normal, but the rhythm remains irregular (see below). Permanent AF is sometimes called established AF.

Most people with AF have permanent AF.

How common is atrial fibrillation (AF)?

It is common, but mainly occurs in older people. Nearly 50,000 cases are diagnosed each year in the UK. It becomes more common with increasing age. About 1 in 200 people aged 50-60 have AF. This rises to around 1 in 10 people aged over 80 years. It is uncommon in younger people unless they have certain heart conditions.

What causes atrial fibrillation (AF)?

Causes of AF include the following:

- **High blood pressure** is the most common cause. High blood pressure puts a strain on the heart muscle.
- AF is a common complication of various heart conditions. For example, AF is a complication of ischaemic heart disease. This is the condition that causes chest pains (angina) and heart attacks and is common in older people. Various other heart problems may also trigger AF to develop. For example, AF occurs in some people with **heart valve problems**, **pericardial disease**, **dilated cardiomyopathy** and **hypertrophic cardiomyopathy**.

- Other conditions and situations that may trigger AF to develop include:
 - An **overactive thyroid gland (hyperthyroidism)**.
 - **Pneumonia**.
 - **Pulmonary embolus**.
 - **Obesity**.
 - **Lung cancer**.
 - Drinking a lot of alcohol.
 - Drinking a lot of caffeine (tea, coffee, etc).
- In about 1 in 10 cases of AF there is no apparent cause. The heart is otherwise fine and there are no other diseases to account for it. This is called lone AF.

What are the symptoms of atrial fibrillation (AF)?

Symptoms often develop quickly, soon after the AF develops. Possible symptoms include:

- **A 'thumping' heart (palpitations)**. This means that you become aware of your heart. You may feel it beating in a fast and irregular way.
- **Dizziness**.
- **Chest pains (angina)** may develop. The pains tend to occur when you exert yourself, but they may also occur even when you are resting.
- **Breathlessness** is often the first symptom that develops. It may occur all the time, but you may become breathless just when you exert yourself, such as when you walk up stairs.

Breathlessness, dizziness and angina may develop because when the heart beats too fast, it becomes less efficient. Small amounts of blood pumped faster are not as useful to the body as larger amounts pumped at a slower, normal rate. A reduced output of blood from the heart can lead to blood pooling in the veins of the lungs, which can lead to these symptoms.

Many people with AF have no symptoms, particularly if their heart rate is not very fast. The AF may then be diagnosed by chance when a doctor or nurse feels your pulse.

Are any tests needed for atrial fibrillation (AF)?

- A heart tracing called an **electrocardiogram (ECG)** usually confirms the diagnosis. This test can also rule out other causes of an erratic or fast heart rate. Sometimes a 24-hour ECG is needed if your AF comes and goes and the resting ECG has not showed it.
- Other tests such as blood tests and an ultrasound scan of the heart (**echocardiogram**) are often advised. These tests look for an underlying cause of AF, such as a heart problem or an overactive thyroid gland.
- Often an underlying cause is already known about. For example, you may already have chest pains (angina). You may not need any further tests if AF develops as a complication.

What are the possible complications of atrial fibrillation (AF)?

An increased risk of having a stroke (or other blood clot problem)

The main complication of AF is an increased risk of having a **stroke**. AF causes turbulent blood flow in the heart chambers. This **sometimes** leads to a small blood clot forming in a heart chamber.

A clot can travel in the blood vessels until it gets stuck in a smaller blood vessel in the brain (or sometimes in another part of the body). Part of the blood supply to the brain may then be cut off, which causes a stroke.

The risk of developing a blood clot and having a stroke varies, depending on various factors. The level of risk can be calculated by your doctor using a set of specific questions. This will help to decide what treatments are required. All people except those at the lowest risk will be offered medication to help prevent clots from forming.

Other complications

Less common complications of AF include the following:

- Heart failure - this develops in some cases. See separate leaflet called [Heart Failure](#).
- Weakness of the heart muscle (dilated cardiomyopathy). The reason why cardiomyopathy develops in some people with AF is not clear. See the separate leaflet called [Dilated Cardiomyopathy](#).
- Chest pains (angina) may get worse if you have angina.

What are the treatment options for atrial fibrillation (AF)?

Treatments that may be considered include:

- Rate control. This means bringing the heart rate back down to normal. This is done for all people with AF who have a fast heart rate (that is, most cases).
- Rhythm control. This means converting the irregular rhythm back to a normal regular rhythm. This is only possible in some cases.
- Anticoagulation treatment which aims to prevent a stroke.
- Other treatments in certain circumstances.

Each of these is now discussed further.

Rate control treatment

If your heart rate is brought down to normal, your heart becomes efficient again and your symptoms usually improve. Your pulse may still feel irregular, but not fast.

Several medicines can slow the heart rate down. They include [beta-blocker](#) medicines (such as [atenolol](#) and [propranolol](#)), [calcium-channel blocker medicines](#) (such as [diltiazem](#) and [verapamil](#)) and [digoxin](#). These medicines work by interfering with the electrical impulses of the heart. The medicine chosen may depend on factors such as other heart problems that you may have.

In untreated AF, the heart rate may be as fast as 180 beats per minute, although it is more commonly between 120 and 160 beats per minute. The aim of medication is to bring the heart rate back down to normal (ideally, to less than 90 beats per minute when resting).

Treatment is usually successful, but the dose needed can vary from person to person. Also, in some people a combination of medicines may be needed if the heart rate is not brought down low enough with a single medicine.

Rhythm control treatment

Rhythm control means reverting the erratic heartbeat back to a normal regular rhythm. This is called cardioversion.

One method of cardioversion is to give your heart an electric shock. Another method is to use a medicine that may convert the heart rhythm back to a regular beat. One medicine used for rhythm control is [amiodarone](#). Both of these methods have only limited success. For example, after cardioversion, within a year, in about half of cases, the heart has reverted back to AF.

Cardioversion is more likely to be considered as a possible option in certain situations - for example:

- If your AF developed recently.
- If you are younger than 65. (Age is no bar to cardioversion, but it is less likely to be an option the older you become.)
- If an underlying cause of the AF has been successfully treated (and so AF is unlikely to come back again once the normal heart rhythm has been restored).
- If you have no other heart abnormality (lone AF, as described earlier).
- If you have acute heart failure or unstable angina which is being made worse by the irregular heartbeat of AF.

Cardioversion is usually not an option in certain situations - for example:

- If you have certain heart diseases that include a structural problem to the heart - for example, certain valve problems such as mitral stenosis.
- If you have had AF for a long time (usually for more than 12 months).
- If you have had several previous attempts at cardioversion which have not worked, or only worked for a short time before the heart reverted back to AF.

A newer technique to restore the heart rhythm is called catheter ablation. In this procedure a long, thin wire (catheter) is passed into the chambers of the heart via a large blood vessel in a leg. The tip of the catheter can destroy tiny sections of heart tissue that may be the source or trigger of the abnormal electrical impulses. This treatment is only suitable in certain cases and is not a routine treatment. It does not always work and there is a small risk of serious complications. Your doctor will discuss with you in more detail if you are suitable to have rhythm control treatment and which method of cardioversion would be best for you.

Anticoagulation

See also the separate leaflet called [Preventing Stroke When You Have Atrial Fibrillation](#).

All people with AF (except those with the lowest risk of having a stroke) should be offered [anticoagulation treatment](#). Anticoagulation means that you take a medicine to reduce the chance of forming a blood clot and having a stroke. Some people call anticoagulation "thinning the blood" although the blood is not actually made any thinner. The most commonly used anticoagulant medicine has been warfarin, although others have recently been developed. They work by interfering with certain chemicals in the blood to prevent blood clots forming so easily.

They reduce the risk of stroke by nearly two thirds. In other words, these treatments can prevent about 6 in 10 strokes that would have occurred in people with AF.

As with all treatments, there is a small risk if you take an anticoagulant. The main risk is that a bleeding problem may develop as the blood will not clot so well. For example, some people develop a serious bleeding ulcer in the gut. [Warfarin](#) can interact with many different medicines and things in your diet. Some of the newer anticoagulants, such as [apixaban](#), [dabigatran](#) and [rivaroxaban](#), do not have these interactions.

If you take warfarin you will need regular blood tests (INR tests) to check how quickly your blood clots. Blood tests may be needed quite often at first, but should become less often quite quickly. The aim is to get the dose of warfarin just right so your blood does not clot as easily as normal, but not so much as to cause bleeding problems. Dabigatran and rivaroxaban do not need regular blood tests. If you have had trouble getting your INR level just right, your doctor may suggest one of these medicines as an alternative to warfarin.

Aspirin is another medicine that helps to prevent blood clots forming and was used extensively in the past. It is now known that it is not as effective as warfarin, but is just as likely to cause problems. Aspirin is therefore no longer recommended.

Other treatments

Other treatments may be advised, depending on the need to treat any underlying problems such as chest pains (angina), heart valve problems, high blood pressure (hypertension), and overactive thyroid (hyperthyroidism).

Further help & information

AF Association

PO Box 6219, Shipston-on-Stour, Warwickshire, CV37 1NL

Tel: 01789 451837

Web: www.afa.org.uk

Anticoagulation Europe (UK)

PO Box 405, Bromley, Kent, BR2 9WP

Tel: 0208 289 6875

Web: www.anticoagulationeurope.org

British Heart Foundation

Greater London House, 180 Hampstead Road, London, NW1 7AW

Tel: (Heart Helpline) 0300 330 3311, (Admin) 020 7554 0000

Web: www.bhf.org.uk

Further reading & references

- [Management of atrial fibrillation](#); NICE Clinical guideline (June 2014)
- [Atrial fibrillation](#); NICE CKS, August 2009
- [Management of Atrial Fibrillation 2010 and Focused Update 2012](#); European Society of Cardiology (2012)
- [WatchBP Home Afor opportunistically detecting atrial fibrillation during diagnosis and monitoring of hypertension](#); NICE Medical technologies guidance (Jan 2013)

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