

Clinical update on arrhythmias



With any arrhythmia, the particular type of heart involved is a key factor, **Gary Culliton** reports in his latest Clinical Update. Diseases of the atrium – AF and atrial flutter – account for well over half of arrhythmias.

● All the latest news/reports on arrhythmias

Heart history is a key factor

Scars in the heart and impaired function are very important in the context of evaluating the risk of palpitations. **Dr Jonathan Lyne** spoke on the topic of electrical cardiology and palpitation at a recent Blackrock Clinic GP educational meeting, discussing cardiology problems presenting in primary care.

Dr Lyne is a consultant cardiologist and electrophysiologist at Blackrock Clinic. His areas of interest include palpitation, cardiac rhythm disturbances, atrial fibrillation and investigation of collapse and faints.

With any arrhythmia, it is important to consider the context and the particular type of heart involved. A person with a history of or cardiac disease is at very high risk if they describe any collapse, arrhythmia or palpitation as that may be suggestive of ventricular arrhythmia.

Any ventricular arrhythmia with structural heart disease – a previous heart attack or left ventricular dysfunction shown on echo or other imaging, for example – is a cause for concern.

At higher risk

A person with a history of arrhythmia, recurrent syncope or a malignant family history – a first-degree relative under 35 with sudden cardiac death, for instance – is also at a higher risk. Persons with known heart disease, an ischaemic history with impairment of ventricular function or scarring and symptoms of palpitations had the foundations of ventricular arrhythmia and sudden death, said Dr Lyne.

Some arrhythmia persists and can be documented on an ECG. Some may be intermittent, requiring an ambulatory or Holter monitor. 'Event monitors' are also useful in patients who have intermittent symptoms, said Dr Lyne. People can get these for two to four weeks or more to provide a documentation of their symptoms. In some patients, despite numerous monitoring attempts, they may undergo an electrophysiology study to induce an arrhythmia as a day-case procedure. There are implantable monitors.

Among the major tachycardias are supraventricular tachycardias (SVT) including atrial tachycardias, atrial flutter and atrial fibrillation. AV nodal reentrant tachycardia is one of the most common SVTs – accounting for 80 per



'AF is still a major cause of stroke. It is associated with massive economic, healthcare and morbidity costs'



Dr Jonathan Lyne

cent of these. Among rarer conditions, patients with the Wolff-Parkinson-White syndrome (WPW) have an extra conduction pathway, called an accessory pathway. Accessory pathways – such as exist in patients with WPW syndrome – may lead to arrhythmias.

There are very high success rates – 90 to 95 per cent – with low risks of complications for ablation, in atrioventricular nodal reentry tachycardia (AVNRT), common SVTs, accessory pathways and atrial flutter. Success rates for ablation with ventricular arrhythmia (certainly with underlying heart disease), have not been quite as high but are improving.

Diseases of the atrium – atrial fibrillation (AF) and atrial flutter – account for well over half of arrhythmias. Atrial fibrillation often involves irregular palpitation and symptoms. Treatment with an antiarrhythmic drug may be attempted. If it does not work for the patients, if there are unacceptable side-effects or if the patient declines medication, Dr Lyne offers an ablation, which has been shown to be very successful. In between 85 and 95 per cent of cases, AF can be resolved by ablation.

Bradycardias

Bradycardias or pauses may occur as sinus node function may deteriorate with age, though they can also be diseased in younger people. Sinus node disease is a common cause of pacemaker insertions and is associated with atrial fibrillation and flutter.

In terms of bradycardia, a sinus arrest (sinus node stopping) and complete AV block can both be medical emergencies. The most common cause for pacemaker insertion is sinus arrest (the sinus node not working). This may be difficult to confirm at first and may require monitoring of the heart or testing of its electrical function. People may present with dizziness, presyncope or loss of consciousness.

AF is among the most frequently seen arrhythmias. The European heart rhythm association guidance for AF says there should be an ECG in order to confirm the diagnosis.

Anticoagulation issues are assessed using the CHA₂DS₂-VASc score. Treatment with anticoagulants may or may not be selected.

Rate, rhythm and symptoms were considered, as was the value of ablation as opposed to drugs, said Dr Lyne.

Ablation "upfront" – rather than medical therapies – may be an option in some cases of paroxysmal AF. However, in practice, most patients receive at least one drug. The patients whom Dr Lyne sees might have been previously prescribed a beta-blocker, sotalol, flecainide or dronedarone – and often more than one of these. Some may

have undergone a cardioversion previously. However, ablation can be indicated after the failure of just one medication.

In considering anticoagulation, the main issue relates to prevention of clots from the left atrial appendage (clots form in an 'earlike structure' – full of crevices and holes – off the left atrium).

The risk of stroke in people with any kind of AF is approximately five times greater than in those who do not have the condition. The risk is the same whether the patient is experiencing paroxysmal AF or persistent AF. It is the scoring system (CHA₂DS₂-VASc) that will determine risk, not the type of AF. There is also a higher mortality risk. When the score using the CHA₂DS₂-VASc scale – which takes into account congestive heart failure, hypertension, age (greater than 65), diabetes, previous stroke or TIA, gender (women are higher risk than men) – is greater than two, anticoagulation is indicated.

The CHA₂DS₂-VASc scale gives a significant weighting to factors such as gender and age (eg it is possible to score one for being female and one for being over age 65). Thus most female patients Dr Lyne sees score two, and the guidelines indicate anticoagulation even where the AF is very infrequent.

"Anticoagulation is under-used," said Dr Lyne. "AF is still a major cause of stroke. It is associated with massive economic, healthcare and morbidity costs."

In people who cannot receive anticoagulants, a Watchman

(or another similar left atrial appendage occlusion device) may be considered. This closes the left atrial appendage where clots form. This has the potential to reduce risk down to the same level as patients receiving warfarin and with less risk of bleeding within the brain.

Ventricular rate

A significant proportion of arrhythmias involve atrial flutter, which frequently does not respond as well to medication. Drugs do not really treat or prevent flutter very well: more often they tend to slow the ventricular rate.

Atrial flutter with 1:1 conduction was a cause for real concern, said Dr Lyne. In AF, the atrium is in a state of electrical chaos. The upper chambers can no longer operate in a co-ordinated fashion.

Compared to many arrhythmias, atrial flutter has been very well studied. Typically, it involves rotation of the circuit around the tricuspid valve – usually 250 to 300 times per minute. In most instances, the ventricular rate is around 150 beats per minute. This is recorded and the more typical ECG pattern of flutter waves 'saw-toothing' makes these cases easier to spot.

Atrial flutter is amenable to treatment. The circuit is terminated using a catheter ablation technique. This is usually done under general anaesthetic and care is taken to avoid clots. A patient who has had atrial flutter may be considered for treatment with ablation therapy. With atrial flutter, Dr Lyne said the risk of recurrence with ablation was very low – less than 1 per cent.

Atrial flutter

Dr Lyne cited a 53-year-old Blackrock Clinic patient who presented with atrial flutter with 1:1 conduction – which is often seen in young people with good AV node conduction. This case could easily have been mistaken for ventricular arrhythmia, he explained.

The second most common supraventricular tachycardia (SVT) seen is AV nodal reentrant tachycardia (AVNRT). Dual atrioventricular (AV) node pathway physiology is widespread: a slow and a fast pathway. This arrhythmia is completely contained within about 5ml of myocardium, in the main "junction box" of the heart. There can be a circuit involving conduction up one pathway and down another.

One signal goes up to the atrium and another signal goes down to the ventricle – at the same time. A very fast SVT is produced in the AV node, right in the centre of the heart.

Dr Lyne cited the case of a student from abroad who had presented with palpitations on several occasions but had never documented this. There was sudden onset rapid palpitation in her chest, which made her dizzy. The ECG showed 200bpm with narrow complexes. One of the two pathways (the slow pathway) in the AV node was ablated and this successfully treated the AVNRT. A second arrhythmia needed to be ablated in the same patient, involving an accessory pathway. The patient has had no symptoms since.

Palpitations in people who do not have a normal heart are a worry, and Dr Lyne spoke about arrhythmia in the context of heart disease. He cited the case of a 65-year-old patient with a ventricular tachycardia associated with a previous inferior myocardial infarction. Dead muscle combined with live muscle leaves patients susceptible to arrhythmia. In particular cases, it is possible to find electrical channels within and between scars: ablation was done to stop ventricular arrhythmia, said Dr Lyne.

Ventricular ectopy or isolated ectopic beats were considered. In unusual cases, ectopic beats can cause major problems, even in normal hearts, said Dr Lyne. Ablation can assist in such cases particularly if medication has not been effective or poorly tolerated due to side-effects.

MRI 'safe'

In terms of the devices now available, generally almost all new pacemakers are now MRI "safe". Leadless pacemakers – which do not require wires or boxes – are likely to be used in a greater number of patients but are relatively new technology at the moment. Heart failure devices are also inserted. Using more pacing leads, cardiac resynchronisation makes the heart more efficient again.

The 'SonR' concept involves a pacing lead with a device on the end for listening to heart sounds. This changes devices' pacing parameters to make them more effective. The heart sound gets louder as cardiac output goes up. The device is self-setting and works in a closed-loop fashion and can optimise settings.