Atrial fibrillation

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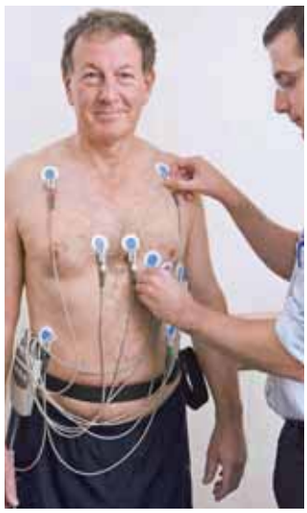
Introduction

Atrial fibrillation (AF) is a cardiac arrhythmia with ECG findings of irregularly irregular RR intervals and an absence of p waves (see ECG, below). It is associated with substantial morbidity and mortality because of an associated significant increase in risk of stroke, thromboembolic events and heart failure, and impaired quality of life.

Atrial fibrillation is the most common sustained cardiac arrhythmia encountered in clinical practice. Its prevalence and incidence is increasing due to advancing age of the population.

This article will briefly cover recommended treatment options and consider these options in a rural setting. However, most clinicians would agree that when



it comes to atrial fibrillation, there are many different approaches to management.

Types of AF

Australian, US and European guidelines recommend classification systems based on simplicity and clinical relevance (see Table 1, next page).

In a rural setting, clinicians could group atrial fibrillation into first detected/paroxysmal and persistent/permanent: note that stroke outcomes are similar for each group.

In the ED setting there are patients who are stable, allowing some consultation, assessment and thinking time, and there are those who are unstable and require immediate attention; for example, those with shock, acute pulmonary oedema, angina, AMI, or altered conscious state. In this group you need to think: "Does this patient need anticoagulation and cardioversion?"

Also consider primary versus secondary causes: which conditions are reversible and/or able to be detected clinically in a rural setting? For example, diagnosing infection may allow both treatment of the arrhythmia and its cause. Access to an ECG and point-of-care troponin device can also allow risk stratification for ischaemic heart disease or assist in the diagnosis of pericarditis or myocarditis.

Excessive alcohol consumption ("binge drinking" or "holiday heart syndrome") is another reversible precipitant.

Common risk factors; potential complications

Hypertension is the most common co-morbid factor and occurs in more than 50% of patients with atrial fibrillation. The risk of stroke and thromboembolism is significantly higher in patients with both conditions than in those with either condition alone.

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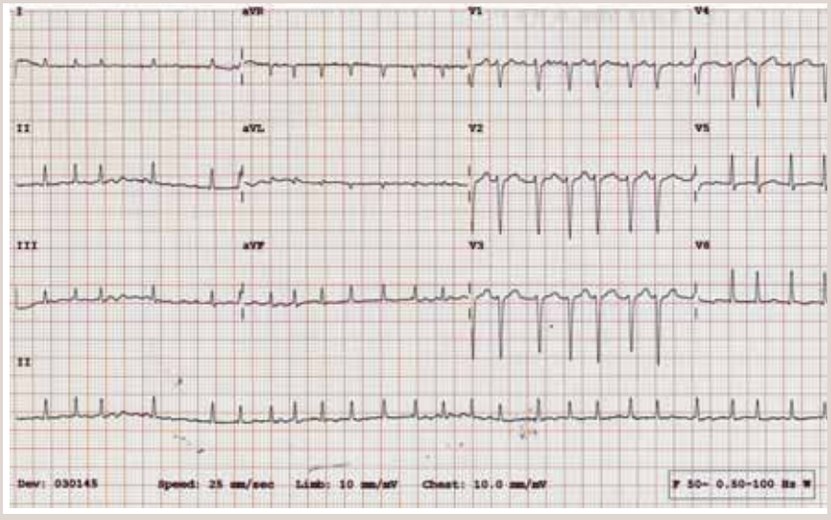
CASE HISTORY

Helen, a 68-year-old woman, presents with sudden-onset palpitations and dizziness she has had for three hours. Helen was successfully reverted to sinus rhythm five years ago using direct current (DC) cardioversion. Helen has no dyspnoea or chest pain. She is haemodynamically stable with a blood pressure of 130/90mmhg and an irregularly irregular pulse with a rate of 176bpm (see right). There are no signs of cardiac failure. Helen has no clear precipitants for this presentation, has hypertension that is well controlled on metoprolol 50mg bd, hypercholesterolaemia and no known ischaemic heart or thyroid disease. An ECG shows AF with no other abnormalities. How would you manage her?

Case outcome, page 14



HOME TRUTH

- Considering antithrombotic strategy for prevention of stroke is more important for your patient's outcome than choosing a rate or rhythm strategy.

Investigations and mana

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The absolute risk of stroke in patients with this arrhythmia averages 3-4% per year but it can vary widely, depending on patient age and other clinical features. Patients with non-valvular atrial fibrillation who develop stroke have double the death rate and an increased severity of stroke (with greater disability and poor functional outcomes), compared with stroke patients with no atrial fibrillation.

Other consequences include acute haemodynamic instability, left ventricular dysfunction, the need for hospital admission, and also persistent arrhythmia symptoms that interfere with quality of life.

TABLE 1: Types of atrial fibrillation

AF Category	Defining Characteristics
First detected	The first diagnosed episode
Paroxysmal	Recurrent episodes that self-terminate in less than seven days.
Persistent	Recurrent episodes that last more than seven days
Permanent	Long-standing persistent (>1 year), or permanent (accepted by patient and physician); that is, rhythm interventions not usually pursued.

TABLE 2: CHA2DS2-VASc score for atrial fibrillation stroke risk

Risk Factor	Score
Congestive cardiac failure	1
Hypertension	1
Age >75 years	2
Diabetes	1
Stroke/TIA/thromboembolism	2
Vascular disease history (previous MI, peripheral arterial disease or aortic plaque)	1
Age 65-74 years	1
Sex category (ie, female sex)	1
Maximum score	**9**

Which investigations are really necessary?

Silent atrial fibrillation is common; it is recommended that all patients aged >65 have their pulse checked at each consultation. A 12-lead ECG will confirm the diagnosis and may show evidence of structural heart disease, myocardial infarction or ischaemia, LV hypertrophy, bundle branch block or ventricular pre-excitation.

Blood tests are considered routine in a hospital or metropolitan setting but there is not strong evidence to support many tests. Potassium and/or troponin levels (both available using point-of-care testing) are the most likely tests to alter acute management in the rural setting, by detecting MI or a reversible cause. INR testing (as a point-of-care test or for home use) is a potentially valuable test for monitoring anticoagulation in a rural setting, given the most important aim is to prevent stroke.

Echocardiography

A non-invasive transthoracic echocardiogram is generally performed in patients with newly diagnosed atrial fibrillation and when there is a major change in the patient's clinical state. The aim is to detect valvular heart disease, left atrial thrombus, left ventricular hypertrophy and pericardial disease.

This test also assesses left and right atrial size (which indicates likelihood that atrial fibrillation may become permanent), and left ventricular size and function.

In a rural setting, it is worth considering whether an echo is likely to detect significant valvular heart disease when there is no murmur and no clinical signs of cardiac failure. Also, it is not very sensitive for left atrial appendage thrombus, one of the most important predictors of stroke. Use of this test should be considered in terms of genuine urgency, and the referral logistics. Indications include known cardiac disease or risk factors, or severe symptoms.

Management

Management of atrial fibrillation is aimed at reducing symptoms and preventing severe complications such as stroke. These goals are pursued simultaneously (especially in the first acute episode) by treating cardiac disease and controlling ventricular rate. However, antithrombotic therapy to prevent stroke is the intervention most likely to alter morbidity and mortality.

Indications for anticoagulation

- Preceding acute cardioversion for haemodynamic instability. Anticoagulate with heparin concurrently if AF > 48-hour duration. Do not delay anticoagulation if patient is unstable and AF<48-hour duration.
- Pre-elective cardioversion (electrical or pharmacological) – for three weeks if atrial fibrillation duration >48 hours
- Post cardioversion (electrical or pharmacological) – for four weeks
- Long-term and based on ongoing stroke risk (note that the ongoing stroke risk is considered the same

gement options

TABLE 3: Adjusted stroke rate according to CHA2DS2-VASc Score

Score	Stroke risk p.a.	Treatment
0	0% *small sample	no treatment or aspirin
1	1.3%	OAC* preferred or aspirin
2	2.2%	OAC
3	3.2%	OAC
4	4%	OAC
5	6.7%	OAC
6	9.8%	OAC
7	9.6%	OAC
8	6.7%	OAC
9	15.2%	OAC

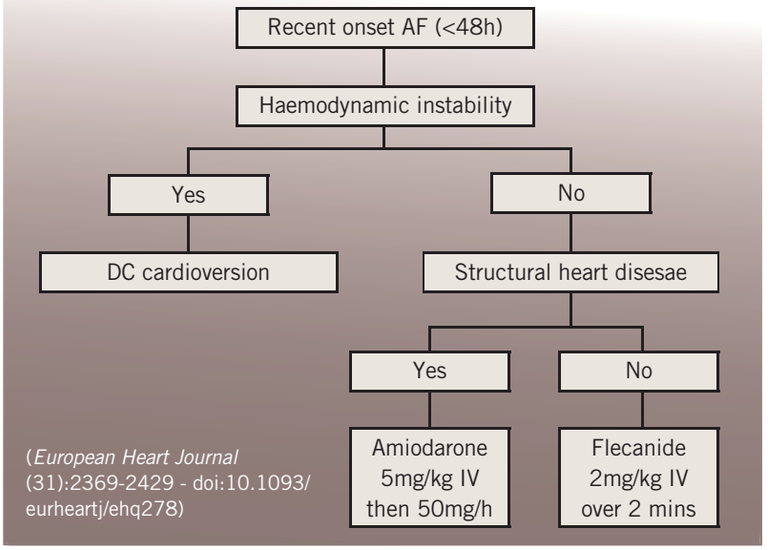
*oral anticoagulation

Table 4: HASBLED Score

Hypertension	1 point
Abnormal liver or kidney function	1 point each
Stroke	1 point
Bleeding	1 point
Labile INRs	1 point
Elderly (eg, >65 years)	1 point
Drugs (eg, antiplatelet, NSAIDs) or alcohol	1 point each
	Maximum 9 points

(Tables 2, 3, and 4: European Heart Journal *(31):2369-429. doi:10.1093/eurheartj/ehq278)*

Figure 1: Rhythm control approach – acute



(*European Heart Journal* (31):2369-2429 - doi:10.1093/eurheartj/ehq278)

for paroxysmal or permanent atrial fibrillation).

In a rural setting, a validated clinical scoring tool can assist with the decision to use antithrombotic therapy. The CHA2DS2 score has recently been updated to the CHA2DS2VASc score (see tables 2 ands 3). This tool is accessible through websites (eg, www.mdcalc. com/cha2ds2-vasc-score-for-atrialfibrillation stroke-risk) and also via smart phone apps (eg, calculate by QxMD www.qxmd.com/apps/calculate-by-qxmd).

An assessment of bleeding risk is needed before and during anticoagulation. Scoring tools such as HASBLED (see table 4) can assess factors that contribute to an increased bleeding risk; these represent a continuum of risk rather than using a cutoff score. As score increases, proceed with caution and arrange regular review of anticoagulant strategy.

The agents used most often for anticoagulation are IV heparin or subcutaneous low molecular weight heparin (SLMWH). While newer oral anticoagulatants may offer less monitoring than warfarin, there is potential toxicity associated with renal impairment.

Reports of "non inferiority" for newer agents compared with standard treatment need to be considered against the increased cost, lack of long-term data, and lack of an antidote for some of these newer agents. You need to ask yourself: "What would I do if my patient had significant bleeding, and there is no antidote to reverse toxicity?"

Cardioversion

Synchronised DC cardioversion is indicated to restore sinus rhythm if there is:

- Atrial fibrillation with acute haemodynamic compromise
- Atrial fibrillation with pre-excitation (broad complex irregular tachycardia which causes haemodynamic instability due to ventricular rates >200/min).

When atrial fibrillation has been present for <48 hours beforehand, either pharmacological or electrical cardioversion could be performed (see Figure 1, right).

Electrical DC cardioversion in the stable patient is safe and effective, with a reported success rate of 90-100% compared with pharmacological therapy, which has a reported success of roughly 50%.

However, pharmacological reversion does not require the facilities, expertise and resources necessary to sedate a patient for electrical cardioversion. This typically requires a level of sedation similar to a general anaesthetic and, therefore, a protected airway. Remember also that haemodynamic shock can be underestimated and doses of drugs for sedation will need to be reduced.

While the use of electrical cardioversion is not without risks, antiarrhythmics are associated with significant proarrhythmic potential, and patients often require a prolonged period of observation.

When cardioversion is indicated in patients with atrial fibrillation and haemodynamic stability, the advantages and disadvantages of both pharmacological and electrical cardioversion should be discussed before initiating treatment.

Medical therapies

Rate versus rhythm control

The benefits of maintaining sinus rhythm versus rate control in patients with atrial fibrillation is subject to ongoing debate. Early landmark trials found that a rhythm-control strategy conferred no advantage over a rate-control strategy, a finding in part attributed to the increased hospitalisations and adverse side effects associated with anti-arrhythmic drugs.

However, subsequent studies and analyses have lent support to the benefits of achieving sinus rhythm in certain patient subgroups.

Overall, a rate-control strategy is needed for most patients to adequately control ventricular rate when atrial fibrillation occurs. This means continuing the rate control agent between episodes, similar to the use of anticoagulants in antithrombotic strategy. Suggested drug doses for some agents are listed in table 5 (see page 14). A lenient rate control strategy with target HR <110/min reduces risk of bradyarrhythmias and is

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THE GEMS

- Hypertension is the most common co-morbid factor in patients with atrial fibrillation. It significantly increases their risk of stroke and thromboembolism.
- Consider secondary causes for atrial fibrillation such as infection, thyrotoxicosis and alcohol excess.
- Potassium and/or troponin levels are the most likely tests to alter acute management in the rural setting.
- Electrical DC cardioversion in the stable patient is safe and effective with a reported success rate of 90-100% compared with pharmacological therapy, which has a reported success of about 50%.

The right therapy

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useful if there are no, or tolerable, symptoms at this rate.

A rhythm control strategy may be added to rate control if the patient is symptomatic despite adequate rate control. Other reasons include coexistent heart failure, treatment of a corrected precipitant, patient preference, younger age and higher activity levels. This strategy is more commonly used for paroxysmal atrial fibrillation and in patients without underlying cardiac disease.

Selecting therapy appropriate to the patient

Successful outcomes for treating patients with atrial fibrillation are heavily dependent on appropriate and adequate thromboprophylaxis. The need for such prophylaxis exists regardless of the treatment approach pursued.

Patients should have the opportunity to make informed decisions about their care and treatment. It is important to emphasise that there is not a "one-size-fits-all" approach to treatment.

Good communication should be supported by the provision of evidence-based information offered in a form that is tailored to the needs of the individual patient. The National Heart Foundation (www.heartfoundation.org.au/SiteCollectionDocuments/Atrial-Fibrillation-information-sheet.pdf) and state health departments produce plain language fact sheets.

Selecting medications with a dual purpose or benefit is helpful. Examples include:

- ACE inhibitors or angiotensin receptor blockers for coexistent CCF or hypertension
- Beta-blockers for hypertension
- Beta-blockers for thyrotoxicosis
- Beta-blockers or amiodarone for acute coronary syndromes

In patients with Wolff-Parkinson-White syndrome or rapid atrial fibrillation with ventricular pre excitation, either DC cardioversion or amiodarone is indicated. The ABCD drugs (adenosine, beta-blockers, calcium channel blockers and digoxin) are contraindicated in this group. They can facilitate antegrade conduction along the accessory pathway during episodes resulting in acceleration of the ventricular rate, hypotension, or ventricular fibrillation.

Table 5: Examples of drugs for rate control

DRUG	IV ADMINISTRATION	Usual oral maintenance dose
Metoprolol	2.5-5mg IV every 2 mins, up to 3 doses	25-50 mg bd
Verapamil	0.075-0.15mg/kg over 2 mins	40mg bd to 360mg od (SR)
Amiodarone (preferred if hypotension or pre excitation syndrome)	300-450mg IV over 20 mins to 2 hours 900mg over next 24 hours	100-200mg daily

Surgical intervention

Ablation strategies generally target the pulmonary veins or pulmonary vein antrum, and in some studies have been effective at maintaining sinus rhythm in patients and improving outcomes. Referral to a cardiologist with expertise in this area can be considered if the patient has intolerable symptoms despite a trial of at least one anti-arrhythmic drug.

CASE OUTCOME

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You request pathology tests, which show normal inflammatory markers and electrolytes. Recent investigations include a normal echocardiogram last year and a normal ECG last month. You discuss the patient with your on-call cardiologist. Given that Helen has had very infrequent paroxysmal AF with successful cardioversion in the past, treatment with anticoagulation and DC cardioversion is chosen. After the procedure she is admitted to the Short Stay Unit for observation and discharged the following day to be followed up with the cardiologist in a month. You arrange to monitor her anticoagulation which will continue for four weeks, and you also increase her beta-blocker dosage. Helen is advised to seek medical attention if symptoms recur. At each review you take the opportunity to re-assess the need for, and the risks and benefits of, continued anticoagulation.