

THE OUT-OF-HOSPITAL MANAGEMENT OF ATRIAL FIBRILLATION

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Atrial fibrillation (AF) is the most common arrhythmia encountered in the human population. The incidence increases as the age advances in the community. It is seen in above 5% of those older than 65 years.^{1,2}

It can be paroxysmal or persistent. There are wide varieties of causes of AF, which include ischaemic heart disease, hypertension, sick sinus syndrome, valvular heart disease, congenital heart disease, pre-excitation syndromes, cardiomyopathies and myocarditis etc. Systemic diseases like hypoxia, pneumonia, thyrotoxicosis, septicaemia, pulmonary embolism and cardio-stimulant drugs can also cause it. Sometimes it is seen without any predisposing condition when it is termed 'lone atrial fibrillation'.

The presence of AF can lead to a variety of disabling symptoms such as palpitations, angina, dyspnoea or poor exercise tolerance. There is a loss of atrial contraction, which is responsible for poor filling of the left ventricle. This may cause symptoms of poor effort tolerance even when ventricular rate is controlled.^{3,6} AF is also associated with quadrupling the risk of stroke and doubling the rate of death.^{7,9} It can precipitate ventricular fibrillation if it is associated with rapid ventricular response, as may be seen in pre-excitation.

Therefore, it is mandatory that patients with AF should receive appropriate therapy.

Some aspects of AF can be managed in a GP's surgery or in an ambulance (i.e. out of hospital settings). However, comprehensive management of AF can be best undertaken using hospital resources.

The most dangerous form of AF is the one which presents with fast rate with compromised haemodynamics. This clinical situation may need immediate electrical cardioversion in the following situations:

- ventricular rate above 160/minute;
- hypotension attributed to AF;
- severe pulmonary oedema;
- myocardial infarction; and
- altered sensorium.

A rapid trial of anti-arrhythmics can be undertaken, if possible, before electrical cardioversion. Synchronised direct current (DC) shock can be given in an ambulance.

The patient should also have intravenous loop diuretics and oxygen by mask, if there are signs of left ventricular failure. Such patients are sent immediately to hospital, after preliminary resuscitation. AF can be a presenting picture of

myocardial infarction or ischaemia. Therefore, it is prudent to send all those patients with recent onset (less than 48 hours) of AF to the hospital for assessment, even when they are haemodynamically stable.

In contrast, stable patients with chronic AF receive different a strategy. There are five different approaches towards managing chronic, stable AF:

- rate control;
- rhythm control;
- anticoagulation;
- management of medical conditions causing or exacerbating AF; and
- management of paroxysmal AF.

The decision for rate versus rhythm control is usually taken in the hospital. However, some input can always be given by out of hospital services.

Rate versus rhythm control has its own advantages and disadvantages on both sides.

The PIAF¹⁰ study has shown that the results of both strategies are comparable. Symptom control and exercise tolerance are better with the rhythm control strategy. However, the number of hospital admissions is increased, mainly for repeated cardioversion.

Rate control

AF is difficult to keep in sinus rhythm in the following situations:

- presence of valvular heart disease, particularly mitral stenosis;
- long-standing AF, typically more than six months;
- patients with left ventricular dysfunction;
- dilated left atrium; and
- structural heart disease, e.g. hypertrophic obstructive cardiomyopathy.

Therefore, in these patients, a rate control strategy may work better.

There are a variety of anti-arrhythmics available to control ventricular response. Digoxin is tried traditionally. It is better in failing heart. Digoxin is no better than placebo in converting AF into sinus rhythm (DAAF study¹¹).

Digoxin is frequently not useful in controlling heart rate in those with paroxysmal AF. Calcium channel blockers such as verapamil or diltiazem are useful if the patient has systemic

hypertension. It should be noted that verapamil has negative inotropic action and, hence, is better avoided in left ventricular dysfunction.

Patients with cardiomyopathy, left ventricular dysfunction and bundle branch block may be best treated with amiodarone. The patients should be carefully watched for side effects of amiodarone.

Beta-blockers are also used to control the ventricular rate. Class 1c antiarrhythmics (propafenone, flecainide, Ibutilide, and Dofetilide¹²) can be used. However, they can cause prolongation of QTc interval. This may lead to sudden death.

Rhythm control

The decision regarding rhythm control is usually taken in the hospital. However, GPs have a lot to offer these patients.

Elective cardioversion is carried out in the hospital. However, these patients are anticoagulated usually in the community with warfarin for three to four weeks before cardioversion. The international normalised ratio (INR) is kept between 2 and 3. The ventricular rate is also controlled in this period. Digoxin is commonly used for this purpose. However, beta-blockers or calcium antagonists can be used. Some authorities suggest holding digoxin one day before elective cardioversion.

The patient is discharged from hospital after successful cardioversion. They need anticoagulation for four to six weeks more if sinus rhythm is maintained.

Relapse after successful cardioversion is reported to be between 37% and 85% in various studies.¹³ Therefore, some prophylactic anti-arrhythmic therapy may be advised, particularly after first relapse. Digoxin is no better than placebo in preventing episodes of AF. Drugs like sotalol, metoprolol or amiodarone are used depending on clinical situation. The class Ic anti-arrhythmics are used with extreme caution if at all. One study advises to titrate the dose of Dofetilide with QTc interval.

Some patients will relapse to AF, despite prophylactic anti-arrhythmic therapy. These patients are best referred to hospital again for elective or emergency electrical cardioversion. Repeated, resistant recurrences are best managed with either converting to rate control strategy or by referral to a cardiologist for nodal ablation with permanent pacing.

Some patients undergoing cardiac surgery may need prophylactic anti-arrhythmics to prevent post-cardiac surgery atrial fibrillation. One study has reported that amiodarone, if started seven days before cardiac surgery, can reduce post-operative incidence of AF.¹⁴ This can be done in the out of hospital settings.

Anticoagulation

Many studies (AFASAK¹⁵, BAATAF¹⁶, CAFA¹⁷, SPINAF¹⁸) have concluded that anticoagulation does provide protection against stroke. Anticoagulation with warfarin reduces the incidence of embolic cerebrovascular events. The current trend is to maintain INR between 2 and 3. The presence of mechanical valve may need higher INR of 3-4.¹⁹ Anticoagulation should particularly be considered in the

following situations:

- age above 65 years;
- prior history of stroke or transient ischaemic attack;
- systemic hypertension;
- ischaemic heart disease;
- diabetes mellitus;
- clinical or echocardiographic evidence of left ventricular dysfunction;
- thrombus in any of the cardiac chambers;
- spontaneous echo contrast in any of the cardiac chambers;
- valvular heart disease (e.g. mitral stenosis or aortic stenosis);
- structural heart diseases e.g. hypertrophic cardiomyopathy; and
- 'low flow' left atrial appendage.

If anticoagulation is contraindicated, or cannot be used, aspirin should be advised. Aspirin is shown to be effective in decreasing the incidence of ischaemic cerebrovascular events, in a few studies like SPAF²⁰ and the SPAF III²¹ sub-study. Low fixed dose of warfarin with or without aspirin does not show any benefit in reducing stroke.²²

Management of medical conditions

Medical conditions like hypoxia, pneumonia, septicaemia and thyrotoxicosis can precipitate AF. These should be promptly treated. AF can be self-limiting in these conditions. However, some patients may continue to have AF. These patients should be managed on standard lines.

Concomitant myocardial ischaemia and left ventricular failure should be managed aggressively, as this may provoke uncontrolled and repeated AF. Thyrotoxic patients should be made euthyroid before cardioverting.

Paroxysmal AF

Recurrent troublesome, frequent and symptomatic paroxysmal AF should receive prophylactic anti-arrhythmic therapy. Anticoagulant therapy may be started depending on standard indications. The patient with less frequent AF should receive regular follow up and reassurance with or without aspirin.

Conclusion

AF is a common arrhythmia and can be due to a variety of cardiac or systemic disorders. Acute AF with haemodynamic compromise should receive acute management before the patient is sent to hospital. There are many issues such as rate control, rhythm control and anticoagulation that can be managed in the community using hospital resources optimally.

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