Management of Atrial Fibrillation

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Abstract

Atrial fibrillation (AF) is the most common cardiac arrhythmia, affecting an estimated 4.5 million people within the European Union. Indeed, the prevalence of AF continues to rise, in view of the aging population and the better management of heart attacks, making it the new "epidemic". Irrespective of a rate control or rhythm control strategy, appropriate antithrombotic therapy is central to AF management, by reducing the risk of stroke and thromboembolism. This overview focuses on the management of AF, with reference to recently published guidelines and describes their application in clinical practice using three clinical case scenarios.

Introduction

Atrial fibrillation (AF) is increasingly recognized as a significant contributor to ill health in the Western world. This condition is the most common cardiac arrhythmia, affecting an estimated 4.5 million people within the European Union [1]. This figure will continue to rise, correlating not only to the aging population and the better management of heart attacks, but also as a consequence of more aggressive application of investigations, such as ambulatory electrocardiographic monitoring.

The recent revision of consensus guidelines from the American College of Cardiology/American Heart Association/European Society of Cardiology (ACC/AHA/ESC) could not have been more timely [2]. This overview focuses on various recommendations within this document and describes their application in clinical practice using three clinical case scenarios.

The Size of the Problem

The prevalence of AF is currently around 1% of the general population. There is a strong correlation with advancing age, and of those > 65 years of age, around 5% have AF. This figure rises sharply to almost 10% in those aged > 80 years [3]. Aside from age, AF associates strongly with hypertension, ischemic, structural, functional and valvular heart disease, hyperadrenergic states (such as thyrotoxicosis or surgery) and excess alcohol [4, 5]. Worryingly, AF is associated with a substantial excess of both morbidity and mortality, as well as impaired quality of life [5, 6]. The presence of AF independently increases the risk of death by 1.5-fold in men, and 1.9-fold in women [6]. The general trend has also been toward more hospitalizations for AF – especially amongst the elderly – with lower rates of discharge to the patients' own homes [5].

AF increases the risk of stroke by up to fivefold across all age groups and accounts for up to 15% of all ischemic stroke [7]. This link also strengthens with age, and in those > 80 years of age, AF accounts for nearly 25% of strokes, especially in the presence of comorbidities [7]. Worryingly, those with AF who have a stroke have a particularly poor outcome with greater disability, mortality and longer hospital stays [8].

Given the high prevalence of AF, some attempt at screening for this condition is likely to be particularly fruitful. In particular any patient who complains of symptoms potentially attributable to AF should have an electrocardiogram (ECG) to document the arrhythmia. Palpation of an irregular pulse is not adequate to make a diagnosis and can only raise suspicion. The role of screening for AF was recently ad-
dressed in the SAFE study (Screening for Atrial Fibrillation in the aged) [9], which was a study to determine the most cost-effective method of screening for AF in the population aged ≥ 65 years, as well as its prevalence and incidence in this age group. Also, SAFE was designed to evaluate the relative cost-effectiveness of different methods of recording and interpreting the ECG within a screening program. This contemporary UK study reported that the baseline prevalence of AF was 7.2%, with a higher prevalence in males (7.8%) and patients aged ≥ 75 years, with an incidence of 0.69–1.64% per year, depending on screening method. In terms of a screening program, the SAFE study suggests that only strategy that improved on routine practice was opportunistic screening for AF, rather than targeted screening.

Given the number of potential contributory factors, it is important to assess each patient with a thorough history taking and clinical examination. A chest radiograph, echocardiogram and full laboratory work-up including thyroid, renal, hepatic function and full blood count should be sought in all patients. In some, particularly where a diagnosis of paroxysmal AF is suspected, ambulatory ECG monitoring and event monitoring can be invaluable.

Management of Atrial Fibrillation
Management of AF involves three objectives [2]. Firstly, adequate rate control needs to be established. Secondly, an assessment of stroke and thromboembolic risk should be performed and appropriate therapy implemented. Finally, if deemed appropriate, correction of the rhythm disturbance may be attempted. The initial objectives for management often become clear from the history and initial investigations. For instance in paroxysmal AF, the emphasis should be toward reducing paroxysms and maintaining sinus rhythm. In permanent AF, rate control should usually be sought.

Rate Control
Although digitalis was once the mainstay of rate control for AF, it is increasingly recognized that this drug fails to provide adequate heart rate control during exercise and hyperadrenergic states – such as fever, thyrotoxicosis and surgery [10, 11].

Hence current guidance is that digitalis monotherapy be considered only in elderly, sedentary patients. β-blockers or non-dihydropyridine calcium channel blockers (verapamil, diltiazem) are usually considered first-line and provide good control of ventricular rate for the majority of patients. In general, the resting heart rate should be < 90 beats per minute (bpm) and < 110 or 200 minus age on exertion [12]. Should the patient remain tachycardic despite adequate dosages of these drugs, then addition of digoxin (the hybrid approach) is often helpful. The class III antiarrhythmic drugs, sotalol and amiodarone, are generally used as third-line agents, but should be considered in those cases where heart rate control remains suboptimal or where other drugs are poorly tolerated or contraindicated. However, given the significant side effect profile of both these drugs, their use is probably best reserved for initiation under specialist guidance.

Rhythm Control
Rhythm control refers both to restoration and long-term maintenance of sinus rhythm. In paroxysmal AF this is generally achieved pharmacologically, although in persistent AF, electric cardioversion may be required in addition to the use of antiarrhythmic drugs. Success is not always guaranteed and although electric cardioversion may be successful in 75–93% of patients, this depends strongly on duration of AF (success rates are particularly poor after 1 year), left atrial size and coexisting structural heart disease. This initial success is often not sustained, as even when using an aggressive serial cardioversion strategy for early relapse, approximately 50% of patients remain in sinus rhythm at 1 year, whilst at 5 years, only around 25% remain free of AF [13–15].

Chemical/pharmacological cardioversion can be achieved using a number of drugs; most commonly, the choice is between Vaughan Williams class IC (flecainide, propafenone) and class III (amiodarone, sotalol). Apart from speed of cardioversion, there is generally little to choose between route of administration, with success reported in up to 80% with oral therapy, rising to only 90% with intravenous administration [16].

To improve long-term maintenance of sinus rhythm, antiarrhythmic drugs are usually required. β-blockers or calcium channel blockers are the most commonly used drugs for this purpose, although long-term amiodarone or sotalol may be required in some, particularly if recurrence is problematic. Class I agents such as flecainide may be used in younger patients without structural or ischemic heart disease, although under these circumstances concomitant use of a β-blocker is generally advised as these agents can otherwise enhance the likelihood of 1 : 1 conduction of atrial flutter through the atrioventricular (AV) node. Figure 1 illustrates suggested antiarrhythmic drug therapy to maintain sinus rhythm in recurrent paroxysmal or persistent AF, whilst Figure 2 offers an overview of pharmacological management of recurrent persistent or permanent AF.