Atrial fibrillation

A new perspective on an old problem

IRENE STEVENSON MB BS, FRACP

Managing atrial fibrillation has until recently centred on decisions about anticoagulation and controlling cardiac rate and cardiac rhythm. New evidence strongly supports inclusion of a fourth cornerstone – risk factor modification.

Atrial fibrillation (AF) is the most common sustained arrhythmia. One in four people will develop AF in their lifetime, and risk increases with age.[1] Prevention and treatment of AF is central to reducing the burden of AF, particularly the risk of stroke.

The three cornerstones of AF management have traditionally been:

- anticoagulation (warfarin and more recently nonvitamin K antagonist oral anticoagulants)
- rate control (digoxin, beta blockers, nondihydropyridine calcium channel blockers)
- rhythm control (flecainide, sotalol, amiodarone).

There is ever-increasing evidence that a fourth arm, risk factor modification, is necessary. The emphasis in AF management needs to change from treating AF as the disease itself, to targeting the reason it occurs. In most patients, AF is a manifestation of stressed atria. The approach to managing AF should be akin to managing the risk factors for coronary atherosclerosis; we do not only fix 'plumbing issues' in the heart with a stent but also treat the 'water' to prevent the pipes from blocking up again.

Risk factors for AF

Association is one thing, but proving causation is much harder, and proving that modification of the risk factor improves the outcome is the necessary completion of the evidence base. There are three main factors for which there is increasing evidence that modification improves outcomes. They are:

- obstructive sleep apnoea
- obesity
- exercise.

There is widespread consensus that other conditions associated with AF, such as alcohol consumption, dyslipidaemia, hypertension,

Key points

- **The three cornerstones of atrial fibrillation (AF) management have traditionally been anticoagulation, rate control and rhythm control.**
- **There is increasing evidence that modification of three main risk factors obstructive sleep apnoea, obesity and exercise improves outcomes.**
- **Treatment of patients with sleep apnoea using continuous positive airway pressure reduces the risk and recurrence of AF.**
- **Patients undergoing cardioversion or AF ablation should be actively screened for sleep apnoea and treated if it is present.**
- **Weight loss has a dose-related impact on AF, with a gradual and sustained weight loss of 10% or more without fluctuations having the greatest benefit.**
- **Light to moderate exercise is protective against AF.**
- **Risk factor management is essential in conjunction with antiarrhythmic medications and AF ablation to maximise treatment effects.**

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Dr Stevenson is a Cardiologist at The Royal Melbourne Hospital and Box Hill Hospital, Melbourne, Vic.

An evidence-based approach to treating atrial fibrillation

- Treatment of atrial fibrillation (AF) is no longer confined to rate control, rhythm control and anticoagulation but also requires risk factor management
- The three risk factors for which management has shown positive effects on AF occurrence and burden in recent trials are obstructive sleep apnoea, obesity and exercise
  - Obstructive sleep apnoea should be managed using continuous positive airway pressure and weight loss
  - Patients with obesity should be assisted to achieve a gradual, sustained weight loss of ≥10% of body weight
  - Moderate exercise such as a half-hour brisk walk daily should be recommended
- Risk factor management is essential in conjunction with antiarrhythmic medications and AF ablation to maximise treatment effects

heart failure, pulmonary disease and diabetes, should be treated, but so far it is not clear that addressing these issues has any benefit with respect to AF burden, occurrence and recurrence.

Obstructive sleep apnoea

It is well established that sleep apnoea is an independent predictor of AF. Up to 62% of patients with AF have been shown to have sleep apnoea, compared with only 38% of controls.[2,3] Sleep apnoea causes potential stress for the heart through intermittent hypoxaemia and hypercapnia, sympathetic overactivity, physical stretch and inflammation.[4,5]

Several studies provide evidence that treating sleep apnoea helps patients with AF. One study involving patients undergoing cardioversion and another of patients having an AF ablation procedure showed a reduction in AF recurrence in patients treated with continuous positive airway pressure (CPAP).[6,7] In fact, it appears that in those with severe sleep apnoea, if the sleep apnoea is not treated it is a waste of time, expertise and resources attempting a cardioversion or ablation, as durable freedom from AF is unlikely. Conversely, those treated with CPAP had recurrence rates similar to those who did not have sleep apnoea at all.

A recent meta-analysis, which reviewed seven studies that included over 1000 people with obstructive sleep apnoea, found that CPAP markedly reduced the risk of AF, by 42%.[8] A randomised prospective clinical trial still needs to be carried out, but these findings suggest that treating sleep apnoea with CPAP is an effective treatment option for AF.

Patients undergoing treatment for AF, particularly AF ablation procedures, should be actively screened for sleep apnoea and treated if it is present.

In Australia, access to in-hospital sleep studies is limited, although there is an expansion of availability as doctors become more aware of the potential benefits of treatment of obstructive sleep apnoea in people with various cardiovascular conditions, not only AF. Home screening for sleep apnoea is likely to become more widely available and perhaps even routine in the work-up of patients with AF. Compliance, cost and tolerability of CPAP are barriers that need to be overcome through patient and doctor education and financial support.

It is important to note that CPAP is not the only treatment for sleep apnoea. Lifestyle changes such as weight loss can also prevent and reduce sleep apnoea and, consequently, AF.

Obesity

In Australia, two in three adults are overweight (body mass index >25 kg/m^2) or obese (body mass index >30 kg/m^2), up from 56% in 1995.[9]

As with sleep apnoea, there is a clear association between obesity and AF.[10] Recent compelling Australian studies have shown not only this association between obesity and AF, but also the positive effects of interventions resulting in weight loss.

A group of investigators at Adelaide University demonstrated that sheep that were overfed developed atrial enlargement, fibrosis and inflammation as well as abnormal electrical properties of the heart, and that these changes were associated with spontaneous and more persistent AF.[11]

The LEGACY (Long-Term Effect of Goal-Directed Weight Management in an Atrial Fibrillation Cohort) study reported the remarkable finding that almost half of the patients who lost 10% or more of their body weight were free from AF after five years without using other rhythm-control strategies.[12] The reduction in AF symptom burden in those with a sustained 10% or more weight loss extended to patients treated with antiarrhythmic medication or ablation. There was a dose-related impact on AF, with greatest benefit from a gradual and sustained weight loss without fluctuations. High rates of successful weight loss were achieved through patients attending a specific doctor-led one-to-one weight-loss clinic, separate from the arrhythmia clinic. Patient education included dieting and exercise strategies, and weight loss goals were achievable because they were small and short term.

The benefits of a 10% or more reduction in body weight were:

- reduced AF symptoms and burden (over five years, 46% of patients were free from AF)
- improved blood pressure with reduced medication use
- improved lipid profiles and blood glucose levels
- reduced sleep apnoea (obesity is the strongest risk factor for sleep apnoea)
- positive structural changes to the heart (reduction in atrial size).

A further study has demonstrated that treatment of obesity with weight loss reduces the recurrence of AF after catheter ablation.[13]

Successful AF management is not only dependent on what antiarrhythmic drug is given or how well a doctor performs an AF ablation but also what the doctor and patient do before and after the procedure to address risk factors. One study has shown that after a

successful AF ablation procedure patients progressively developed atrial scarring despite freedom from AF.[14] This contrasts with patients in the Aggressive Risk Factor Reduction Study for Atrial Fibrillation (ARREST-AF) substrate study who reduced their body mass by 10% or more, in whom the atrial scar regressed.[15] The underlying cause of AF is not treated by ablation. This in some part explains why there have been so many touted 'best' techniques for AF ablation, none of which approach 100% success.

Exercise

Excess exercise is associated with increased risk of AF, as is a sedentary lifestyle with its often concomitant excess weight.

Moderation is the answer, and light to moderate exercise is protective against AF. A large study looking at more than 80,000 women found that moderate amounts of exercise (30 minutes a day or 150 minutes a week) reduced the risk of developing AF.[16]

The CARDIO-FIT (Impact of Cardiorespiratory Fitness on Arrhythmia Recurrence in Obese Individuals with Atrial Fibrillation) study, a substudy of the LEGACY study, looked at 308 patients and categorised them into low, adequate and high fitness groups based on their performance in treadmill tests. Patients whose fitness improved over two treadmill tests, as well as those who were already fit, had a reduced occurrence of AF.[17]

Patients need to think of regular exercise as a medication that needs to be taken regularly. Perhaps doctors should literally get out the prescription pad and prescribe a 'half-hour brisk walk daily'.

Conclusion

There are shifting sands regarding our understanding and management of AF. No longer is it good enough just to 'anticoagulate, medicate and ablate'. AF is a systemic disease, which is why focal treatments alone often fail. Based on current evidence, modification of risk factors, as summarised in the Box, is essential.

Patients need to be guided to take some ownership of their AF. If they do so, almost half can manage their AF without requiring antiarrhythmic drugs or an ablation procedure. Even those who require more than risk factor management clearly do better when antiarrhythmics and ablation are combined with risk factor management through weight loss, treatment of sleep apnoea and exercise. Patient ownership is integral to the success of AF management; it is evident now that doctors need to manage not only the arrhythmia, but also the person who has it. **CT**

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A list of references is included in the website version of this article (www.cardiologytoday.com.au).

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