Rate and rhythm control strategies for atrial fibrillation

Rate control versus rhythm control
Before treating a patient with atrial fibrillation (AF), it is necessary to consider the patient’s symptomatology and the prognostic implications if the arrhythmia were allowed to persist or recur. Essentially, the treatment for AF can be divided into two main treatment strategies: rate control and rhythm control [1]. For rate control, the use of chronotropic drugs or electrophysiologic ablation is required to reduce the rapid ventricular rate often found in patients with AF (unless the patient has concurrent atrioventricular block). Although the atria continue to fibrillate with this strategy, it improves the symptoms and reduces the risk of associated morbidity such as tachycardia-induced cardiomyopathy. The risk of thromboembolism remains as a result of the persistence of the AF; however, this risk may be reduced by administering antithrombotic drugs.

Rate control strategy for atrial fibrillation
When a relapse occurs in patients with paroxysmal AF, it is important to control the ventricular rate if the patients are symptomatic or hemodynamically compromised by it. In patients with permanent AF, rate control is also necessary to improve the quality of life and distressing symptoms, and prevent left ventricular dysfunction. Generally, a target resting heart rate <80 beats/min at rest and <115 beats/min during light and moderate exercise is aimed for [2]. There are three classes of drugs to choose from for rate control:
- digitalis;
- β-blockers; and
- calcium channel blockers.
The American Heart Association/American College of Cardiology/European Society of Cardiology (ESC) guidelines suggested that β-blockers or the calcium channel blockers diltiazem and verapamil should be used in most patients with chronic AF without heart failure, whereas in patients with heart failure, digoxin or even the antiarrhythmic amiodarone should be used to control heart rate [3,4]. Intravenous amiodarone is not effective for acute conversion (<1 hour) but may still be useful for late conversion and is successful in over 80% of cases within 24 hours [2]. Digoxin provides rate control during rest but its effect is not maintained during exercise, so it is very useful in elderly people with a low level of activity. The dose should be titrated against resting heart rate [2]. Several studies have tried to establish whether lenient rate control (eg, <110 beats per minute at rest) or strict rate control (eg, <80 beats/min at rest and <110 beats/min during moderate exercise) is preferable. Strict rate control is only advised when lenient control leaves the patient with symptoms due to the arrhythmia.

When rapid control of the ventricular response to AF is required or oral administration of medication is not feasible, intravenous medication such as diltiazem may be considered [6]. Otherwise, in hemodynamically stable patients with a rapid ventricular response to AF, negative chronotropic medication may be administered orally. Combinations may be necessary to achieve rate control in both acute and chronic situations. Some patients may develop symptomatic bradycardia that requires permanent pacing.

For acute rate control of AF in patients without heart failure or accessory pathway, intravenous β-blockers (esmolol, metoprolol, and propranolol), diltiazem, or verapamil may be used as first-line treatment. For patients with heart failure with no accessory pathway, intravenous digoxin or amiodarone may be used to control the heart rate of AF. Among patients with AF and accessory pathway, only intravenous amiodarone is indicated for use [2]. Intravenous β-blockers need to be used with caution for fear of unsuspected heart failure due to their negative inotropic effects, except in AF associated with thyrotoxicosis where β-blockers are preferred [3].

**Rhythm control strategy for atrial fibrillation**

For rhythm control, the use of cardioversion is required to convert AF to normal sinus rhythm. There are two types of cardioversion: electrical and pharmacologic. However, not all attempts at cardioversion are successful. At 1 year after cardioversion, approximately 50% of patients revert back into AF [6].

In patients presenting with acute-onset AF within 48 hours, pharmacologic cardioversion is the preferred strategy, whereas electrical cardioversion is the standard procedure where the AF is more prolonged. Cardioversion