Atrial fibrillation (AF) is the most common sustained arrhythmia in humans and affects 1-2% of the general population worldwide. It affects 3 and 6 million of people in United States and Europe respectively. It has also been estimated that there are over 70,000 patients with AF in Hong Kong. Its incidence also rises with age and the lifetime risk of AF development in those older than 40 was estimated to be ~25%. On the other hand, AF also affects a significant proportion of younger patients with a prevalence of 0.7% in those aged between 55-59 years. It is also expected that these figures will increase 2.5 – 3 fold during the next 50 years. AF doubles the risk of death, increases the risk of stroke by 5 fold and heart failure by 3 fold. While it commonly co-exists with other cardiovascular disorders, it also adversely affects the prognosis in those with coronary artery disease, heart failure or even hypertension. Management of AF is a complex issue. Guidelines about the management are available but the adoption into clinical practice is a real challenge and is limited by cultural, social and economic reasons.

Rhythm or Rate Control

Both patients and physicians may frequently ask the same question when facing AF: Is it better to be in sinus rhythm? Such a debate between rhythm or rate control has been lasting for decades and also leading to multiple randomised clinical trials testing the hypothesis that rhythm control is superior to rate control in achieving better clinical outcomes. What was consistently observed in these clinical trials was that both strategies were equivalent if cardiovascular events like mortality or stroke were chosen to be the primary endpoints in patients at risk of stroke and with or without heart failure provided appropriate antithrombotic therapy was offered to eligible patients. In other words, proper anticoagulation, instead of deciding rate or rhythm control strategy, is probably the key to lower cardiovascular events in these patients. The clinical implications of these findings are now translated into and emphasised in the management guidelines of AF by the European Society of Cardiology in 2010. The guidelines clearly state that both strategies are not mutually exclusive. The focus of AF management nowadays should shift from the focus of rate or rhythm decision to the comprehensive treatment plan for an individual.

Stroke Prevention in AF

Evaluation of the thromboembolic risks in AF patients has become the top priority in the management algorithm. The most widely adopted assessment tool is the CHADS2 score. One point will be assigned if the patient has Congestive heart failure, Hypertension, Age >75 and Diabetes mellitus and 2 points for previous history of Stroke of transient ischaemic attack. It is very useful in the primary care setting as it can be easily remembered by physicians and does not require any sophisticated investigations. Patients classified as high risk for thromboembolism (CHADS2 score ≥ 2) should receive anticoagulation while those at low or intermediate risk can receive either anti-platelet or oral anticoagulation (OAC). A new assessment tool has been introduced recently, namely CHA2DS2-VASc, taking into account of several important predictors of stroke in patients with non-valvular AF like age group of 65-74 (1 point) and >75 (2 points), female sex (1 point) and co-existing vascular disease (1 point). It should not be considered as a brand new scheme but rather a refined version. OAC is still recommended for those with CHADS2 score ≥ 2 but a detailed assessment with regard to these non-major but relevant risk factors is necessary for those with CHADS2 score 0 or 1. OAC is preferred for those with CHA2DS2-VASc score of 1 while no antithrombotic therapy is recommended for CHA2DS2-VASc score of 0. The new guidelines also stress the importance of bleeding risk assessment with the HAS-BLED scheme. The abbreviation stands for Hypertension, Abnormal renal or liver function (1 point each), Stroke, Bleeding episodes, Labile INR, Elderly (age >65) and Drugs (anti-platelet or non-steroidal anti-inflammatory drug) or alcohol (1 point each) with maximum of 9 points. Caution should be taken when prescribing OAC to those with HAS-BLED score ≥ 3.

The role of the novel oral direct thrombin inhibitor, Dabigatran, which has recently been approved by the Food and Drug Administration (FDA) in the United States for stroke prevention in AF, in improving the compliance by obviating the need of strict dietary requirement and frequent blood monitoring when comparing to vitamin K dependent OAC needs special attention. RELY study was a large scale prospective randomised clinical trial and clearly demonstrated that Dabigatran with dose of 110mg bd was as effective as warfarin in preventing strokes but with lower bleeding
risk while the dose 150mg bd was superior to warfarin in stroke prevention and of similar bleeding risk\(^2\). The safety issues like lack of specific antidote, management of haemorrhage, optimal dosage for an individual and long term side effect about this new drug remain unanswered but it seems to be a promising alternative to warfarin.

**New Drug for Rhythm Control**

A revised anti-arrhythmic drug scheme for achieving rhythm control has been introduced in the new AF management guideline by ESC. Dronedarone (400mg bd) has been approved as the first line therapy in AF patients with and without structural heart disease. In addition, it is the first anti-arrhythmic agent approved by FDA with the indication of reducing the risk of cardiovascular hospitalisation among patients with non-permanent AF as demonstrated in the ATHENA study\(^2\). The most interesting finding from ATHENA is, perhaps, that the benefit of the new drug was not limited only to those converted to sinus rhythm in the post hoc analysis\(^2\) and may further support the notion that rate or rhythm strategy debate is probably not the key for favourable cardiovascular outcomes in selected AF patients. However, the new drug should not be considered as a true substitute for amiodarone particularly in patients with severe heart failure (New York Heart Association class III or IV) as it has been associated with worsening of heart failure in the ANDROMEDA study\(^2\). Although the efficacy in maintaining sinus rhythm might be lower than amiodarone\(^3\), the favourable side-effect profiles will certainly make dronedarone as the drug of choice in those with left ventricular hypertrophy, coronary artery disease and mild heart failure as stated in the new guideline. Data are lacking, however, about the efficacy of this new drug when comparing to flecainide or propafenone in those with no evidence of structural heart disease in preventing AF recurrence.

**Catheter Ablation Therapy for AF**

Symptoms like severe palpitation, dizziness, dyspnoea, impaired exercise tolerance are common in patients with AF. In the RECORD AF study, up to 76-85% of patients with AF were classified as having symptomatic AF. Previous studies had also demonstrated that the overall quality of life in patients with AF was even worse than those after myocardial infarction, reflecting the disturbing nature of the disease on daily living. Anti-arrhythmic drugs were ineffective in maintaining sinus rhythm with symptomatic recurrence in more than 50% in these patients even with amiodarone. In addition, the significant side effects of these anti-arrhythmic drugs e.g. liver toxicity, lung fibrosis and thyroid disorder have largely limited its role in clinical practice.

Previous studies have shown that the trigger of AF onset was commonly originated from premature atrial complex (PAC) coming from the myocardial sleeves wrapping around the ostia of the pulmonary veins. Electrical isolation of all 4 pulmonary veins preventing these PAC from entering the left atrium has been proven to be an effective method for controlling AF\(^4, 5\). In brief, radiofrequency lesions were delivered circumferentially to all 4 pulmonary veins after transeptal puncture. With the advances in technology and 3-dimensional mapping, the procedure time and success rate have been improved substantially. The procedure time has been shortened to 3-4 hours in experienced hands. Major complications including stroke, cardiac perforation and atrio-oesophageal fistula formation were low (<1%) in high volume centres\(^6\). Multiple randomised clinical trials comparing the efficacy of ablation versus medical therapy in drug refractory patients have unequivocally demonstrated the superiority of ablation over medical therapy and around 70-75% of patients would become AF free after 1 year of follow up. Moreover, the symptoms and frequency scores and quality of life by SF-36 were consistently in favour of pulmonary vein isolation. In 2006, AF ablation is recommended to patients who remained symptomatic despite at least 1 anti-arrhythmic drug. In the latest guideline, the procedure can also be recommended as the initial therapy in those with minimal or no structural heart disease as the post-ablation outcomes are the most optimal in these selected patients and obviating the needs of anti-arrhythmic drugs\(^2\).

**Conclusion**

With the ageing population, there will undoubtedly be a growing number of patients suffering from AF. Stroke prevention remains the top priority in the management algorithms in AF managements according to the latest guidelines. A proper risk stratification scheme is, in fact, available and should be routinely adopted in daily clinical practice. New oral thrombin inhibitors have great potential to replace the problematic vitamin K dependent oral anticoagulation drug and hopefully improve the acceptance of these evidence-based stroke prevention strategies to both patients and physicians. Novel anti-arrhythmic drugs with better side effect profiles may be useful in patients with structural heart disease but caution has to be taken in heart failure. Catheter ablation for AF is a preferred therapy in those with symptomatic AF despite anti-arrhythmic therapy and perhaps an initial therapy for young patients or those with minimal structural heart disease as they are expected to have the most favourable outcomes after ablation therapy. Rate or rhythm control strategy is no longer mutually exclusive to each other. An individualised treatment plan is needed for every single patient with AF.
References


