UNDERSTANDING THE STANDARD TREATMENTS AND THE TREATMENT OPTIONS OF ATRIAL FIBRILLATION

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Atrial fibrillation (AF), the most common cardiac arrhythmia, is associated with substantial morbidity and mortality due to the consequences of thromboembolic events. Framingham data suggest that patients with AF have a 1.5-2 fold increase in mortality rate when compared with the general population [1]. The overall objectives of treatment for AF include the prevention of complications, such as stroke, and maintaining the patient's functional ability and quality of life. Since AF encourages structural, functional and electrophisiologic changes of the left atrium [2], understanding the treatments for AF is critical for achieving these important objectives. Treatment of AF is complex and depends on whether the patient is currently experiencing symptoms, how long the patient has been in AF, the overall health of the patient, co-morbidities, and the size and function of the heart's chambers. General treatment options include pharmacological therapy, medical procedures, and lifestyle changes. The goals of treating AF include: preventing blood clots from forming, rhythm control, rate control and treating any underlying disorder causing or raising the risk of AF.

Rhythm control involves the restoration and maintenance of sinus rhythm. The benefits of sinus rhythm include decreasing symptoms, improved cardiac output and exercise capacity, and reduced risk for stroke [3,4]. The choice of antiarrhythmic drugs depends on the type of AF, any other medical conditions, side effects of the medicine chosen and how well the AF responds.

The antiarrhythmic therapy proves highly efficacious for some patients (< 50% of all patients). It is non-invasive but this approach is associated with high recurrence rate and adverse effects of the drugs. Several drugs can convert the irregular heart rhythm back to a normal regular rhythm: quinidine, procainamide, disopyramide, acainide, propafenone, amiodarone, sotalol, ibutilide and dofetilide.

Rate control involves using medications to maintain a ventricular rate under 100 beats per minute without attempting to terminate the arrhythmia [5]. Drugs used to slow the heart rate include: digoxin, beta-blockers (propranolol and atenolol), calcium antagonists, (diltiazem and verapamil), procainamide and quinidine. Beta-blockers and calcium channel blockers are first-line agents for rate control in AF. These drugs can be administered either intravenously or orally. Beta-blockers are especially effective in the presence of thyrotoxicosis and increased sympathetic tone or in patients with myocardial ischemia. Calcium channel blockers are more effective than digoxin when given orally for long-term rate control. They reduce rate of AV nodal conduction and ventricular response. Beta-blockers slow the sinus rate and decrease AV nodal conduction. Digoxin slows electrical conduction through the AV node and thus decreases the rate at which electrical impulses are conducted from the atria to the ventricles, and is often used to treat patients with heart failure.

Rate control versus rhythm control. Clinical trials such as AFFIRM, RACE and STAF [6,7,8] have compared a strategy of rate control versus rhythm control using antiarrhythmic drugs. All these trials reached the same conclusion: there is no mortality difference between the two approaches and that rate control may suffice for most patients with AF.

Cardioversion may be performed electively or emergently to restore sinus rhythm in patients with the new-onset AF. Cardioversion is most successful when

initiated within 7 days after the onset of AF. The need for cardioversion may be acute when AF is responsible for hypotension, heart failure or angina. Cardioversion can be pharmacologic based or electrical. Several antiarrhythmic drugs (flecainide, propafenone, dofetilide, amiodarone) have established efficacy in the pharmacologic conversion of AF to sinus rhythm. However, currently used drugs have limited efficacy and cause cardiac and extracardiac toxicity.

Anticoagulation. Before deciding the anticoagulation therapy for individual patient with AF it is important to estimate the risk of stroke. An easy score to estimate the risk of stroke is the CHADS2 score [congestive heart failure, hypertension, age >75 (doubled), diabetes, stroke (doubled)]. In patients with CHADS2 score of >2 chronic anticoagulant therapy is recommended in a dose adjusted to achieve an INR value in the range of 2.0 to 3.0 unless contraindicated. Patients with CHADS2 score of 0 can be safely treated with aspirin. The decision in patients with CHADS2 scores 1 or 2 are individualized and depend on the other risk: vascular disease, age 65-74 and sex category (female). Thus, more detailed stroke risk factors for thromboembolism are indicated [9]. Warfarin reduces the risk of stroke in patients with AF but increases the risk of hemorrhage and is difficult to use. Dabigatran is a new oral direct thrombin inhibitor, and as compared with warfarin, given at a dose of 110 mg, was associated with rates of stroke and systemic embolism similar to those with warfarin, but lower rate of major hemorrhage was observed [10].

Nonpharmacologic approaches. In some patients in whom AF cannot be adequately managed by pharmacological therapy and if no underlying cause can be found the treatment options are several nonpharmacological approaches like atrioventricular node ablation with pacemaker placement, catheter-based ablation, and surgical ablation. In 1998, Haissaguerre et al. first demonstrated that pulmonary veins (PVs) provided focal firings triggering the occurrence of paroxysmal AF [11]. Catheter ablation of the posterior left atrium, including the antra surrounding the PVs, has proven effective at ablating AF. There are different surgical ablative techniques that can effectively modify the atrial substrate: by making a series of atrial incisions and cryolesions. These procedures results in the interruption of the multiple reentry circuits necessary for the propagation of AF. The operation may be performed alone or in conjunction with other cardiac surgical procedures such as coronary artery bypass, atrial septal defect repair, congenital heart disease surgery or mitral valve repair [12].

In conclusion, understanding the different treatment options is vitally important for successful management of AF for further reducing cardiovascular morbidity and mortality.

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