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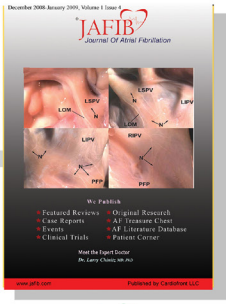

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# Atrial Fibrillation: a Patient's Guide to Understanding Drug Therapy

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## Introduction

Atrial Fibrillation (AF) as defined by the American Heart Association is an irregular heart beat (rhythm) where the small upper chambers of the heart (atria) beat ineffectively. The atria cannot pump all of the blood out of the chambers, resulting in pooling of the blood or clot formation. Unfortunately, if a part of the clot leaves the atria, it can become lodged in an artery in the brain resulting in an ischemic stroke.[1]

Atrial Fibrillation (AF) is the most common clinically significant heart rhythm problem and affects more than 5% of the population greater than 65 years of age.[2,3] Risk factors which predispose patients to a stroke include congestive heart failure (CHF), high blood pressure (hypertension), age > 75 years old, diabetes, and previous stroke/transient ischemic attack (TIA). Patients with AF and a significant risk factor account for about 15% of ischemic strokes nationally. According to the 2006 Atrial Fibrillation guidelines, patients should be treated with aspirin or warfarin to prevent ischemic strokes. Aspirin and warfarin help to prevent the formation of a clot thus decreasing the likelihood of having a stroke. The decision for which preventive drug to use depends on the number of risk factors a patient has.[4]

This paper will review two common treatment options for AF: 1) heart rate control and 2) heart rhythm control with medications. Multiple clinical trials have studied the effects of rhythm control versus rate control.[5,6,7,8,9] Most of these studies have included elderly patients with high blood pressure or another risk factor for stroke. In each study, the primary outcome which was studied did not differ between the two treatment groups (rate control vs. rhythm control). As a result of these studies, deciding which treatment to use has centered on whether a patient is symptomatic with AF or asymptomatic.[9] This discussion will focus on what medications are commonly used to control heart rate and which medications control heart rhythm.

Heart rate control refers to the heart rate of the ventricles (lower chambers of heart). The goal heart rate is 60-80 beats per minute at rest and 90-115 beats per minute with exercise.[3] An important point to remember is that if using medications to control heart rate, patients are still in AF, meaning the upper chambers of the heart are still beating irregularly. This implies that if the rate control option is chosen, patients with significant risk factors will need to be on therapy for stroke prevention (aspirin or warfarin). There are multiple classes of medications to control the heart rate. They include β (beta) blocking agents, calcium channel blockers (CCBs), and digoxin.

Examples of β blockers include metoprolol and atenolol. These medications work directly on the

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heart to decrease the heart rate. β blockers are well tolerated with few significant side effects although there are a few to monitor.[4,10] Some patients may experience fatigue due to the low heart rate associated with β blockers and patients with a history of asthma may experience an exacerbation but this has mainly been associated with high doses. β blockers may also lower blood pressure which would be beneficial in patients with hypertension.

Calcium channel blockers (CCBs) used for heart rate control include diltiazem and verapamil. These medications work by decreasing the electrical stimulation to the ventricles (lower chambers in the heart). This results in a lower heart rate. The most common gastrointestinal side effect is constipation which occurs more often in elderly patients. Diltiazem and verapamil may also lower blood pressure which would be beneficial in patients with hypertension. β blockers and CCBs have very similar effects on heart rate control; they are also comparable for onset of action and cost. The main difference lies in the other beneficial effects from β blockers. For example, medications such as metoprolol and atenolol have been shown to improve outcomes after a heart attack. Therefore, it a patient has AF and a history of a heart attack, choosing a β blocker would help control the heart rate but also help improve outcomes after the heart attack. Many of these factors are taken into consideration when choosing the best agent for rate control.

The last medication we will discuss for rate control is digoxin. Digoxin is derived from a digitalis plant and helps to control the heart rate by decreasing electrical conduction into the ventricles. Digoxin has a delayed onset of action compared to β blockers and CCBs and should be used if one of these medications is not successful in controlling the heart rate. Digoxin may have beneficial effects for patients with congestive heart failure (CHF) and should be considered for patients with CHF who require rate control for their AF.[4,10]

In summary, treating AF with rate control medications requires warfarin or aspirin therapy for patients with risk factors for a stroke. The medications used for rate control are relatively safe, and patients experience few intolerable side effects from β blockers, CCBs and digoxin. For patients with asymptomatic AF and no contraindications to aspirin or warfarin therapy, rate control is a feasible option to decrease incidence of stroke and improve symptoms of elevated heart rate.

Medications which would control the heart rhythm are known as antiarrhythmic medications. These medications would theoretically prevent the atria from beating irregularly and return the patient to a regular, normal heart rhythm. There are many medications which can be used to convert a patient with AF back to a regular heart rhythm. Unfortunately, most of these medications can also cause other heart rhythm problems so clinicians are careful to prescribe these medications in patients who are least likely to experience heart rhythm problems. Examples of antiarrhythmic medications used to treat AF are amiodarone, dofetilide, sotalol, flecainide, propafenone, procainamide, and quinidine. Through various mechanisms, these medications help to restore a normal rhythm to the heart. The effectiveness of each medication has been established but certain conditions predispose patients to the successful conversion to a regular heart rhythm.[4] For example, in patients with CHF, amiodarone has been shown to be the most successful with the least effect on causing another heart rhythm problem. Although this sounds like a great option for CHF patients, amiodarone has been associated with significant side effects and clinicians are careful to choose this medication for patients who are least likely to experience these long term side effects. There are specific situations where each of the antiarrhythmic medications would be an optimal choice in patients with AF.[4,5,8]

In conclusion, the choice between heart rate control and heart rhythm control depends first on symptoms with AF in a patient. If a patient experiences significant symptoms with AF, it is prudent to try rhythm control management to improve quality of life.[4, 5, 7] If however a patient is relatively symptom free and at high risk for experiencing side effects with antiarrhythmic medications, it would be wise to choose a medication to control the heart rate. The decision to choose heart rate control or heart rhythm control in patients with AF is complicated and involves balancing the benefits gained with therapy with the side effects associated with the medications to treat AF.

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