

Rate vs. Rhythm Control: Making the Decision

As stated in recently published guidelines, there is no evidence that rhythm control or rate control is superior to the other, and both are recommended as acceptable initial approaches in all but permanent AF (rate control preferred). The choice of approach is not trivial, and should be made to best achieve patient well-being and quality of life. Pre-existing patient characteristics may make a rhythm control approach impossible, and rate control should be sought instead.

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Case 1: Chris



Chris, 44, is a healthy engineer but feels generally unwell, without specific complaints. A routine exam reveals an irregularly irregular pulse at 110 bpm and an ECG shows atrial fibrillation with rapid ventricular response and no other abnormalities.

This is Chris's first documented episode of atrial fibrillation and he has no other co-morbidities. His echocardiogram is normal.

Which strategy is best for Chris? For the answer, see page 42.

The physician managing a patient with atrial fibrillation (AF) has three goals:

- the improvement of patient well-being (reduction of symptoms and improvement of quality of life [QOL]),
- the prevention of stroke and
- the prevention of late consequences of AF (such as tachycardia-induced cardiomyopathy).

Current evidence suggests that these goals can be accomplished by pursuing either rhythm control (restoration and maintenance of sinus rhythm [SR]) or rate control (control of the ventricular response in AF without regard to the atrial rhythm) strategies.

Symptoms and quality of life

The causes of symptoms in patients with AF are complex and only partially understood. Symptoms range from palpitations and shortness of breath to decreased exercise tolerance and anxiety. They arise due to rapid ventricular rate, irregularity of rhythm and other factors, such as underlying heart disease and a patient's subjective perceptions.

Most older patients with AF can have their symptoms well-controlled or even eliminated with either a rhythm or rate control strategy. In younger, more active patients, achievement of SR has been associated with somewhat better QOL and increased exercise tolerance.

Case 2: Hoshiar



Hoshiar, 85, has a dilated, non-ischemic cardiomyopathy and an ejection fraction of 38%. He presents with atrial fibrillation of unknown duration and symptoms of exercise intolerance. He is on atenolol, 25 mg, once daily, ramipril, 10 mg, once

daily, and no anticoagulation.

Which strategy is best for Hoshiar? For the answer, see page 42.

Rate vs. Rhythm Control

Table 1. Factors favouring rate vs. rhythm control

Favours rate control	Favours rhythm control
Persistent atrial fibrillation	Paroxysmal atrial fibrillation
Recurrent atrial fibrillation	First episode of atrial fibrillation
Less symptomatic	More symptomatic
≥ 65 years of age	≤ 65 years of age
Hypertension	No hypertension
No history of chronic heart failure	History of chronic heart failure
Previous anti-arrhythmic drug use	No previous anti-arrhythmic drug use
Patient preference	Patient preference

Reproduced from: Wyse DG, Simpson CS: Rate control versus rhythm control—Decision making. Can J Cardiol 2005;21 Suppl B:15B-8B.

Choosing rate versus rhythm control for QOL and exercise tolerance must be individualized for each patient, as there are no large subgroups of patients for whom one strategy has resulted in improved symptoms and QOL. Patient preference for a given approach should be carefully considered. Other patient characteristics (discussed below) can influence the decision to pursue a rhythm control strategy or reject it in favour of rate control. Patients with paroxysmal AF, in whom symptoms can be clearly correlated with occurrence of AF (*e.g.*, on Holter or loop monitoring) should be considered for rhythm control.

Factors favouring rate vs. rhythm control

Factors predictive of a successful rhythm control approach and those favouring an initial rate control approach are listed in Table 1. Choosing a rate control approach because of intolerance to anti-arrhythmic drugs is of particular importance in some elderly patients; in the Atrial Fibrillation Follow-up Investigation of Rhythm Management trial, there was an increase in hospitalizations in the rhythm control arm driven, in part, by side-effects of anti-arrhythmic drugs.

Both approaches have limitations, though the rhythm control strategy may not be as widely applicable. Table 2 lists various methods of rhythm and rate control and common limitations to their use.

Note that it is common (and sometimes necessary) to try one strategy first and switch between strategies depending on the response. This is especially valuable in persistent AF; after cardioversion, QOL can be re-assessed to determine the symptomatic benefit of sinus rhythm in the individual patient.

FAQ

Which patients should I refer for the restoration of sinus rhythm?

While any patient can be considered, those who have highly symptomatic atrial fibrillation, are under 65 years of age, have congestive heart failure symptoms, and can tolerate anti-arrhythmic drugs should be strongly considered for rhythm control.

Table 2. Methods of rate and rhythm control in AF: Advantages, disadvantages and contraindications

Rate Control	Advantages	Disadvantages	Contraindications (relative or absolute)
Pharmacologic			
Digoxin	Well-tolerated, symptom control in CHF	Poor control of HR during exercise	Renal failure (use with caution)
Beta-blockers	Potent lowering of ventricular rate	Decreases exercise tolerance in some patients, side-effects	Asthma, reactive airway disease
Calcium channel blockers	Potent lowering of ventricular rate		Poor LV function, CHF
Non-Pharmacologic			
AV node ablation and pacing	Lowers and regularizes ventricular rate, effective for symptoms	Pacemaker dependence, possible long-term LV dysfunction	
Rhythm Control			
Pharmacologic			
<i>Class I agents</i> Propafenone, flecainide	Well-tolerated in patients without structural heart disease, low incidence of toxicity	Less likely than amiodarone or sotalol to maintain SR.	CAD, structural heart disease
<i>Class III agents</i> Amiodarone	Most likely to maintain SR	Long-term toxicity (more of a consideration in younger patients)	Lung disease, liver disease
Sotalol	HR lowering and class III anti-arrhythmic effect	Pro-arrhythmic potential (torsades) beta-blockade, related side-effects	Renal failure
Non-pharmacologic			
DC cardioversion	Immediate restoration of sinus rhythm	AF relapse likely without concomitant anti-arrhythmic treatment	
AF ablation (pulmonary vein isolation)	Potential cure of AF	Limited target population, long-term results uncertain, procedure-related complications	
Atrial defibrillator	Immediate, patient-controlled restoration of SR	Absolute compliance with anticoagulation essential, limited data regarding symptom control, morbidity	
Atrial pacing	Non-pharmacologic maintenance of sinus rhythm	Low efficacy, requires pacemaker implant	

AF: Atrial fibrillation
 CHF: Chronic heart failure
 HR: Heart rate
 LV: Left ventricular


AV: Atrioventricular
 SR: Sinus rhythm
 CAD: Coronary artery disease

The information for Table 2 was originally published in The Canadian Journal of Cardiology 2005; 21(Suppl B):15B-18B.

Preventing late complications

The development of AF is an adverse prognostic factor for morbidity and mortality, particularly in patients with congestive heart failure. Patients who remain in sinus rhythm have lower mortality than those with persistent AF, but it is not clear that actively achieving SR with a rhythm control strategy confers increased survival or whether it is simply a marker for patients who will have a better outcome. Regarding tachycardia-induced cardiomyopathy, the relationship between it and AF with uncontrolled ventricular response is conjectural, and there is no evidence to suggest that pursuing one strategy over another will more effectively prevent the development of LV dysfunction.

Stroke prevention

Stroke is the most devastating consequence of atrial fibrillation and it is well established that its incidence can be greatly reduced by anticoagulation in patients with risk factors (age > 65, hypertension, diabetes, previous stroke or transient ischemic attack, structural heart disease/LV dysfunction, mitral valve disease). Even in patients in whom SR is thought to have been achieved, prolonged episodes of asymptomatic AF occur and this increases the risk for stroke. In most cases, anticoagulation should be continued regardless of rhythm achieved. In the Atrial Fibrillation Follow-up Investigation of Rhythm Management trial, there was no difference in stroke incidence between rate and rhythm control groups, but a majority of strokes occurred in patients in whom anticoagulation had been discontinued. 

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More on Chris

Rhythm control (cardioversion) is reasonable and feasible. While Chris does not need long-term warfarin (acetylsalicylic acid will suffice), he should be anticoagulated for three weeks prior to cardioversion and four weeks after.

Chris is started on sotalol, 80 mg, twice daily, prior to cardioversion and afterwards. He is in sinus rhythm on followup three months later.

More on Hoshiar

Given the presence of left ventricular dysfunction, it is elected to try and restore sinus rhythm (SR) to improve symptoms. Hoshiar is loaded with, and continued on, amiodarone and given warfarin to maintain a therapeutic international normalized ratio for three weeks.

He is cardioverted electively. The procedure is successful, but atrial fibrillation recurs within two weeks, even on adequate doses of amiodarone. Symptoms were slightly improved while in SR. It is decided to pursue a rate control approach. Digoxin is added and his atenolol dose is increased; amiodarone is discontinued and warfarin is continued. He feels improved to the same degree as he did while in SR.

FAQ

If rhythm control is achieved, can I reassure the patient that he/she will no longer need warfarin?

No. Patients with successful clinical rhythm control are known to have ongoing episodes of silent atrial fibrillation. They therefore have the same risk of stroke as prior to therapy and anticoagulation needs to be continued based on their existing stroke factors.

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FAQ

What is the “pill in the pocket” approach?

For patients with repeated episodes of symptomatic paroxysmal atrial fibrillation and no structural heart disease, an “as needed” rhythm control approach can be taken. A single large dose of flecainide, 300 mg, or propafenone, 600 mg, can be taken at the time of symptom onset to try to restore sinus rhythm before the patient presents to the emergency department for treatment. This strategy, which can be effective in some patients, should first be attempted under observation in the hospital.

Resources

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Take-home message

- Clinical trials have demonstrated that in patients with atrial fibrillation, both rate control and rhythm control are acceptable as initial approaches to management. The exception is permanent AF in which rate control is the preferred strategy.
- The decision to choose one strategy over another should be made to achieve the best possible patient well being and quality of life. Relief of symptoms of AF, such as palpitations, shortness of breath, and exercise intolerance should be the goal.
- Beyond patient symptoms and preference for one or the other therapy, factors that may influence the choice of rhythm control include: age < 65 and the presence of congestive heart failure. Rate control may be preferable in older patients who are more likely to suffer side-effects and complications of anti-arrhythmic drugs.
- A change from one strategy to the other may be required several times before the ideal management for a specific patient is found.
- Stroke prophylaxis must be continued based on patient risk factors, not the strategy chosen or ultimate rhythm achieved.
- Treat the patient, not the ECG!



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