QUESTION: Is a long term rate control strategy as effective as a rhythm control strategy for atrial fibrillation (AF)?

Design
Randomised (allocation concealed†), blinded (outcome assessors and monitoring committee‡), controlled trial with a mean follow up of 3.5 years (Atrial Fibrillation Follow up Investigation of Rhythm Management [AFFIRM] study).

Setting
213 clinical sites in North America.

Patients
4060 patients who were ≥ 65 years of age (mean age 70 y, 61% men) or had other risk factors for stroke or death; had AF that was likely to be recurrent, likely to cause illness or death, and warranted long term treatment; and had no contraindications to anticoagulants. Follow up was 98%.

Source of funding:
National Heart, Lung and Blood Institute.

Abstract and commentary also appear in ACP Journal Club.

Intervention
2027 patients were allocated to rate control using the following drugs alone or in combination as selected by the treating physician: β blockers, calcium channel blockers (verapamil and diltiazem), or digoxin. Target heart rate was ≤ 80 beats/min at rest and ≤ 110 beats/minute during the 6 minute walk test. Continuous anticogulation was required. 2033 patients were allocated to rhythm control using the following antiarrhythmic drugs alone or in combination: amiodarone, disopyramide, flecainide, moricizine, procainamide, propafenone, quinidine, sotalol, or dofetilide. Cardioversion could be used if necessary. Continuous anticoagulation was encouraged, but could be stopped if sinus rhythm was maintained for ≥ 4, but preferably 12, consecutive weeks with antiarrhythmic drugs. After failure of ≥ 2 trials of either a rate control or rhythm control drug, patients could be considered for non-pharmacological therapy, such as radio frequency ablation, a maze procedure, and pacing techniques as appropriate to the randomised strategy. The goal for anticoagulation with warfarin was an international normalised ratio of 2.0–3.0.

Main outcome measures
The main outcome was overall mortality. A secondary outcome was a composite of death, disabling stroke, disabling anoxic encephalopathy, major bleeding, and cardiac arrest.

Main results
Analysis was by intention to treat. During the course of the study, 248 patients crossed over from the rate control group to the rhythm control group, and 594 patients from the rhythm control group crossed over to the rate control group. The rate control and rhythm control groups did not differ for death (table) or the secondary composite endpoint (32.7% vs 32.0%, p=0.33).

Conclusion
A rate control strategy and a rhythm control strategy had similar effects on mortality and cardiovascular morbidity in patients with atrial fibrillation.

*See glossary.
†Information provided by author.

Continued on next page
Rate control was not inferior to rhythm control for recurrent persistent atrial fibrillation


QUESTION: Is rate control inferior to rhythm control for persistent atrial fibrillation (AF)?

Design
Randomised [allocation concealed*†], blinded [outcome assessors and monitoring committee*†], controlled, non-inferiority trial with mean follow-up of 2.3 years (Rate Control vs Electrical Cardioversion for Persistent Atrial Fibrillation [RACE] Study).

Setting
31 centres in the Netherlands.

Patients
522 patients (mean age 68 y, 63% men) with recurrent persistent AF or flutter, 1–2 electrical cardioversions during the previous 2 years, and no contraindications to oral anticoagulation. Exclusion criteria were arrhythmia lasting >1 year, New York Heart Association class IV heart failure, current or previous treatment with amiodarone, or a pacemaker. All patients were included in the analysis.

Intervention
256 patients were allocated to rate control, which comprised digitalis, a non-dihydropyridine calcium channel blocker, and a β blocker; alone or in combination. Target resting heart rate was <100 beats/minute. 266 patients were allocated to rhythm control and had electrical cardioversion without previous treatment with antiarrhythmic drugs. Criterion for non-inferiority was an upper boundary of the 90% confidence interval (CI) ≤10% for the difference between the incidence of the primary endpoint in the rate control group and the rhythm control group.

Main outcome measure
A composite endpoint of death from cardiovascular causes, heart failure, thromboembolic complications, bleeding, need for pacemaker implantation, or severe adverse effects of antiarrhythmic drugs. Criterion for non-inferiority was an upper boundary of the 90% confidence interval (CI) ≤10% for the difference between the incidence of the primary endpoint in the rate control group and the rhythm control group.

Main results
Analysis was by intention to treat. The rate control group was not inferior to the rhythm control group for the primary endpoint (table) or for the individual components of death from cardiovascular causes, heart failure, thromboembolic complications, bleeding, or pacemaker implantation. The rate control group had fewer severe adverse effects of antiarrhythmic drugs (table).

Conclusion
Rate control was not inferior to rhythm control for persistent recurrent atrial fibrillation and was associated with fewer severe adverse effects from antiarrhythmic drugs.

OUTCOMES Rate control Rhythm control Absolute difference (90%, CI)

| Composite endpoint | 17.2% | 22.6% | -5.4% (-11.0 to 0.4) |
| Severe adverse effects | 0.8% | 4.5% | -3.7% (-6.0 to -1.4) |

For correspondence:
Dr IC Van Gelder,
University Hospital,
Groningen, The Netherlands.
ic.vangelder@ thoraxazg.nl

Abstract and commentary also appear in ACP Journal Club.

Rate control v rhythm control for recurrent persistent atrial fibrillation at mean 2.3 years follow up

COMMENTARY—continued from previous page

Given that rate control is currently a mainstay of AF treatment, is there a “best drug” for rate control? Probably not. But because cardiac disease and hypertension are common in patients with AF, β blockers such as metoprolol would be an appropriate first choice for patients who can tolerate this class of drugs. The literature suggests that patients may require more than one drug for good rate control.

Alan Silver, MD, MPH
North Shore-Long Island Jewish Health System
Lake Success, New York, USA