

## A Sober Reality? Alcohol, Abstinence, and Atrial Fibrillation

Anne M. Gillis, M.D.

Atrial fibrillation is the most common sustained arrhythmia and is associated with significant morbidity, including an increased risk of stroke and death. The prevalence of atrial fibrillation is predicted to at least double over the next 4 decades. This emerging atrial fibrillation epidemic is fueled by the aging of the population, as well as lifestyle factors including more sedentary activity and a substantial increase in obesity worldwide.<sup>1</sup> These factors are associated with an increase in hypertension, type 2 diabetes mellitus, and obstructive sleep apnea, all of which are important risk factors for atrial fibrillation.

The treatment of atrial fibrillation has focused predominantly on prevention of stroke and management of arrhythmia with rate-control or rhythm-control strategies. However, more recently, there has been an increased focus on aggressive modification of risk factors for prevention of atrial fibrillation.<sup>1,2</sup> Modifiable risk factors include hypertension, obesity, diabetes, sleep apnea, sedentary lifestyles, and alcohol consumption. Studies have shown that a successful strategy for sustained weight loss (more than 10% of body weight) is associated with reduced blood pressure, improved glycemic control, normalization of lipid profile, and reduced burden or recurrence of atrial fibrillation without the use of antiarrhythmic drugs or ablation.<sup>2</sup>

Moderate-to-heavy alcohol consumption is strongly associated with incident atrial fibrillation in both men and women.<sup>3-5</sup> There appears to be a dose-dependent effect, with 1 drink per day associated with a reported 8% increased risk of incident atrial fibrillation.<sup>3</sup> Alcohol is also reported to be a common trigger for episodes of paroxysmal atrial fibrillation.<sup>6</sup> The mechanisms by which alcohol precipitates atrial fibrillation are multifactorial.<sup>7</sup> Excessive exposure to alcohol causes triggered atrial activity,<sup>8</sup> increases sympathetic tone or parasympathetic tone (or both), shortens atrial refractoriness, and reduces sodium channel expression.<sup>7</sup> These effects provide the triggers and substrate for maintenance of atrial fibrillation. Regular moderate alcohol consump-

tion is associated with clinically significant atrial electrical and structural remodeling, including left atrial dilatation, atrial fibrosis, and slowing of conduction.<sup>7,9</sup> Myocardial inflammation, oxidative stress injury or activation of the renin-angiotensin system (or both) associated with hypertension, elevated left atrial pressure, and other risk factors for atrial fibrillation may contribute to atrial remodeling and the substrate for atrial fibrillation.<sup>7</sup>

In this issue of the *Journal*, Voskoboinik et al. report the results of a randomized clinical trial in Australia evaluating an intervention of abstinence from alcohol among regular drinkers with a history of atrial fibrillation.<sup>10</sup> A total of 70 patients randomly assigned to alcohol abstinence successfully reduced their alcohol intake from a mean ( $\pm$ SD) of 16.8 $\pm$ 7.7 standard drinks per week to 2.1 $\pm$ 3.7 standard drinks per week (87.5% reduction), with complete abstinence achieved by 61% of patients in that group; 70 patients assigned to the control group reduced their intake from 16.4 $\pm$ 6.9 to 13.2 $\pm$ 6.5 drinks per week (19.5% reduction). Alcohol abstinence was associated with a modest reduction in weight (3.7 kg), as well as a reduction in both systolic and diastolic blood pressure. Over 6 months of follow-up, survival without recurrent atrial fibrillation was significantly prolonged and atrial fibrillation burden was significantly reduced in the abstinence group. The trial was well designed and conducted, and participants' adherence to the randomized intervention was high.

The results of the current trial confirm that alcohol is an important modifiable risk factor in the management of atrial fibrillation. However, there are some important limitations to note. The sample size was small, and the vast majority of participants were men (85%). Alcohol consumption per week at baseline was moderate to heavy. The overall burden of atrial fibrillation was quite low (<2%), and the total duration of follow-up was only 6 months.

Some important questions remain unanswered. Would a strategy of alcohol abstinence

be as effective in patients with a higher burden of atrial fibrillation who presumably have more serious atrial electrical or structural remodeling that would confer a predisposition to recurrent atrial fibrillation? Would a reduction in alcohol consumption to more modest levels or nondaily alcohol consumption (or both) rather than complete abstinence be effective in preventing atrial fibrillation?<sup>4,5</sup> Do responses differ according to sex? Subgroup analyses suggest that women may not have benefitted from alcohol abstinence, but the trial was not adequately powered to address this question.

Finally, can abstinence from alcohol be sustained over the long term? It is important to emphasize that the steering committee revised the study protocol and shortened the follow-up to 6 months from a planned 12 months owing to challenges in recruiting participants who were willing to abstain from alcohol for 12 months. Alcohol consumption is strongly embedded in the food and societal culture of Australia as well as other westernized countries. “Everything in moderation” is a common adage used in discussions of risk-factor modification with patients who have atrial fibrillation. However, the current study presents a compelling argument for alcohol abstinence as part of the successful management of atrial fibrillation. Nevertheless, the sobering reality is that for many persons with atrial fibrillation, total abstinence from alcohol may be a difficult goal to achieve.

Disclosure forms provided by the author are available with the full text of this editorial at NEJM.org.

From the Department of Cardiac Sciences, University of Calgary, Libin Cardiovascular Institute of Alberta, Calgary, AB, Canada.

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