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**The Value of Implantable Cardioverter Defibrillators in Managing Atrial
Fibrillation
Daniel Frisch, M.D.**

Atrial fibrillation (AF) is associated with an increased risk of mortality as well as significant morbidity including bothersome symptoms, exacerbation of heart failure, and thromboembolic events.^{1 2-6} Explanations for the mortality risk are variable, but the majority opinion favors AF as a marker of reduced health status, especially cardiovascular health.^{6,7}

In patients with congestive heart failure (CHF) AF is especially problematic. Atrial fibrillation may occur in 10% to 30% of patients and is associated with both a reduction in exercise capacity and a worsened long-term prognosis.^{8 9} As CHF class increases there is a concomitant rise in the prevalence of AF, which often adversely affects outcome.^{9 10} A particular harbinger of poor outcome is the new diagnosis of AF in patients with CHF. These patients require additional medical attention as they are at increased risk of mortality.^{11 12-14}

The diagnosis of atrial fibrillation can be made in several ways, most often by electrocardiography, when patients present with symptoms.^{15,16} In more than 10-25% of patients, however, AF is discovered in the absence of symptoms or after a complication attributable to AF.^{7,17} An obvious limitation of relying on symptoms and of

episodic screening for AF is that silent episodes may occur during periods without observation.

In an era where the indications for implantable devices continue to grow, along with the ability to perform sophisticated telemetry monitoring, it is not surprising that AF is being diagnosed during routine device interrogation. Importantly, device-derived atrial high rate episodes correlate with true AF diagnosis.^{18,19} In one study, 38% of patients with a history of AF had episodes of AF lasting more than 48 hours noted at the time of interrogation despite these patients being asymptomatic and in sinus rhythm at the time of evaluation.²⁰ In patients receiving pacemakers for sinus node dysfunction up to 68% may have device-documented AF over time.²¹ This is especially true in patients with a history of AF. In one cohort without documented AF prior to implant, atrial high-rate episodes lasting longer than 5 minutes were noted in 29% of the patients.²² Furthermore, detection of atrial high-rate events in devices is a predictor of poor outcome.²³ Based on these observations, it is likely that the current estimates of AF prevalence in the general population may eventually be revised upward.

In this issue of the *Journal*, Dr. Bunch et al. have submitted an analysis from the Inhibition of Unnecessary RV Pacing with AV Search Hysteresis in ICDs (INTRINSIC RV) study that evaluated newly-detected AF (as diagnosed by the proprietary Atrial Rhythm Classification algorithm) in patients with and without a history of AF.²⁴ Over 80% of the cohort had New York Heart Association (NYHA) Class II heart failure or greater. In an unadjusted model comparing patients with and without a history of AF, the

cohort with prior AF had significantly more CHF hospitalizations, death, and ICD shocks. After adjustment for baseline characteristics these differences were attenuated, and after further adjustment for medication differences, there were no statistical differences. It is interesting that adjustment for medication differences eliminated the differences in death, CHF hospitalization, and ICD shocks between the groups with and without a history of AF. The authors consider that effective medication use may have mitigated the cardiovascular risk factors that would have predisposed to adverse outcomes. This finding stands in contrast to observations made by others, which have shown increased ICD therapies, heart failure progression, and mortality in patients with a history of AF.^{25,26} The disparity possibly reflects differences in medication use and modification of other co-morbidities.

An additional observation was that new-onset AF during the first three months after implant in patients without a prior history of AF (45 of 1170, 4%) was associated with a significant increased risk of death [HR 2.86, p=0.05] but not with inappropriate ICD shock or CHF hospitalization after adjustment. In the group without a history of AF there was a 3.2% incidence of death (n=36) when no AF was documented and an 8.9% incidence (n=4) when AF was diagnosed within the first 3 months after implant. Though the numbers are small, these patients may represent a particularly high-risk group. Although the duration of the AF episodes is not stated, this may be of some relevance. In an analysis of the Mode Selection Trial (MOST), atrial high event rate episodes of 5 minutes or longer predicted an increased risk of cardiovascular events including stroke.²³

In contrast, another study looking at the duration of atrial high rate events, found that only episodes lasting longer than one day increased risk.²⁷

The investigators also noted that 12% of the cohort received an ICD shock during the first 3 months after implantation. Occurrence of a shock was associated with an increase in hospitalization for CHF and for subsequent shocks, but not death. In a similar population that was followed longer, the presence of any shock carried a higher risk of death.²⁸ Both reports are reminders that any ICD shock carries the potential for unfavorable consequences in patients with left ventricular dysfunction.

An important limitation, voiced by the authors, bears emphasis which is that up to a third of patients with “new-onset AF,” may have had AF prior to device implantation. The analyses presented in this paper should be interpreted cautiously in light of this scenario.

Overall there are three relevant findings in this study. First, aggressive medical therapy may mitigate the negative impact of AF in ICD patients, possibly by addressing underlying cardiovascular issues and possibly by avoiding inappropriate shocks. Second, the development of AF may herald an adverse change in clinical status necessitating intensification of care. Finally, this report reiterates the value of implanted devices to serve as patient monitors, in addition to their ability to deliver therapy, and compels further investigation.

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