HEART OF THE MATTER

Atrial Fibrillation and ICDs

The confluence of atrial fibrillation and an implanted cardioverter defibrillator for primary prevention of sudden death in patients with chronic heart failure is coming under increased scrutiny as a cause for inappropriate shocks. Current guidelines advise the use of an ICD or CRT-D (cardiac resynchronization therapy–defibrillator) in chronic heart failure patients with an ejection fraction of less than 35%.

It is well known that atrial fibrillation (AF) is a common occurrence in heart failure patients. AF is the most common reason for inappropriate ICD shocks, which comprise 20%-25% of all ICD discharges (J. Am. Coll. Cardiol. 2008;51:1357-65).

SIDNEY GOLDSTEIN, M.D.

Inappropriate shocks have as yet been of little concern other than a cause of transitory discomfort to the patient and its impact on the patient's quality of life. However, recent follow-up examinations of patients suggest that inappropriate shocks in heart failure are more frequent in patients who also have AF, and that such patients have an increased mortality risk.

In a study of AF in ICD patients, 85% of whom were implanted for primary prevention, 27% had either paroxysmal or chronic persistent AF at the time of implantation (J. Am. Coll. Cardiol. 2010; 55:879-85). During the 3 years of follow-up, 4% developed new AF. The incidence of inappropriate shock was twice as frequent in patients with AF, compared with those with normal sinus rhythm. Patients with persistent AF experienced a significant, twofold increase in mortality, compared with patients in sinus rhythm. In the Sudden Cardiac Death in Heart Failure Trial (SCD-HeFT) using a single-lead defibrillator, appropriate shocks occurred in 48% of patients and inappropriate shocks comprised 32% of defibrillator shocks. Patients receiving either appropriate shocks for ventricular tachyarrhythmias or inappropriate shocks had an increased risk of mortality (N. Engl. J. Med. 2008;359:1009-17).

Inexpert programming may be a major cause of inappropriate shocks, according to a retrospective analysis of 89,000 patients that focused on the physiologic causes of inappropriate shocks in patients with new-onset or chronic AF presented by Dr. Bruce Wilkoff at the annual meeting of the Heart Rhythm Society. Dr. Wilkoff, of the Cleveland Clinic Foundation, suggests that the occurrence of inappropriate shocks is largely related to a low heart rate threshold for the discharge of a shock (more than 180 bpm), a rate that often encompasses the rate of AF, making it unlikely that the ICD will discriminate that rhythm from slow ventricular tachycardia or fibrillation, thus leading to inappropriate shocks. As the device comes out of the box it is preprogrammed at 180 bpm, and according to Dr. Wilkoff the implanter rarely adjusts it. This is probably more likely to occur in patients implanted by nonelectrophysiologists, which occurs in 25% of instances. He reported that in this retrospective study, increasing the rate threshold can decrease the frequency of inappropriate shocks by 17%-28%. He further makes a plea to adjust the threshold of ICD discharge to more than 200 bpm at the time of implantation (CARDIOLOGY NEWS June 2010, p. 1).

There is some suggestion that the single-chamber ICD, the most commonly implanted ICD for primary prevention in heart failure patients, is not as sensitive to the recognition of supraventricular tachycardia as is a dual-chamber ICD, and therefore more likely to lead to an inappropriate shock (Circulation 2007;115:9-16). The MADIT-RIT trial is currently recruiting patients in a randomized trial using a dual-chamber ICD comparing standard programming to higher rate cutoff or a longer discharge delay or both on the frequency of inappropriate shocks. An additional objective of the trial will be to examine if these changes will affect mortality and morbidity.

The cause of heart failure progression in patients is uncertain and difficult to predict. It is possible that the development of AF is itself a marker for progression. On the other hand it is possible that ICD discharge may lead to further tissue loss or the generation of new or lethal arrhythmias in a previously compromised ventricle. Evidence for these possibilities is lacking. MADIT-RIT may throw more light on the subject.

After years of effort to expand the number of patients receiving ICDs, device manufacturers are now turning their efforts to making the devices safer. Modification of triggering thresholds can go a long way to making the life of the implanted patient more comfortable. Whether these modifications will improve survival is yet to be seen. ■

DR. GOLDSTEIN, medical editor of CARDIOLOGY NEWS, is professor of medicine at Wayne State University and division head emeritus of cardiovascular medicine at Henry Ford Hospital, both in Detroit. He is on Data Safety Monitoring Committees for the National Institutes of Health and several pharmaceutical companies.

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Sales Director, IMNG
Mark E. Altier, 973-290-8220, m.altier@elsevier.com

National Account Manager
Courtney Leonard, 973-290-8223, c.leonard@elsevier.com

Advertising Offices 60 Columbia Rd., Bldg. B, 2nd flr., Morristown, NJ 07960, 973-290-8200, fax 973-290-8250

Classified Sales Manager, IMNG
Robert Zwick 973-290-8226, fax 973-290-8250, r.zwick@elsevier.com

Classified Sales Representative
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Editorial Offices 5635 Fishers Lane, Suite 6000, Rockville, MD 20852, 877-524-9335, cardiologynews@elsevier.com

Address Changes Fax change of address (with old mailing label) to 973-290-8245 or e-mail change to subs@elsevier.com

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Senior Systems Administrators Lee J. Unger, Kreg M. Williams

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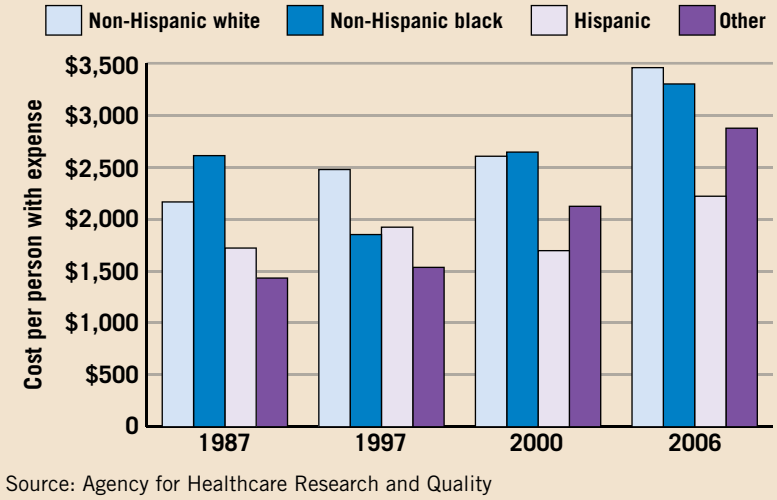

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