Atrial fibrillation is generally associated with a nonphysiologic rapid ventricular rate, which in and of itself may create cardiomyopathy or aggravate underlying ventricular dysfunction. Rate control thus becomes critically important, and medical therapy with beta-receptor antagonists is usually employed. Additional measures include digoxin and sometimes amiodarone. Some patients may benefit from atrioventricular (AV) junctional ablation to permanently eliminate tachycardia by deliberately creating complete heart block; rate is then controlled, and rhythm is regularized via an implanted permanent pacemaker. This technique is commonly known as "ablate and pace." For patients with refractory tachycardia despite medical therapy, or when medications are poorly tolerated, this approach can improve quality of life and ventricular function (11,12). Generally, this invasive strategy has been reserved for the small numbers of patients who meet stringent criteria because it renders the patient pacemaker-dependent.

Cardiac resynchronization therapy (CRT) has recently been introduced to correct ventricular dyssynchrony present in many patients with bundle branch block and HF. Substantial laboratory and clinical experience preceded small- and large-scale clinical trials, and ultimately brought this innovative technology to the clinic with established indications, namely NYHA functional class III to IV, left ventricular ejection fraction (LVEF) <35%, and QRS duration >120 to 130 ms. Interestingly, virtually all patients who participated in the clinical investigations of CRT were in sinus rhythm, and there is precious little experience of applying CRT in patients with HF and AF.

Why does it matter if the patient who may otherwise qualify for CRT has AF? Patients with AF have no AV synchrony, so coordinated AV pacing with appropriately programmed AV intervals is not possible. Thus, biventricular pacing delivery, and more importantly capture, cannot be reliably assured. Patients with AF often have consistent or intermittent excessive ventricular rates, necessitating pacing at higher than desired programmed pacing rates, if indeed pacing can keep up with the underlying rate and pattern. Special pacing features can attempt to consistently overtake the spontaneous rhythm, but may do so at the expense of higher rates or may not be consistently effective. Even when pacing is delivered, many ventricular complexes may be fused or pseudo-fused, making pacing capture percentages retrievable from the CRT device inaccurate and an overestimate of effective pacing capture. It is generally believed that near maximal effective and complete biventricular capture is necessary to assure optimal CRT response.

Although CRT has now undergone rigorous and thorough investigation, only 1 randomized clinical trial permitted enrollment of patients with AF, and all others were restricted to patients in sinus rhythm. This trial, MUSTIC (Multisite Simulation in Cardiomyopathies), was a randomized crossover 6-month investigation; a substudy (13) enrolled patients with NYHA functional class III heart failure,
message that all CRT patients should be regularly interrogated to ensure close to 100% capture and, if not, to take prudent measures to achieve this goal regardless of underlying rhythm.

This is an important large observational study, but the results must be interpreted cautiously. The study did not randomly allocate the ablation therapy, and it is possible that the nonablated group differed in some important way that affected outcome. On the surface, there were no important differences between the groups, but unmeasured variables certainly may have been discrepant. The relative contributions of better rate control and CRT in the ablated group could not be discerned. It is also conceivable that the perceived need to perform ablation was triggered by factor(s) that simply identified a group of patients who were destined to respond to CRT regardless of the imposition of ablation. Although unlikely, continuation of drugs in the nonablated group to achieve rate control, which were not needed in the ablated group, may have unexpectedly influenced some end points (19). The interrogation of biventricular pacing percentage was performed only once and may have been inaccurate or unrepresentative. No data are available regarding hospitalization and mortality. The foregoing discussion is most relevant to those with permanent AF; patients with paroxysmal AF or AF of shorter duration going discussion is most relevant to those with permanent AF and HF. This study suggests that simply inserting a CRT device will not be effective in many of these patients, perhaps the majority—this is a major concern. The results of this study also beg the question of whether all patients with advanced refractory HF and permanent AF should have AV ablation before CRT. Certainly, recent data (20–22) have laid the groundwork for more frequent use of the “ablate and pace” approach in some specific clinical contexts, but to create pacemaker dependency in large numbers of HF patients will require definitive results from a well-designed and powered randomized clinical trial.

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