

Editorial Comment

Radiofrequency Catheter Ablation for Idiopathic Right Ventricular Tachycardia: First, Last or Only Therapy—Who Decides?*

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As in the adult, radiofrequency catheter ablation has significantly changed the approach to the child with sustained tachyarrhythmias. Initially reported for the treatment of patients with the Wolff-Parkinson-White syndrome (1), radiofrequency catheter ablation has been extended in application to include concealed accessory connections, atrioventricular node reentry and primary atrial and ventricular arrhythmias. Overall, success rates as high as 94% have been reported for children and adolescents (2), with procedural complication rates and outcomes primarily correlated with experience (3).

As profound as the impact of catheter ablation has been on the approach to the patient with sustained tachyarrhythmias, it has equally changed the practice of clinical electrophysiology. In pediatric cardiology, this has given rise to several centers of electrophysiology/ablation emphasis, with these centers functioning as referral centers for multiple states or geographic regions (4). Physicians at these centers may receive several referrals in a given day and at times must decide on the appropriateness of catheter ablation for a given patient based solely on data provided by the referring institution. At times, this is not problematic, as in the patient with cardiac arrest or syncope and pre-excitation; however, at other times, the history is less substantive, such as in the patient with palpitations and a short PR interval on the electrocardiogram.

Further confounding this situation are the constraints imposed by managed care regimes, which may dictate that preclinical testing and evaluation be performed and interpreted at the patient's primary center. Frequently, these tests or their results are only available to the electrophysiologist during the immediate precatheterization evaluation, by which time the patient and extended family are fully anticipating a definitive cure of what has been described to them as a potentially life-threatening problem. Thus, the electrophysiologist may

feel compelled to proceed with the procedure to maintain rapport with both the patient and family as well as the referring physician.

Several of these issues may be considered in context of the report by O'Connor et al. (5) on the successful ablation of idiopathic right ventricular tachycardia in five of six children, 6 to 16 years old, in this issue of the Journal. Briefly, successful ablation sites were located in the outflow portion of the right ventricle, similar to several earlier reports of ablation of nonsustained and sustained ventricular tachycardia in adults (6,7). Although this technique appears to be successful, several concerns must be considered before a more global advocacy of this treatment can be endorsed. The first relates to the risk of the disease (arrhythmia) compared to the risk of the procedure. For several decades, a generally benign prognosis had been reported for idiopathic monomorphic ventricular tachycardia originating from the right ventricular outflow tract in the absence of structural heart disease (8). In the study by O'Connor et al., only two patients were symptomatic (palpitations and chest pain), and no patient had experienced syncope. Although there have been a few case reports of unexpected sudden cardiac arrest in patients with idiopathic monomorphic ventricular tachycardia, the exclusion of arrhythmogenic right ventricular dysplasia cannot be ensured from methods of prior decades. This seemingly benign prognosis needs to be balanced with the report of Coggins et al. (9) on radiofrequency catheter ablation for idiopathic ventricular tachycardia, which concluded with the statement that "significant complications (including death) can occur and should be considered in the risk/benefit analysis for each patient."

A second concern relates to the high number of prolonged (20 to 120 s) radiofrequency energy applications in several of these patients. The average number of attempted ablations was 23 ± 15 /patient, which is high compared with those reported in adult series. It is appropriate that the authors cite the study of Saul et al. (10), which suggested late enlargement of radiofrequency lesions placed in the ventricles of infant lambs. Histologic lesions were notable for the invasion of normal myocardium by fibrous and elastic tissue. This finding raises the possibility of "iatrogenic right ventricular dysplasia" after repeated applications of radiofrequency energy in the previously "normal" heart. It is clear that a much larger series and longer follow-up period will be required to resolve these concerns.

A third issue relates to that of volume of experience and the number of centers performing these procedures in young patients. The effect of a "learning curve" has been demonstrated for catheter ablation of several arrhythmias in children and will most likely apply for idiopathic ventricular tachycardia (3). Because the total number of young patients with idiopathic right ventricular tachycardia who require treatment with catheter ablation will undoubtedly remain limited, proficiency in this area will be difficult to achieve.

A final issue is that of noninducibility of ventricular tachycardia in the catheterization laboratory. Although all six pa-

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tients were reported to have exercise-induced sustained ventricular tachycardia, only two had sustained tachycardia during catheterization as a guide to electrophysiologic mapping. In two patients, mapping was guided by single premature ventricular contractions or bigeminy, which may be confounded by fusion with sinus beats as well as the uncertainty of the response of these isolated beats to attempted radiofrequency catheter ablation.

These are limitations, concerns and uncertainties that the referring cardiologist needs to assess before making a patient referral with the anticipation of successful and complication-free catheter ablation. Clearly, there are some patients with idiopathic ventricular tachycardia who experience hemodynamic compromise with their arrhythmia and in whom antiarrhythmic drug therapy is either ineffective or associated with unacceptable side effects. In these patients, catheter ablation represents a rational therapy, with recognition of the previously discussed potential limitations. However, in other patients monomorphic, repetitive ventricular ectopic activity may be neither symptomatic or problematic.

A careful evaluation of both anatomy and hemodynamic significance of idiopathic ventricular tachycardia or any other arrhythmia should be made by the patient's cardiologist. Although cognitive input from the referral center may guide the decision process, treatment or nontreatment recommendations should be made at the primary center of care with a full understanding of the potential limitations and risks of the procedure compared with that of the risk of the arrhythmia. This will allow a reasoned selection of patients for catheter

ablation such that this therapy will be the first, last or only option when appropriate for a given patient.

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