

A Perspective on the Role of Catheter Ablation in the Management of Tachyarrhythmias

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Introduction

The first clinical application of a catheter ablation technique was to create complete atrioventricular (AV) block by the transcatheter delivery of a direct-current shock to the AV junction in patients with supraventricular tachycardia refractory to pharmacologic therapy.^{1,2} This was followed by attempts at catheter ablation of ventricular tachycardia (VT) foci, accessory pathways, and atrial tachycardia foci. The purpose of this article is to provide a perspective on the current role of these catheter ablation techniques in the management of patients with tachyarrhythmias.

General Comments

Requirements for Physicians Performing Catheter Ablation

Physicians who perform catheter ablation procedures should be competent in all areas of clinical electrophysiology. This requires a minimum of one year of training devoted to clinical electrophysiology. The physician must be able to determine accurately tachycardia mechanisms; to identify and localize accessory pathways, and to map the exit sites of ventricular tachycardia. In addition to technical competency in these areas, the physician should be experienced with the use of pharmacologic therapy, devices such as the automatic implantable cardioverter/defibrillator, and the surgical approaches to the therapy of tachycardias. The interests of the patient are best

served by physicians who are experienced not only with catheter ablation techniques, but also with the other available forms of nonpharmacologic therapy. Only physicians who are familiar with the pros and cons of all forms of nonpharmacologic therapy are able to select the best form of therapy for a given patient.

Resources Necessary for Performing Catheter Ablation

Certain resources must be available for performing detailed electrophysiologic studies in the initial evaluation of potential catheter ablation candidates.

A cardiothoracic surgeon and an operating room equipped for cardiopulmonary bypass should be immediately available in the event of cardiac tamponade. Although the risk of perforation of a myocardial structure is small with the catheter ablation techniques currently in use, it is nevertheless possible that a catheter-related problem may result in a misdirected shock and myocardial or coronary sinus perforation. Surgical back-up, therefore, must be available.

In addition, hospitals in which catheter ablation procedures are performed should have the capability for continuous electrocardiographic monitoring in the post-ablation period. Patients must be carefully observed for the occurrence of new arrhythmias related to the intracardiac shocks.

Catheter Ablation of the AV Junction

Efficacy and Risk

The Percutaneous Mapping and Ablation Registry has accumulated data on the efficacy and

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ery of shocks to the wall of the right atrium or in the right atrial appendage.^{12,13} Experience with this technique is preliminary and any conclusions regarding its role in the management of patients who have atrial tachycardias would be premature.

Expectations for the Future

Development of a catheter technique which reliably modifies AV conduction without creating high degree AV block would result in resolution of symptomatic tachycardias without the need for a permanent pacemaker. Modification of the AV junction has been difficult to achieve with direct-current shocks, but it is possible that better techniques will be developed with the use of laser or radiofrequency. Eventually, catheter "modification" (as opposed to "ablation") may become a reasonable alternative to pharmacologic therapy, instead of a last resort, in patients who have symptomatic supraventricular tachycardias.

At this point, it seems unlikely that catheter ablation will ever assume a major role in the treatment of patients with VT who often have diffuse myocardial disease and multiple potential VT foci. Furthermore, in many cases there may not be an actual VT "focus," but instead a large area of macroreentry. It therefore may be unrealistic to expect that any technique which produces small and discrete lesions will be effective in a large proportion of patients who have recurrent VT.

Preliminary experience suggests that catheter ablation of posteroseptal and right free-wall accessory pathways may have an acceptable risk/benefit ratio. More accurate mapping techniques will undoubtedly be important for improving results of catheter ablation of right-sided accessory pathways. It remains to be determined whether a safe and effective catheter technique for ablating left free-wall accessory pathways can be developed.

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