

Catheter Ablation of Accessory Pathways: Can We Do Better by Using Dual Chamber Mapping ?

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Abstract

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Radiofrequency catheter ablation of accessory pathways was first introduced in the late 1980's through the pioneering efforts of Mel Scheinman, Fred Morady, Warren Jackman, and others (1). The procedure was rapidly shown to be safe and effective. While initially performed as a staged procedure with a diagnostic EP study performed weeks in advance of ablation, the concept of "diagnosis and cure" during the same procedure was shown to be feasible in 1991 and has adopted worldwide (2). As evidence of the safety and effective of ablation of APs, a single center clinical trial of 250 patients with an accessory pathway in 1994 reported a success rate of 94 %, and a complication rate of 4 % (3). And, a large multicenter clinical trial in

1999 reported a success rate of 93 % (4). It is notable that these excellent results were achieved with point by point electrogram based mapping under fluoroscopic guidance prior to the development of 3D mapping systems such as Carto, Ensite, and the Arrhythmia mapping system. Over the past 10 – 20 years there has been a gradual adoption of 3D mapping systems for all ablation procedure. As an experienced operator with excellent results achieved with only fluoroscopic mapping, I initially did not see the value in employing a 3D mapping system for these “simple” ablation procedures. But with time my approach has changed and I now employ 3D mapping systems with all ablation procedures. Consistent with my experience, a recent large retrospective multicenter study revealed both improved efficacy and a lower fluoroscopy exposure in patients who underwent RF catheter ablation of an accessory pathway guided by 3D mapping as compared with the standard fluoroscopic approach (5).

In this issue, Mori et al. present their study investigating the relative utility of standard 3D single chamber mapping using the Ensite or Carto mapping systems with 3D dual chamber mapping approach using the Arrhythmia mapping system (6). This single center nonrandomized trial enrolled 111 patients undergoing catheter ablation of an accessory pathway. Fifty patients had a standard 3D single chamber map performed and 61 patients had the Arrhythmia guided 3D dual chamber map performed to determine the location of the accessory pathway. The end points of the trial were ablation success, recurrence rates, number of RF lesions, total RF ablation time, RF dose, fluoroscopy time, and fluoroscopy dose. The results of the study revealed no difference in ablation success (50/50 vs 61/61) or AP recurrence during follow-up (2/50 vs 1/50, p NS). Each of the other parameters studied were shorter in the Arrhythmia dual chamber arm as compared with the conventional single chamber arm: # RF applications 1 vs 3, RF time 9.2 vs 96.6 sec, RF energy 248 vs 2867 J, fluoro time 19.2 vs 26.5 min, fluoro dose 52.5 vs 119 mGy. The only complication was cardiac tamponade due to RV perforation in one patient in the dual chamber group.

The results of this study are impressive. The Arrhythmia mapping system was shown to have several advantages as compared with the standard 3D single chamber approach. Of particular note were the reduction in the number of RF lesions needed for success (median of 1 vs 3) as well as marked reductions in RF time and RF energy. The 7-minute reduction in fluoroscopy time is also notable. Before all EPs go out an acquire the Arrhythmia mapping system, or utilize it for AP ablation if they have access to this mapping system, it is important to consider some of the limitations of this study. The first limitation was that it was retrospective in design. Secondly, operator bias cannot be excluded. And third there was no mention of total procedure time and the cost of the procedure. In my experience what matters most to patients is freedom from complications, and acute and long-term procedure success. These parameters did not differ. A third parameter patients and hospitals care about is total procedure time. And as noted above, this information was not provided and a fourth parameter that health systems and insurers care about is procedure cost. And again, as noted above, this information was not provided. I suspect patients care little about whether 1 or 3 RF applications was needed for success nor about the total RF energy delivered. Patients do care about fluoroscopy time and radiation exposure. And for this parameter the Arrhythmia dual chamber mapping approach was superior. But does a 6-minute difference in fluoroscopy time really matter when it comes to radiation associated risk to patient?

At the end of the day we should congratulate Dr Mori and his colleagues for conducting an important clinical trial comparing standard single chamber 3D mapping and 3D dual chamber mapping with the Arrhythmia system. These investigators have taught us the value of 3D dual chamber mapping. It will be fascinating to see the ripple effect of this study. Will EPs all over the world start using this system when mapping and ablating a patient with an AP or not? For me the answer is not yet. I have performed thousands of procedures with my current 3D mapping system including hundreds of patients with an AP. My outcomes have been excellent and I see no need to utilize a different system. But if I run across a patient where I am unable to be successful with a standard approach, I will be very tempted to utilize the Arrhythmia system if a second ablation procedure is needed.

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