A 37-year-old man with frequent episodes of paroxysmal atrial fibrillation refractory to antiarrhythmic therapy (and no other documented arrhythmias on multiple Holter examinations) underwent an attempt at radiofrequency ablation of the atrial fibrillation. Catheter positions are shown in the left anterior oblique view in Figure 1 and include 2 catheters in the left and right upper pulmonary veins. During mapping, the patient developed atrioventricular node reentry tachycardia (AVNRT) both spontaneously and with atrial extrastimuli; this AVNRT was later ablated. Before ablation, the patient’s rhythm spontaneously changed from AVNRT to atrial fibrillation (Figure 2). The catheter in the right upper pulmonary vein clearly recorded pulmonary venous potentials, which initiated atrial ectopic beats (as seen in the change of the activation sequence in the coronary sinus) and subsequent atrial fibrillation.

Atrial fibrillation is a common occurrence in patients with supraventricular tachycardias, including AVNRT, and often starts during the supraventricular tachycardia. The mechanism by which atrial fibrillation begins during supraventricular tachycardias is unknown, although spontaneous atrial premature depolarizations have been cited as a trigger. Furthermore, the mechanism behind why atrial fibrillation recurs after successful ablation of supraventricular tachycardia is unknown. As seen in this patient, 1 site from which spontaneous ectopy can initiate atrial fibrillation during AVNRT is in the pulmonary veins; this is similar to what has been reported during sinus rhythm. This provides a potential mechanism for the continued incidence of atrial fibrillation after successful ablation of AVNRT and perhaps other supraventricular tachycardias as well.

References

Transition From Atrioventricular Node Reentry Tachycardia to Atrial Fibrillation Begins in the Pulmonary Veins
Eugen C. Palma, Kevin J. Ferrick, Jay N. Gross, Soo G. Kim and John D. Fisher

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