Radiofrequency catheter ablation of atrioventricular nodal reciprocating tachycardia using intracardiac echocardiography in pregnancy

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We describe a case report of a 32-year-old woman during the 10th week of pregnancy with symptomatic and recurrent atrioventricular nodal reciprocating tachycardia successfully treated by conventional radiofrequency ablation, under intracardiac echocardiography surveillance.

Introduction

Conventional radiofrequency (RF) treatment for drug refractory paroxysmal supraventricular tachycardia occurring during pregnancy arises concerns about the foetus exposure to radiation and should be avoided if possible, especially during the first trimester.1

We describe the case of a pregnant woman with a drug-refractory, poorly tolerated atrioventricular nodal reciprocating tachycardia (AVNRT) successfully treated by RF ablation with intracardiac echocardiography (ICE) guiding and without radiation exposure.

Case report

A 32-year-old woman presented at the 10th week of pregnancy with poorly tolerated, recurrent palpitations and multiple admissions at the emergency department, where the electrocardiogram documented episodes of narrow QRS complex tachycardia (heart rate 170 bpm.) with regular RR interval and no P-waves evidence. Owing to the patient refusal of pharmacological therapy, a decision was made to attempt RF catheter ablation of the tachycardia under ICE surveillance, in order to avoid fluoroscopy and X-ray exposure.

The procedure was performed in the EP laboratory. Intracardiac echocardiography was performed using a commercially available 9F–9 MHz Ultra ICE catheter-based ultrasound transducer (EP Technologies, Boston Scientific Corp., San Jose, CA, USA). The Ultra ICE catheter was introduced percutaneously into the left femoral vein through a 55° precurved polyethylene long venous sheath (Convoy, EP Technologies, Boston Scientific Corp., San Jose, CA, USA) to guide the advancement of a quadripolar catheter (Spike ultra 4R/6 J 125, Fiab, Florence, Italy) and a 4-mm-tip ablation catheter (Cerablate Easy, Osypka Medical, Berlin, Germany) along the venous system (Figure 1) and in the heart chambers (Figure 2). Using two atrial extra-stimuli, a dual pathway conduction was demonstrated with the initiation of AVNRT (Figure 3). Three RF applications were delivered at the posterior portion of the Koch’s triangle, where a slow potential was recorded. At the end of the procedure and 30 min later, AVNRT was no longer inducible both without and with isoproterenol infusion. Total procedural time was 80 min. Neither complications were associated with the procedure or overt effect was noted on the foetus.

Discussion

There are only a few reported cases of RF ablation in pregnant women, mostly performed with fluoroscopy guiding; more recently, a strict radioactive dosimeter surveillance and a three-dimensional mapping system approach have been successfully used.2,3 In patients with AVNRT, ICE may facilitate slow pathway ablation, because it can clearly visualize the structures in and around Koch’s triangle, and may be useful in locating the ablation tip and the endocardial contact, obviating the need for fluoroscopy.4,5 To the best of our knowledge, this is the first report describing a RF ablation of a AVNRT with ICE guiding and without fluoroscopic exposure during the first trimester of pregnancy. In conclusion,
Figure 1  Intracardiac echocardiography imaging during the catheters advancement in the venous system. Intracardiac echocardiography guided the catheters advancement from the right femoral venous entry site, through the IVC (A and B), into the RA (C). AO, aorta; CS, coronary sinus; FO, fossa ovalis; IVC, inferior vena cava; RA, right atrium; RV, right ventricle; and TV, tricuspid valve.
Figure 2. Intracardiac echocardiography imaging during electrophysiological study and radiofrequency ablation. (A) Upper right atrium level with the atrial catheter positioned at the level of interatrial septum. (B) Tricuspid valve level with the catheter position in the right ventricle. (C) Tricuspid valve level with the catheter pullback from the right ventricle to the region of His bundle. (D) Tricuspid valve level with catheter position in the posterior region of Koch’s triangle.

Figure 3. Slow-fast atrioventricular nodal re-entrant tachycardia induction at electrophysiological study. HRA, upper right atrium electrogram and HBE, His bundle electrogram.
ICE-guided RF catheter ablation could be an alternative approach in highly symptomatic patients with AVNRT whenever patient conditions suggest to avoid X-ray exposure.

Conflict of interest: none declared.

References


