Radiofrequency catheter ablation of left ventricular outflow tract tachycardia with the assistance of the CartoSound system

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Catheter ablation of left ventricular outflow tract tachycardia (LVOTT) holds the risk of complications, if foci are located close to the coronary artery orifices. The use of an accurate three-dimensional electro-anatomic approach is necessary to avoid ablation in the coronaries. We report a case in which we demonstrate the value of the CartoSound system, in the ablation of LVOTT.

Introduction

Catheter ablation of left ventricular outflow tract tachycardia (LVOTT) is still a challenging issue, when foci are located in the proximity of the coronary orifices, enlarging thereby the risk of complications.1 We report a case in which we demonstrate the advantages of the CartoSound (Biosense Webster, Inc., Diamond Bar, CA, USA) system in the ablation of LVOTT.

Case report

A 54-year-old female patient was referred to our institute with 2 years history of premature ventricular complexes (PVC). Her main complaints were palpitations, and occasional dyspnoea, enhanced by physical exercise. Premature ventricular complexes on surface ECG showed left bundle branch block morphology, vertical axis in the frontal plane, with transition in V2 in the precordial leads indicating that PVCs had LVOT origin (Figure 1). Premature ventricular complexes in bigemin fashion and a 3 s non sustained ventricular tachycardia were observed during stress testing. Echocardiography described an ejection fraction of 43%, moderate diffuse hypokinesia, and concentric left ventricular hypertrophy. Contrast-enhanced retrospective ECG triggered Dual-Source MSCT Angiography (Siemens AG, Somatom Definition, Erlangen, Germany) was performed 7 days before ablation. It revealed slight calcification in the left main coronary artery and in the left anterior descending artery. At the time of referral, she was taking valsartan, hydrochlorothiazide, magnesium, potassium, and amiodarone. Her previous medication included bisoprolol that, however, did not provide any symptomatic improvement. An electrophysiology study was performed because of hardly tolerated palpitations. Three-dimensional (3D) reconstructions were performed from multislice CT angiography prior to ablation using Carto software. Reconstructions depicted left ventricle, aorta, and coronary arteries. At the beginning of the procedure, ventricular bigeminy was observed. A Sound Star intracardiac echocardiography (ICE) catheter was inserted into the right atrium via femoral venous approach, and a Navistar ablation catheter was inserted into the left ventricle via femoral artery approach. The endocardial contours of the left ventricle, the aortic root, and the right coronary artery were traced on the ICE images at the time of the onset of the QRS.

Figure 1 Twelve-lead surface ECG prior to ablation (left side) and after ablation (right side). Premature ventricular complexes on surface ECG showed left bundle branch block morphology, vertical axis in the frontal plane, with transition in V2 in the precordial leads indicating that PVCs had LVOT origin.
and merged with the 3D reconstructed CT angiographic image (Figure 2). With electro-anatomic mapping, the source of PVCs, i.e. the site of earliest activation (−113 ms before the onset of the QRS), was identified, which was located in the left sinus of valsalva, 1.8 cm below the left main coronary orifice. Radiofrequency ablations (30 W, 1 min, 50 °C) in this location resulted in the elimination of the arrhythmia. In order to avoid ablation in the coronary artery and to guarantee safe lesion formation, the ablation catheter was continuously visualized with ICE during RF current application. Programmed ventricular pacing after ablation did not induce any ventricular arrhythmia.

Discussion
This case demonstrates the effectiveness of the CartoSound system in cases when highly accurate anatomic approach and controlled lesion formation are most important. CartoSound system enables the depiction of the ultrasonic contours in an arbitrary phase of the heart cycle, which results in more accurate merging with ECG-gated angiographic images such as coronary CT angiograms. ICE also provides direct visual control of lesion formation during ablation.2

Conflict of interest: none declared.

References