Atrial fibrillation ablation procedure using electroanatomic reconstruction of the right and left atrium in a patient affected by dextrocardia

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We describe a case report of a patient affected by drug refractory persistent atrial fibrillation and dextrocardia, who underwent an ablation procedure using an electroanatomic mapping system.

Case presentation

In 2005, a 69-year-old woman was admitted to our Cardiology Department for an ablation procedure of a persistent atrial fibrillation. The patient was symptomatic for impaired functional status, and she was refractory to pharmacological treatment with antiarrhythmic drugs of class IA, IC, and amiodarone. Furthermore, she was affected by dextrocardia (atrial situs inversus, atrioventricular concordance and ventriculoarterial concordance) with situs viscerus inversus; the echocardiogram showed a mild biatrial enlargement with normal ventricular systolic function.

Figure 1 (A) and (B) Anterior and posterior projection of the heart of the patient affected by dextrocardia, respectively. (C) and (D) Anterior and posterior projection of the right and left atria (created using an electroanatomic mapping system), respectively, of the same patient. RA, right atrium; LA, left atrium; RV, right ventricle; PA, pulmonary artery; AO, aorta.
Two months before the ablation procedure, the patient underwent a 16-slice spiral computed tomography (CT), which showed a typical pattern of dextrocardia as depicted in Figure 1A. In addition, the CT images were essential to understand the patient’s anatomy: as shown in Figure 1B, the pulmonary veins (PVs) had a common trunk on the right side of the morphological left atrium and there were two separate pulmonary veins with early branching on the left side of the morphological left atrium.

**Procedure**

A multipolar catheter was positioned in the coronary sinus from the left internal jugular vein. The mapping catheter and the probe for intracardiac echocardiography were inserted through the left and the right femoral vein, respectively. The transseptal catheterization was guided by fluoroscopy and intracardiac echocardiography (ICE—Boston Scientific) as described by Dr Roberto De Ponti1 in his paper.

The three-dimensional reconstruction of the right and left atrium, based on the CT images, was carried out during atrial fibrillation rhythm using an electroanatomic mapping system (CARTO Biosense-Webster, Diamond Bar, CA, USA). Normal voltages were registered at bipolar voltage maps of both atria (Figure 1C and D).

After the mapping, a circumferential catheter ablation (Navi-Star™, Thermo-Cool™, Biosense-Webster, Diamond Bar, CA, USA) of the PVs ostia was performed by delivering sequential radiofrequency energy applications with an irrigated-tip catheter. The sinus node rhythm was restored by electrical cardioversion, and the ablation was validated by observing the complete abatement of potentials inside the ablation lines and by testing a bidirectional block of the atrium–vein conduction using a circular mapping catheter (Lasso™, Biosense Webster). The procedure took 3 h and 30 min during which there was a fluoroscopy exposure of 52 min.

During a 12-month follow-up, there were no recurrences of atrial tachyarrhythmias and there was no need for antiarrhythmic therapy.

**Commentary**

There are three significant aspects in this report: first, to our knowledge, this is the first case of atrial fibrillation ablation procedure using an electroanatomic mapping system in a patient affected by dextrocardia; secondly, the electroanatomic mapping system was very useful in understanding the complexities of an inverted anatomy and thirdly, the CT images proved to be a great aid in the planning and preparation for the intervention.

**Conflict of interest:** none declared.

**Reference**


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**CASE REPORT**

**Pacemaker-mediated tachycardia with varying cycle length: what is the mechanism?**

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As new algorithms are being developed to promote intrinsic atrioventricular conduction in preventing the deleterious effects of right ventricular pacing, more complex rhythm strips can be encountered. In our patient with a dual-chamber implantable cardioverter-defibrillator, such an algorithm resulted in a pacemaker-mediated tachycardia with several changes in cycle length.

**Case report**

A 63-year-old woman was transferred to our hospital after an episode of polymorphic ventricular tachycardia (VT) triggered by a junctional rhythm with prolonged QT. Echocardiography revealed the aspect of a hypertrophic cardiomyopathy. There was a familial history of sudden cardiac death. She was initially treated with a temporary pacemaker to prevent bradycardia-dependent polymorphic VT by overdrive pacing. Because of persistent underlying bradycardia and the suspicion of a hypertrophic or infiltrative cardiomyopathy with an increased risk of sudden death, a dual-chamber implantable cardioverter-defibrillator (ICD) (Biotronik Lumos 340 DR-T XL) was successfully implanted on the third day after transfer. Lead measurements at implantation and initial ICD settings are listed in Table 1. After a diagnostic work-up, the diagnosis of cardiac amyloidosis was finally made.

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