CARDIAC PACING

UNIQUE IMAGE REVIEW

Cardiac Resynchronization Therapy in a Patient with Dextrocardia and Situs Inversus

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ABSTRACT. Situs inversus totalis with dextrocardia is a rare congenital anomaly and there are only a few case reports of cardiac resynchronization therapy (CRT) implantation in these patients. We describe the procedure of CRT implantation in a patient with dextrocardia.

KEYWORDS. Cardiac resynchronization therapy, dextrocardia.

Case presentation

Cardiac resynchronization therapy (CRT) in patients with dextrocardia can be technically challenging. There are a few case reports of this procedure in the literature.1–3 A 60-year-old man with dextrocardia and situs inversus totalis, left bundle branch block, and congestive heart failure was referred for CRT defibrillator device implantation. He had non-ischemic cardiomyopathy with New York Heart Association functional class II and left ventricular ejection fraction of 20–25%. Cardiopulmonary exercise testing showed marked reduction in maximal oxygen consumption to 11.5 ml/kg/min.

Procedure

A bilateral axillary venogram was performed first to exclude left and right persistent superior vena cava (PSVC). There was no PSVC present. The right axillary vein was cannulated and the right ventricular and atrial leads were implanted. The coronary sinus was cannulated in the right anterior oblique (RAO) projection with a 120-cm-long Daig Response™ CSL (St. Jude Medical, Minnetonka, MN) catheter introduced through a straight Attain™ sheath (Medtronic Inc., Minneapolis, MN). A left anterior oblique (LAO) projection of the CS venogram was obtained as shown in Figure 1. A large straight inferolateral branch appeared suitable for CS lead implantation (arrow in Figure 1). Two Versacore wires (Abbott Vascular Inc., Santa Clara, CA) were used to stabilize the Attain™ sheath and subselect the target branch as shown in Figure 2. The left ventricular lead (Medtronic 4598, Medtronic Inc.) was delivered through the Attain™ sheath into the inferolateral branch over a 0.014 Acuity Whisper™ wire extra distal support (EDS) coronary sinus J-shaped tip (CS-J) (Boston Scientific, Maple Grove, MN). Figure 3 shows the final result. Figure 4 shows the electrocardiogram before and after the CRT.

Discussion

Situs inversus totalis with dextrocardia is a rare congenital anomaly affecting 2 in 10,000 live births in the United States.4 In situs inversus, all organs are the mirror image of their usual anatomic position and the morphologic left atrium is to the right of the morphologic right atrium. Dextrocardia can be associated with other congenital cardiac anomalies or it can be an isolated finding with normal life expectancy.2,5 These patients are increasingly surviving into adulthood and may present with heart failure.

For CRT implantation, one should know that in patients with dextrocardia the RAO view serves as the equivalent of a LAO projection in the normal heart.3 Therefore either an RAO view should be used or the fluoroscopy image should be reversed so that the visual feel of the procedure is closer to normal. We performed a bilateral axillary venogram to exclude left and right PSVC, as has

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Figure 1: The left anterior oblique projection of coronary sinus venogram in a patient with dextrocardia. The arrow points to the straight inferolateral branch that appeared suitable for coronary sinus lead implantation.

Figure 2: The left anterior oblique projections showing the process of subselecting the target branch for coronary sinus lead implantation using two Versacore wires. (a) Initially the wire on top was inserted in a branch to stabilize the Attain™ sheath then the second wire was inserted in the inferolateral branch. (b) Both wires are in the inferolateral branch.
Figure 3: The final result of cardiac resynchronization therapy implantation in a patient with dextrocardia. (a) Left anterior oblique projection. (b) Right anterior oblique projection.

Figure 4: (a) Electrocardiogram before implantation of cardiac resynchronization therapy in a patient with dextrocardia. (b) Electrocardiogram of the same patient after cardiac resynchronization therapy.
been reported previously.\textsuperscript{6} If right PSVC is not present, then the anatomy is more favorable for right-sided device implantation.

References


