ICD-DX implantation in a patient with dextrocardia after in-operating-room ventricular fibrillation during pacemaker replacement – a case report

Damian Małecki^{1,B-D}, Marcin Michalak^{2,C-E}, Marcin Grabowski^{2,A-B,E}

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1 Medical University of Warsaw

2 1st Department of Cardiology, Medical University of Warsaw

Address for correspondence:

Damian Małecki, Medical University of Warsaw
email: dammalecki@gmail.com

Marcin Michalak, 1st Department of Cardiology, Medical University of Warsaw
email: mmajkelak@gmail.com

Marcin Grabowski, 1st Department of Cardiology, Medical University of Warsaw
email: marcin.grabowski@wum.edu.pl

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Introduction

Dextrocardia is a rare congenital anomaly of chest anatomy, resulting in the heart being located mostly in the right hemithorax and the apex pointing to the right side. The prevalence of this condition is 0.83 in 10,000 pregnancies^[1]. If the patient affected by dextrocardia requires implantation of a pacemaker (PM), it may result in technical difficulties due to abnormal anatomy^[2].

Case report

A 72-year-old woman with a VVI pacemaker as the treatment of paroxysmal 2:1 atrioventricular block (a single chamber PM was implanted due to technical difficulties in 2008) was admitted to the hospital for elective pacemaker replacement because it was approaching the end of battery life. The patient was prepared for the procedure in the operating room, and the pacemaker setting was changed to VVI 40 bpm to promote an intrinsic rhythm. While administering local anaesthesia (1% xylocaine) ventricular tachycardia (VT) with heart rhythm >200 bpm occurred, which briefly evolved to ventricular fibrillation

(VF). VF was successfully stopped with a 200 J shock. Previous settings of the PM were restored. The PM replacement was postponed and the patient was transferred to the Cardiological Intensive Care Unit (CICU). A few episodes of non-sustained VT were observed later at the CICU. Echocardiography did not reveal any structural heart disease, and coronary angiography showed no significant coronary artery disease or vascular anomalies. The patient was qualified for implantation of an implantable cardioverter-defibrillator (ICD). Due to complex anatomy of the heart and the presence of sinus rhythm, a single chamber ICD with atrial sensing (ICD-DX) was chosen as the patient did not agree to removal of the old lead. The procedure and perioperative period were uncomplicated.

Discussion

Pacemaker implantation in a patient with dextrocardia can be challenging for an operator. Reversed anatomy of the heart requires extended attention while introducing the leads into the heart and placing them in the right position. The lead implanted in 2008 was placed in a rather atypical position (Fig. 1),

Figure 1.

but the operator performing ICD implantation decided to place the lead traditionally, with its tip at the apex of the anatomic right ventricle (Fig. 2).

Figure 2.

The patient was qualified for ICD implantation because of the episode of VF which occurred in the operating room. The aetiology of VF was unclear in this case. It might have been triggered by 40 bpm bradycardia (which was a result of changing the pacemaker settings prior the replacement procedure) or xylocaine, the drug used for local anaesthesia, but no firm conclusion can be made. Because spontaneous arrhythmia could not be excluded, the patient was qualified for ICD implantation as secondary prevention of sudden

cardiac death. Since the patient's ejection fraction (EF) was 68%, cardiac resynchronization therapy (CRT) was not taken into consideration.

The patient did not agree to the removal of the old ventricular lead, so the ICD-DX device was chosen due to its VDD pacing capability while using just one lead to provide ventricular stimulation synchronised with atrial rhythm (Fig. 3).

Figure 3.

Previously, the patient had a VVI pacemaker implanted but because of preserved sinus rhythm atrioventricular dissociation was present (Fig. 4). The VVI pacing mode is acceptable

Figure 4.

but is not optimal for patients with sinus rhythm. Lack of synchronisation between atria and ventricles may be tolerated poorly by patients due to pacemaker syndrome^[3].

The ICD device was implanted in the left pectoral region. Similarly to right side implantations in normal hearts the defibrillation threshold test (DFT) should be considered in this patient, but there are no specific recommendations. Our patient refused DFT assessment.

Because of the unusual placement of the ventricular lead and different heart orientation, the calculated heart axis may seem incorrect in a person with dextrocardia. Characteristic features of right apical pacing in dextrocardia can be seen in the ECG recorded after ICD implantation (Fig. 5). These features are negative P waves and QRS complexes in lead I, as

well as reversed R wave progression in precordial leads: the tallest in V1 and progressively decreasing in amplitude from V2 to V6. To obtain the correct precordial electrocardiogram, respective leads should be placed on the right side of the chest.

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