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Biventricular Pacemaker Implantation in an Elderly Patient with Situs Inversus Dextrocardia

Situs Inversus Dekstrokardili İleri Yaşlı Bir Hastada Biventriküler Kalp Pili İmplantasyonu

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Abstract

Dextrocardia is a rare anomaly. Although other congenital defects may accompany this anomaly, many patients have normally functioning hearts, and when they get old, they face common cardiac disorders, namely coronary heart disease and heart failure and may require pacemaker implantation. The number of papers reporting biventricular pacemaker implantation in these patients is limited. We report a woman of advanced age with dextrocardia who underwent biventricular cardiac pacemaker implantation for advanced heart failure.

Key Words: Dextrocardia, Heart failure, Cardiac Resynchronization Therapy, Biventricular Pacemaker, Elderly

Öz

Dekstrokardi nadir bir anomalidir. Bu anomaliye başka konjenital defektler eşlik edebilse de, birçok hastanın normal fonksiyon gösteren bir kalbi vardır ve bu hastalar yaşlandıklarında koroner arter hastalığı ve kalp yetersizliği gibi sık karşılaşılan kalp hastalıkları ile karşılaşmakta ve bu nedenlerle kalp pili takmak gerekebilmektedir. Dekstrokardili hastalarda kardiyak resenkronizasyon tedavisi amaçlı biventriküler kalp pil takılmasına ilişkin bildiri sayısı azdır. Biz bu olgu sunumunda ileri kalp yetersizliği için biventriküler kalp pili takılan dekstrokardili ileri yaşta bir kadın hasta bildirmektediriz.

Anahtar Kelimeler: Dekstrokardi, Kalp Yetersizliği, Kardiyak Resenkronizasyon Tedavisi, Biventriküler Kalp Pili, Yaşlı

Introduction

Dextrocardia is a rare anomaly having an incidence of 0.83/10.000 (1). Approximately one-third of dextrocardia cases have situs inversus dextrocardia (SID), where cardiac chambers are located in the mirror image of their usual locations. Although other congenital defects may accompany this anomaly, many patients have normally functioning hearts, and when they age, they face common cardiac disorders, namely coronary heart disease and heart failure and require pacemaker implantation. The number of papers reporting biventricular pacemaker implantation in these patients is limited (2). We report a woman

with SID who underwent biventricular cardiac pacemaker implantation for advanced heart failure.

Case Report

A 76-year-old woman with SID presented with New York Heart Association Class 3 heart failure with difficulty performing smallest tasks, and getting dizzy at upright position but without syncope. She had undergone stent implantation 17 years earlier, and no ischemia was detected by a myocardial perfusion scan performed for severely reduced left ventricular ejection fraction (LVEF) (28%) three years ago. She was taking moderate doses of heart failure medications. She had no anemia, thyroid

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dysfunction, or kidney dysfunction. She had a pulse rate of 56 bpm, blood pressure of 96/58 mmHg, basal pulmonary crackles, and 2+ edema. Her electrocardiogram (ECG) showed left bundle branch block with a QRS duration of 132 msec (Figure 1a). Her echocardiography demonstrated SID without other defects, severe global left ventricular (LV) hypokinesis and dilatation (LVEF of 33%, LV end-systolic and end-diastolic volumes of 114 mL and 169 mL, respectively). Since she had developed no effort or rest angina since her myocardial perfusion scintigraphy three years earlier had shown no ischemia, and since her ejection fraction had remained almost unchanged compared to her LVEF measured three years earlier (33% vs 28%, respectively), no active ischemia was considered in the patient, and thus coronary angiography was not scheduled. Hence, biventricular pacemaker implantation with defibrillation capability cardiac resynchronization therapy defibrillator was scheduled to reduce morbidity and mortality. Under local anesthesia a pacemaker pocket was opened in right pectoral area and the right subclavian vein was accessed. Coronary sinus was cannulized and its angiography was performed, revealing a suitable posterolateral branch into which the coronary sinus lead was placed in right anterior oblique (RAO) 40° projection with the following parameters: R wave 15 mV, pacing threshold 1 V at 0.5 msec, lead impedance 890 ohm, no diaphragmatic stimulation at maximum output. The right ventricular electrode with pace-sense and defibrillator leads was placed into right ventricular apex in anteroposterior (AP) projection and its position was verified in the left anterior oblique (LAO) 30° projection with the following parameters: R wave 20 mV, pacing threshold 0.6 V at 0.5 msec, pacing impedance 620 ohm, shock impedances 39 and 54 ohms. The right atrial electrode was placed in AP projection

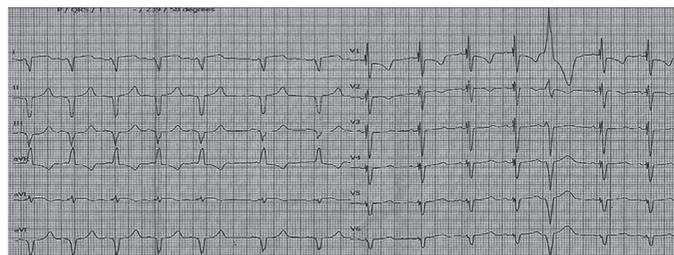
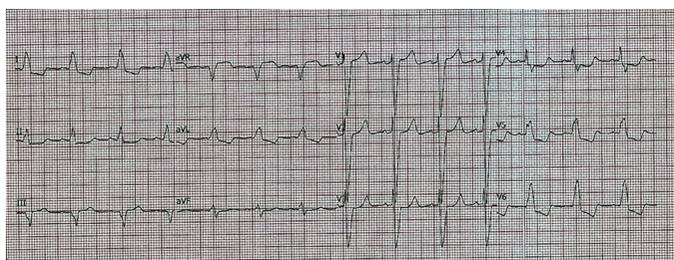


Figure 1: Preimplant electrocardiogram (ECG) with right-sided chest electrodes and reversed arm electrodes showing left bundle branch block morphology and prolonged total QRS duration (132 msec), b) postimplant ECG with right-sided chest electrodes and reversed arm electrodes showing narrow QRS (114 msn)

with the following parameters: p wave 2.5 mV, pacing threshold 0.4 V at 0.5 msec, lead impedance 430 ohm. The pulse generator was placed into the pocket and the procedure was completed uneventfully. The final view of the PM leads was shown in Figure 2a, b. A postimplant ECG showed a narrowed QRS duration of 114 msec (Figure 1b). The patient was lost to follow-up after discharge, therefore we could not document the expected improvement in LV systolic function or symptoms.

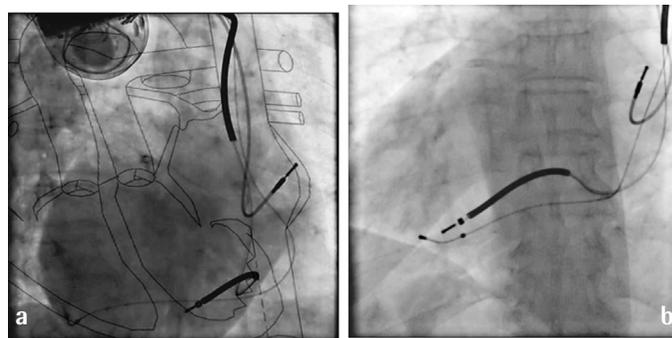


Figure 2: a) Anteroposterior view of the final position of the pacemaker leads, b) right anterior oblique view of the final position of the pacemaker leads, with a schematic drawing of dextrocardia anatomy superimposed on the fluoroscopic image

Discussion

Dextrocardia is a rare cardiac anomaly (3). Only a few cases of biventricular pacemaker implantation in SID have been reported (4–8). Among the only two cases reported from our country, our patient is the oldest one, with the other one being a 75-year-old man with non-ischemic cardiomyopathy (9). Pacemaker lead placement, particularly left one, may pose challenges in SID, although standard equipment may usually suffice for most cases, especially when there is no other complex anomaly. In these patients, right-sided approach is usually recommended for the ease of coronary venous lead placement, and it also has the theoretical advantage of the containment of the heart by the shock vector of the ICD coils (10). When placing the LV lead into coronary circulation, RAO projection is used, which is the mirror-image analogue of the LAO projection (6). We also implanted the LV lead in RAO projection. Similarly, we verified the position of the right ventricular lead in LAO position which is the analogue of the RAO projection in dextrocardia. The absence of any additional cardiac or venous anomaly facilitated our procedure. Given the normal life expectancy of many patients with dextrocardia, more patients with SID will need biventricular pacemaker implantation in the future. Therefore, cardiologists and interventional electrophysiologists should be familiar with pacemaker implantation in this anomaly.

Ethics

Informed Consent: Since this paper is a case report written retrospectively, an informed consent of the patient was not requested. No information about the identity of the patient was provided.

Authorship Contributions

Surgical and Medical Practices: O.Ç., E.D., M.Y., İ.A., M.B.Ö.,
Concept: O.Ç., İ.A., Design: O.Ç., E.D., Data Collection or
Processing: O.Ç., E.D., Analysis or Interpretation: O.Ç., E.D., M.Y.,
İ.A., M.B.Ö., Literature Search: O.Ç., Writing: O.Ç.

Conflict of Interest: No conflict of interest was declared by
the authors.

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