



IMAGE IN CARDIOLOGY

Turning the heart around: Pacemaker implantation in *situs inversus*



Implantação de *pacemaker* num doente com *situs inversus*: um desafio anatómico

Joana Certo Pereira^{a,*}, Isabel Santos^a, Francisco Gama^{a,b}, Pedro Adragão^{a,b}

^a Department of Cardiology, Hospital de Santa Cruz, Centro Hospitalar Lisboa Ocidental, Carnaxide, Lisbon, Portugal

^b Department of Cardiology, Hospital da Luz, Lisbon, Portugal

Received 8 July 2025; accepted 19 August 2025

Available online 8 December 2025

Case presentation

We present the case of a 79-year-old man with *situs inversus totalis* who was admitted to the emergency department for syncope caused by high-grade atrioventricular block, with no identifiable reversible causes. Transthoracic echocardiography revealed preserved ejection fraction and no valvular disease.

The chest X-ray showed *situs inversus*, leading to a thoracic computed tomography scan to confirm the venous anatomy. The computed tomography scan confirmed the complete mirror-image anatomy and excluded

venous drainage abnormalities (Figure 1A and B). Despite the unusual anatomy, a dual-chamber pacemaker was successfully implanted in the left prepectoral region via ultrasound-guided axillary vein puncture. Atrial and ventricular leads were positioned in the right atrial appendage and right ventricular apex, respectively (Figure 1E and F), with appropriate electrical parameters.

This case illustrates the importance of pre-procedural imaging in patients with *situs inversus* and demonstrates that standard transvenous pacemaker implantation is feasible with careful planning, despite the anatomical inversion.

* Corresponding author.

E-mail address: joanacerto@gmail.com (J. Certo Pereira).

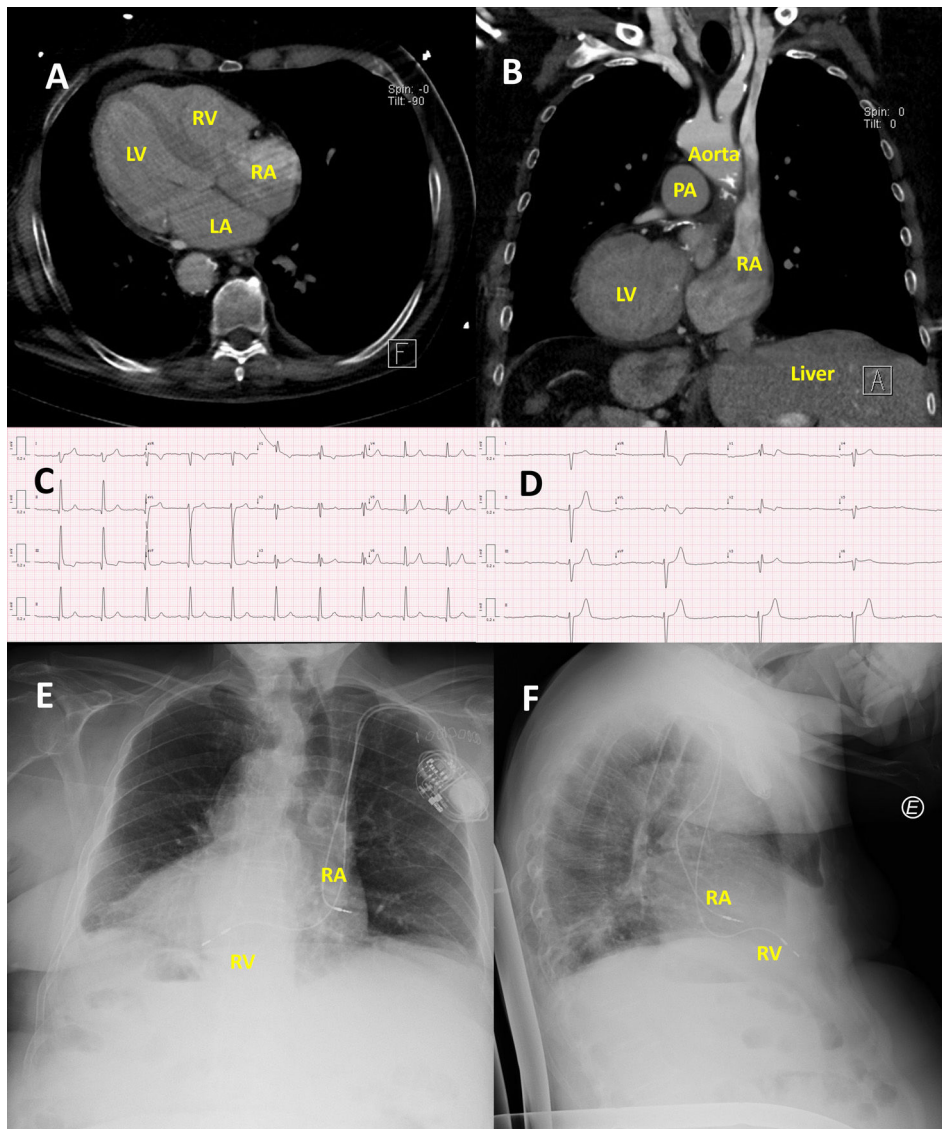


Figure 1 Dual-chamber pacemaker implantation in a patient with *situs inversus totalis* with dextrocardia. (A) Axial view and (B) coronal view of thoracic computed tomography scan showing mirror-image anatomy with dextrocardia, normal atrioventricular and ventriculoarterial connections, and right-sided liver. (C) Baseline ECG showing sinus rhythm with right bundle branch block and left posterior fascicular block. (D) ECG performed after syncope revealing trifascicular block with second-degree atrioventricular block Mobitz type II. (E) Posteroanterior and (F) lateral chest radiographs demonstrating left-sided pacemaker generator with transvenous leads directed toward the right atrial appendage and right ventricular apex, confirming successful pacemaker implantation. LA: left atrium; LV: left ventricle; RA: right atrium; RV: right ventricle; PA: pulmonary artery.

Funding

None declared.

Conflict of interest

None declared.