

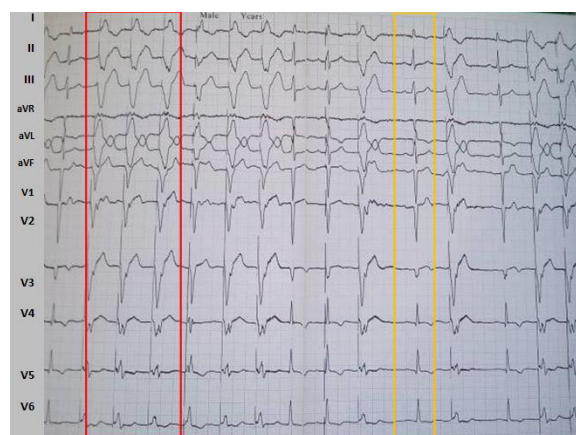
## LETTERS

## Implantable cardioverter-defibrillator troubleshooting diagnosis with the contribution of an electrocardiogram

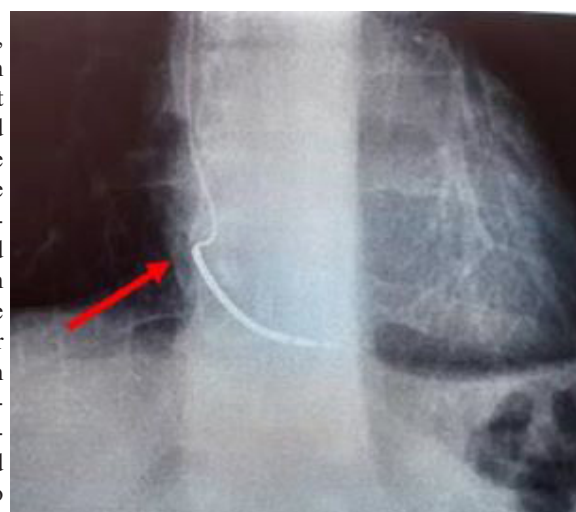
Dear Editor

A 50-year-old man with a previous history of anterior myocardial infarction treated with percutaneous coronary intervention (PCI) visited the pacemaker clinic of our hospital due to a vibration he felt in the area of the implantable cardioverter-defibrillator (ICD) generator while he was completely asymptomatic. He was a New York Heart Association class II patient with a left ventricular ejection fraction of approximately 25-30 %. For three years, he had been receiving Guideline-Directed Medical Therapy, for patients with heart failure with reduced ejection fraction, in maximum tolerated doses (sacubitril/valsartan, metoprolol, eplerenone, and rosuvastatin). Two years back, he received an ICD, due to the detection of symptomatic episodes (palpitations with dizziness) of non-sustained ventricular tachycardia, on an ambulatory Holter monitor, which was reproduced in an electrophysiological study. A few months after implantation, the patient developed an episode of left subclavian vein thrombosis, presenting as painless swelling of the veins at the base of the neck and mild pain in the left axilla. Because of this episode, aspirin was discontinued, and anticoagulant therapy (apixaban) was administered, while the interrogation of the device then showed no parameter changes. On the contrary, the recent interrogation of the device revealed that this vibration was due to notification of reduced Right Ventricular lead impedance less than the lower limit, at 170 Ohms. There were no other pathological issues concerning the device (battery longevity 4.1-7.2 years, remaining capacity to ERI 82 %, capture 1.0 V @ 1.5 ms, sense 4.3 mV, pulse amplitude 3.5 V, pulse width 1.5 ms). Ventricular pacing was less than 1 %, no ventricular tachycardia or fibrillation episodes were recorded, nor was any anti-tachycardia pacing or shock delivered. With the increase of the basic rate to 100 min<sup>-1</sup>, intermittent pacing was observed, with simultaneous detection of unipolar pacing (Figure 1), which, in combination with low impedance, indicates lead dislodgment and concurrent lead insulation failure<sup>1</sup>. Chest X-ray showing ventricular lead dislodgement was performed and compared to a previous one. The lead dislodgement caused a sharp curve just before the coil of the lead, which conduced to the reduction of the lead impedance because of damage to its insulation (Figure 2)<sup>2</sup>. He was a professional ironworker, and the resulting disorder was attributed to intense manual labor. He was referred to the catheterization laboratory for immediate repair of the dislodgement, but due to the history of left subclavian thrombosis, lead extraction or revision was not feasible. Thus, the only possible intervention was reprogramming pacing parameters while he remained asymptomatic in six months follow-up. In conclusion, the intermittent and unipolar pacing shown on ECG indicates ICD lead malfunction, so further investigations and expert help need to be requested.

**Keywords:** implantable cardioverter-defibrillator, troubleshooting, electrocardiogram



**Figure 1:** Ventricular lead intermittently and unipolar pacing, indicative of ICD's troubleshooting (captured QRS complexes are depicted in the red box, while non-captured QRS complexes are shown in orange).



**Figure 2:** Chest X-ray showing ventricular lead dislodgement. The lead dislodgement caused a sharp curve just before the coil of the lead, which conduced to the reduction of the lead impedance because of damage to its insulation.

**Conflict of interest**

The authors declare no conflict of interest.

**References**

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