

# Double devices: Dysfunction or not?



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## Introduction

The removal of the old batteries is generally the rule when performing an upgrade procedure or a box replacement owing to battery depletion. However, once they are abandoned in the pocket, the behavior of the old batteries at the end of service (EOS) may be completely unexpected. A recent case reported a syncopal episode that was caused by an old battery (having switched into VVI mode) perturbing the new implanted device.<sup>1</sup> In contrast, we report a case of an asynchronous mode switch of an old abandoned battery, raising some concern about the likelihood of the induction of an R-on-T phenomenon (torsades de pointes).

## Case report

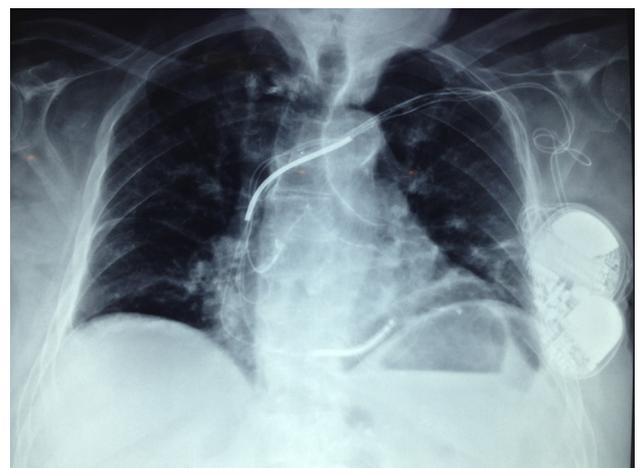
An 87-year-old male patient was referred to our institution for a suspected lead dysfunction. The patient was implanted with a left-sided dual-chamber pacemaker device in 2005 (Medtronic Kappa DR) in another center because of a high degree of atrioventricular heart block. In his past medical history, the patient was treated for diabetes, was a former smoker, had a bilateral leg amputation, had only 1 functional kidney, and then developed symptomatic ischemic cardiomyopathy with a depressed left ventricular ejection fraction (LVEF 25%), permanent atrial fibrillation, and a complete left bundle branch block.

He then underwent, in June 2012, an upgrade comprising a new left-sided cardiac resynchronization therapy-defibrillator (CRT-D) (Medtronic D354 TRM, Medtronic Inc, Minneapolis, MN) with 3 newly implanted leads: another atrial lead, a left ventricular (LV) lead, and a defibrillator lead. The old pacemaker battery (Kappa DR) was left in place and abandoned in the pocket, still connected with its 2 leads: the original atrial and right ventricular (RV) leads implanted in 2005. No data were available in the report concerning the function and integrity of the old pacing leads that would explain the need for implanting a new atrial lead. In October 2016, the patient had a CRT-D battery replacement

for a Medtronic AMPLIA CRT-D in another center (Figure 1), without any revision of the old battery or its leads. In May 2017, the patient was referred for a suspicious lead dysfunction; he was asymptomatic (NYHA I) and without any presyncope. A super-response was observed, with complete recovery of left ventricular ejection fraction and no more hospitalization for acute heart failure.

Electrocardiography showed a CRT-D programmed into a VVIR 70 beats per minute (bpm) mode, with underlying atrial fibrillation and with asynchronous pacing spikes at 65 bpm (EOS) of the abandoned ipsilateral pacemaker (Figure 2). Device interrogation of the CRT-D initially revealed RV and LV lead impedance and threshold measurements to be within normal limits. No tachyarrhythmic episodes were detected. In this asymptomatic patient and given the major risk of infection in case of reintervention, it was initially decided not to remove the old battery.

However, telecardiology monitoring was proposed and 1 month later reported several episodes of (nonphysiological) nonsustained ventricular tachycardia with abnormal short V-V intervals, also associated with sound alert heard by the patient (Figure 3). The Signal Integrity Counter (SIC) went suddenly from 0 to 46 SIC per day. Owing to the short V-V intervals, we had a high degree of suspicion for implantable cardioverter-defibrillator (ICD) lead malfunction. Of note, there was a gradual ICD lead impedance



**Figure 1** Fluoroscopic image in anteroposterior projection showing the presence of the 2 batteries on the left side.

**KEYWORDS** Asynchronous stimulation; Cardiac resynchronization; Double devices; Lead fracture; Old batteries  
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remote monitoring of cardiac devices, not only in those complex situations but also in our daily practice for the regular follow-up of ICD.

### Conclusion

This case highlights the possibility of a reversion to the asynchronous mode (VOO) of old batteries. Our report as well as the recent literature strongly supports the

necessity of removing old batteries when performing an upgrade procedure.

### References

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