



Rapid communication

Home monitoring report from a single lead Lumax DX implantable cardioverter defibrillator: New observations in a new system

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ABSTRACT

A 56-year-old man underwent a single lead Lumax 640 DX implantable cardioverter defibrillator implantation for primary prevention of sudden cardiac death. A DX system consists of a single lead, which provides atrial as well as ventricular electrograms, and enhances atrial arrhythmia detection. Three months after the implantation, high-frequency episodes were detected on the far field and the atrial channels, but not on the bipolar right ventricular channel; these were classified as atrial tachycardia. In the present report, we discussed the unusual pattern of the artifacts that was related to an electromagnetic interference detected by the novel DX system.

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1. Case report

A 56-year-old man with a history of prior myocardial infarction and severe left ventricular dysfunction underwent an implantable cardioverter defibrillator (ICD) implantation for primary prevention of sudden cardiac death. Since the patient had normal sinus rhythm and normal atrio-ventricular conduction, a single lead, Biotronik, Lumax 640 VR-T DX ICD was selected. A DX system consists of a single lead, which provides atrial as well as ventricular electrograms, and enhances atrial arrhythmia detection [1]. The patient was followed-up in the clinic and via the home monitoring service. The procedure and the 1-month follow-up visit were uneventful. Three months later, several atrial monitoring episodes, classified as atrial tachycardia (Fig. 1), were recorded by the device and the home monitoring system. Unusual high frequency artifacts were seen on the far field (RV coil to can) and the atrial channels, whereas the bipolar right ventricular channel was unaffected. Due to the unusual combination of the far field and atrial channel artifacts, normal lead parameters ($P=2.0$ mV, $R=11.4$ mV, RV threshold=0.6 V, and impedance=464 Ω), and due to the unique high frequent “crescendo–decrescendo” artifacts pattern lead fracture was

very unlikely. The patient was telephoned immediately; he confirmed using an electrical disk saw (Fig. 2) at the time that coincided with the abnormal ICD recordings. These recordings disappeared after he stopped using the saw. However, it was unclear why the artifacts were seen on the atrial channel but not on the right ventricular. The probable explanation was that the floating atrial dipole sensor was amplified 4-times, and the programming of the atrial sensitivity was higher than the ventricular sensitivity [2]. The relatively novel Lumax DX system consists of a single lead which provides both atrial and ventricular signals. The atrial signals are sensed by a floating atrial pole, and are amplified by the Lumax 640 VR-T DX device. This system along with the home monitoring was developed to decrease the risk of inappropriate ICD shocks by appropriately detecting atrial arrhythmias and enabling physicians to intervene earlier. However, in the present case, electromagnetic interference was detected by the atrial lead and falsely classified as atrial arrhythmia. Physicians should thus be aware of the unique DX atrial sensing mechanism, and carefully assess each of the intra-cardiac electrogram recorded by the device in order to avoid an inaccurate diagnosis of a lead fracture or atrial arrhythmia.

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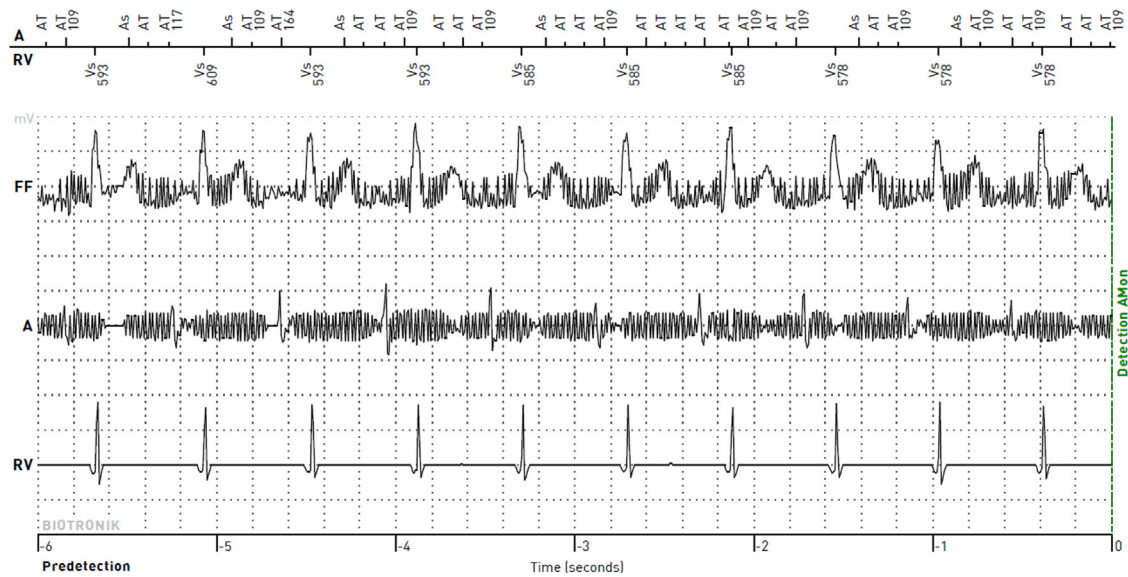


Fig. 1. High atrial rate episode recorded by the home monitoring system. Home monitoring report revealing high frequency artifacts on the far field channel (top) and the atrial channel (middle), whereas the bipolar right ventricular channel (bottom) remained unaffected.



Fig. 2. An electrical disk saw. The timing of using the electrical disk saw coincided with the abnormal recordings of the implantable cardioverter defibrillator.

Conflict of interest

All authors declare no conflict of interest related to this case.

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