

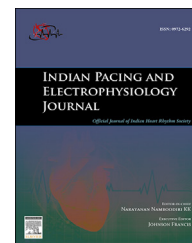
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# An inappropriate defibrillator shock during ventricular tachycardia

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## ABSTRACT

Ventricular oversensing in patients with defibrillators is an infrequent but deleterious condition. We report a patient with a cardiac resynchronization–defibrillation device that presented with hyperkalemia and syncope. Device interrogation revealed ventricular double-counting within the QRS of a slow ventricular tachycardia, resulting detection of the slow ventricular tachycardia in the ventricular fibrillation zone, and delivery of an effective therapy, below device programmed detection rate. This case of defibrillator inappropriate detection emphasizes the relevance of device electrogram interrogation in order to minimize inappropriate therapies.

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This case describes a 65-year-old man with history of ischemia cardiomyopathy, chronic kidney disease stage III, and a primary prevention cardiac resynchronization and defibrillation device (CRT-D) (programed as biventricular DDD, lower rate 50/min). He was admitted in the emergency department complaining of syncope and presenting hyperkalemia (8.0 mEq/l).

The 12-lead electrocardiogram (Fig. 1) revealed absence of atrial activity, a wide QRS escape rhythm, alternating with lower rate ventricular pacing, and non-sustained monomorphic ventricular tachycardia, at 100/min.

CRT-D interrogation reported diagnosis and therapy delivery in ventricular fibrillation zone (HR > 214bpm). Electrogram analysis (Fig. 2) revealed a slow sustained ventricular tachycardia (100/min), with wide QRS and with fractionation

of the endocardial ventricular electrogram. Consequently, ventricular double counting within QRS occurred, resulting in ventricular tachycardia detection in the ventricular fibrillation zone, and delivery of inappropriate shock therapy, treating the slow ventricular tachycardia, which was itself below the programmed detection rate of the device. Severe hyperkalemia resulted in loss of atrial activity, disturbance of intraventricular conduction with QRS widening, and the development of a slow sinusoidal ventricular tachycardia with defibrillator oversensing.

ECG and endocardial ventricular electrogram interpretation in patients with defibrillators is essential to identify the cause of inappropriate therapies, and define the best strategy to minimize them [1–3].

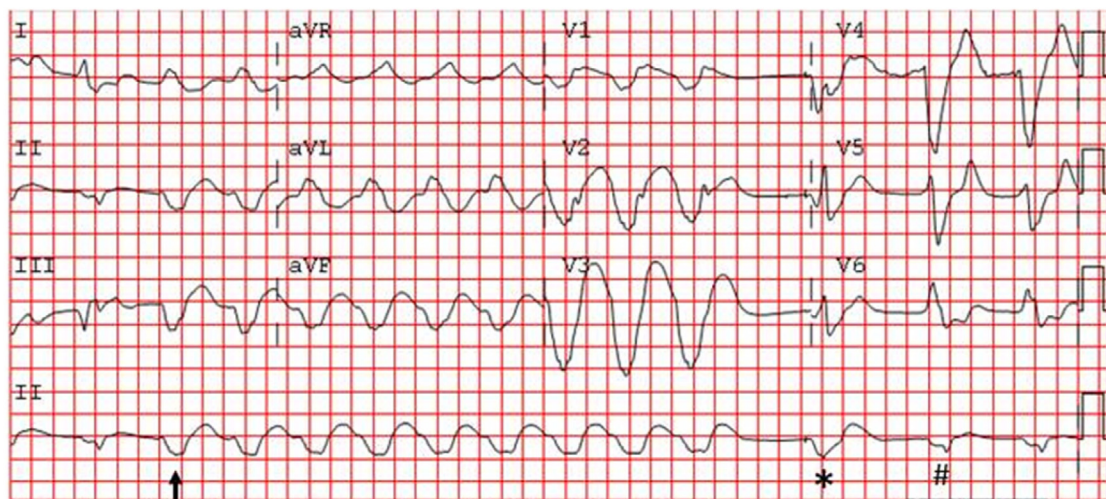
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**Fig. 1 – 12-lead electrocardiogram. Non-sustained monomorphic ventricular tachycardia, at 100/min (arrow); Lower rate ventricular pacing (\*); Wide QRS escape rhythm (#); Atria activity is absence.**

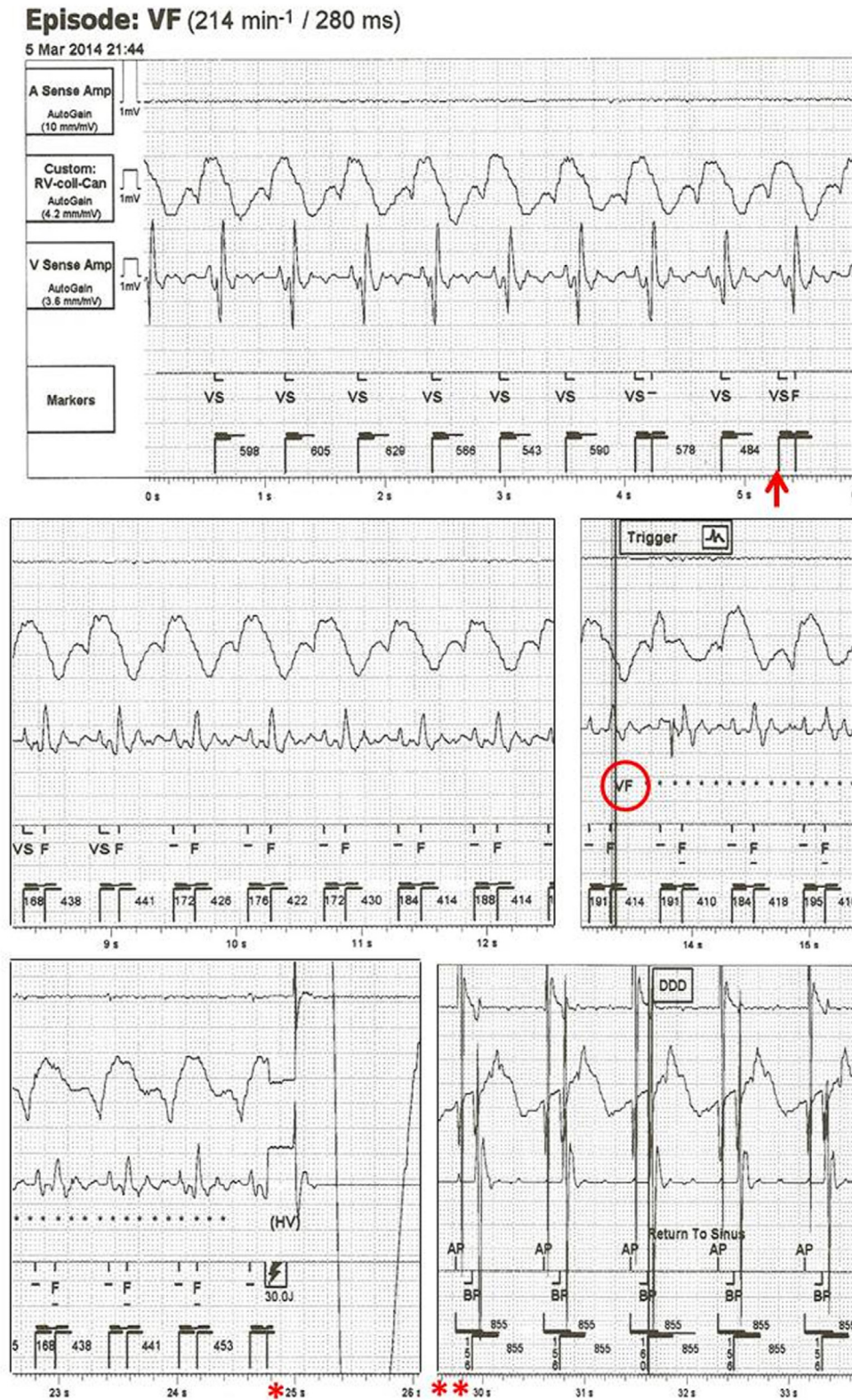


Fig. 2 – CRT-D endocardial electrogram. Slow sustained ventricular tachycardia and ventricular double-counting within QRS complex (arrow); diagnosis of ventricular fibrillation (circle); Shock delivery (\*); DDD biventricular pacing after therapy (\*\*).

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**Conflict of interest**

Authors declare to have no conflict of interest.

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