Case Report

Decay-Delay Technology for Management of Defibrillator T-wave Oversensing

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Appropriate sensing is indispensable for appropriate functioning of implantable cardioverter-defibrillator (ICD). Oversensing is a major clinical dilemma in patients with ICD leading to inappropriate ventricular arrhythmia detection and therapy. T-wave oversensing is an important clinical problem leading to QRS double counting with inappropriate therapy, in particular. We present a patient with dilated cardiomyopathy and intermittent T wave oversensing by an ICD which could be resolved by device reprogramming.

Introduction

Appropriate sensing is indispensible for appropriate functioning of implantable cardioverter-defibrillator (ICD). Oversensing is a major clinical dilemma in patients with ICD leading to inappropriate ventricular arrhythmia detection and therapy. Oversensing may originate from myopotentials, electromagnetic interference and other electrical signals. T-wave oversensing is an important clinical problem leading to QRS double counting with inappropriate therapy, in particular. We present a patient with dilated cardiomyopathy and intermittent T wave oversensing by an ICD which could be resolved by device reprogramming.

Case Presentation

A 49-year-old female with diagnosis of dilated cardiomyopathy was admitted for multiple ICD shocks. We performed ICD analysis (St-Jude Medical) which shows inappropriate ICD therapies due to T wave oversensing (Figure-1). Impedance of right atrial pacing, right ventricular pacing and high voltage leads were in normal range. ICD analysis with 'Sense-Ability' settings determined 60 msec decay delay with 62.5% threshold start (Figure-2 A). We changed the decay delay to 95 msec with 62.5% threshold start (Figure-2 B). The patient was admitted. Defibrillation threshold was checked for reliable ventricular fibrillation sensing.

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Discussion

Sense-Ability Technology

Sense-ability feature with decay-delay and threshold start provides the flexibility to fine-tune sensing to patient needs and help eliminate the over-sensing of T waves, far-field R waves, fractionated QRS complexes and other signals.

Oversensing of spontaneous T waves often occurs in the setting of low-amplitude R waves because sensitivity and/or amplifier gain is automatically adjusted in relation to the low-amplitude preceding R wave.[1, 2] Further, patients with low-amplitude R waves may require lower minimum sensing thresholds to ensure reliable sensing of ventricular fibrillation (VF). T wave oversensing in the setting of a low-amplitude R wave is a warning that detection of VF may be unreliable and should be assessed at noninvasive electrophysiological study. The ventricular lead should be revised if the safety margin for sensing VF is insufficient.[3, 4]

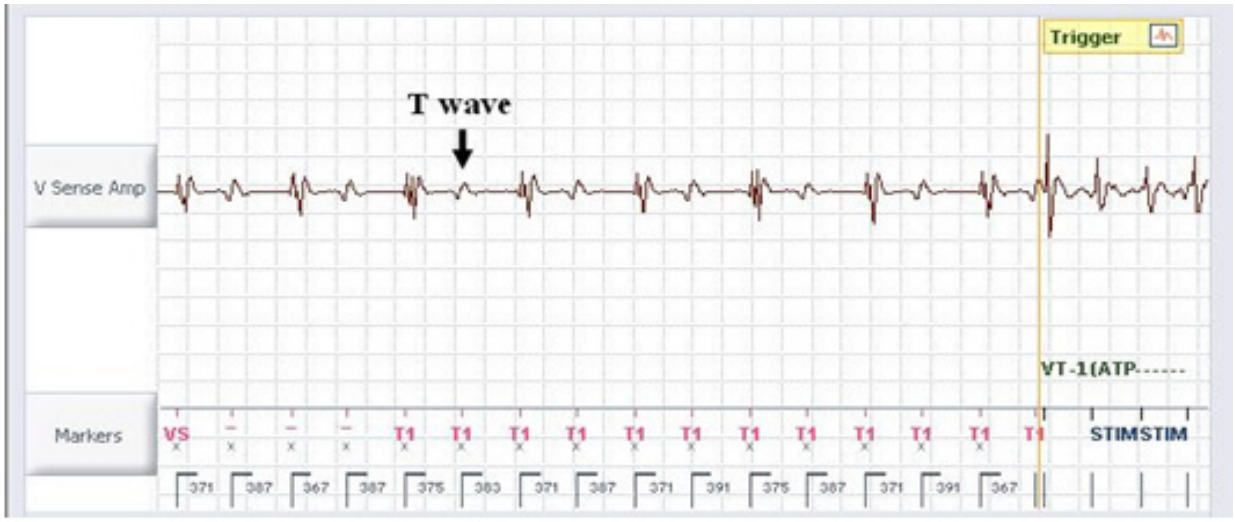

Figure 1. Ventricular electrocardiogram (VEGM) tracing of a patient with T wave oversensing during sinus rhythm. Every T wave was sensed by ICD (QRS double counting) resulted in the diagnosis of ventricular tachycardia and delivery of high-voltage therapy.

Acknowledgement

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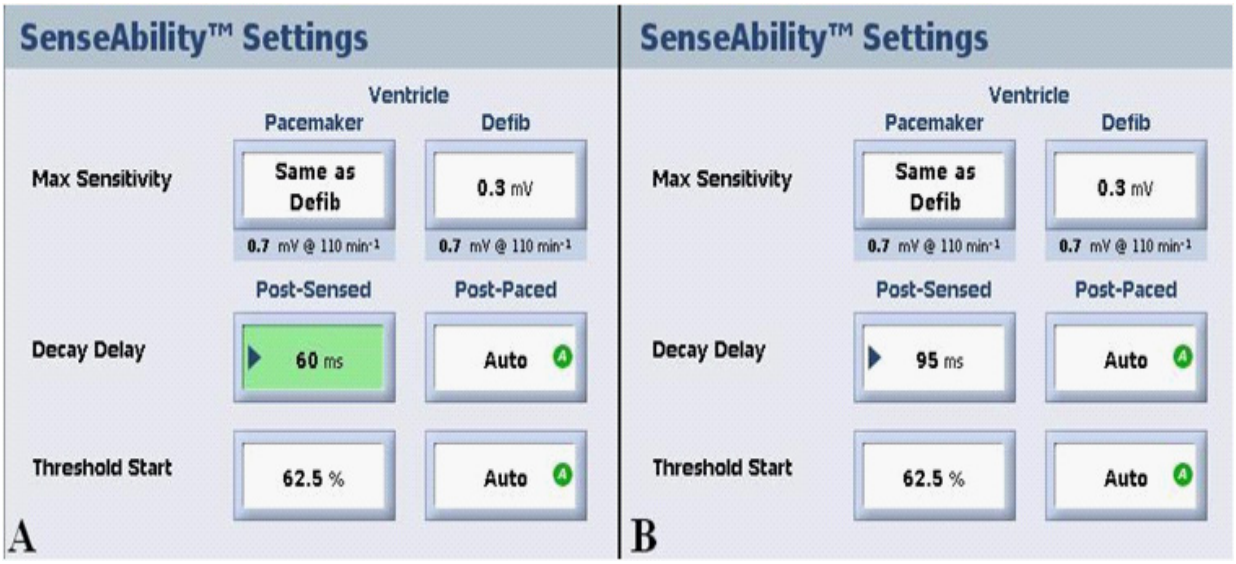

Figure 2. **A**: ICD analysis with 'Sense-Ability' settings determined 60 msec decay-delay with 62.5% threshold start. **B**: Decay-delay was changed to 95 msec with 62.5% threshold start.

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