

March 19th Question

See Answer to March 12th Following Question

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A 43-year-old woman presents with palpitations and is noted to have the ECG shown in Figure. What can be excluded as a mechanism for the tachycardia?



Figure. Twelve lead electrocardiogram of presenting tachycardia.

Answer Options

- A. Orthodromic nodofascicular/nodoventricular reentry
- B. Orthodromic atrioventricular reentry
- C. Junctional/His-bundle ectopy
- D. Dual atrioventricular nodal physiology
- E. Duplicate atrioventricular node or atriofascicular connection

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ANSWER TO MARCH 12th QUESTION

A. Low sensing amplitude



Figure. Near- and far-fied electrograms recorded from the right ventricular (RV) lead on device interrogation.

Explanation

The high-frequency noise shown with solid arrows in the Figure could be because of myopotentials recorded by the far-field RV coil to can shock electrogram. It is noteworthy that the shock electrogram is not used for sensing cardiac events and as an extension not pertinent for rate-based detection of ventricular tachyarrhythmias. The shock electrogram serves a role for template matching for supraventricular versus ventricular tachycardia discrimination and for recording the far-field electrogram during any tachycardia episodes for subsequent review by the health professional. The electrogram used for binning ventricular events is the near-field RV tip to RV ring (or RV tip to RV coil for integrated bipolar leads).

The rhythm shown clearly is a regular rhythm ≈ 109 QRS complexes per minute. The non-QRS oversensed events generate short RR intervals in the ventricular

fibrillation detection zone. These non-QRS sensed events time with the low-frequency T wave on the near-field electrogram (dashed arrows). This is a case of T-wave oversensing. The T-wave oversensing is noted in conjunction with periodic diminution of the R waves on the near-field electrogram (≈ 3 mV, asterisks). The sensing threshold for ventricular events in implanted cardioverter defibrillators is not fixed but automatically scaled to the sensed R-wave amplitude and gradually decays after a sensed event. If the sensed R-wave amplitude is low, the sensing threshold starts at a lower value with a higher likelihood of T-wave oversensing, especially if the R:T amplitude ratio is also reduced (option A).¹

There is no evidence for any nonphysiological high-frequency noise attributable to lead fracture (option B), electromagnetic interference (option C), or connection problem between lead and header (option E), or noncyclic high-frequency myopotential oversensing (option D) on the near-field electrogram.

ACKNOWLEDGMENT

I thank Phillip S. Cuculich, MD, and Praveen K. Rao, MD for providing the case presented in the March 19th Question.

REFERENCE

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March 19th Question Amit Noheria

Circ Arrhythm Electrophysiol. 2018;11:
doi: 10.1161/CIRCEP.118.006252

Circulation: Arrhythmia and Electrophysiology is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231

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Print ISSN: 1941-3149. Online ISSN: 1941-3084

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World Wide Web at:

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