March 19th Question

See Answer to March 12th Following Question

Amit Noheria, MBBS, SM

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?

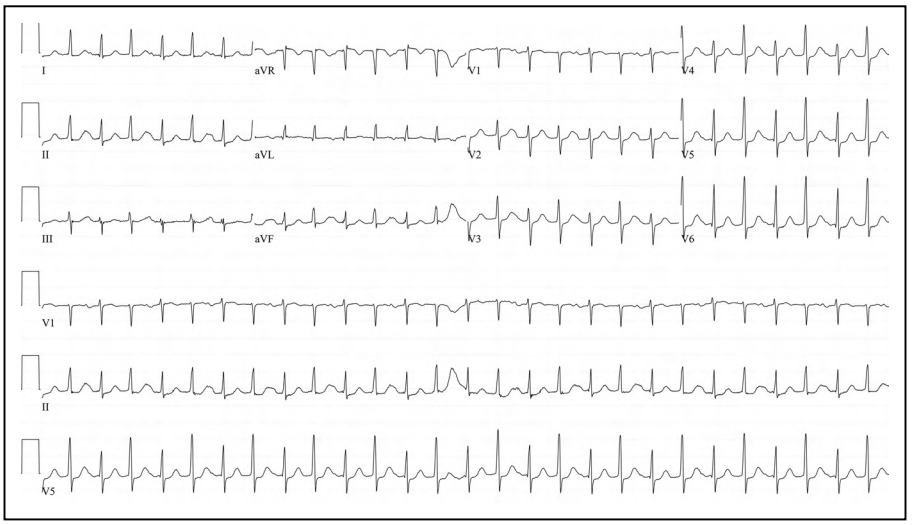

Figure. Twelve lead electrocardiogram of presenting tachycardia.

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

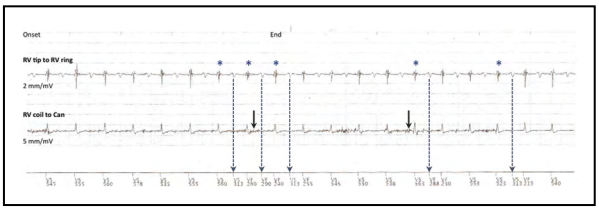

Figure. Near- and far-fied electrograms recorded from the right ventricluar (RV) lead on device interrogation.

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

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REFERENCE

1. Swerdlow CD, Friedman PA. Advanced ICD troubleshooting: part I. *Pacing Clin Electrophysiol*. 2005;28:1322–1346. doi: 10.1111/j.1540-8159.2005.00275.x.

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