Focus on ECGs: Case #9

Evaluation of Chest Pain after Implantable Cardioverter-Defibrillator Placement

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A 65-year-old woman with a history of congestive heart failure presented at the emergency department with right-sided upper-chest and shoulder discomfort. Two months prior, she had been given a single-lead Fortify Assura™ VR 1357-40Q implantable cardioverter-defibrillator (ICD) (St. Jude Medical, now part of Abbott Laboratories; St. Paul, Minn). She described her symptoms, which had started 6 hours before admission, as off-and-on pain of mild-to-moderate severity that was not associated with exertion or respiration. She reported no shortness of breath, cough, fever, chills, or dizziness. An electrocardiogram (ECG) was obtained upon presentation (Fig. 1).

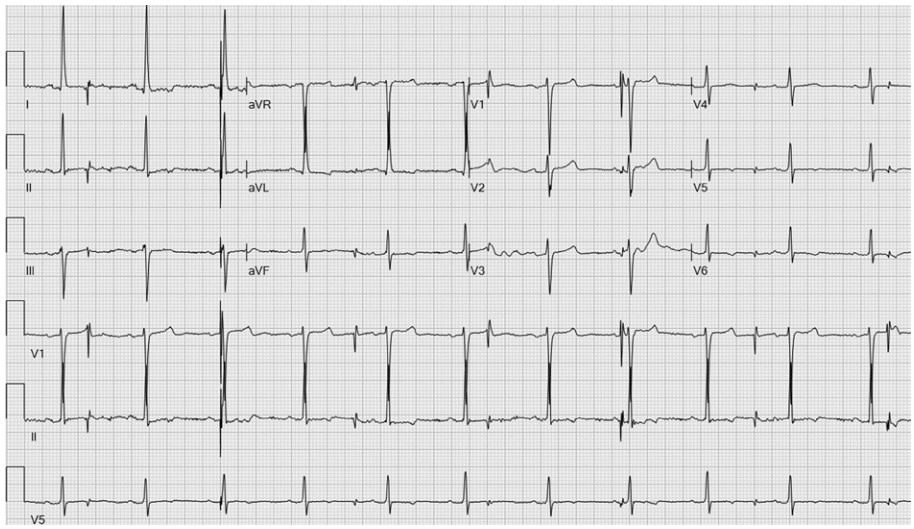

Fig. 1

What are the differential diagnoses?

See next page for the answer, as well as a link to the Focus on ECGs *blog, where you can participate in a moderated discussion.*

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Answer

Differential diagnoses include ICD lead malfunction (fracture, dislodgment, or perforation), ventricular undersensing with safety pacing (by the ICD), and sinus rhythm with motion artifact. The ECG (Fig. 2) shows sinus rhythm at a rate of 58 beats/min with QRS criteria for left ventricular hypertrophy and independent small deflections (asterisks) at a regular rate of 40 beats/min. These deflections are low-amplitude complexes followed by T waves in leads I, II, and V_1. In other leads, they look very small, suggesting artifact or perhaps pacemaker stimuli with undersensing and failure to capture. The pacing stimulus appears at the beginning of the third QRS with no change in QRS configuration, suggesting a pseudofusion beat.

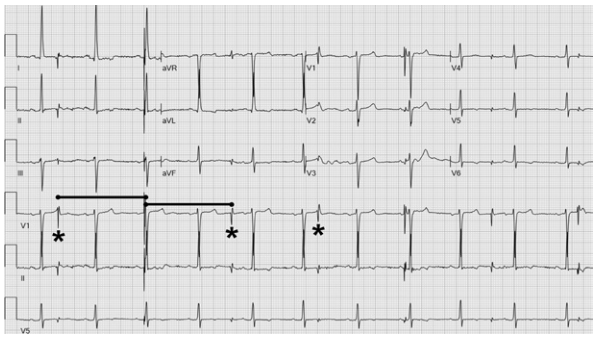

Fig. 2

The current chest radiograph (Fig. 3A), when compared with one obtained after device implantation (Fig. 3B), was consistent with Twiddler syndrome, a very rare cause of pacemaker malfunction. This syndrome was first reported in patients with pacemakers[1] and later in patients with ICDs.[2,3] Rotation of the generator inside the pocket due to patient manipulation or loose anchoring of the device can cause the lead to retract into the superior vena cava or subclavian vein. Our patient's ICD generator had rotated in the pocket. When this happens, the location of the lead might cause intermittent twitching of the shoulder muscle or diaphragm by stimulating the brachial plexus or the phrenic nerve, respectively—and indeed the patient's symptoms were twitching of the shoulder and upper-chest muscles.

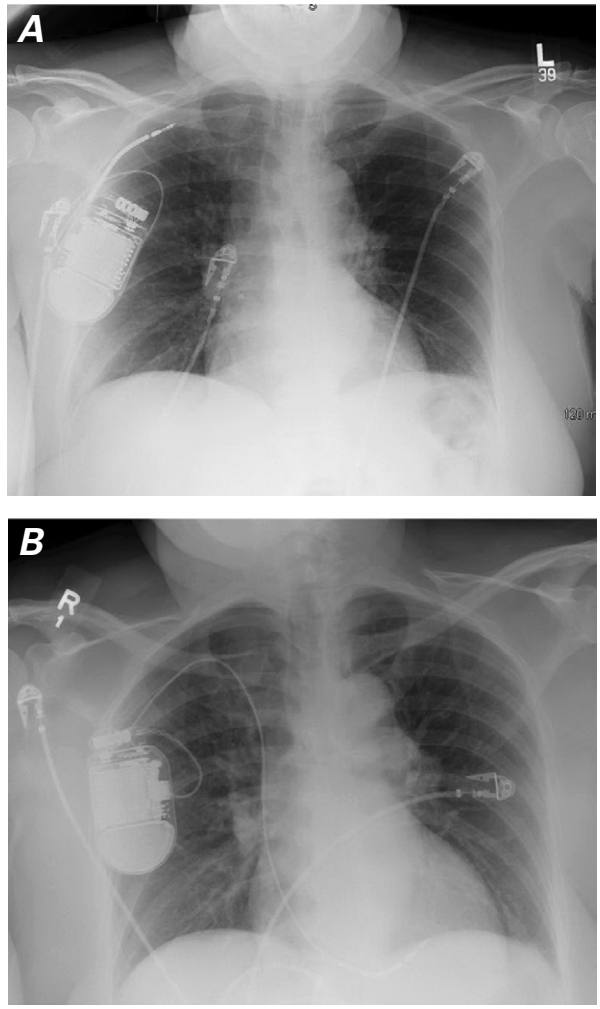

Fig. 3

References

1. Bayliss CE, Beanlands DS, Baird RJ. The pacemaker-twiddler's syndrome: a new complication of implantable transvenous pacemakers. Can Med Assoc J 1968;99(8):371-3.
2. Boyle NG, Anselme F, Monahan KM, Beswick P, Schuger CD, Zebede J, Josephson ME. Twiddler's syndrome variants in ICD patients. Pacing Clin Electrophysiol 1998;21(12):2685-7.
3. Nicholson WJ, Tuohy KA, Tilkemeier P. Twiddler's syndrome. N Engl J Med 2003;348(17):1726-7.

To participate in a moderated discussion of this case, go to THIJournal.blogspot.com. Two weeks from the original posting date, the discussion will close, but the comments will remain online for reference.