Focus on ECGs: Case #13

Confusion, Ataxia, and Wide-Complex Tachycardia:

What Caused This Arrhythmia?

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A previously healthy 36-year-old woman presented at the emergency department with gradual-onset confusion, ataxia, and aphasia. Her vital signs were normal. On physical examination, she reacted to painful stimuli but was nonverbal and unable to follow commands. Initial laboratory results revealed no abnormalities. Computed tomograms of the head and results of a lumbar puncture were nondiagnostic. During hospitalization, the patient decompensated and needed emergency intubation and vasopressor support. An electrocardiogram (ECG) was obtained (Fig. 1). An echocardiogram revealed an acute reduction of left ventricular ejection fraction (range, 0.35–0.40) and anterior wall-motion abnormalities. Notable laboratory results included troponin I, 17.1 ng/mL; normal thyroid values; and negative toxicology screening.

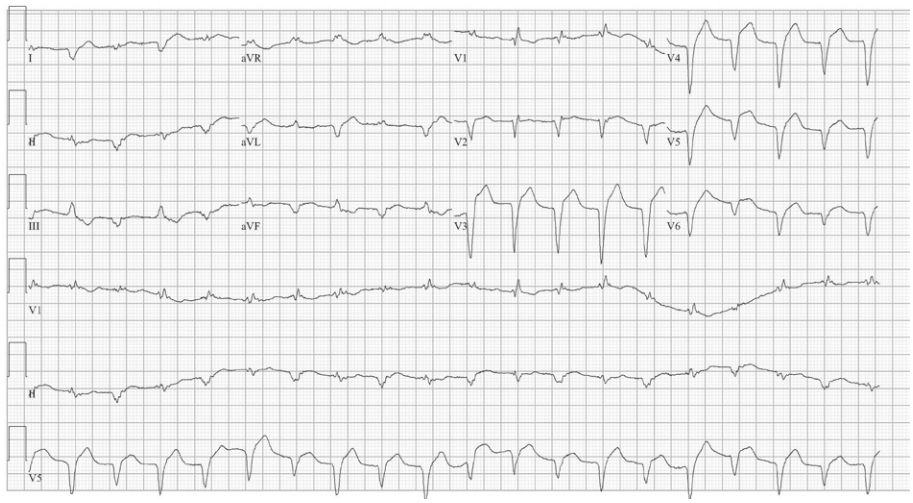

Fig. 1

Which of the following diagnoses explains the ECG?

A) Supraventricular tachycardia with aberrant conduction
B) Bidirectional ventricular tachycardia
C) Drug toxicity
D) Accelerated junctional rhythm

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

B) Bidirectional ventricular tachycardia

The differential diagnosis includes ventricular tachycardia (VT), supraventricular tachycardia (SVT) with aberrant conduction, preexcitation SVT, SVT with intramyocardial conduction delay, drug toxicity, accelerated junctional rhythm, and ventricular-paced rhythm.[1]

In Figure 1, lead V_5 reveals a regular, monomorphic, wide-complex tachycardia at 115 beats/min, no discernible P waves, a QRS interval of 120 ms, and a QT interval of 368 ms (QTc, 509 ms). An alternating ectopic firing from the left anterior and left posterior fascicles results in a ventricular arrhythmia in which V_1 displays a right bundle morphology. Leads V_1 and V_5 suggest that the axes of each QRS complex have the same orientation. However, leads III and aVF have alternating QRS complexes, thus confirming the diagnosis of bidirectional VT.[2]

Several causes of bidirectional VT are myocarditis, myocardial infarction, digoxin toxicity, herbal aconite poisoning, cardiac channelopathies, Andersen-Tawil syndrome, and catecholaminergic polymorphic VT. Our patient's angiogram showed no coronary artery disease, and digoxin toxicity was ruled out. Analyses of cardiac magnetic resonance images and surgical specimens from an endomyocardial biopsy led to a final diagnosis of acute lymphocytic myocarditis.

Myocarditis (like digoxin toxicity) often mimics various cardiac arrhythmias and can manifest itself as partial or complete heart block or as new-onset bundle branch block. Acute idiopathic lymphocytic myocarditis caused our patient's bidirectional VT. This case illustrates the importance of evaluating all leads for axis determination.

Acknowledgment

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References

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2. Vereckei A. Current algorithms for the diagnosis of wide QRS complex tachycardias. Curr Cardiol Rev 2014;10(3):262-76.

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