A previously healthy 18-year-old woman presented to her local hospital with 3 days of heart failure symptoms. An echocardiogram showed severe left ventricular dilation and global hypokinesis with an ejection fraction of 17%. Her history and clinical evaluation were consistent with an acute virus-induced cardiomyopathy. She had not taken any medications before her presentation, and her initial ECG was normal. On hospital day 3, she had a cardiac arrest with documented torsade de pointes, and electric cardioversion was successful. Amiodarone was initiated, and she was transferred to our institution. As shown in the Figure, A, her admission ECG was notable for right-axis deviation, marked QT prolongation (QTc, 685 ms), and classic T-wave alternans. She subsequently developed multiple episodes of polymorphic ventricular tachycardia, as shown in the Figure, B. Amiodarone was discontinued as a result of prolongation of the QT interval. The patient eventually received a left ventricular assist device for hemodynamic support, and after her acute illness resolved her QT interval normalized, and there were no further arrhythmias.

Beat-to-beat T-wave alternans is known to frequently precede the onset of malignant ventricular arrhythmias. The most common manifestation of this is microvolt T-wave alternans, but it is undetectable on a standard ECG. Rarely, as shown here, macrovolt T-wave alternans can be seen on a 12-lead ECG. It has principally been described in association with long-QT syndromes, which may be drug induced or otherwise unrecognized in the absence of mitigating factors (such as medications or illness). Overall, this classic finding serves as an ominous sign of electrically unstable myocardium and a clinical predictor of ventricular arrhythmia.

Disclosures
None.

References
Figure. A, Standard 12-lead ECG with findings of sinus tachycardia, right-axis deviation, marked QT prolongation (QTc, 685 ms), and classic beat-to-beat T-wave alternans. B, Simultaneous telemetry and arterial blood pressure monitoring from the same patient, with polymorphic ventricular tachycardia initiated by an R-on-T phenomenon.
Macrovolt T-Wave Alternans and Polymorphic Ventricular Tachycardia
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