ECG of the Month

Changing Morphology of a Wide-QRS Tachycardia

Mazen M. Kawji, MD, and D. Luke Glancy, MD

An obese 49-year-old man with a history of systemic arterial hypertension, diabetes mellitus, dyslipidemia, three myocardial infarcts, an ischemic cardiomyopathy, a four-vessel coronary artery bypass operation 7 years earlier, and implantation of a cardioverter-defibrillator 2 years earlier comes to the hospital with palpitations and dyspnea. An ECG is recorded (Figure 1).

Figure 1. ECG recorded on admission. See text for explication.

What is your diagnosis?

Explication is on page 236
ECG of the Month
Presentation on page 235

DIAGNOSIS: Ventricular tachycardia. Both at the beginning and in the middle portion of the tracing pacemaker spikes from short bursts of anti-tachycardia pacing by the cardioverter-defibrillator are seen. These bursts do not terminate the ventricular tachycardia but do change its morphology.

On the left side of the tracing the QRS is negative in lead II, whereas the QRS is positive in lead II on the right side of the tracing. The QRS is positive in lead V1 in both portions of the tracing, but its morphology changes. The rate of the tachycardia is 201 beats per minute on the left and 199 beats per minute on the right. Various mechanisms could explain the tachycardia; to us a plausible one is an ectopic automatic focus in the left side of the ventricular septum with the anti-tachycardia pacing changing the depolarization pathway of the ventricular tachycardia by concealed conduction into the pathway(s). Despite anti-arrhythmic drugs, the tachycardia recurs repeatedly, finally subsiding with the temporary use of a left ventricular assist device.

When he is last seen three years later for another episode of cardiogenic failure, the patient’s ECG shows sinus tachycardia, an indeterminate QRS axis in the frontal plane, right bundle branch block, and changes of his old inferior and anterolateral myocardial infarcts (Figure 2).

The first electrocardiogram of this patient published by the Journal was one recorded 2 years before the ECG in Figure 1 and 5 years before the ECG in Figure 2. That original ECG showed bidirectional ventricular tachycardia and led to the implantation of the cardioverter-defibrillator, which has been used numerous times. Monomorphic ventricular tachycardia is the typical ventricular tachycardia that appears months to years after a myocardial infarct, but, as in this patient, many iterations of ventricular tachycardia may occur, some undoubtedly with concurrent or facilitating etiologies.

Dr. Kawji is a cardiologist trained at the LSU Health Sciences Center in New Orleans, who now practices at the Heartland Cardiovascular Center, Silver Cross Hospital, New Lenox, Illinois. Dr. Glancy is an emeritus professor of medicine (cardiology) at the LSU Health Sciences Center in New Orleans.

REFERENCES