Electrocardiogram of a man with a single-chamber cardioverter/defibrillator

D. Luke Glancy, MD, Christopher L. Daniels, MD, Vijayendra R. Jalgam, MD, Rehan Z. Ali, MD, and Paul A. LeLorier, MD

Figure. Electrocardiogram recorded on current admission. See text for explication.

A 70-year-old man with diabetes mellitus, systemic arterial hypertension, and over 7 years of intermittent congestive symptoms due to a nonischemic dilated cardiomyopathy, with a left ventricular ejection fraction of 20%, as well as chronic kidney disease, with a current serum creatinine of 4.24 mg/dL, had an implantable cardioverter/defibrillator/pacemaker lead placed through the left subclavian vein into the right ventricle 2½ years before presentation. During his most recent admission for worsening congestive symptoms, the serum B-type natriuretic peptide level was 3845 pg/mL, up from a 12-month low of 253 pg/mL 4 months earlier.

An electrocardiogram recorded on admission is shown in the *Figure*. The atrial rhythm was sinus bradycardia at a rate of 52 beats per minute. There was first-degree atrioventricular block, and an electronic ventricular pacemaker sensed and captured normally in the VVI mode at a rate of 60 beats per min. The P waves were broad (0.16 seconds) and notched (0.09 seconds between

the two upright peaks in lead II), findings typical of left atrial enlargement (1, 2). There was a nonspecific intraventricular conduction defect with a QRS duration of 0.13 seconds. The paced QRS complexes had a duration of 0.20 seconds and resembled left bundle branch block, consistent with the device's pacing the right ventricle. The third paced complex was a fusion complex with the electronic pacemaker contributing little or nothing to the QRS morphology, i.e., a so-called pseudofusion complex.

As kidney failure worsens, the ability to eliminate salt and water is impaired, and the relative contributions of the failing kidneys and of the failing heart to the patient's congestive

From the Sections of Cardiology, Departments of Medicine, Louisiana State University Health Sciences Center and the Medical Center of Louisiana, New Orleans.

Corresponding author: D. Luke Glancy, MD, 7300 Lakeshore Drive, #30, New Orleans, Louisiana 70124 (e-mail: dglanc@lsuhsc.edu).

symptoms often are difficult to discern (3, 4). In this patient, the contribution of each was large. Although the patient met criteria for an upgrade to a biventricular pacemaker (5), a more satisfactory relief of his congestive symptoms would likely result from dialysis, which would eliminate accumulated salt and water regardless of the cause, as well as reduce other manifestations of uremia (6). In the meantime, thought should be given to slowing the electronic pacemaker to 45 beats/minute. The patient's native QRS complexes were narrower than the paced QRS and presumably produced a more efficient left ventricular contraction. The trade-off, however, is a slight decrease in heart rate that could decrease cardiac output.

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