A “De-Synching” Feeling

A 78-year-old man presented with worsening dyspnea and edema. He had undergone coronary artery bypass grafting in 2001. At the current presentation, he had ischemic cardiomyopathy with a left ventricular (LV) ejection fraction of 0.20 and was taking home inotropic therapy. Two months previously, he had begun cardiac resynchronization therapy with use of an implanted biventricular pacemaker.

Physical examination revealed elevated jugular venous pressure, bibasilar crackles, and pitting edema above both knees. An electrocardiogram (ECG) was obtained (Fig. 1).

What is the cause of this ECG pattern?
A) Loss of LV lead capture
B) Loss of right ventricular (RV) lead capture
C) Fusion beats
D) Acute myocardial infarction

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.
A) Loss of LV lead capture.

The patient’s baseline ECG 2 months earlier (Fig. 2) had shown atrioventricular sequential biventricular pacing with a V-V interval programmed at 80 ms, and with LV pacing preceding that of the RV. There was a prolonged isoelectric period, followed by a dominant R wave in lead V1. This pattern confirms the contribution of LV pacing preceded by a prolonged latency from the pacer spike.

In contrast, the patient’s presenting ECG shows a QS pattern in lead V1, as well as an S wave in leads I and aVL (Fig. 1). This pattern indicates an RV preponderance of the depolarization pattern consistent with loss of LV lead capture.¹

A frequently used algorithm for determining loss of LV lead capture requires an R/S ratio <1 in lead V1, and >1 in lead I.² The algorithm has a sensitivity of 94% and a specificity of 96%. Both criteria were evident on our patient’s ECG.

Loss of LV lead capture has substantial clinical implications. Investigators who studied the specific effects of acute lead dislodgments reported an adjusted odds ratio of 5.62 for the combined endpoints of cardiac arrest, tamponade, pneumothorax, and infection—and a 2.66 odds ratio for in-hospital death.³ Recognizing loss of LV lead capture early might help to mitigate adverse outcomes if successful, timely cardiac resynchronization can be achieved.

References


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