

A “De-Synching” Feeling

David A. Burkland, MD
Mohammed Saeed, MD,
FACC
Yochai Birnbaum, MD, FACC

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).

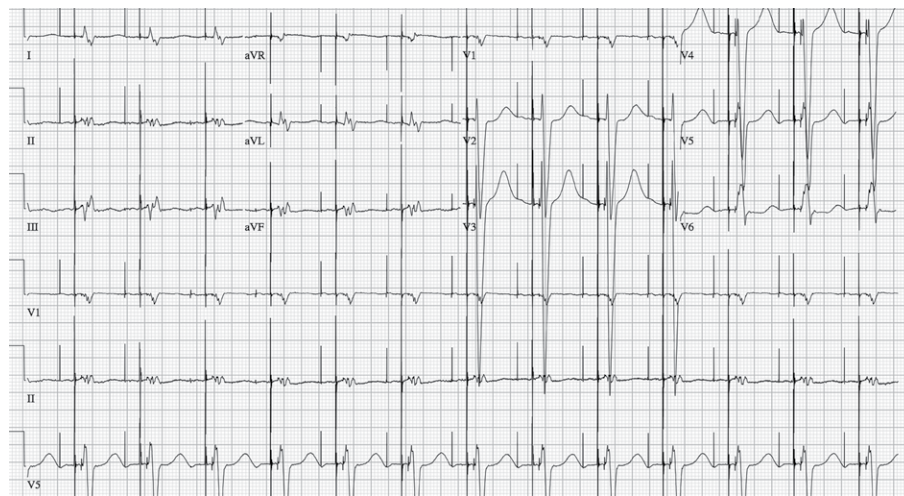


Fig. 1

Section Editors:

Yochai Birnbaum, MD,
Mohammad Saeed, MD,
James M. Wilson, MD

From: Section of Cardiology,
Department of Medicine,
Baylor College of Medicine;
and Department of Cardiol-
ogy, Texas Heart Institute
and Baylor–St. Luke’s Medi-
cal Center; Houston, Texas
77030

Address for reprints:

David A. Burkland, MD,
P-322, 6770 Bertner Ave.,
Houston, TX 77030

E-mail: Burkland@bcm.edu

© 2017 by the Texas Heart®
Institute, Houston

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.

FOCUS ON ECGs: ANSWER #8

Answer

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.



Fig. 2

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

1. Barold SS, Herweg B. Usefulness of the 12-lead electrocardiogram in the follow-up of patients with cardiac resynchronization devices. Part I. *Cardiol J* 2011;18(5):476-86.
2. Ammann P, Sticherling C, Kalusche D, Eckstein J, Bernheim A, Schaer B, Osswald S. An electrocardiogram-based algorithm to detect loss of left ventricular capture during cardiac resynchronization therapy. *Ann Intern Med* 2005;142(12 Pt 1):968-73.
3. Cheng A, Wang Y, Curtis JP, Varosy PD. Acute lead dislodgments and in-hospital mortality in patients enrolled in the national cardiovascular data registry implantable cardioverter defibrillator registry. *J Am Coll Cardiol* 2010;56(20):1651-6.

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