

Profound Bradycardia During Passage of a Swan-Ganz Catheter

D. Luke Glancy, MD; Frank E. Wilklow, MD; and Neeraj Jain, MD

A 67-year-old woman with systemic arterial hypertension, hyperlipidemia, and 3-vessel coronary arterial disease with angina pectoris was referred for coronary bypass surgery. Her admission electrocardiogram is shown below (Figure). During pre-operative attempts by anesthesia to pass a Swan-Ganz catheter from the right internal jugular vein to the pulmonary artery, profound bradycardia appeared. It required full-scale cardiac resuscitation and cancellation of the bypass operation.

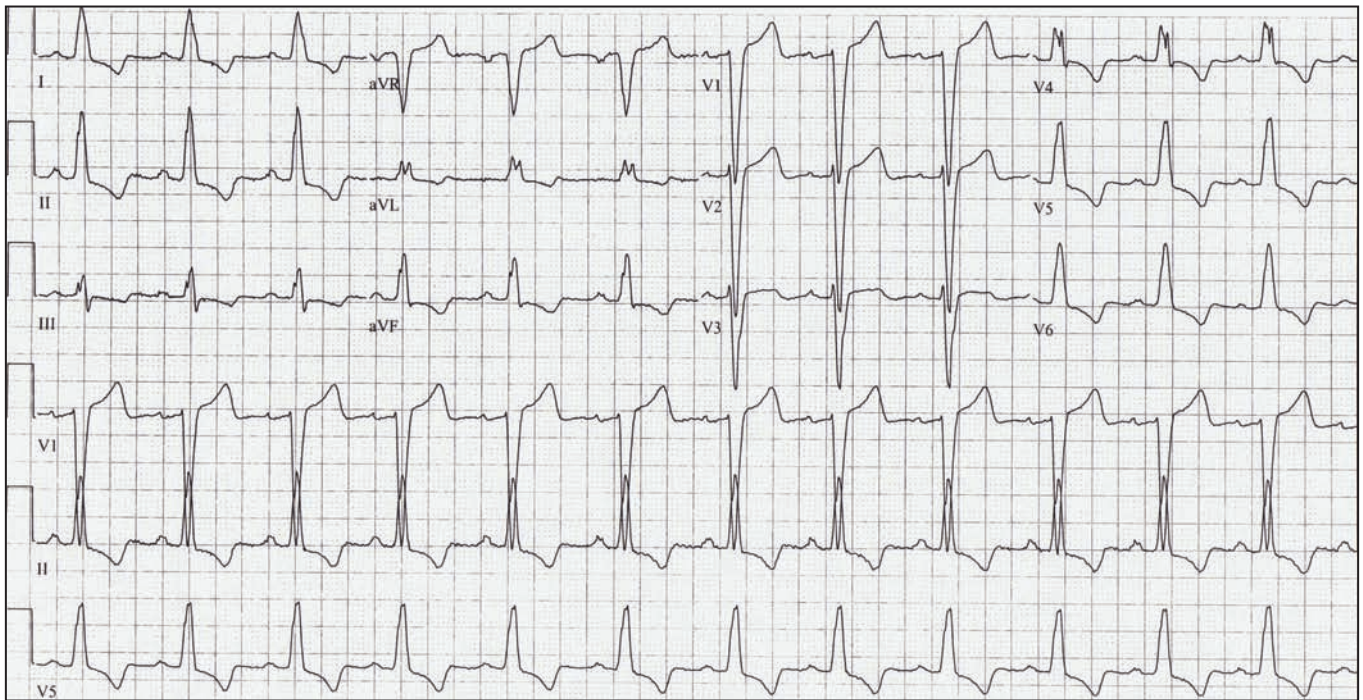


Figure. Electrocardiogram recorded on admission.

What is your diagnosis?
Explication is on the following page.

ECG of the Month

Presentation is on the previous page.

DIAGNOSIS: The admission electrocardiogram showed normal sinus rhythm and a wide (≥ 0.12 seconds) QRS complex with monophasic R waves in leads I, aVL, and V₆ and a rS pattern in lead V₁, findings typical of complete left bundle branch block. The subsequent profound bradycardia was due to catheter-induced transient right bundle branch block and, thus, complete heart block resulting from bilateral bundle branch block.

Transient right bundle branch block and its potential for causing complete heart block in patients with pre-existing left bundle branch block are well-known complications of right heart catheterization.^{1,2} Because the left bundle branch and its anterior and posterior fascicles constitute a much broader array of specialized conduction fibers than does the slender right bundle branch, left bundle branch block during left heart catheterization is rare.

Since complete heart block is uncommon during fluoroscopically guided right heart catheterization in persons with pre-existing left bundle branch block, and often is of brief duration when it does occur, prophylactic placement of a temporary pacemaker is not considered mandatory so long as the catheterization team is prepared for rapid insertion of such a pacemaker should the need arise.¹ Because in this particular patient the complete heart

block lasted long enough to require extensive resuscitative efforts that resulted in atrial fibrillation and the need for subsequent electrical cardioversion, when she returns for bypass operation a temporary pacemaker should be inserted at the time of right heart catheterization, and the procedure should be done under fluoroscopic control.

REFERENCES

1. Kerensky RA. Complications of cardiac catheterization and strategies to reduce risks. In: *Pepine CJ, Hill JA, Lambert CR* (editors). *Diagnostic and Therapeutic Cardiac Catheterization*, 3rd edition. Baltimore: Williams & Wilkins; 1998:91-105.
2. Kern MJ, Deligonul U, Donohue TJ, et al. Hemodynamic data. In Kern MJ (editor). *The Cardiac Catheterization Handbook*, 3rd edition. St. Louis: Mosby; 1999:123-223.

This **ECG of the Month** is presented by the Sections of Cardiology, Departments of Medicine, Louisiana State University School of Medicine in New Orleans, and the Medical Center of Louisiana in New Orleans. **Dr. Glancy** is a professor; **Dr. Jain** is an assistant professor; and **Dr. Wilklow** is a fellow in the Section of Cardiology, Department of Medicine, Louisiana State University Health Sciences Center, New Orleans.

LEAD AUTHORS: EARN CME CREDIT FOR PUBLISHING ARTICLES

Physicians may claim AMA PRA Category 1 Credit™ directly from the AMA for learning that occurs as a result of publishing articles. Credit can be awarded only for articles published within the last three years. Applicants should keep a copy of the application and supporting documentation submitted.

Credit may be claimed only for meeting the following criteria:

1. Publishing an article in a journal as a lead author.
2. The journal must be included in the MEDLINE bibliographic database.

The AMA will award 10 credits per article.

Go to www.ama-assn.org/ama/pub/category/16244.html to print a Direct Credit Application and to receive more details.



TARGET AUDIENCE

The July/August ECG of the Month is intended for general internists, surgeons, anesthesiologists, critical care physicians, emergency room physicians, cardiologists, and critical care and catheterization laboratory nurses.

EDUCATIONAL OBJECTIVES

After reading this article, the healthcare provider should be able to recognize the electrocardiographic pattern of left bundle branch block; understand the potential for inducing transient right bundle branch block and, thus, complete heart block, when right heart catheterization is performed in a patient with complete left bundle branch block; and know the precautions to be taken in this situation. Estimated time to complete this activity is one-half (.5) hour.

CME INFORMATION

CREDIT

The LSMS Educational and Research Foundation designates this educational activity for a maximum of one-half (.5) *AMA PRA Category 1 Credit™*. Physicians should only claim credit commensurate with the extent of their participation in the activity.

DISCLOSURE

Dr. Glancy discloses that he is editor of this journal.
Dr. Wilklow has nothing to disclose.
Dr. Jain has nothing to disclose.

ORIGINAL RELEASE DATE	EXPIRATION DATE
7/31/2007	7/31/2008

CME QUESTIONS

Read the preceding CME article and complete the registration, evaluation, and answer form on page 230 to earn CME credit. Mail or fax the registration, evaluation, and answer form to the LSMS Educational and Research Foundation. Answers must be postmarked or faxed prior to July 31, 2008. Participants must attain a minimum score of 75% to receive credit. LSMS members may also go online at http://www.lsms.org/Pubs/Journal/journal_cme.asp and complete the interactive answer sheet for each CME article.

Choose the one answer that is most correct for each question.

1. True/False:
Complete heart block can be caused by bilateral bundle branch block.
2. Catheter-induced complete heart block is most likely to occur when:
 - a. Right heart catheterization is performed in a patient with no preexisting conduction disturbance.
 - b. Right heart catheterization is performed in a patient with a long P-R interval.
 - c. Right heart catheterization is performed in a patient with left bundle branch block.
 - d. Left heart catheterization is performed in a patient with right bundle branch block.
3. True/False:
In every patient with left bundle branch block, a temporary pacemaker must be placed before right heart catheterization.
4. True/False:
Fluoroscopic guidance during right heart catheterization will reduce the risk of transient right bundle branch block.



™ & © 2003 The Jim Henson Company

Eats flies. Dates a pig.
Hollywood star.

LIVE YOUR DREAMS

Pass It On.

THE FOUNDATION FOR A BETTER LIFE
www.forbetterlife.org