

Pulled over: dyspnea and atypical chest pain associated with tall R waves and deep S waves in electrocardiographic leads V₁ and V₂

ENRIQUE M. VELASQUEZ, MD, D. LUKE GLANCY, MD, AND RAJA W. DHURANDHAR, MD

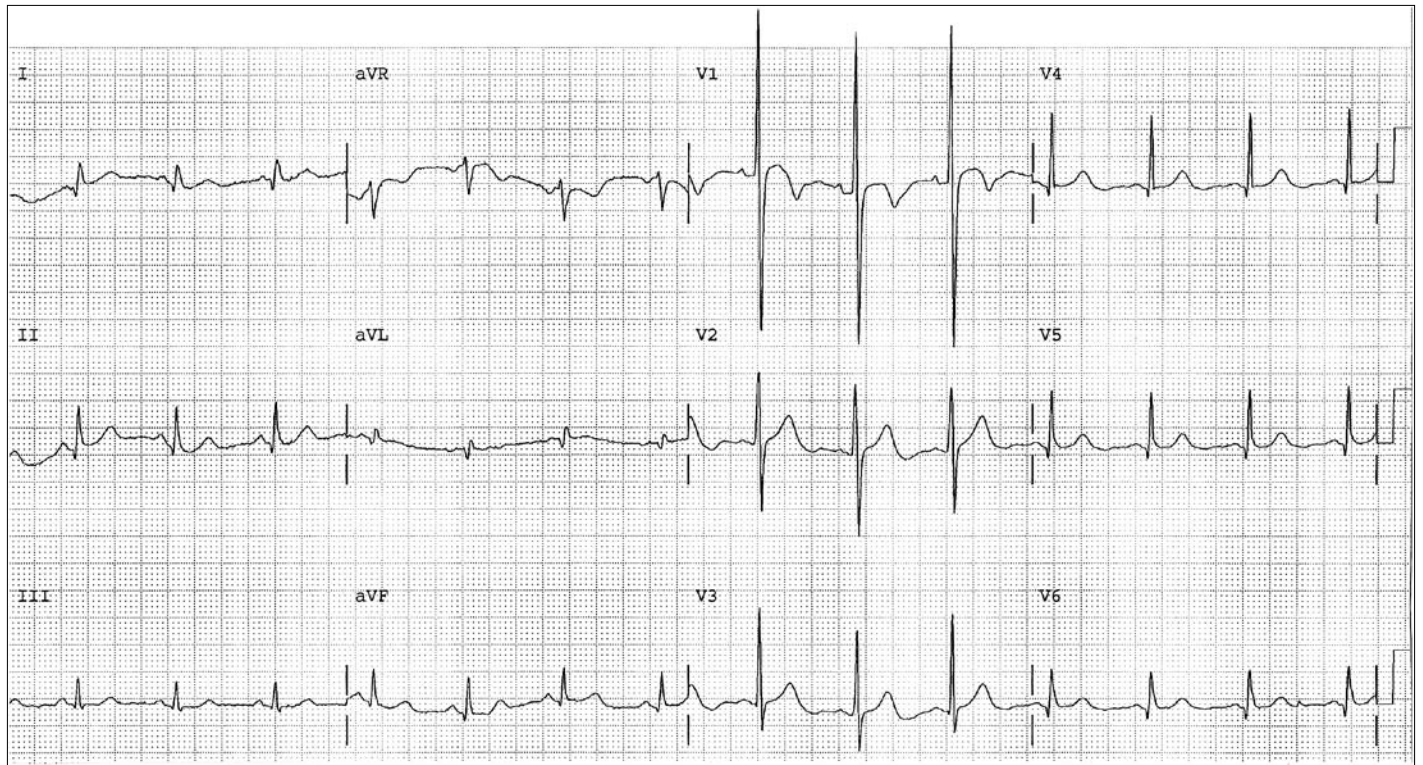


Figure 1. Admission electrocardiogram shows normal sinus rhythm, patient-motion artifacts in the limb leads, and tall R waves in leads V₁ and V₂.

A 69-year-old male resident of a nursing home presented to the emergency department with complaints of shortness of breath and atypical chest pain. A 12-lead electrocardiogram was done on admission (Figure 1).

The electrocardiogram was normal except for prominent R waves in the right precordial leads (V₁, V₂). The differential diagnosis of tall R waves in these leads includes right ventricular hypertrophy, ventricular septal hypertrophy, posterior myocardial infarct, right bundle branch block, ventricular preexcitation of the Wolff-Parkinson-White type, Duchenne's muscular dystrophy, dextrocardia and/or rightward displacement of the cardiac apex, and a normal variant (diagnosis of exclusion) (1).

In this patient, the normal QRS axis in the frontal plane and the absence of right atrial enlargement made right ventricular hypertrophy an unlikely diagnosis. Most patients with posterior-wall myocardial infarcts also have electrocardiographic evidence of inferior-wall myocardial infarction, which was absent in this patient. In cases in which an isolated posterior-wall myocardial

infarct is suspected, the use of leads V₇ through V₉ is helpful to confirm the diagnosis (1). An echocardiogram did not reveal a wall-motion abnormality or any evidence of septal or right ventricular hypertrophy. The normal QRS duration excluded right bundle branch block. The electrocardiogram showed a normal PR interval and no evidence of delta waves or QRS prolongation to suggest preexcitation of the Wolff-Parkinson-White type. This patient did not have any history to suggest Duchenne's muscular dystrophy, and patients with the disorder do not live to this age. Is this a case of dextrocardia? The answer is in the chest radiograph (Figure 2).

From the Section of Cardiology, Department of Medicine, Louisiana State University Health Sciences Center and the Touro Infirmary, New Orleans, Louisiana.

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Corresponding author: D. Luke Glancy, MD, Section of Cardiology, Department of Medicine, Louisiana State University Health Sciences Center, 1542 Tulane Avenue, Room 436, New Orleans, Louisiana 70112.

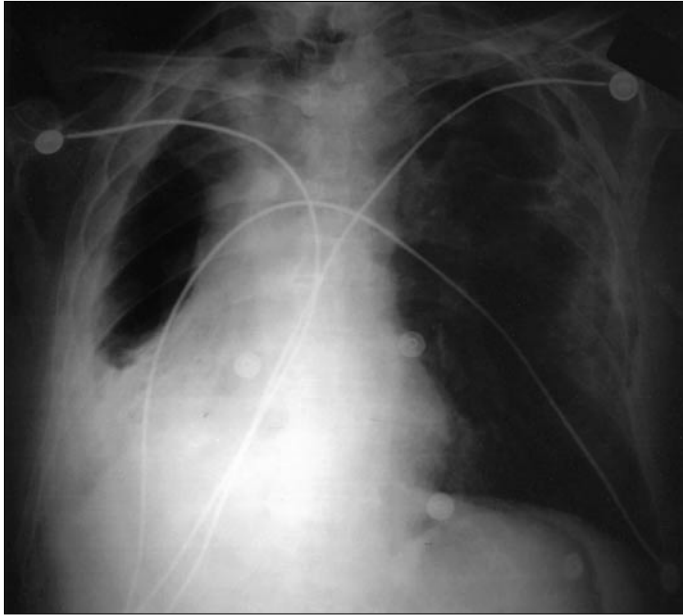


Figure 2. Portable anteroposterior chest radiograph shows loss of volume in the right lung with a shift of the heart and mediastinum to the right. Pleural thickening is present bilaterally, greater on the right.

A portable anteroposterior chest radiograph showed volume loss in the right lung with mediastinal shift toward the right. The heart was essentially pulled over into the right hemithorax. Pleural thickening and scarring also were present. A history of mycobacterial lung infection treated many years ago was later obtained from the nursing home. The patient had a negative cardiac ischemic workup, had negative sputum smears and cultures for mycobacteria, and was treated for a bacterial lower respiratory infection with resolution of his symptoms.

The heart and cardiac apex are normally on the left, but either or both may be in the midline or on the right (2). When the mal-

position is congenital, abnormalities of cardiac morphology often coexist (3–7); these are much less common when the malposition is so-called mirror-image dextrocardia as part of complete situs inversus (6, 7). The heart and/or the cardiac apex also may be in the midline or on the right owing to skeletal, diaphragmatic, or lung abnormalities (6, 7), such as when the heart is pulled over by loss of right-lung volume as in this case or when it is pushed over by eventration of the left hemidiaphragm (8). Tall R waves will be seen in leads V_1 and/or V_2 when the ventricular septum is to the right of those leads, and the leads lie over the left ventricle, or when right ventricular enlargement accompanies the cardiac malposition.

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