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A 52-Year-Old Man With Unheralded Syncope

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A 52-year-old man with mild asthma presented to the hospital after an episode of unheralded syncope while walking. On arrival, he was afebrile, with a blood pressure of 120/80 mm Hg, heart rate of 35/min, respiratory rate of 16/min, and pulse oximetry of 98% on ambient air. His examination revealed regular bradycardia without cannon A waves, clear lung fields to auscultation, and warm extremities. Chest radiography revealed hilar adenopathy. Electrocardiography showed sinus bradycardia, first-degree atrioventricular block, left posterior fascicle, and right bundle branch blocks (Figure 1A). Transthoracic echocardiography revealed an ejection fraction of 50% without regional variation. On exercise stress single-photon emission computed tomography, the patient completed 9 minutes of a standard Bruce protocol and developed transient high-grade atrioventricular block but had no ischemic ST-segment changes or defects on perfusion imaging. Cardiac magnetic resonance imaging (cMRI) with gadolinium contrast-enhanced first-pass myocardial perfusion imaging at rest and contrast-enhanced late gadolinium enhancement imaging revealed low-normal left ventricular systolic function but no other abnormalities (Figure 1B).

Diagnosis

Cardiac (and systemic) sarcoidosis

What to Do Next

D. Order cardiac fluorodeoxyglucose positron emission tomography (FDG-PET)

Discussion

Sarcoidosis is an inflammatory, granulomatous disease of unclear origin that affects multiple organs. Clinically evident cardiac involvement occurs in 5% of patients with sarcoidosis, although the estimated prevalence of clinically silent cardiac involvement in patients with systemic or pulmonary disease is higher (25%).¹ Recognition of cardiac involvement in sarcoidosis is important because its presence portends a poor prognosis.²

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Clinical manifestations of cardiac sarcoidosis (CS) depend on the location and extent of disease and include conduction abnormalities, ventricular arrhythmias, heart failure, and sudden death. The 2014 Heart Rhythm Society Guidelines provide a diagnostic framework for CS and recommend that patients with biopsy-proven extra-CS be screened for cardiac symptoms and with 12-lead electrocardiography.³ In the presence of symptoms or abnormal electrocardiography and/or echocardiography results, advanced cardiac imaging (cMRI and/or FDG-PET) should be performed. In adults younger than 60 years without established sarcoidosis, the presence of unexplained Mobitz II or complete heart block should prompt further evaluation with chest computed tomography or other advanced imaging, such as PET. If the results of 1 or more of these modalities are positive, a biopsy should be performed.³ Lymph node or lung biopsy is preferred because of higher sensitivity and lower procedural risk. Otherwise, endomyocardial biopsy may be performed with electrophysiologic or image guidance because of the focal nature of the disease.³

Because cardiac biopsy may be limited by diagnostic yield, feasibility, and procedural risk, cMRI and FDG-PET are important tools for the diagnosis of CS. Both provide high sensitivity (>75%) for detecting CS, although FDG-PET has a higher sensitivity and cMRI a higher specificity.⁴ Thus, PET may lead to the diagnosis of CS when cMRI findings are negative or inconclusive. Imaging findings suggestive of CS on both modalities have strong prognostic implications.^{5,6}

Corticosteroids are the first-line medical treatment for CS. Observational data suggest that corticosteroid therapy in CS may be associated with improved atrioventricular conduction and lower rates of adverse cardiovascular events, although there is a paucity of high-quality data that demonstrate survival benefit.⁷ Despite this, most experts recommend treatment of CS with corticosteroid therapy.¹ More recent investigations suggest that corticosteroid therapy can reduce myocardial inflammation, as assessed by FDG-PET, and may be associated with improvement in ejection fraction.⁸ Consequently, FDG-PET may be used serially to assess response to therapy and guide further management.⁴

Beyond medical therapy, device guidelines apply to patients with CS and advanced heart block. Patients with CS also have a substrate for ventricular arrhythmias and should undergo risk stratification and consideration for implantable cardioverter-defibrillator placement. Implantable cardioverter-defibrillator therapy is recommended for patients with sustained ventricular arrhythmias, including prior cardiac arrest and/or left ventricular ejection fraction of 35% or less despite optimal medical therapy and immunosuppression. Implantable cardioverter-defibrillator therapy may also be useful in patients with CS who have an indication for permanent pacemaker placement, unexplained syncope believed to be arrhythmic in origin, and/or inducible sustained arrhythmias.³

Patient Outcome

Although the patient's cMRI findings were unremarkable, cardiac FDG-PET results revealed myocardial inflammation in the basal inferoseptal wall (Figure 2A). Fused whole-body PET computed tomography revealed multifocal FDG-avid mediastinal, hilar, supraclavicular, and upper abdominal lymphadenopathy (Figure 2B). Endobronchial ultrasonography-guided

lymph node biopsy revealed noncaseating granulomas consistent with sarcoidosis. The patient was started on a regimen of prednisone, 40 mg daily. During the hospitalization, he also developed complete heart block and underwent placement of a dual-chamber pacemaker defibrillator. Four months after discharge, interval FDG-PET revealed resolution of myocardial inflammation with small residual perfusion defect in the basal inferior wall and reduction in FDG uptake of lymphadenopathy.

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What would you do next?

- A.** Order invasive electrophysiologic testing
- B.** Order coronary angiography
- C.** Order 30-day event monitoring
- D.** Order cardiac fluorodeoxyglucose positron emission tomography

Figure 1.
Initial patient presentation.

Figure 2.

Patient outcome. A, Technetium Tc99m sestamibi resting myocardial perfusion single-photon emission computed tomographic (CT) (top rows) and fluorodeoxyglucose positron emission tomographic (FDG-PETs) scans (bottom rows) showing focal, intense FDG uptake of the basal inferoseptal wall (arrowheads). B, Fused whole-body PET-CT scan showing multifocal FDG-avid lymph nodes.