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Abnormal ^{18}F-FDG and ^{82}Rb PET Findings in Chagas Heart Disease

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Abstract: Uptake of the radiopharmaceutical ^{18}F-FDG visualized by PET imaging can reflect abnormal myocardial inflammation. When utilized in conjunction with other imaging modalities, such as echocardiography, PET ^{18}F-FDG imaging can help distinguish between active cardiac sarcoidosis and other etiologies of nonischemic cardiomyopathy. We present a case of a 46-year-old man with nonischemic cardiomyopathy and ventricular tachycardia who underwent an echocardiogram suggestive of cardiac Chagas disease. A subsequent ^{18}F-FDG PET demonstrated abnormal hypermetabolism. The diagnosis was confirmed by positive serologic examination results.

Key Words: nonischemic cardiomyopathy, ^{18}F-FDG, PET, echocardiogram, cardiac Chagas disease

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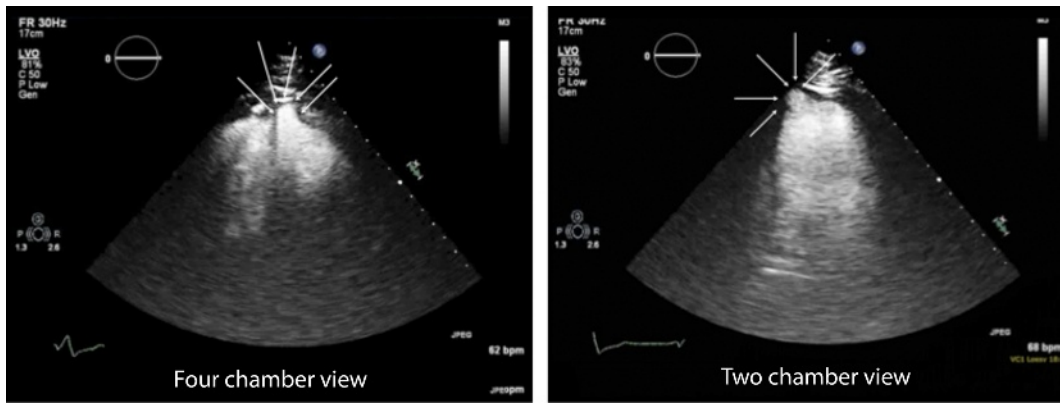

FIGURE 1. A 46-year-old man from southern Mexico with no known coronary artery disease (patent coronary arteries on recent coronary angiography) presented to the hospital with recurrent episodes of ventricular tachycardia. His medical history was notable for sick sinus syndrome, and he recently underwent placement of an implantable cardioverter defibrillator. A contrast-enhanced echocardiogram performed at time of admission demonstrated global hypokinesis with dyskinesia of the apical cap of the left ventricle and a focal finger-like apical aneurysm. Two representative contrast-enhanced views are demonstrated in 4 chamber and 2 chamber views, with arrows pointing to the finger-like apical aneurysm. Dynamic imaging demonstrated global hypokinesis with dyskinesis of the apical aneurysm (Movie 1, 4 chamber cine, http://links.lww.com/CNM/A73) and near akinesis of the mid to basal inferior and lateral walls (Movie 2, short axis cine, http://links.lww.com/CNM/A74). These findings raised the question of chronic Chagas disease, as narrow-necked left ventricular apical aneurysms have been described as a distinguishing feature.[1,2]

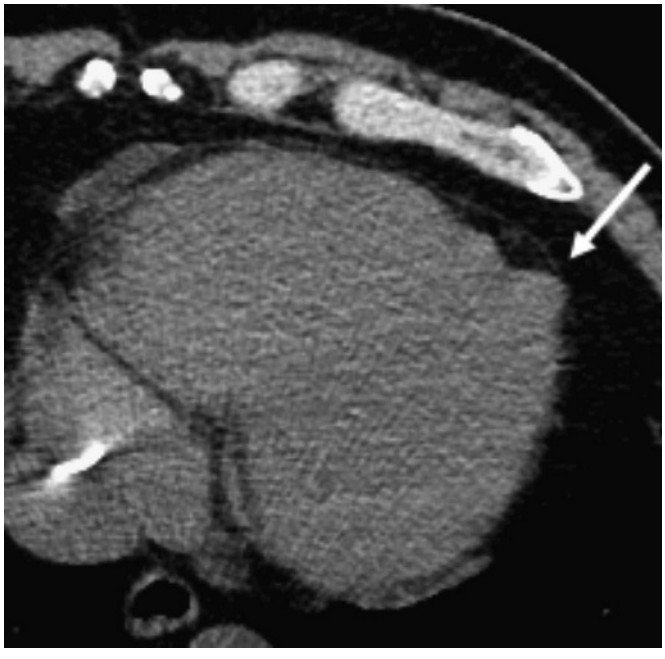

FIGURE 2. A CT scan of the chest again demonstrated the apical aneurysm (indicated with an arrow) and an implantable cardiac defibrillator but was otherwise unremarkable.

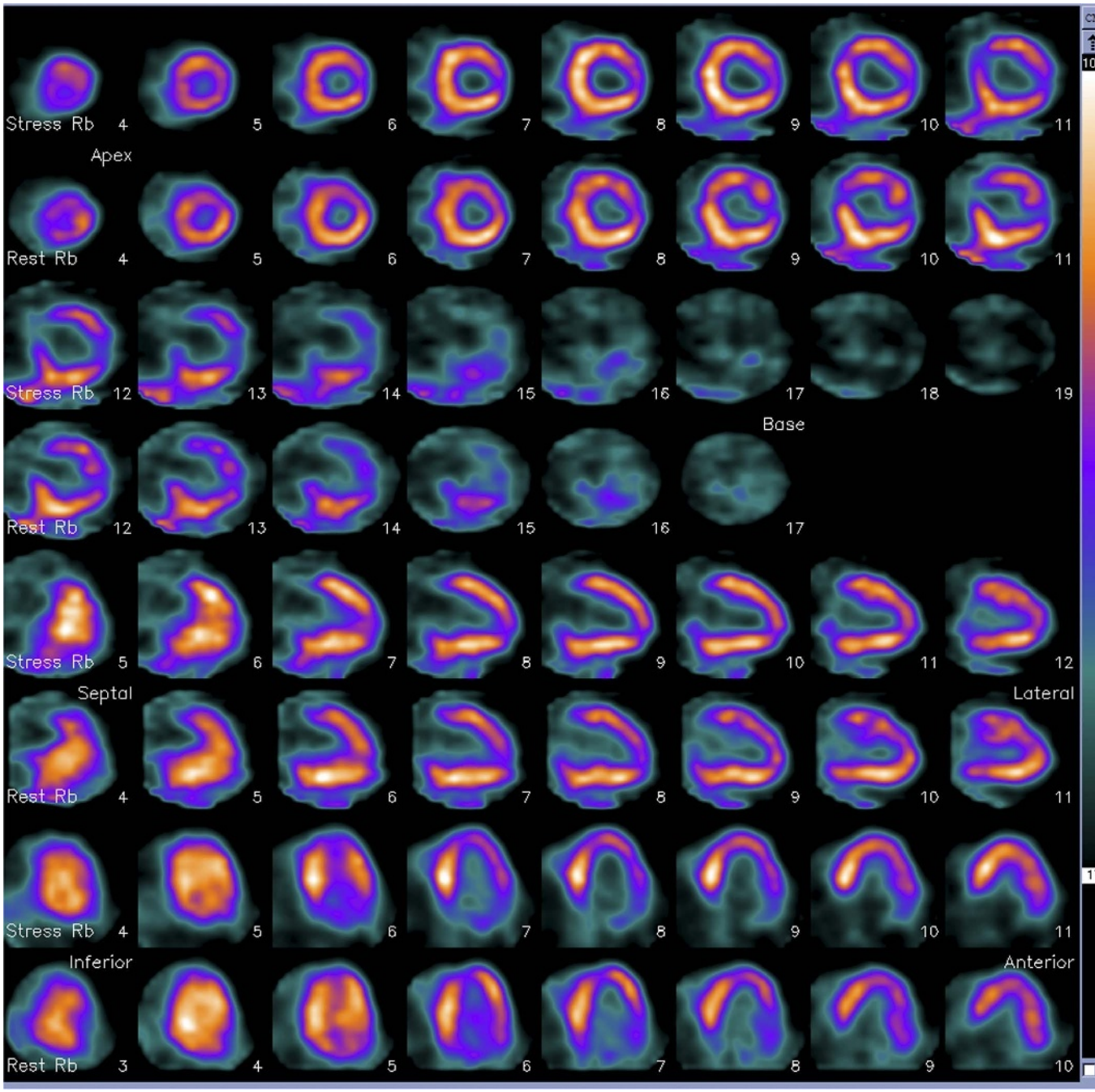

FIGURE 3. A pharmacologic nuclear stress test demonstrated fixed perfusion defects at the base of the septum and lateral wall, and a small fixed apical defect, without reversible perfusion defects to suggest ischemia. Dynamic gated cine imaging demonstrated global hypokinesis with near akinesis of the basal inferolateral wall, as well as dyskinesis of the apex (Movie 3, http://links.lww.com/CNM/A75; Movie 4, http://links.lww.com/CNM/A76).

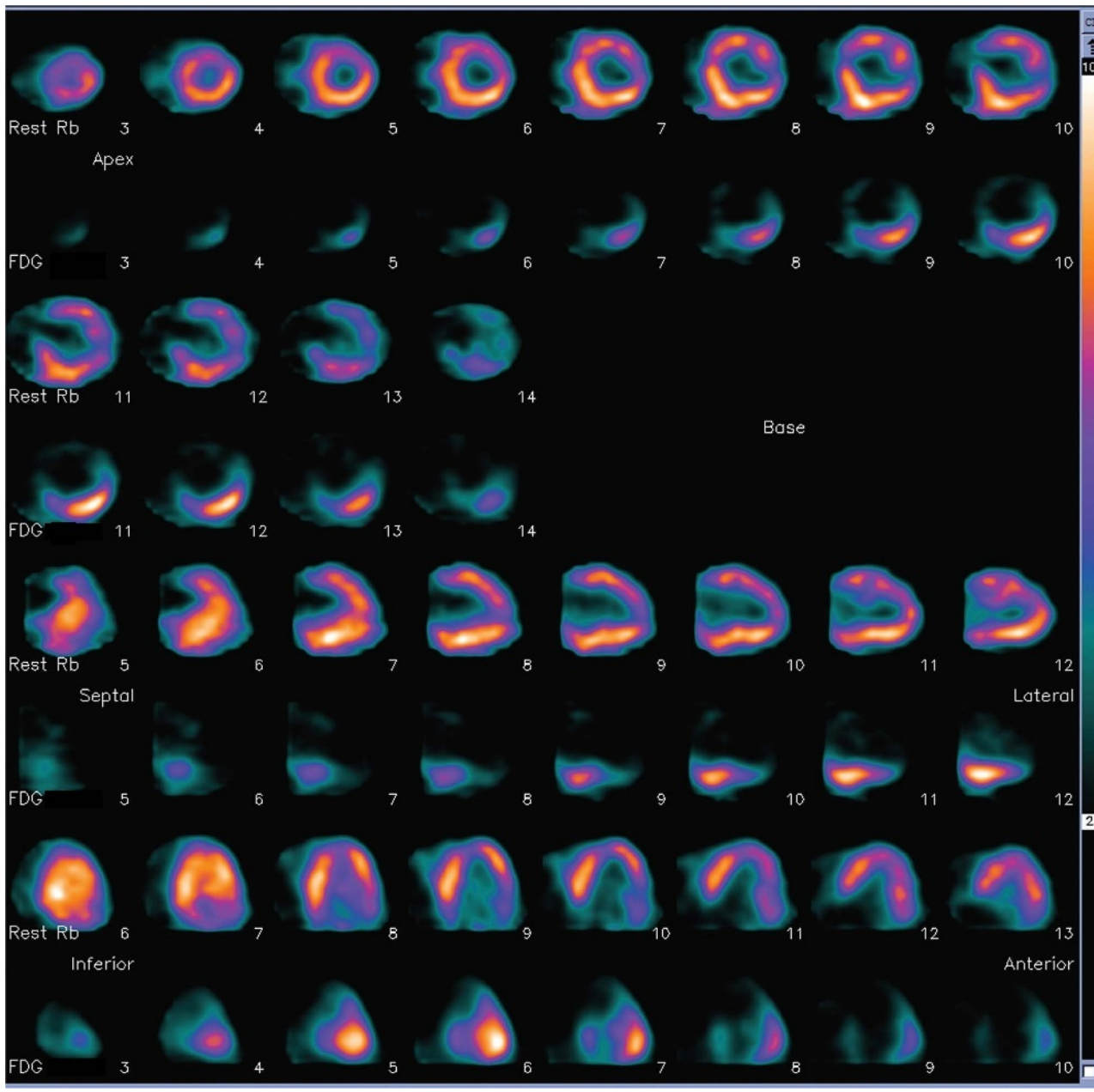

FIGURE 4. Myocardial PET imaging with ^{18}F-FDG and ^{82}Rb was performed to evaluate for abnormal metabolism, which can indicate inflammation.[3] The patient was prepared according to our institution's cardiac sarcoid protocol according to published guidelines,[4] which included a high fat, low carbohydrate diet on the day before imaging, and no food on the day of imaging. A cardiac sarcoid protocol ^{82}Rb/^{18}F-FDG PET demonstrated fixed perfusion defects at the base of the interventricular septum and base of the lateral wall, with a partially overlapping territory of hypermetabolism involving the inferior and lateral walls. There was no hypermetabolism associated with the apical perfusion defect. Increased ^{18}F-FDG uptake at the base of the septum, the base of the lateral wall, and additional hypermetabolism in the inferior wall was suggestive of myocardial inflammation, as preparation was adequate in this patient.[5,6] Endomyocardial biopsies demonstrated endocardial fibrosis with no evidence of granulomas, iron, or amyloid deposition. Trypanosoma cruzi immunoglobulin G (IgG) and immunoglobulin M (IgM) antibodies were detected, demonstrating positive serology for Chagas disease.[7,8] Therefore, a diagnosis of cardiac Chagas disease was made based on positive imaging and serologic findings. The patient had his amiodarone dose increased to minimize risk of future arrhythmias and was referred to the infectious disease clinic for consideration of therapy for Chagas disease. The patient was offered treatment with benznidazole, but deferred therapy due to the limited clinical benefit[9] and high potential for adverse effects.[10] At the time of submission of this report, there is only 1 additional known patient where ^{82}Rb/^{18}F-FDG PET imaging was described in conjunction with Chagas disease.[11] Taken together with the prior case report, and micro-PET studies in mouse models,[12] this case suggests that ^{82}Rb and ^{18}F-FDG PET imaging may play an important role in detecting active inflammation associated with Chagas disease.