The Importance of Glucose Optimization Prior to FDG-PET Imaging in the Diagnosis of Cardiac Sarcoidosis

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A 65-year-old-male with pulmonary sarcoidosis, 2:1 atrioventricular-block with pacemaker, CKD4, and diabetes presented in decompensated heart failure with an undifferentiated non-ischemic cardiomyopathy.

On prior admission, cardiac sarcoid involvement was suspected, leading to FDG-PET imaging which was negative (Fig. 1). FDG-PET was pursued over cardiac MRI given concern for pacemaker artifact and gadolinium in CKD. EF was 55% at that time.

Upon re-admission, EF was <30% and suspicion remained for cardiac sarcoidosis. Although a high-fat, low-carbohydrate diet was ordered prior to previous PET imaging, a chart review showed that unsupervised meals may have caused false-negative imaging. PET imaging was repeated with glucose optimization via strict dietary compliance and a 12-h fast. Imaging was now indicative of active cardiac sarcoidosis (Fig. 2).

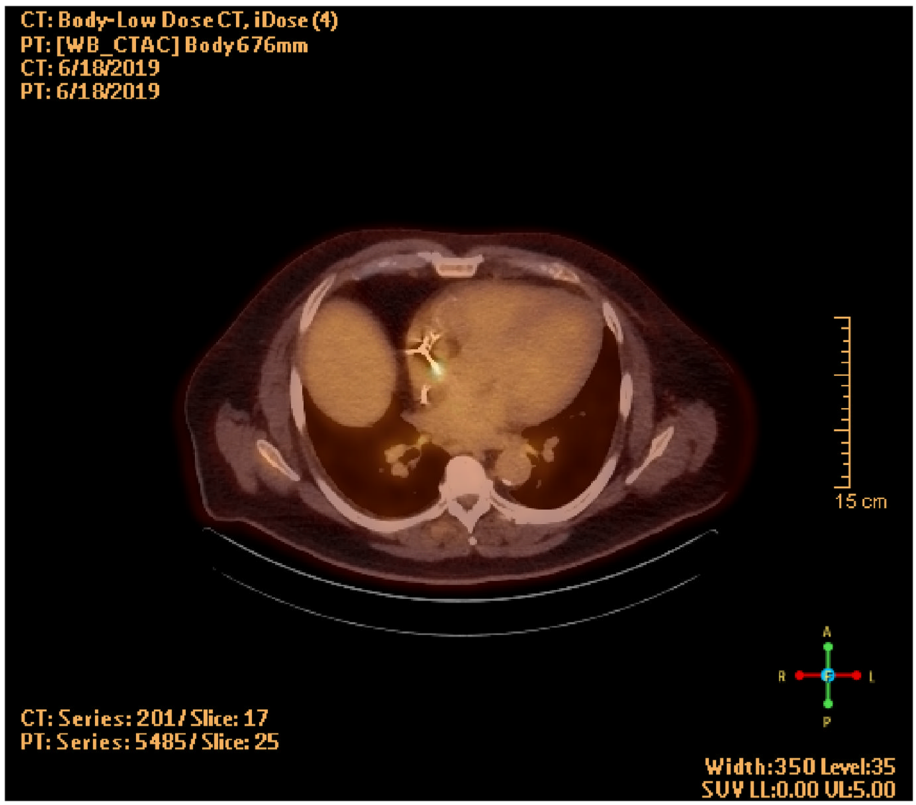

Fig. 1 FDG-PET without UptakeInitial PET imaging with absence of myocardial radiotracer uptake suggestive of cardiac sarcoid involvement. Blood glucose at the time of the study was 157 mg/dl, (157-210 over previous 4 hours)

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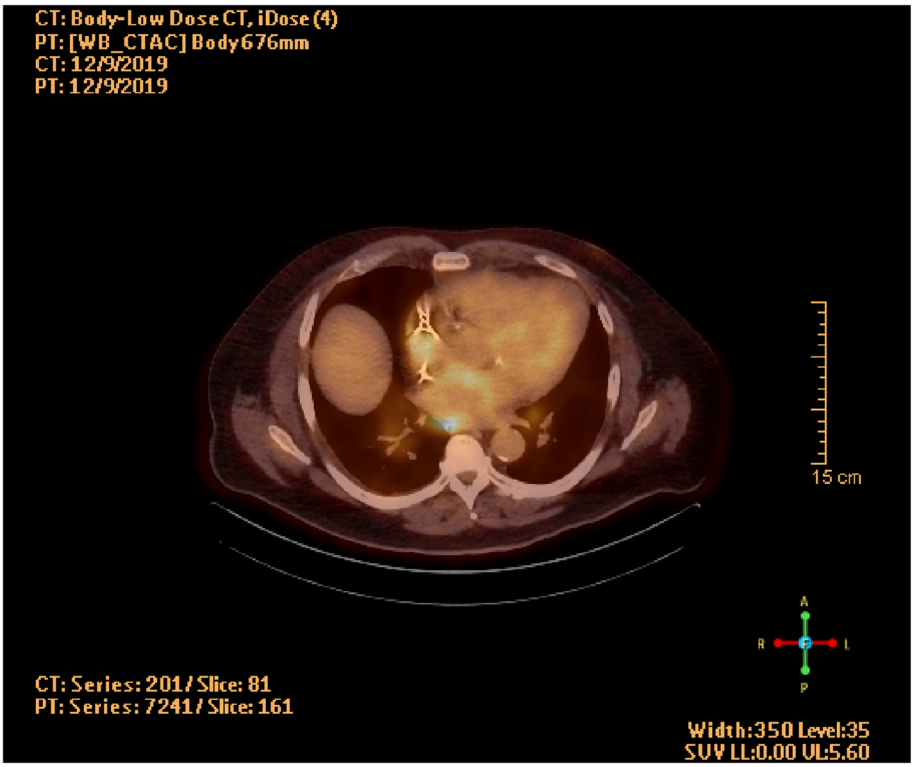

Fig. 2 FDG-PET with UptakeRepeat imaging demonstrating increased metabolic activity and F18-FDG uptake noted in the intra-atrial septum and left ventricle myocardium indicative of active sarcoidosis. Blood glucose at the time of the study was 118 mg/dl, (100-118 over previous 4 hours)

Cardiac sarcoidosis portends an increased risk of adverse cardiovascular outcomes [1]. Early therapy with anti-inflammatories and glucocorticoids can mitigate LV-remodeling and arrhythmias [2, 3] if initiated before the EF declines below 30% [4]. Given false-negative initial study, our patient did not receive appropriate time-sensitive therapy and suffered progressive cardiomyopathy.

Glucose and FDG compete for enzymes and transport mechanisms causing altered radiotracer distribution [5] and false-negative results, especially in insulin-sensitive tissues such as the heart [6], necessitating glucose optimization to avoid diminished sensitivity in FDG-PET imaging [7–9].

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