Positron emission tomography for diagnosis of prosthetic valve endocarditis

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INTRODUCTION

We illustrate the potential use of ^{18}F-FDG PET/CT in patients with suspected prosthetic valve endocarditis (PVE) and infected cardiac devices.

CASE PRESENTATION

A 43-year-old male with distant, over 11 years ago, history of multiple valve replacement and pacemaker implantation (epicardial system) presents with 5-day history of night sweats, fevers, and malaise. The presence of high-grade methicillin-sensitive staphylococcal bacteremia led to suspicion of bacterial mechanical valve endocarditis. However, echocardiography did not show vegetations or abscesses. Given the high suspicion for infection, an ^{18}F-FDG PET/CT scan for inflammation was performed (Figure 1). Images show circumferential uptake of ^{18}F-FDG surrounding the mitral and aortic prosthetic valves (green arrows) with less intense uptake localized to the tip of left ventricular epicardial lead (blue arrow). Given the patient's remote surgical history (^{18}F-FDG uptake can be seen in recent surgery, but not remote) and clinical presentation, the scan is highly suggestive of prosthetic valve and left ventricular lead infection.

DISCUSSION

The Duke's criteria have lower sensitivity and specificity in diagnosing PVE[1,2] and echocardiography can be limited, as vegetations or abscesses are not visualized in up to 40% of cases.[1] ^{18}F-FDG PET/CT is an important diagnostic tool for challenging cases of PVE, with sensitivity and specificity of 80.5% and 73%, respectively.[3] ^{18}F-FDG PET/CT also has a unique and important role in detecting device infection and extracardiac foci of infection including infective embolism.[1] ^{18}F-FDG PET/CT has a significantly higher clinical utility and inter-observer reproducibility in detection of extra-cardiac foci compared to Tc99m-labeled white blood cell SPECT/CT. ^{18}F-FDG PET/CT can also provide information on the extent of infection early on, and guide timely intervention and duration of antibiotic therapy. This case underscores the potential use of ^{18}F-FDG PET/CT in patients with suspected infective endocarditis, particularly those involving prosthetic valves and cardiac devices.

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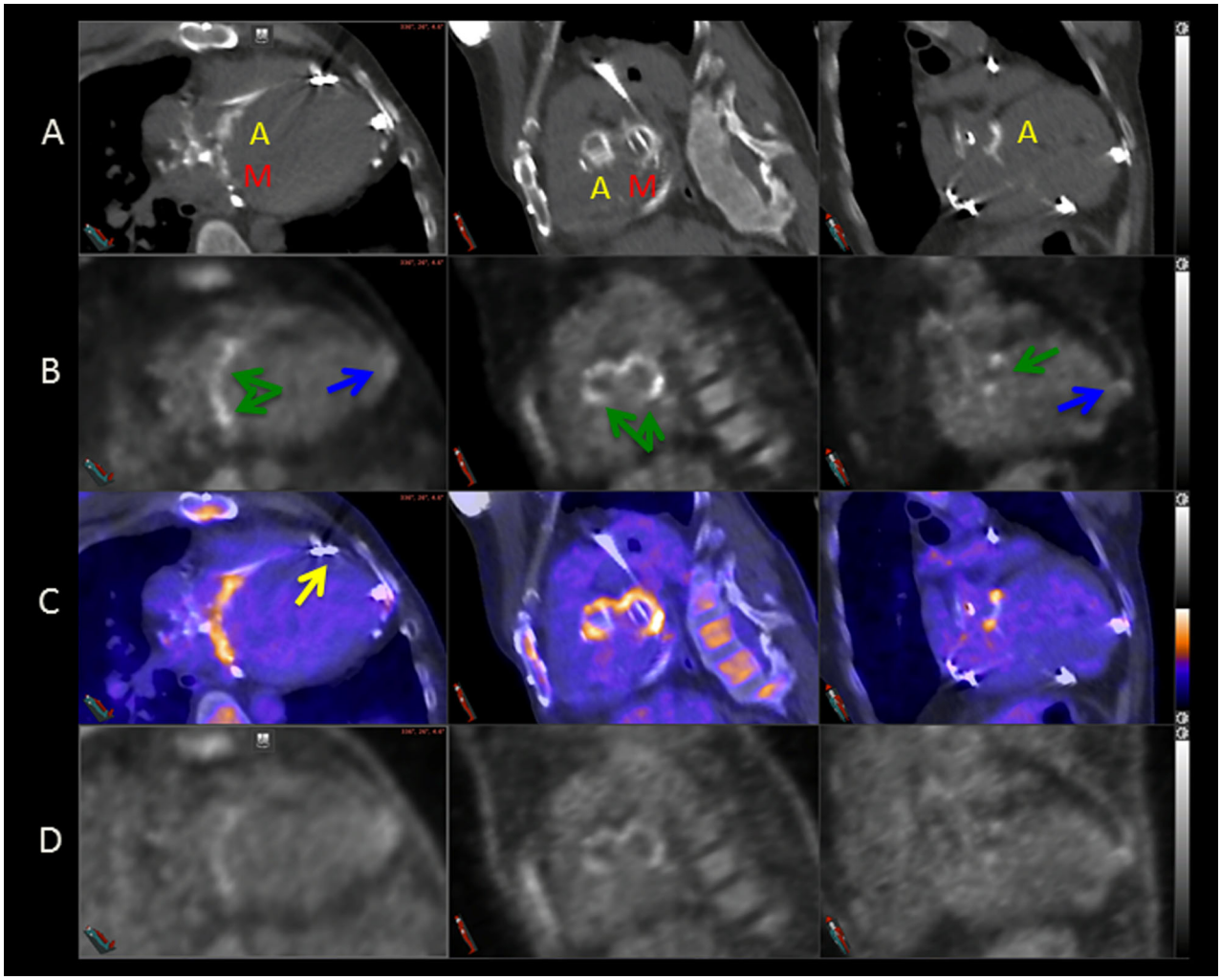

Figure 1. ^{18}F-FDG PET scan with non-contrast, low-dose CT (row **A**), attenuated corrected PET images (row **B**), fused attenuation corrected PET and CT images (row **C**), and non-attenuation-corrected PET images of the heart (row **D**) in multiple views to illustrate the prosthetic aortic valve (A), the prosthetic mitral valve (M), ^{18}F-FDG uptake in the annuli of these valves (green arrows), and FDG uptake in the tip of the left ventricular epicardial pacemaker lead (blue arrow). The non-attenuated corrected PET images (row **D**) also demonstrate the presence of focal ^{18}F-FDG uptake in the same locations, confirming that the ^{18}F-FDG activity observed on the fused PET/CT images is not due to attenuation-correction artifacts caused by the metallic hardware. Also, note that the right ventricular lead tip (yellow arrow) shows no ^{18}F-FDG activity despite equivalent CT density to the left ventricular lead tip.

Disclosure

Vidhu Anand and Martin Rodriguez-Porcel have nothing to disclose. Panithaya Chareonthaitawee receives royalties from UpToDate.

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