



# Impact of <sup>18</sup>F-FDG-PET/CT in Managing a Case of Fungal Prosthetic Valve Endocarditis

## Mantar Kaynaklı Protez Kapak Endokarditi Olgusunun Yönetiminde <sup>18</sup>F-FDG-PET/CT'nin Etkisi

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### Abstract

Approximately 0.1% of all prosthetic cardiac valves are affected by fungal endocarditis (bacterial endocarditis being the most common cause), which has a high case fatality rate. Post-treatment clinical improvement and a negative blood culture do not definitively rule out the presence of residual active disease. Among imaging techniques, trans-oesophageal echocardiography has higher sensitivity than transthoracic echocardiography, but has its own limitations. Functional imaging with <sup>18</sup>F-fluorodeoxyglucose positron emission tomography/computed tomography (<sup>18</sup>F-FDG PET/CT) has shown to have high overall sensitivity, specificity, and accuracy for the diagnosis and follow-up evaluation of prosthetic valve infective endocarditis, thereby significantly influencing clinical management. Here, we report a rare case of a patient with Marfan syndrome and fungal prosthetic valve endocarditis, in which <sup>18</sup>F-FDG-PET/CT played a significant role in management decision.

**Keywords:** Marfan syndrome, fungal endocarditis, <sup>18</sup>F-FDG-PET/CT, prosthetic valve endocarditis, Candida endocarditis

### Öz

Tüm protez kalp kapaklarının yaklaşık 0,1'i mantar endokarditinden etkilenir (en yaygın nedeni bakteriyeldir) ve yüksek bir ölüm oranına sahiptir. Tedavi sonrası klinik iyileşme ve negatif kan kültürü, kalan aktif hastalığın varlığını kesin olarak dışlamaz. Görüntüleme tekniklerinde, transözofageal ekokardiyografi, transtorasik ekokardiyografiye göre daha yüksek duyarlılığa sahiptir, ancak kendine özgü kısıtlılıkları da vardır. <sup>18</sup>F-florodeoksiglukoz pozitron emisyon tomografisi/bilgisayarlı tomografi (<sup>18</sup>F-FDG PET/BT) ile fonksiyonel görüntüleme, protez kapak enfektif endokarditinin tanı ve takip değerlendirilmesinde yüksek genel duyarlılık, özgüllük ve doğruluk göstererek klinik yönetimi önemli ölçüde etkilemektedir. Burada, Marfan sendromu ve fungal protez kapak endokarditi olan nadir bir olguyu sunuyoruz; bu olguda <sup>18</sup>F-FDG-PET/BT, tedavi kararında önemli bir rol oynamıştır.

**Anahtar Kelimeler:** Marfan sendromu, fungal endokardit, <sup>18</sup>F-FDG-PET/BT, protez kapak endokarditi, Candida endokarditi

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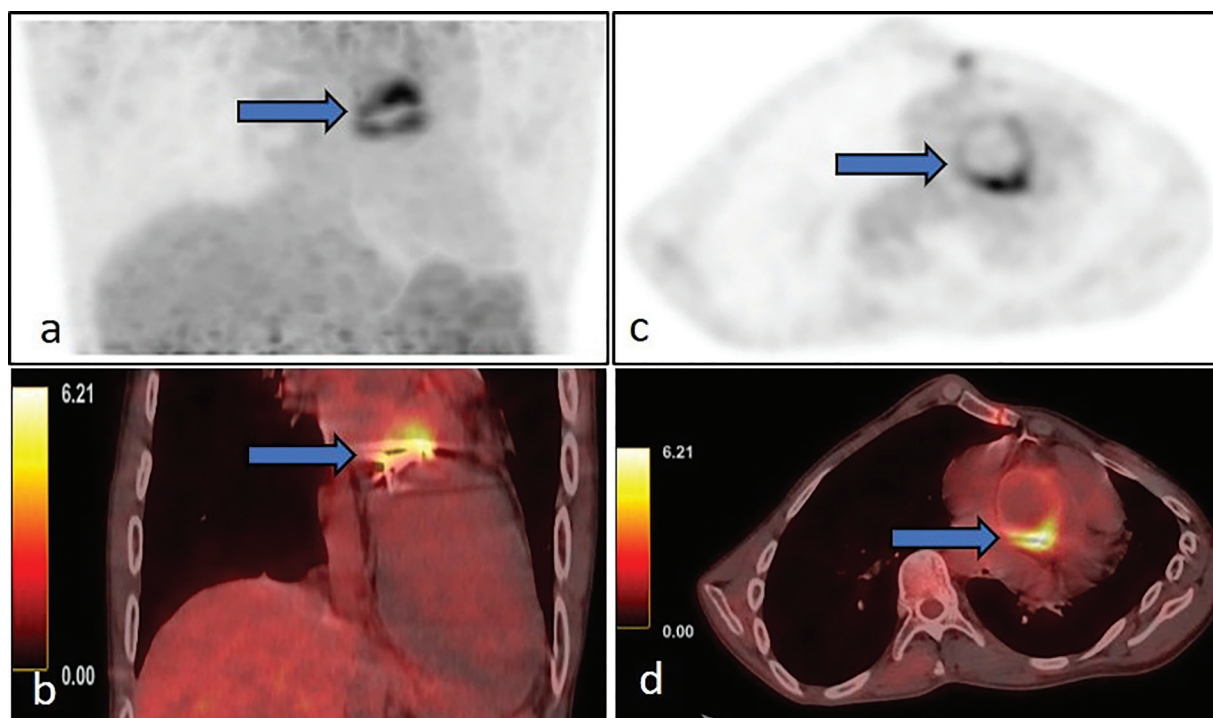
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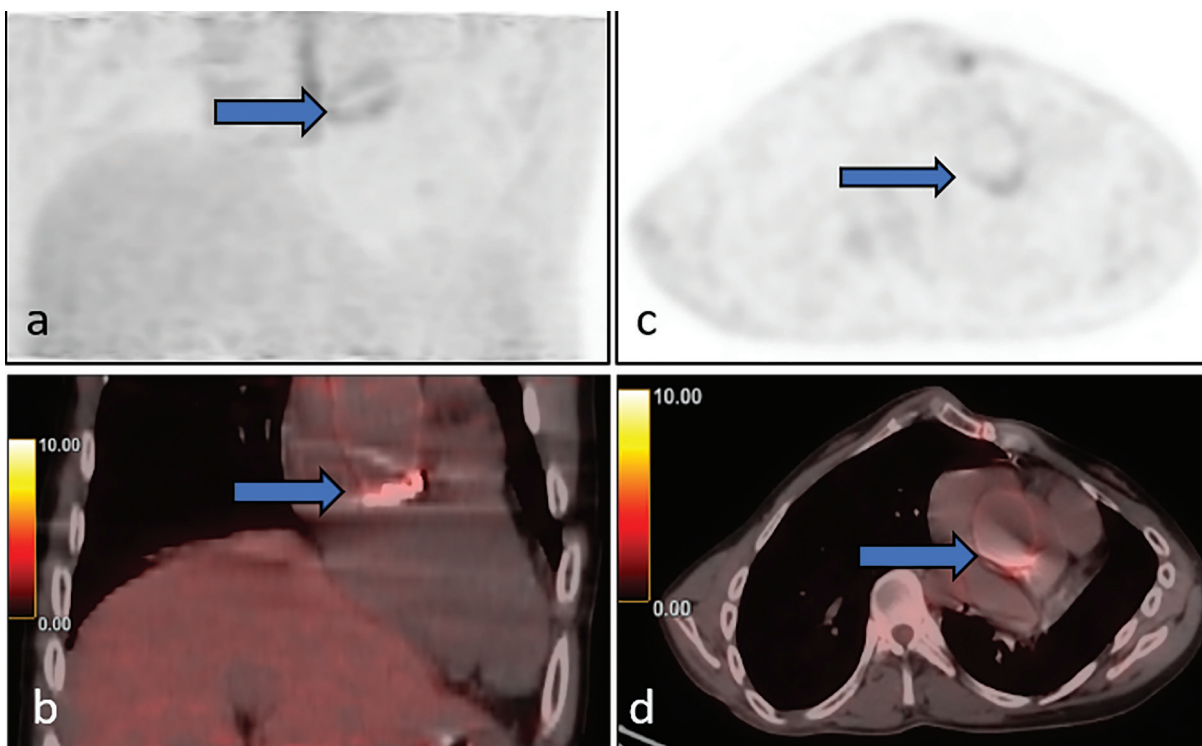
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**Figure 1.** A 28 years-old-male patient with Marfan syndrome associated with severe aortic regurgitation and dilated aorta underwent aortic valve replacement surgery. One month later, he developed fungal prosthetic valve endocarditis with positive blood culture (*Candida albicans* and *Candida parapsilosis*), and 2D transthoracic echocardiography (TTE) showed multiple vegetations on the anterior mitral leaflet and the prosthetic aortic valve. After 6 weeks of treatment, repeat blood culture, 2D TTE and transesophageal echocardiography were negative for residual active disease.  $^{18}\text{F}$ -fluorodeoxyglucose positron emission tomography/computed tomography ( $^{18}\text{F}$ -FDG PET/CT) (a-d) was performed to confirm any residual active focus in the heart before proceeding towards step-down approach to therapy. Cardiac non-attenuation corrected (NAC) maximum intensity projection and axial images (a,c) and corresponding fused PET/CT coronal and axial images (b,d) showed circumferential heterogeneously increased metabolic activity along the aortic prosthetic valve, suggestive of persistent residual infection. Increased metabolic activity on the NAC image ruled out a false-positive result due to overcorrection by the metallic prosthesis. Positive  $^{18}\text{F}$ -FDG-PET/CT led to continuation of antifungal treatment in this case. Fungal endocarditis accounts for 1% to 3% of all infective endocarditis (IE) cases, affects nearly 0.1% of all prosthetic cardiac valves, and is disproportionately associated with a high morbidity and case fatality rate (>70%); it also presents greater diagnostic challenges compared with bacterial IE (1). *Candida* species are the most common cause of fungal endocarditis (2). Blood cultures and echocardiography can be falsely negative, as in this case.  $^{18}\text{F}$ -FDG-PET/CT has high sensitivity and specificity of 86% and 84%, respectively for IE (3). 2023 Duke-International Society for Cardiovascular Infectious Diseases Criteria for Infective Endocarditis Criteria has incorporated  $^{18}\text{F}$ -FDG-PET/CT in the major imaging criteria for its diagnosis owing to its high positive predictive value (4).



**Figure 2.** Corresponding follow up <sup>18</sup>F-fluorodeoxyglucose positron emission tomography/computed tomography (<sup>18</sup>F-FDG PET/CT) images (a-d) after 8 months of treatment showed near complete resolution of the metabolic activity suggesting complete metabolic response to therapy, thus guiding treatment discontinuation. The Step-down approach to therapy is relatively common in fungal prosthetic valve endocarditis, as the infection resolves following an initial course of antifungal agents. However, long-term suppressive antifungal therapy is indicated in selected groups of patients in whom the infection persists (5). This case of fungal prosthetic valve endocarditis highlights the important role and high diagnostic value of <sup>18</sup>F-FDG-PET/CT in finding occult/residual disease in cases of negative routine diagnostic results, guiding further management and also for final response evaluation.

## Ethics

**Informed Consent:** The participants signed a consent regarding publishing their data and photographs.

## Footnotes

### Authorship Contributions

Surgical and Medical Practices: D.S., Concept: K.B., P.S.S.P., G.K.P., K.A., D.S., Design: K.B., P.S.S.P., G.K.P., K.A., D.S., Data Collection or Processing: K.B., P.S.S.P., D.S., Analysis or Interpretation: K.B., P.S.S.P., G.K.P., K.A., D.S., Literature Search: K.B., P.S.S.P., Writing: K.B., P.S.S.P., G.K.P., K.A., D.S.

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