^{18}F-FDG PET/CT in the Assessment of Suspected Mitral Prosthetic Valve Endocarditis: A Case Report

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Abstract

A 54-year-old woman with a mechanical mitral valve prosthesis presented with fever and tachycardia. Four pairs of blood cultures were positive for Escherichia coli. Echocardiography showed prosthetic obstruction and a mobile echogenic structure. The differential diagnosis included prosthetic valve endocarditis and prosthetic thrombosis. ^{18}F-FDG PET/CT showed focal uptake in the prosthetic and periprosthetic region (SUVmax 2.6). Together with the clinical, microbiological and echocardiographic findings, this supported the diagnosis of prosthetic valve endocarditis. The case illustrates the contribution of PET/CT when echocardiography leaves the cause of prosthetic valve dysfunction uncertain.

Keywords: Endocarditis; Fluorodeoxyglucose F18; Positron Emission Tomography

Introduction

Infective endocarditis requires timely assessment [1,2,3,4]. In patients with prosthetic valves, echocardiography may leave uncertainty about the cause of valve dysfunction. This case illustrates the contribution of ^{18}F-FDG PET/CT in that setting [5,6,11].

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Case Report

A 54-year-old woman had an 18-year history of diabetes treated with insulin and a seven-year history of hypertension treated with losartan and bisoprolol. She underwent mitral valve replacement in 2018 for symptomatic severe mitral stenosis with atrial fibrillation. At presentation she was febrile with a heart rate of 125 beats/min and fasting capillary glucose of 1.72 g/L. A prosthetic click was audible. ECG showed a heart rate of 112 beats/min, narrow QRS complexes and monomorphic left ventricular premature contractions. Leukocyte and neutrophil counts were 11,181/µL and 9,440/µL, respectively, and C-reactive protein was 253 mg/L. Four pairs of blood cultures were positive for Escherichia coli.

Transthoracic echocardiography showed mitral prosthetic obstruction with reduced antegrade flow. Transesophageal echocardiography showed a mobile, homogeneous echogenic structure measuring 10 × 10 mm on the anterior atrial side. Prosthetic valve endocarditis and mechanical prosthesis thrombosis were considered.

Examination Protocol

After six hours of fasting, capillary glucose was 6.4 mmol/L. Imaging from skull to mid-thigh began 60 minutes after intravenous administration of 204 MBq of ^{18}F-FDG using a Siemens Biograph 6 TruePoint PET/CT. Helical CT used 110 kVp, 95 mA, pitch 1.75:1, 5 mm slice thickness and 1.5 s rotation time. Three-dimensional PET was acquired without breath-holding for three minutes per bed position across seven 15 cm bed positions, with axial sampling of 3 mm. PET was reconstructed iteratively with CT attenuation correction, eight subsets and four iterations.

Imaging Findings

Focal FDG uptake in the prosthetic and periprosthetic region had an SUVmax of 2.6. Mild circumferential uptake in the right atrial region had an SUVmax of 1.4. The focal mitral uptake supported the diagnosis in conjunction with the clinical, microbiological and echocardiographic findings.



Figure 1. Focal FDG uptake in the mitral prosthetic and periprosthetic region (SUVmax 2.6). A: PET. B: Fused PET/CT. C: CT.

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Discussion

FDG uptake reflects increased glucose metabolism and can occur in infection and other inflammatory processes [7,8,9,10,14]. The 2023 ESC guideline includes characteristic prosthetic or periprosthetic findings on FDG PET/CT among major imaging criteria and recommends nuclear imaging when echocardiography is inconclusive in suspected prosthetic valve endocarditis [11]. The 2023 Duke-ISCVID criteria also incorporate characteristic FDG uptake patterns, with timing after implantation relevant to classification [6].

In this case the focal pattern contributed to the assessment alongside blood cultures and echocardiography. The reported SUVmax describes this examination. Radiolabeled leukocyte imaging is another option in selected cases, and whole-body PET/CT can help evaluate suspected extracardiac foci [11,12,13,15].

Conclusion

In this case, focal prosthetic and periprosthetic FDG uptake supported the diagnosis of prosthetic valve endocarditis when interpreted alongside positive blood cultures and echocardiographic findings. PET/CT can complement echocardiography when the cause of prosthetic valve dysfunction remains uncertain.

Declarations

The authors report written informed consent, preservation of patient anonymity and conduct in accordance with the Declaration of Helsinki and applicable standards. No competing interests or funding were reported. Ethical approval, data availability and acknowledgements: not applicable.

Author Contributions

Zakaria Ouassafrar: conceptualization, investigation, data curation, original draft. Abdel Amide Gbadamassi: methodology, supervision, review and editing. Halima Batani and Hafsa Bensimimoun: formal analysis and visualization. Amal Guensi: supervision, project administration and validation.

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