Positron emission tomography for the diagnosis of prosthetic heart valve endocarditis

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Accepted 29 January 2021

DESCRIPTION

A 52-year-old woman diagnosed with Marfan syndrome had undergone surgeries for the correction of the aorta; Bentall procedure (32 years ago) and a thoracoabdominal aortic replacement (3 years ago). The patient was referred to the hospital with a history of prolonged fever (>40 days). On admission, she had a fever of 39.9°C without any particular manifestations. Laboratory tests revealed leucocytosis ($10.2 \times 10^9/L$) and elevated C reactive protein (12.1 mg/dL), and methicillin-resistant *Staphylococcus epidermidis* was cultured from the blood. A total body CT scan without ECG synchronisation was inconclusive for the origin of fever and cardiac vegetation was not detected on the trans-thoracic echocardiogram. However, positron emission tomography-CT (PET-CT) revealed abnormal fluorodeoxyglucose uptake around the replaced aortic valve (figure 1), highly suggesting prosthetic valve endocarditis (PVE). She underwent an emergency valve replacement surgery with the isolation of the blood-borne pathogen from the resected valve. Following the surgery, the patient was administered prolonged antibiotic therapy and discharged in a state of recovery.

Infective endocarditis (IE) can be fatal, which can occur with non-specific symptoms, such as fever alone. Although the standard for the diagnosis of IE is the modified Duke criteria, it has poor diagnostic accuracy and lower sensitivity of approximately 70% in cases of PVE than in native valve endocarditis, making it challenging to diagnose the case as presented.¹ PET-CT, which can identify inflammatory and infectious processes with a

Patient's perspective

I am grateful for giving me the appropriate diagnosis for prolonged fever and saving my life.

Learning points

1. Infective endocarditis should be included in a differential diagnosis of a febrile patient, especially after heart valve replacement.
2. Positron emission tomography-CT is, though expensive and necessarily not available anytime, highly effective in the diagnosis of prosthetic valve endocarditis.

high accuracy, is recently reported to be effective in the diagnosis PVE as well; it elevates the diagnostic sensitivity up to 97% in combination with the Duke criteria.² Other meta-analysis or editorial comments by specialists in nuclear medicine indicated the utility of PET-CT to uncover undiagnosed PVE cases.^{3 4} European Society of Cardiology guideline also included PET-CT as one of the diagnostic methods.¹ It is, however, necessary to be careful about false positive findings on PET-CT due to surgical adhesives used in past cardiac surgeries.⁵ The present case highlighted that IE should be considered in patients with prolonged fever, for which PET-CT is a useful tool for diagnosis, especially among those after prosthetic heart valve replacement.

Contributors All the authors, YO, HH and KO contributed management of the patient. YO and HH wrote the manuscript and FO supervised them all.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Obtained.

Provenance and peer review Not commissioned; externally peer-reviewed.

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Figure 1 Coronal image of positron emission tomography-CT. Abnormal fluorodeoxyglucose uptake was observed around the replaced aortic valve (arrow).

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To cite: Otsuka Y, Hagiya H, Oka K, et al. *BMJ Case Rep* 2021;14:e241640. doi:10.1136/bcr-2021-241640

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