Positron emission tomography for the diagnosis of prosthetic heart valve endocarditis

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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 leukocytosis (10.2×10^9/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. PET-CT, which can identify inflammatory and infectious processes with a 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. Other meta-analysis or editorial comments by specialists in nuclear medicine indicated the utility of PET-CT to uncover undiagnosed PVE cases. European Society of Cardiology guideline also included PET-CT as one of the diagnostic methods. It is, however, necessary to be careful about false positive findings on PET-CT due to surgical adhesives used in past cardiac surgeries. 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.

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