

## Insidious infective endocarditis: Should we use positron emission tomography more often?

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The diagnosis of infective endocarditis on a prosthetic valve (PVE) remains a challenge even for an experienced team. Effective diagnosis of the disease is particularly important due to the high percentage of in-hospital mortality (~17%) [1]. In addition to symptoms that may have a heterogeneous clinical manifestation, blood cultures, and echocardiography play a key role in baseline diagnostic workup. In some cases, making a diagnosis requires a more sophisticated diagnostic approach.

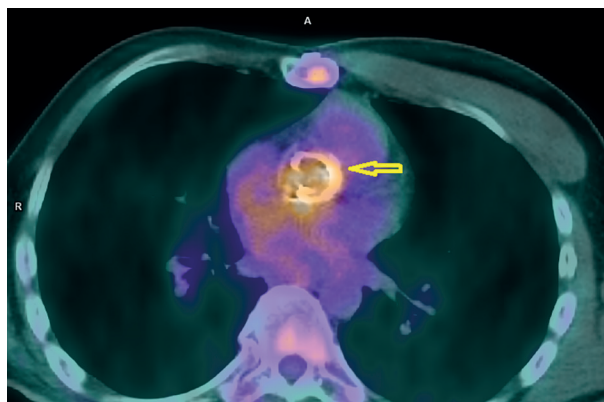
A 35-year-old man with a history of aortic valve replacement with the Edwards Magna 23 mm bioprosthesis due to regurgitation in the course of infective endocarditis (IE) three years earlier, was admitted to the hospital for a periodic fever up to 38.5°C appearing in the evenings over the past 1.5 months. The patient had been hospitalized one month earlier in another cardiology department, where negative blood cultures were obtained, and transthoracic (TTE) and transesophageal echocardiography (TEE) showed no echocardiographic evidence of PVE. IE was excluded based on that, and the patient was discharged home.

Currently, on admission patient was in stable condition and denied any symptoms. Physical examination revealed low-grade fever and a loud systolic murmur over the whole heart, radiating to the carotid arteries. Laboratory tests demonstrated elevated inflammatory markers (C-reactive protein 69 mg/dl, white blood cell count  $11 \times 10^3/\mu\text{l}$ ), normocytic anemia (hemoglobin 11.5 g/dl), and slightly elevated levels of fibrinogen (484 mg/dl), D-dimer concentration (586 ng/ml) and N-terminal pro-B-type natriuretic peptide (163 pg/ml). Chest X-ray showed no consolidations. Again,

TTE and TEE showed no echocardiographic evidence of IE. Due to the fever of unknown origin, it was decided to perform [<sup>18</sup>F]fluorodeoxyglucose positron emission tomography ([<sup>18</sup>F]FDG PET), which showed a moderately increased uptake of [<sup>18</sup>F]FDG in the area of the aortic valve, with the maximum standard uptake value (SUV<sub>max</sub>) = 3.4, most likely due to inflammation [2]. Furthermore, a positive blood culture with *Streptococcus mitans* and a positive urine culture with *Enterococcus faecalis* were obtained. Urinalysis was negative for urinary tract infection. This led to the diagnosis of PVE.

According to current guidelines, PVE patients should receive intravenous antibiotic treatment for 6 weeks [3]. In our case, antibiotic therapy with intravenous ceftriaxone (2 g once a day) for 28 days and gentamicin (240 mg once a day) for 21 days was applied, resulting in clinical improvement, resolution of fever, normalization of inflammatory markers, and negative blood cultures. After 28 days, it was decided to switch the patient to an oral antibiotic treatment with amoxicillin (1 g three times a day) for 14 days. The patient was discharged home in good condition with the recommendation to discontinue amoxicillin after 14 days [4]. During follow-up visits at 1 and 6 months, no signs, symptoms, laboratory, or echocardiographic findings (in TTE) of IE were found; there was no evidence of bioprosthesis degeneration.

The purpose of reporting this case is to underline clinical utility of [<sup>18</sup>F]FDG PET in the management of patients with suspected PVE. [<sup>18</sup>F]FDG PET has high sensitivity (86%) and specificity (84%) for IE diagnosis [5]. We were able to show the clinical course of IE



**Figure 1.** Fusion images of PET/CT performed to diagnose infective endocarditis. Images were acquired with a Biograph 64 PET/CT scanner (Siemens Medical Solutions, Inc.) 60 minutes after injection of 330 mBq [ $^{18}\text{F}$ ]FDG. Presented image shows a transversal, fused PET/CT image, corrected for attenuation. Yellow arrow shows increased radiotracer uptake in the aortic annulus consistent with infection. The semiquantitative PET/CT analysis was performed using the SYNGOVIA application. Standardized uptake value (SUVmax) for valve area was 3.4; reference (myocardial blood pool [MBP] was 2.1, liver SUVmax 2.9)

treated partially with oral antibiotics following the results of a randomized trial in a selected group of IE subjects, which showed that replacing intravenous antibiotics with oral treatment was safe and shortened the patient's hospital stay [4].

## Article information

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