



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

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

**Short title:** PET use for diagnosis of infective endocarditis

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The diagnosis of infective endocarditis on a prosthetic valve (PVE) still 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 which may have a heterogeneous clinical manifestation, blood cultures and echocardiography play a key role at the baseline of diagnostic work-up. In some cases, making a diagnosis requires more sophisticated diagnostic approach.

A 35-year-old man with a history of an 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 due to the periodic fever up to 38.5°C appearing in the evenings over the past 1.5 months. The patient was 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 for PVE. IE was excluded based on that and the patient was discharged home.

Currently, at 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 a fever of unknown origin, it was decided to perform [ $^{18}\text{F}$ ]fluorodeoxyglucose positron emission tomography ([ $^{18}\text{F}$ ]FDG PET), which showed a moderately increased uptake of [ $^{18}\text{F}$ ]FDG in the topography of the aortic valve, the maximum standard uptake value (SUVmax) = 3.4, most likely due to inflammation [2]. Further, positive blood culture with *Streptococcus mitans* and 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 patients with PVE 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 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 month no signs, symptoms, laboratory or echocardiographic findings (in TTE) of IE were found; there was no evidence of bioprosthesis degeneration.

The purpose of this case is to underline clinical utility of [ $^{18}\text{F}$ ]FDG PET in the management of patient with suspected PVE. [ $^{18}\text{F}$ ]FDG PET has high sensitivity (86%) and specificity (84%) for the diagnosis of IE [5]. We were able to show clinical course of IE treated partially with oral antibiotics in reference to the results of randomized trial in selected group of subjects with IE, which showed that replacing intravenous antibiotics with oral treatment was safe and shortened hospital stay of the patient [4].

### **Article information**

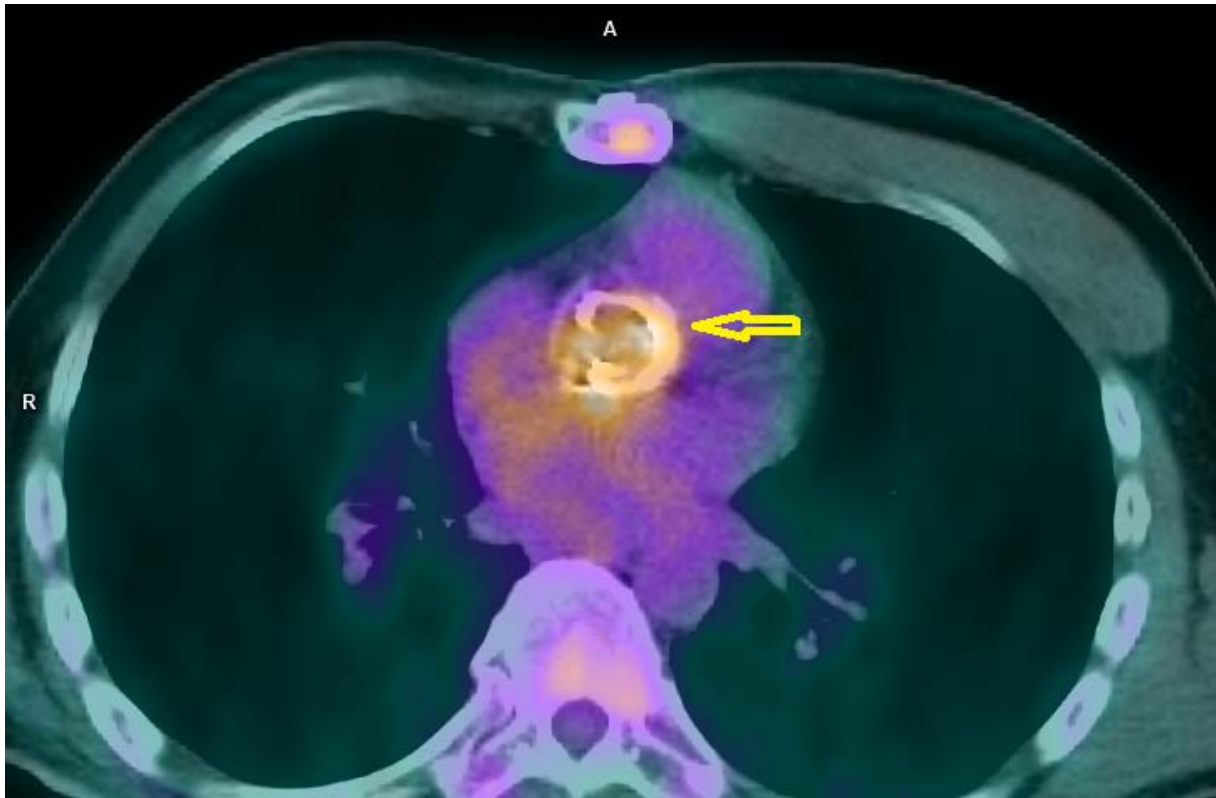
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**Figure 1.** Fusion images of PET/CT performed for diagnosing infective endocarditis. Images were acquired with a Biograph 64 PET/CT scanner (Siemens Medical Solutions, Inc.) 60 minutes after injection of 330 mBq [ $^{18}\text{F}$ ]FDG. Presented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