* Corresponding author:
E-mail address: mvilaseca@salutms.cat (M. Vilaseca-Corbera).

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Diagnostic Challenge of Annular Abscess in a Patient With Prosthetic Aortic Valve: Can F-Fluorodeoxyglucose Positron Emission Tomography Be Helpful?

Reto diagnóstico de un absceso anular en una paciente con válvula aórtica protésica: ¿puede ser útil la tomografía de emisión de positrones con F-fluorodesoxiglucosa?

To the Editor,

A 30-year-old woman was admitted because of asthenia and fever episodes (>39 °C) during the previous month. She had received implantation of a mechanical prosthetic aortic valve (St Jude Medical 21) in 2003. The patient underwent transthoracic echocardiography, which revealed normal native and mechanical valves. Vegetations or possible abscess were not observed. Because endocarditis was suspected, we proceeded with transesophageal echocardiography (TEE), which confirmed the absence of vegetation. However, in longitudinal view we noticed a thickened area of 3 mm at the level of the noncoronary sinus of Valsalva that was not accompanied by hypoechoic or gelatinous extra echoes that could have suggested the presence of an abscess (Fig. 1). Blood cultures were positive to *Streptococcus sanguinis*. The patient received antibiotic treatment with penicillin and gentamicin.

Because the TEE result was regarded as inconclusive, we decided to perform F-fluorodeoxyglucose positron emission tomography/computed tomography (FDG-PET/CT) and to repeat TEE a week later. The FDG-PET/CT scan showed a major FDG uptake at the level of the mechanical aortic valve that suggested the diagnosis of periannular abscess (Fig. 2, Video). A second TEE did not reveal any changes. Follow-up blood cultures 5 days after initiation of antibiotics were negative; however, a low-grade fever persisted.

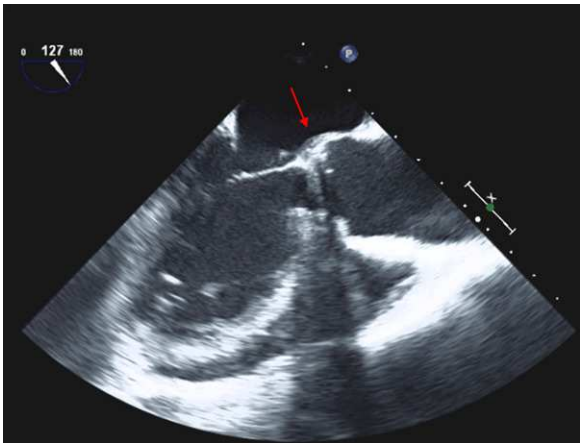

Figure 1. Transesophageal echocardiograph showed a thickened area of 3 mm at the level of the noncoronary sinus of valsalva without hypoechoic or gelatinous extra echoes that suggest the presence of an abscess.

Based on the assumption that the FDG-PET/CT image was compatible with a diagnosis of periannular abscess and that patients with this diagnosis usually have a high mortality on medical therapy, it was decided to perform an exploratory surgery. The prosthetic valve was removed and the Ross procedure was done. Surgically excised tissue was sent for microbiology and pathology analysis that confirmed the diagnosis of periannular abscess and the presence of the *S. sanguinis*. Postoperative echocardiography revealed a well-functioning aortic valve. More than 6 months after surgery, the patient is doing well and follow-up blood cultures are negative.

In clinical practice, the diagnosis of infective endocarditis (IE) is often difficult, and both overdiagnosis and underdiagnosis are observed. Echocardiography represents the central role in the evaluation of patients who have a clinical presentation suggestive of IE. In the majority of published studies, transthoracic echocardiography and TEE sensitivity ranges between 40% and 63% and between 87% and 100%, respectively. Perivalvular abscesses are particularly common in prosthetic valve IE, since the annulus is the usual primary site of infection. This serious complication has been reported in up to 40% of patients with native aortic valve IE and the incidence is higher in patients with prosthetic aortic valve IE.[1]

Usually an abscess is defined as a thickened area or a mass within the myocardium or annular region with a nonhomogeneous echogenic or echolucent appearance.[2] In most studies the criterion used to define a periannular abscess included the notion of a thickened area ≥10 mm.[3] However, this definition may lack sensitivity for the diagnosis of abscess since the echocardiographic appearances of aortic root abscesses ranged from a diffusely thickened aortic root in early cases to multiple echolucent spaces near the aortic annulus in more advanced cases.[4]

Mortality in patients with periannular abscess involving prosthetic aortic valves is up to 70% on medical therapy.[1] The presence of an aortic root abscess is usually an indication for urgent surgery; a rapid and accurate diagnosis is essential if perioperative morbidity and mortality are to be reduced and surgical repair facilitated. In a recent study, 57% of patients with prosthetic valve endocarditis who needed urgent surgery presented some type of periannular complication.[5] In the setting of suspected prosthetic valve IE, negative or inconclusive TEE

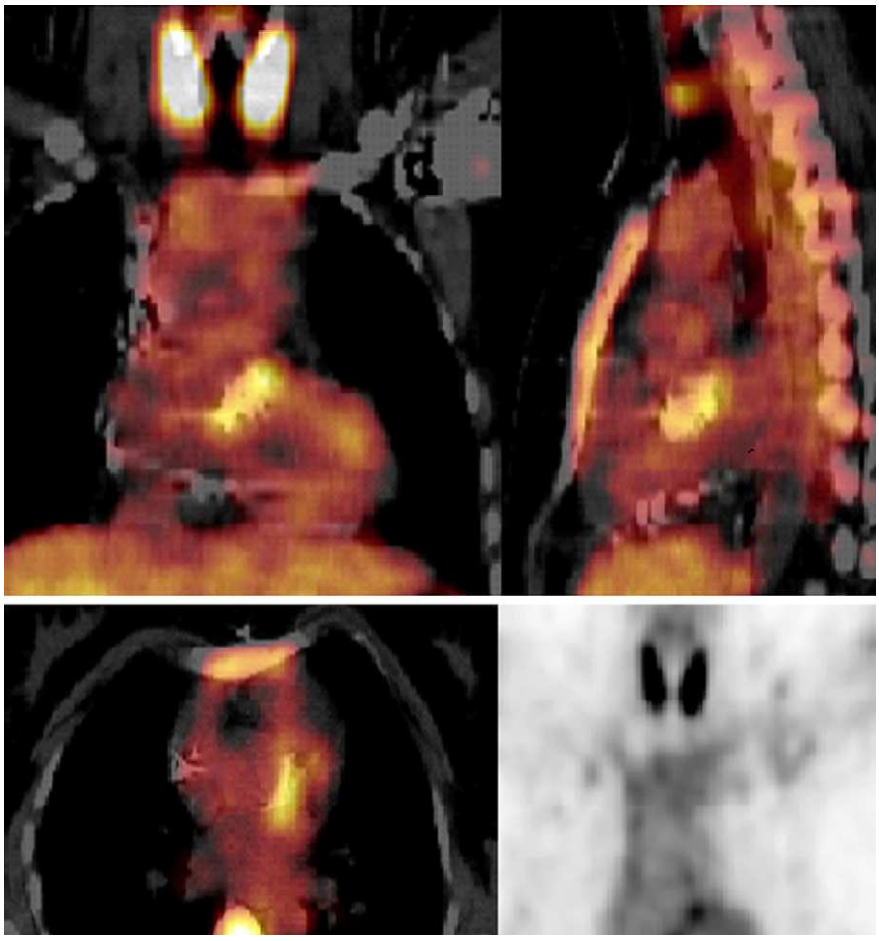

Figure 2. F-fluorodeoxyglucose positron emission tomography scan of the chest showed major fluorodeoxyglucose uptake at the level of the mechanical aortic valve suggesting the diagnosis of periannular abscess.

findings are more difficult to interpret; other diagnostic modalities may be used to confirm the presence of IE. A negative TEE has an important clinical impact on the diagnosis of endocarditis with a high negative predictive value, ranging from 86% to 97%. However, in a study by Graupner et al. including 78 patients, 10% with aortic abscesses were overlooked by the TEE approach.[3] It is important to recognize the phase of the disease in which the study is performed; vegetations/abscess may not be large enough to be visualized when endocarditis is suspected very early on.

In patients with prosthetic aortic valve and periannular abscess vegetations are usually not present in more than 30%. This reality makes the diagnosis of endocarditis even more difficult in this particular population. In these difficult cases other imaging techniques such as cardiac CT and FDG-PET/CT could be useful.[6] Of note, the presence of edema and inflammation frequently observed in the early normal postoperative period may not allow FDG-PET/CT to distinguish between normal clinical evolution and very early postoperative prosthetic valve IE. However, this case report illustrates the usefulness of FDG-PET/CT in patients with suspected late postoperative prosthetic periannular abscess.

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SUPPLEMENTARY MATERIAL

Supplementary material associated with this article can be found in the online version available at doi:10.1016/j.rec.2011.05.021.

Jaume Pons,[a] Francis Morin,[b] Mathieu Bernier,[a] Jean Perron,[c] and Mario Sénéchal[a,*]

[a]*Département Multidisciplinaire de Cardiologie, Institut Universitaire de Cardiologie et de Pneumologie de Québec, Université Laval, Quebec, Canada*
[b]*Service de Médecine Nucléaire, CHUQ, Hôtel-Dieu de Québec, Université Laval, Quebec, Canada*
[c]*Service de Chirurgie Cardiovasculaire, Institut Universitaire de Cardiologie et de Pneumologie de Québec, Université Laval, Quebec, Canada*

[*] Corresponding author:
E-mail address: mario.senechal@criucpq.ulaval.ca (M. Sénéchal).

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