[18F]FDG PET/CTA of transcatheter aortic valve implantation (TAVI): normal findings after implantation vs infective endocarditis (TAVI-IE)


1 University Hospital Vall d’Hebron, Radiology, Barcelona, Spain
2 University Hospital Vall d’Hebron, Cardiology, Barcelona, Spain
3 University Hospital Vall d’Hebron, Nuclear Medicine, Barcelona, Spain
4 University Hospital Vall d’Hebron, Infectious Diseases, Barcelona, Spain

Funding Acknowledgements: None.

Background: [18F]FDG PET/CTA has significantly improved the diagnostic yield of prosthetic valve endocarditis. The concern about differentiating infection from inflammation has been progressively overcome in surgical prosthetic valve replacement, but could still pose a challenge and has not been well evaluated in TAVI patients due to the little available data on the morphologic and metabolic features following TAVI.

Purpose: To find out the morpho-metabolic features of non-infected TAVI (NI-TAVI) and their evolution over time and compare them with a group of patients with suspected TAVI infective endocarditis (TAVI-IE), to determine imaging criteria to help differentiate between TAVI infection and non-infection by [18F]FDG PET/CTA.

Methods: We prospectively recruited 31 patients in the control group with TAVI implantation for severe aortic stenosis between September 2021 and October 2022. They underwent seriated PET/CTA scans at 1, 6 and 12 months after valve implantation. We evaluated the metabolic features (visual and quantitative FDG uptake) and anatomic changes following valve implantation, and their temporal evolution. We compared these “normal” features with the PET/CT findings in a group of 35 patients with definite TAVI-IE.

Results: Thirty-one patients (22 men, average 80 years old) were scanned at 1 month after implantation, of whom 29 and 25 were re-scanned at 6 and 12 months, respectively (3 deaths, 3 not performed due to severe patient’s complications). FDG uptake was visually detectable in 18/31 (58%), 15/29 (52%) and 9/25 (36%) of NI-TAVI at 1, 6 and 12 months after implantation, respectively. Uptake showed a diffuse and homogeneous distribution pattern in 83%. Quantitative analysis showed no significant differences and stability of the FDG uptake values (SUVmax, SUVmean and SUVratio) at 1, 6 and 12 months. VUI values were also stable and far below the cut-off value for infection reported in surgically implanted PV among the 3 scan periods. No anatomic changes or lesions suggesting endocarditis were detected in any patient of the control group at the first scan or during follow-up (2 cases showed subclinical leaflet thrombus deposit).

Within the suspected TAVI-IE group (n=35) there were 19 definitive IE and 16 rejected or possible. Quantitative values in comparison with the NI-TAVI group are described in the results table. FDG uptake pattern was focal or heterogeneous in 70%, and regarding anatomic lesions, we found vegetations in 8 patients, abscess in 3 and one pseudoaneurysm in the definitive group.

(Results Table).

Conclusion: FDG uptake was visually detected in >50% of the NI-TAVI group, displaying a diffuse-homogenous pattern in most cases, and a normal VUI, findings present in the immediate postoperative period and stable after 1 year. The TAVI-IE group showed higher SUV values in definitive IE, focal or heterogeneous uptake pattern in most cases, higher VUI and more frequently associated anatomic lesions.