

Session: P101 What is hot in *Staphylococcus aureus* bloodstream infection ?

Category: 2b. Severe sepsis, bacteraemia & endocarditis

25 April 2017, 12:30 - 13:30
P2134

18F-FDG-PET/CT in *Staphylococcus aureus* bacteraemia: an important diagnostic tool

Marvin Andries Hubert Berrevoets^{*1}, Ilse Kouijzer¹, Erik Aarntzen², Marcel Janssen³, Lioe-Fee De Geus-Oei⁴, Heiman Wertheim⁵, Wim Oyen⁶, Bart Jan Kullberg⁷, Jaap Ten Oever¹, Chantal Bleeker-Rovers⁸

¹*Radboud University Medical Center; Department of Internal Medicine and Radboud Center for Infectious Diseases*

²*Radboud University Medical Center; Department of Radiology and Nuclear Medicine*

³*Department of Radiology and Nuclear Medicine*

⁴*University of Twente; Mira Institute for Biomedical Technology and Technical Medicine; Biomedical Photonic Imaging Group*

⁵*Radboud University Medical Center; Department of Medical Microbiology and Radboud Center for Infectious Diseases*

⁶*Institute of Cancer Research;*

⁷*Radboudumc*

⁸*Radboud University Medical Center; Radboud Expert Centre for Q Fever, Department of Internal Medicine, Division Infectious Diseases; Department of Internal Medicine and Radboud Center for Infectious Diseases*

Background: Metastatic infection is an important complication of *Staphylococcus aureus* bacteremia (SAB). Early diagnosis of metastatic infection is crucial, as specific treatment is required. However, metastatic infection can be asymptomatic and difficult to detect. ¹⁸F-fluorodeoxyglucose positron emission tomography combined with computed tomography (¹⁸F-FDG-PET/CT) has been described to improve the detection of these silent metastatic foci. In this study, we investigated the role of ¹⁸F-

FDG-PET/CT in patients with SAB for detection of metastatic infection and its consequences for treatment and outcome.

Material/methods: All patients with SAB at the Radboud university medical center were included between January 2013 and April 2016. Clinical data and results of ^{18}F -FDG-PET/CT and other imaging techniques including echocardiography were collected. Data were analyzed for metastatic infection detection, treatment modification, and outcome. Primary outcomes were newly diagnosed metastatic infection by ^{18}F -FDG-PET/CT, subsequent treatment modifications and outcome.

Results: A total of 184 patients were included, and ^{18}F -FDG-PET/CT scans were performed in 105 patients. Of these 105 patients, 97 patients had a high risk bacteremia as defined previously. ^{18}F -FDG-PET/CT detected metastatic infectious foci in 71.4% of patients. In 54/105 (51.4%) patients the ^{18}F -FDG-PET/CT was the first imaging modality to detect metastatic infectious foci. Mortality at three months was higher in high risk bacteremia patients without ^{18}F -FDG-PET/CT performed compared to those in whom ^{18}F -FDG-PET/CT was performed (32.7% versus 12.4%, $p < 0.05$). In a multivariate analysis, ^{18}F -FDG-PET/CT was the only factor independently associated with reduced mortality. ^{18}F -FDG-PET/CT led to a total of 106 treatment modifications in 75 patients: shorter treatment duration in 25 patients, surgical or radiological intervention in 19 patients, prolonged intravenous antibiotic therapy in 16 patients, addition of a second drug in 10 patients and extension of total treatment duration in 36 patients.

Conclusions: ^{18}F -FDG-PET/CT is a valuable technique for early detection of metastatic infectious foci, treatment optimisation and associated with significantly reduced three-month mortality.

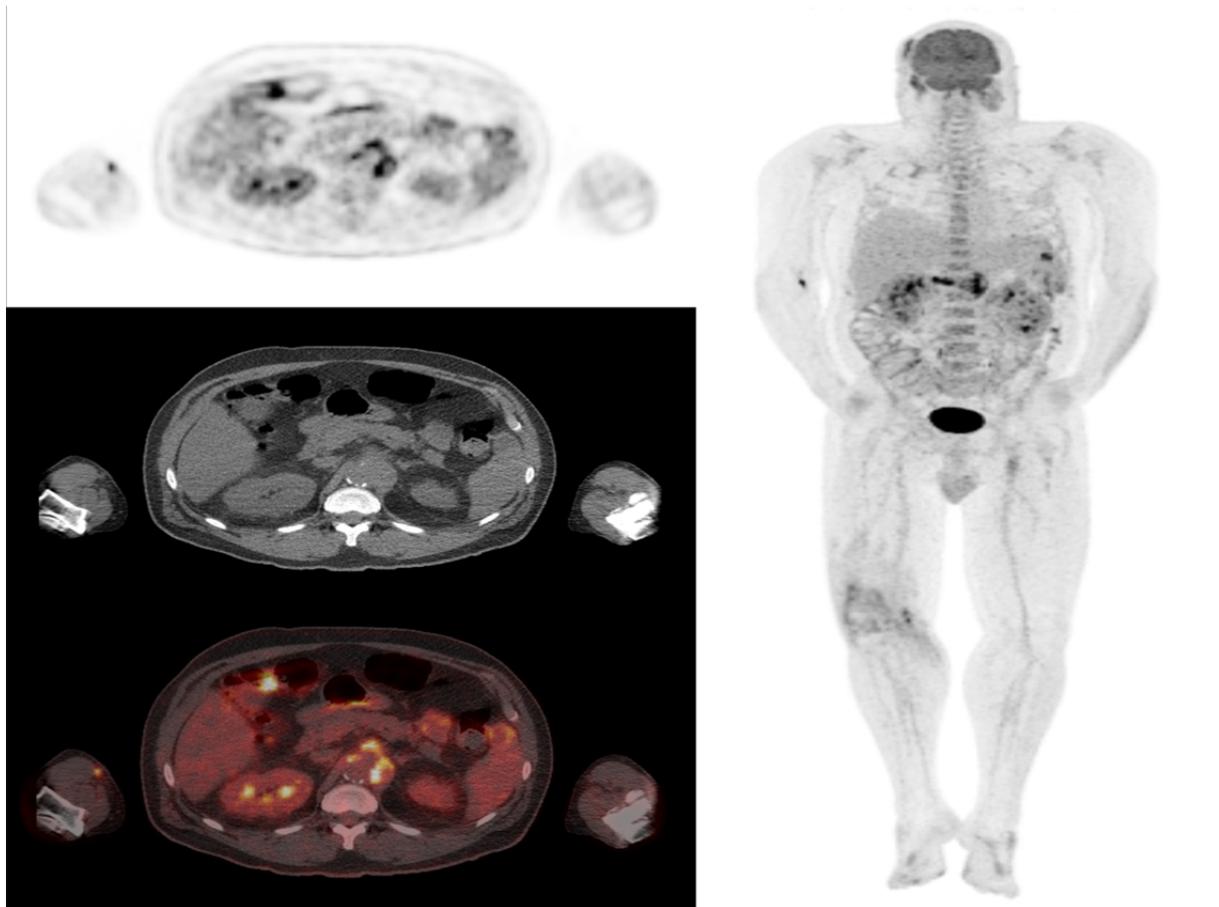


Figure 1. Transversal ^{18}F -FDG-PET/CT images at the level of the celiac trunk (left) and maximum intensity projection (MIP) image (right) of a 60-year-old man who was admitted because of a septic arthritis of his right knee.

Blood cultures grew methicillin-susceptible *Staphylococcus aureus*. A transesophageal echocardiography was negative for endocarditis. Besides an arthritis of his right knee ^{18}F -FDG-PET/CT also showed a mycotic aneurysm of the celiac trunk and multiple small abscesses in liver and spleen. This patient underwent a surgical repair of the celiac trunk and was successfully treated with flucloxacillin intravenously for six weeks after surgery.