Disseminated *Nocardia farcinica* Infection and Treatment Response on F-18 Fludeoxyglucose Positron Emission Tomography Computed Tomography

Abstract

We report a rare case of nocardiosis with increased F-18 Fludeoxyglucose (F-18 FDG) uptake in widespread abscess foci of *Nocardia farcinica* infection in an immunocompromised patient on positron emission tomography computed tomography (PET/CT) imaging. A relatively infrequent cause of nocardiosis, *N. farcinica* is an opportunistic infection that may present with clinically aggressive disseminated disease. Whole-body F-18 FDG-PET/CT allows identifying the extent of disease, as well as monitoring response to therapy in patients with nocardiosis especially the disseminated form.

Keywords: *Disseminated nocardiosis, F-18 fludeoxyglucose positron emission tomography computed tomography, Nocardia farcinica*

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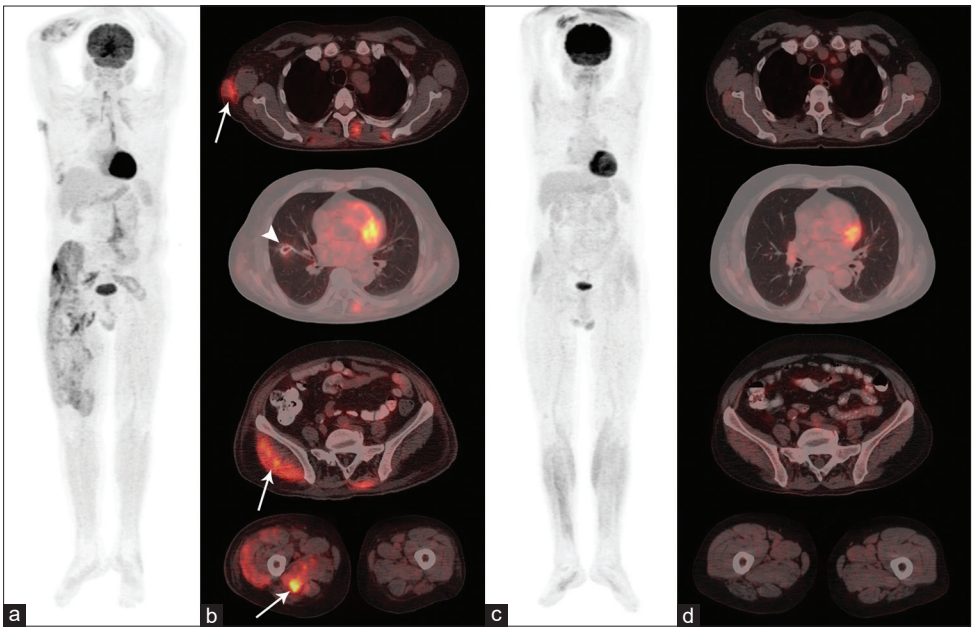

Figure 1: Coronal maximum intensity projection (MIP) (a) and axial fused PET/CT images (b) revealed mild FDG uptake (SUVmax = 1.7) in the cavitary lesion measuring 10 mm × 20 mm in the middle lobe of the right lung (arrowhead). In addition, intense FDG uptake secondary to granulocyte and macrophage activation was noted in widespread subcutaneous and soft tissue infection and abscesses on trunk and extremities, involving the right thigh (arrows). After an 8-week course of trimethoprim/sulfamethoxazole, imipenem, and moxifloxacin treatment, a repeat FDG PET/CT scan (c; coronal MIP, d; axial fused PET/CT images) revealed favorable metabolic response to therapy

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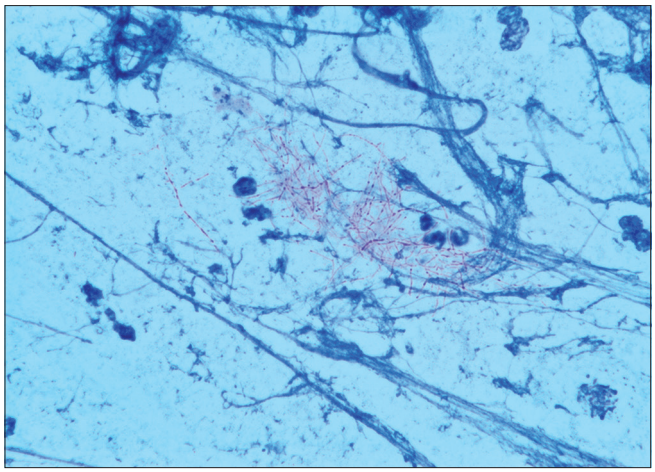

Figure 2: Modified Ziehl–Neelsen stain of gluteal abscess culture showed acid-fast branching filamentous *Nocardia spp*

A 58-year-old man with a history of two months of steroid treatment for ANCA-related crescentic glomerulonephritis presented with a gluteal abscess and fever. Computed tomography (CT) showed a 1 cm-sized cavitary lesion in the right lung. Culture of the gluteal abscess indicated *Nocardia farcinica* infection and he was referred to F-18 FDG PET/CT to evaluate the extent of the disease [Figure 1]. *N. farcinica* is a Gram-positive, partially acid-fast by Ziehl–Nielsen staining and Gomori methenamine silver-positive aerobic actinomycete which is found worldwide in soil and water [Figure 2].[1] *N. farcinica* is a relatively rare cause of nocardiosis particularly in immunocompromised patients and tends to be more virulent than the other Nocardia species.[2] Nocardiosis can affect multiple body systems, most frequently the lungs, central nervous system, and the skin with the ability to cause disseminated disease. The treatment usually consists of a 6-week course of induction phase with intravenous antibiotics and maintenance therapy for at least 1 year.[3] Because nocardiosis is a rare infection, only a few reports have described the lesions of Nocardia species on FDG PET/CT imaging.[3-8] FDG PET/CT scan showing extensive inflammation on multiple abscess foci of *N. farcinica* infection on the legs was reported in a recent study by Zhang *et al*.[4] The advantages of FDG PET/CT to localize infection not only includes shorter imaging times with better spatial resolution as compared to leukocyte imaging; but also rules out the risks and errors caused by withdrawing, labeling a readministration of blood product.[9] The influx of inflammatory cells is responsible for FDG accumulation in pulmonary nocardiosis on PET scan and may mimic lung cancer, in particular squamous cell carcinoma with cavitation. Although the standard uptake value cannot differentiate infection from malignancy, corresponding CT images may help to differentiate the two. Pulmonary nocardiosis typically manifests with consolidations and nodules/masses with or without cavitation especially in the lower lobes. Pleural and chest wall involvement is seen in a small number of patients. Furthermore, mediastinal or hilar lymphadenopathy is not a feature of nocardiosis.[7,10] Pertinent patient history (with emphasis on patient infectious history, treatment, immunocompromised state, and procedures) together with the symptoms may elucidate the underlying etiology leading to abnormal FDG uptake. In line with other studies, whole-body F-18 FDG PET/CT might help distinguish rare infections from malignancy and is used to assess not only localized infection, but also the extent of disease.[8] FDG PET/CT may have a role in guiding sample site selection for suspicious lesions and also compromises a unique possibility in the monitoring of therapy efficacy and directing therapy duration in patients with nocardiosis especially in immunocompromised patients when the therapy is prolonged for a long time [Figure 1].[6,11,12]

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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