Fluorodeoxyglucose Positron Emission Tomography Imaging in *Pneumocystis jiroveci* Pneumonia

Abstract

Fever or pyrexia of unknown origin (PUO) is commonly defined as body temperature higher than 38.3°C on several occasions for a period of at least 3 weeks with uncertain diagnosis after initial routine obligatory investigations. In most cases of PUO, there is an uncommon presentation of a common disease which includes infection, noninfectious inflammatory diseases, malignancy, and miscellaneous causes. We present an interesting case of a 48-year-old man with PUO, who is a known case of multiple myeloma on immunosuppressive therapy, where 18F-fluorodeoxyglucose positron emission tomography-computed tomography was able to detect occult cause of infective etiology.

Keywords: *18F-fluorodeoxyglucose, Pneumocystis carinii, Pneumocystis jiroveci pneumonia, positron emission tomography-computed tomography, pyrexia of unknown origin*

Hemant Rathore, Nirav Thaker[1], Inder Talwar[1]

Departments of Nuclear Medicine and PET CT and [1]Radiodiagnosis, Bombay Hospital and Medical Research Centre, Mumbai, Maharashtra, India

Background and Procedure

We describe a case of a 48-year-old man with pyrexia of unknown origin (PUO), who is a known case of multiple myeloma on immunosuppressive therapy, with remission of disease on recent bone marrow examination. This case presented with dry cough and fever over 4 weeks (100°F–102°F) and had an oxygen saturation of 97% on ambient air. The blood tests apart from mild leukopenia were fairly unremarkable. The chest radiography revealed subtle bilateral lung ground-glass opacities and referred for fluorodeoxyglucose positron emission tomography (FDG-PET)/computed tomographic (CT) scan to rule out the cause. The FDG-PET scan [Figure 1] revealed diffuse increased metabolic activity in bilateral lungs; the corresponding fused high-resolution CT (HRCT) images showed the acute lung changes in the form of hypermetabolic ill-defined confluent ground-glass opacities with interstitial thickening and crazy paving appearance near completely involving bilateral lungs along with mild bronchial and bronchiolar dilatation [Figure 2]. The imaging was suggestive of acute atypical pneumonia which was further investigated by bronchoalveolar lavage cytological examination and culture which demonstrated *Pneumocystis jiroveci*.

Pneumocystic jiroveci pneumonia (PJP), is also known as pneumocystic pneumonia or formerly pneumocystic carinii pneumonia, is caused by the ubiquitous unicellular eukaryote, *P jiroveci*, which is a rare cause of infection in the general population, but it is a more frequent cause of morbidity and mortality in immunocompromised persons who are especially with HIV AIDS, postorgan-transplant recipients, and those receiving long-term cytotoxic or steroid therapy, hematological malignancies, as well as other malignancies.[1] PJP is classified as a fungal pneumonia but does not respond to antifungal therapy. These patients have a long clinical course over months to years, with stable symptoms and radiographic abnormalities corresponding to pathologic findings of traction bronchiectasis, honeycombing, and interstitial fibrosis.

In a study of 105 pneumocystic pneumonia immunocompromised patients, chest radiographic findings were divided into three stages: early stage; normal or nearly normal chest radiograph, mid-stage; bilateral pulmonary infiltrates, and late stage; bilateral pulmonary consolidation. Chest HRCT findings were also divided into three

How to cite this article: Rathore H, Thaker N, Talwar I. Fluorodeoxyglucose Positron Emission Tomography Imaging in *Pneumocystis jiroveci* Pneumonia. Indian J Nucl Med 2022;37:194-5.

Address for correspondence:
Dr. Hemant Rathore, Department of Nuclear Medicine and PET CT, Bombay Hospital and Medical Research Centre, 12 Marine Lines, Mumbai - 400 020, Maharashtra, India.
E-mail: hemant.nuclearmedicine@gmail.com

Received: 15-09-2021
Accepted: 04-10-2021
Published: 08-07-2022

Access this article online

Website: www.ijnm.in

DOI: 10.4103/ijnm.ijnm_140_21

Quick Response Code:

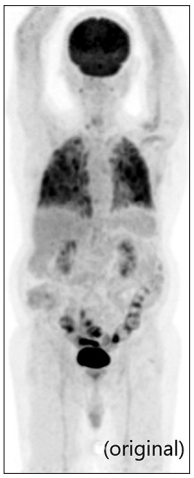

Figure 1: Whole-body fluorodeoxyglucose positron emission tomography scan maximum intensity projection image reveals diffuse increased metabolic activity in bilateral lungs with physiological fluorodeoxyglucose uptake in rest of the visualized body

stages: early stage; bilateral diffuse ground-glass opacity, mid-stage; bilateral diffuse ground-glass opacity with patchy consolidations, and late stage; bilateral diffuse consolidation).[2]

Conclusion

FDG-PET/CT imaging is a very sensitive diagnostic modality for the evaluation of fever of unknown origin by facilitating anatomical localization of focally increased FDG uptake and thereby guiding further diagnostic tests to achieve a final diagnosis.[3] Few studies suggest that FDG-PET scan have an important role to play in the diagnosis and monitoring treatment response of pneumocystic pneumonia in the immunocompromised patients.[4]

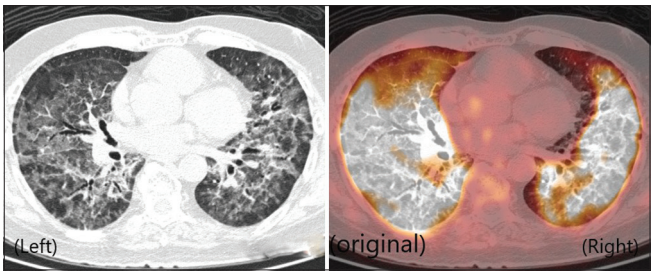

Figure 2: High-resolution computed tomography (left), and fused fluorodeoxyglucose positron emission tomography and high-resolution computed tomography (right) images reveals hypermetabolic ill-defined confluent ground-glass opacities with interstitial thickening near completely involving bilateral lungs

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Bollée G, Sarfati C, Thiery G, Bergeron A, de Miranda S, Menotti J, *et al.* Clinical picture of *Pneumocystis jiroveci* pneumonia in cancer patients. Chest 2007;132:1305-10.
2. Mu XD, Jia P, Gao L, Su L, Zhang C, Wang RG, *et al.* Relationship between radiological stages and prognoses of pneumocystis pneumonia in non-AIDS immunocompromised patients. Chin Med J (Engl) 2016;129:2020-5.
3. Kouijzer IJ, Mulders-Manders CM, Bleeker-Rovers CP, Oyen WJ. Fever of unknown origin: The value of FDG-PET/CT. Semin Nucl Med 2018;48:100-7.
4. Win Z, Todd J, Al-Nahhas A. FDG-PET imaging in *Pneumocystis carinii* pneumonia. Clin Nucl Med 2005;30:690-1.