DOI: 10.4274/tjh.galenos.2021.2020.0625
Turk J Hematol 2022;39:66-67

First Experience of ^{11}C-Methionine PET in Multiple Myeloma in Turkey

Multipl Myelomada ^{11}C-Metiyonin PET'in İlk Türkiye Deneyimi

Elgin Özkan[1], Güldane Cengiz Seval[2], Mine Araz[1], Nuriye Özlem Küçük[1], Meral Beksaç[2]

[1]*Ankara University Faculty of Medicine, Department of Nuclear Medicine, Ankara, Turkey*
[2]*Ankara University Faculty of Medicine, Department of Hematology, Ankara, Turkey*

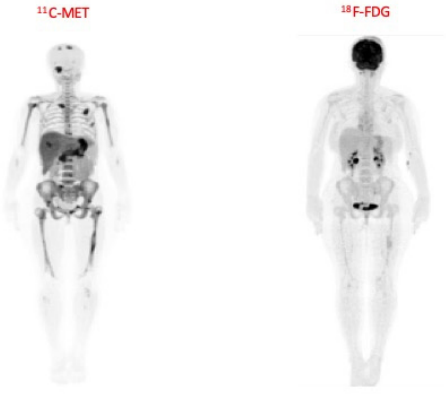

Figure 1. MIP images of ^{11}C-MET and ^{18}F-FDG demonstrate discrepant findings in the whole body.

8F-FDG: 8F-fluorodeoxyglucose

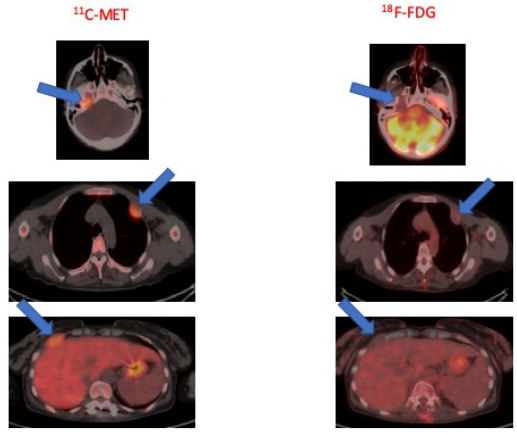

Figure 2. FDG depicts faint uptake in the skeleton (range of SUV_{max}: 1.5-2.9) in contrast to highly intense lesions in ^{11}C-MET (transaxial slice of calvarium, left 4th and right 6th ribs, arrows) (range of SUV_{max}: 14.3-15.4).

A 45-year-old female patient with newly diagnosed immunoglobulin (Ig)G κ-type myeloma at stage III of the disease as per the International Staging System was referred for positron emission tomography (PET) imaging to evaluate the extent of the disease. In this patient, the IgG level was 17.8 g/L (reference range: 7.51-15.6 g/L) and kappa free light chain was 3660 mg/L (reference range: 3.3-19.4 mg/L). Bone marrow biopsy showed 80% plasma cells, which were strongly positive for CD38 and CD138. 11C-Methionine (MET) and 18F-fluorodeoxyglucose (FDG) PET/CT images showed discordant findings in the whole body (Figure 1). Whereas PET/CT with FDG did not depict hypermetabolic intra- or extramedullary foci for active multiple myeloma (MM) (range of SUV_{max}: 1.5-2.9), MET demonstrated focally increased tracer uptake of the axial (Figure 2) as well as appendicular skeleton (range of SUV_{max}: 14.3-15.4).

18F-FDG PET/CT is widely used in prognosis estimation and therapy response evaluation in MM [1]. However, in some cases, plasma cells may not be 18F-FDG-avid [2,3] or may not overexpress the GLUT-1 receptor. Thus, glucose metabolism may not accurately reflect disease heterogeneity, lowering the sensitivity of 18F-FDG PET/CT. 11C-MET PET has emerged recently as a metabolic indicator in 18F-FDG-negative cases. 11C-MET uptake is related to increased plasma cell proliferation and protein synthesis. Both bone marrow and extramedullary involvement can be successfully demonstrated by 11C-MET

Address for Correspondence/Yazışma Adresi: Mine Araz, M.D., Ankara University Faculty of Medicine, Department of Nuclear Medicine, Ankara, Turkey
Phone : +90 533 666 73 13
E-mail : minesoylu@yahoo.com ORCID: orcid.org/0000-0001-6467-618X

Received/Geliş tarihi: October 19, 2020
Accepted/Kabul tarihi: December 22, 2020

[4,5]. Availability of 11C-MET is limited worldwide, however, due to the very short half-life of carbon-11 (11C) and the necessity of a PET center with an onsite cyclotron. This first experience in Turkey demonstrates the discrepant results between 18F-FDG and 11C-MET well. It is now possible in our center to follow non-18F-FDG-avid MM cases with 11C-MET.

Ethics

Informed Consent: Informed consent was obtained from the individual participant included in the study.

Authorship Contributions

Surgical and Medical Practices: G.C.S., M.B.; Concept: M.B., E.Ö.; Design: E.Ö.; Data Collection or Processing: N.Ö.K.; Analysis or Interpretation: M.A., E.Ö.; Literature Search: M.A., E.Ö.; Writing: M.A., E.Ö.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Cavo M, Terpos E, Nanni C, Moreau P, Lentzsch S, Zweegman S, Hillengass J, Engelhardt M, Usmani SZ, Vesole DH, San-Miguel J, Kumar SK, Richardson PG, Mikhael JR, da Costa FL, Dimopoulos MA, Zingaretti C, Abildgaard N, Goldschmidt H, Orlowski RZ, Chng WJ, Einsele H, Lonial S, Barlogie B, Anderson KC, Rajkumar SV, Durie BGM, Zamagni E. Role of 18F-FDG PET/CT in the diagnosis and management of multiple myeloma and other plasma cell disorders: a consensus statement by the International Myeloma Working Group. Lancet Oncol 2017;18:206-217.
2. Zamagni E, Nanni C, Patriarca F, Englaro E, Castellucci P, Geatti O, Tosi P, Tacchetti P, Cangini D, Perrone G, Ceccolini M, Brioli A, Buttignol S, Fanin R, Salizzoni E, Baccarani M, Fanti S, Cavo M. A prospective comparison of 18F-fluorodeoxyglucose positron emission tomography-computed tomography, magnetic resonance imaging and whole-body planar radiographs in the assessment of bone disease in newly diagnosed multiple myeloma. Haematologica 2007;92:50-55.
3. Zamagni E, Patriarca F, Nanni C, Zannetti B, Englaro E, Pezzi A, Tacchetti P, Buttignol S, Perrone G, Brioli A, Pantani L, Terragna C, Carobolante F, Baccarani M, Fanin R, Fanti S, Cavo M. Prognostic relevance of 18-F FDG PET/CT in newly diagnosed multiple myeloma patients treated with up-front autologous transplantation. Blood 2011;118:5989-5995.
4. Lapa C, Knop S, Schreder M, Rudelius M, Knott M, Jörg G, Samnick S, Herrmann K, Buck AK, Einsele H, Lückerath K. 11C-Methionine-PET in multiple myeloma: correlation with clinical parameters and bone marrow involvements. Theranostics 2016;6:254-261.
5. Seval GC, Ozkan E, Beksac M. PET with fluorodeoxyglucose F18/computed tomography as a staging tool in multiple myeloma. PET Clinics 2019;14:369-381.