Molecular Oncologic Imaging

http://publish.mersin.edu.tr/index.php/moi/index

F-18 FDG PET/CT Scan Maybe More Helpfull Instead of Ga-68 PSMA Scan in the Case of Ductal Variant Prostate Cancer

Pınar Pelin ÖZCAN[1] Zehra Pınar KOÇ[2] Gökçe YAVAN[3] Vehbi ERÇOLAK[4]

[1]Mersin University, Faculty of Medicine, Department of Nuclear Medicine, Mersin, Turkey, ppelinozcan@gmail.com
[2]Mersin University, Faculty of Medicine, Department of Nuclear Medicine, Mersin, Turkey, zehrapinarkoc@gmail.com
[3]Mersin University, Faculty of Medicine, Department of Nuclear Medicine, Mersin, Turkey, gyavan95@gmail.com
[4]Mersin University, Faculty of Medicine, Department of Oncology, Mersin, Turkey, vehbiercolak@mersin.edu.tr

Cite this study: Ozcan, P. P., Koc, Z. Z., Yavan, G. & Ercolak, V. (2022). F-18 FDG PET/CT Scan Maybe More Helpfull Instead of Ga-68 PSMA Scan in the Case of Ductal Variant Prostate Cancer. Molecular Oncologic Imaging, 2(1), 22-25

Keywords
Ga 68 PSMA PET-CT
FDG PET-CT
Prostate Cancer
Ductal Variant
Research Article
Received: 13.01.2022
Accepted: 24.02.2022
Published: 15.03.2022

Abstract

Imaging plays an important role in the evaluation of prostate cancer patients. In recent years, much attention has been focused on 68Ga-PSMA PET-CT in prostate cancer patients and has been widely used for staging, especially biochemical relapse-restaging and therapy response for these patients. We hereby, report the rare case of a ductal variant prostate cancer patient and present both Ga-68 PSMA and FDG PET-CT imaging findings.

1. Introduction

A 60-year-old woman with lung cancer underwent Flour-18 Flourodeoxyglucose-Positron Emission Tomography-Computed Tomography (FDG PET-CT) imaging for therapy response evaluation after 15 mCi (555 MBq) FDG injection. MIP (Maximum Intensity Image) (A) and axial fusion images (B) demonstrate complete metabolic response when compared with the previous PET-CT scan. Although, in the current study, areas of hypermetabolic (SUVmax:17) reticulonodular densities and ground-glass opacity with non-uniform density and air bronchogram were seen in both lung parenchyma areas especially in basal sections. This finding was newly developed during follow-up study and were interpreted in line with the viral COVID-19 pandemic findings. The new coronavirus was isolated from a few of patients in China in the late 2019 and spread with people movement to all over the world in a very short time period. The virus spreads from human to human like flu (8) and result coronavirus disease (COVID-19). Computed Tomography (CT) and lung X ray are currently and widely used as an imaging modality especially in emergency departments for evaluation of COVID-19 cases. FDG PET-CT imaging cannot be used in an emergency setting and generally not recommended in infectious diseases. However, COVID-19 infection is seriously endemic in our country and as the diagnosis, treatment and follow-up processes of cancer patients continue uninterruptedly as can be expected during the current pandemic period, we frequently encounter incidentally detected Covid-19 cases.

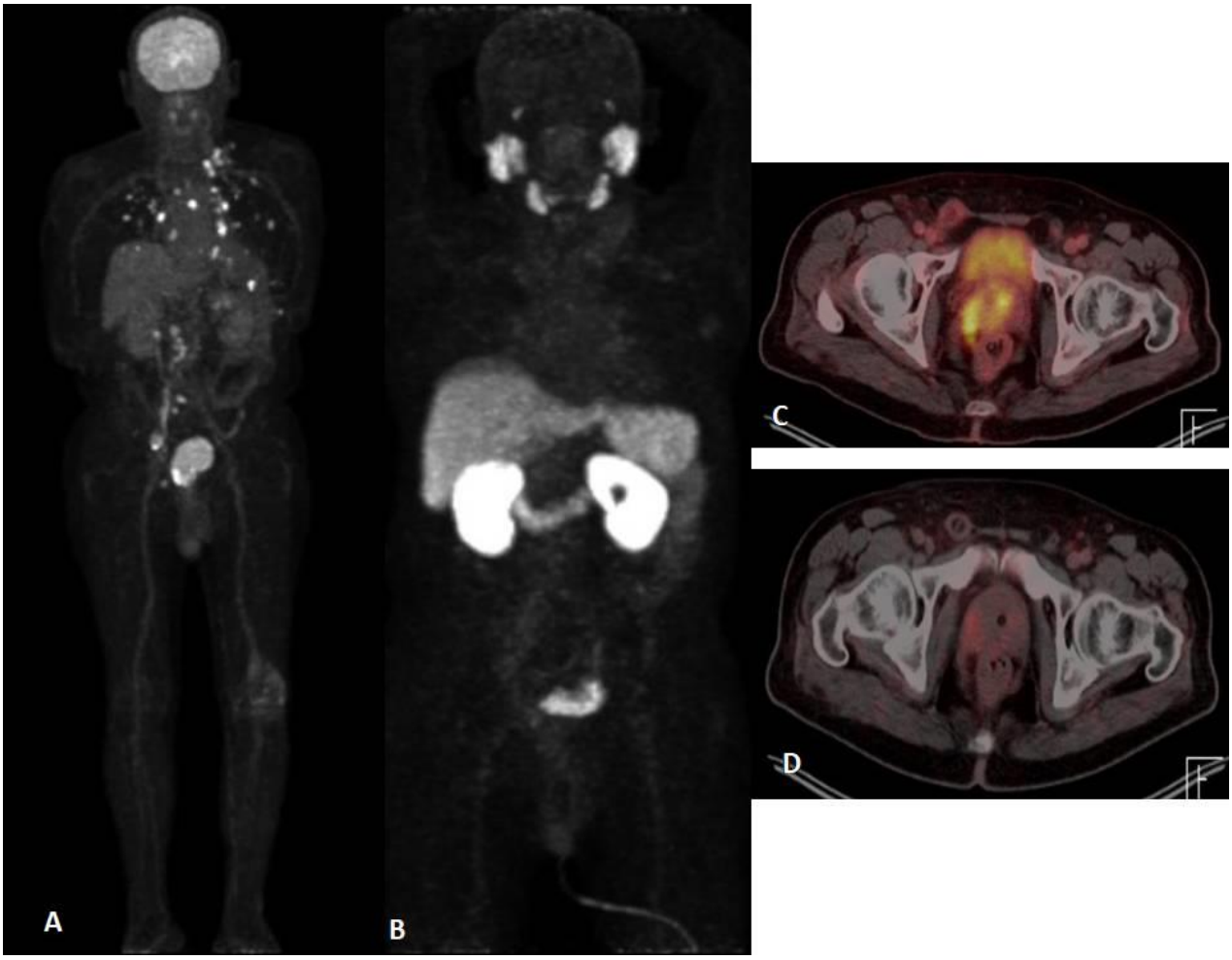

Figure 1. FDG PET-CT study was performed to investigate the primary malignancy in a 70-year-old male patient with multiple nodules in the lung. Whole body PET-CT images were taken after 7 mCi FDG injection. On PET-CT MIP (Maximum intensity projection) images, hypermetabolic multiple metastatic lymphadenopathies, the largest of which is 2 cm, in the left lower cervical, left supraclavicular and infraclavicular area (SUVmax: 15), left axillary and pectoral (SUVmax: 10), mediastinal (SUVmax: 33), intraabdominal (SUVmax; 11), and bilateral pelvic areas (SUVmax: 25), and more than 20 subpleural and parenchymal metastatic nodules in both lungs (SUVmax: 16), left paracardiac (SUVmax: 26) and left supradiaphragmatic lymphadenopathies (SUVmax: 27), and left adrenal possible fat-rich adenoma (SUVmax: 3.95 & HU: 3.95) and bone metastases (SUVmax: 11.54) were detected (A). In addition, primary malignity with intensely increased FDG uptake (SUVmax: 25) on prostate gland in the right periferic and the central zone shown in axial fusion images (C). In the FDG PET-CT study, the reference SUVmax value of the liver normal parenchyma was determined as 4.95. Based on PET/CT imaging findings, primary metastatic prostate cancer was priority considered and biopsy was recommended. After biopsy from the left axillary lymph node, the patient was diagnosed with prostatic ductal adenocarcinoma. At this stage, Ga-68 PSMA PET/CT imaging was also performed for staging purposes due to the diagnosis of prostate cancer and widespread disease. However, Ga-68 PSMA affinity was found to be very low in all metastatic and primary foci in Ga-68 PET/CT imaging (B, D). Despite the diagnosis of prostate cancer in the patient, FDG affinity was found to be very high in all foci. FDG PET/CT imaging was recommended for the patient to monitor treatment response.

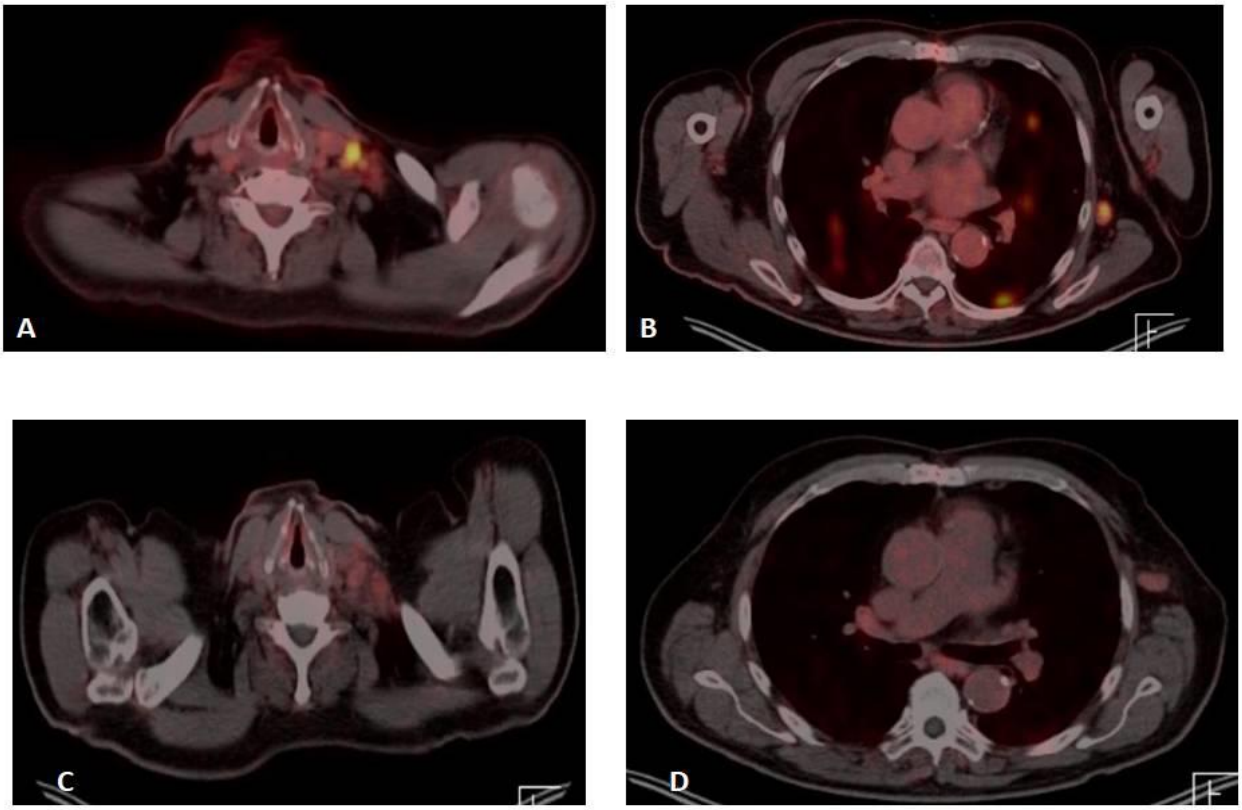

Figure 2. Axial fusion images demonstrate left lower cervical, supraclavicular, infraclavicular, left axillary metastatic lymphadenopathies, metastatic lung nodules show very high FDG uptake (A, B), wherease the same areas have low Ga-68 PSMA uptake (C, D).

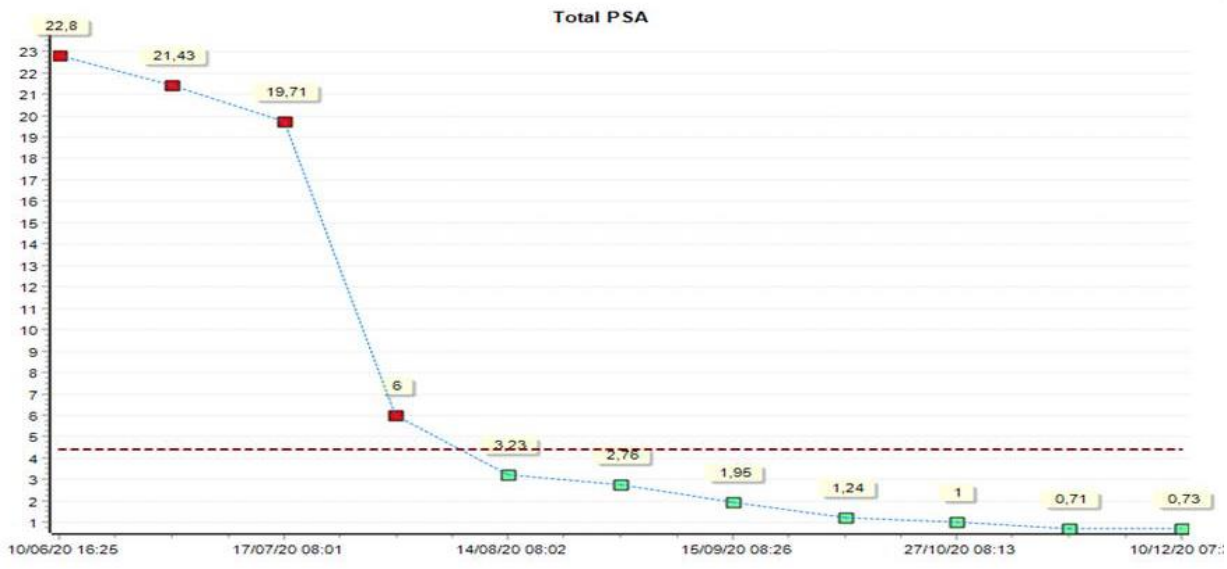

Figure 3. Graph showing the decrease in PSA (Prostate specific antigen) level with treatment response. Ga-68 PSMA PET-CT scan is a new exciting technique for especially prostate adenocarcinaoma patients for staging, restaging, treatment response. Nevertheless, as in this case FDG PET-CT was more useful in prostate ductal adenocarcinoma subtype for both staging and treatment response evaluation. This subtype of prostate cancer can show poor PSMA avidity and better FDG uptake may be because of being more aggressive subtype. Similar to this case report, McEwan L.M. et al. reported two cases of ductal carcinoma as more FDG avid tumors (9).

Conflict of Interest

No conflict of interest was declared by the authors.

Author Contributions

Concept: P.P.O.; Design: P.P.O., G.Y.; Supervision: P.P.O., Z.P.K., V.E.; Funding: P.P.O.; Materials: P.P.O., Z.P.K., V.E.; Data Collection and/or Processing: P.P.O.; Analysis and/or Interpretation: P.P.O.; Literature Review: P.P.O.; Writer: P.P.O., G.Y.

References

1.Perera, M., Papa, N., Christidis, D., Wetherell, D., Hofman, M. S., Murphy, D. G., Bolton, D., & Lawrentschuk, N. (2016). Sensitivity, Specificity, and Predictors of Positive 68Ga-Prostate-specific Membrane Antigen Positron Emission Tomography in Advanced Prostate Cancer: A Systematic Review and Meta-analysis. European urology, 70(6), 926–937. https://doi.org/10.1016/j.eururo.2016.06.021.

2. Larson, S. M., Morris, M., Gunther, I., Beattie, B., Humm, J. L., Akhurst, T. A., Finn, R. D., Erdi, Y., Pentlow, K., Dyke, J., Squire, O., Bornmann, W., McCarthy, T., Welch, M., & Scher, H. (2004). Tumor localization of 16beta-18F-fluoro-5alpha-dihydrotestosterone versus 18F-FDG in patients with progressive, metastatic prostate cancer. Journal of nuclear medicine: official publication, Society of Nuclear Medicine, 45(3), 366–373.

3. Maurer, T., Gschwend, J. E., Rauscher, I., Souvatzoglou, M., Haller, B., Weirich, G., Wester, H. J., Heck, M., Kübler, H., Beer, A. J., Schwaiger, M., & Eiber, M. (2016). Diagnostic Efficacy of (68) Gallium-PSMA Positron Emission Tomography Compared to Conventional Imaging for Lymph Node Staging of 130 Consecutive Patients with Intermediate to High-Risk Prostate Cancer. The Journal of urology, 195(5), 1436–1443. https://doi.org/10.1016/j.juro.2015.12.025.

4. Dewes, S., Schiller, K., Sauter, K., Eiber, M., Maurer, T., Schwaiger, M., Gschwend, J. E., Combs, S. E., & Habl, G. (2016). Integration of (68) Ga-PSMA-PET imaging in planning of primary definitive radiotherapy in prostate cancer: a retrospective study. Radiation oncology (London, England), 11, 73. https://doi.org/10.1186/s13014-016-0646-2.

5. Shakespeare T. P. (2015). Effect of prostate-specific membrane antigen positron emission tomography on the decision-making of radiation oncologists. Radiation oncology (London, England), 10, 233. https://doi.org/10.1186/s13014-015-0548-8.

6. Roach, P. J., Francis, R., Emmett, L., Hsiao, E., Kneebone, A., Hruby, G., Eade, T., Nguyen, Q. A., Thompson, B. D., Cusick, T., McCarthy, M., Tang, C., Ho, B., Stricker, P. D., & Scott, A. M. (2018). The Impact of 68Ga-PSMA PET/CT on Management Intent in Prostate Cancer: Results of an Australian Prospective Multicenter Study. Journal of nuclear medicine: official publication, Society of Nuclear Medicine, 59(1), 82–88. https://doi.org/10.2967/jnumed.117.197160.

7. Fendler, W. P., Schmidt, D. F., Wenter, V., Thierfelder, K. M., Zach, C., Stief, C., Bartenstein, P., Kirchner, T., Gildehaus, F. J., Gratzke, C., & Faber, C. (2016). 68Ga-PSMA PET/CT Detects the Location and Extent of Primary Prostate Cancer. Journal of nuclear medicine: official publication, Society of Nuclear Medicine, 57(11), 1720–1725. https://doi.org/10.2967/jnumed.116.172627.

8. Kuten, J., Mabjeesh, N. J., Lerman, H., Levine, C., Barnes, S., & Even-Sapir, E. (2019). Ga-PSMA PET/CT Staging of Newly Diagnosed Intermediate- and High-Risk Prostate Cancer. The Israel Medical Association journal : IMAJ, 21(2), 100–104.

9. McEwan, L. M., Wong, D., & Yaxley, J. (2017). Flourodeoxyglucose positron emission tomography scan may be helpful in the case of ductal variant prostate cancer when prostate specific membrane antigen ligand positron emission tomography scan is negative. Journal of medical imaging and radiation oncology, 61(4), 503–505. https://doi.org/10.1111/1754-9485.12605.