COVID-19–Related Lung Parenchymal Uptake on ^{18}F-PSMA-1007 PET/CT

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Abstract: A 70-year-old man with newly diagnosed prostate cancer underwent ^{18}F-PSMA-1007 PET/CT for staging. PSMA-avid primary prostatic malignancy was identified. Incidental intense patchy peripheral lung uptake was also noted. The patient tested positive for COVID-19 infection.

Key Words: COVID-19, lung uptake, ^{18}F-PSMA-1007 PET/CT

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REFERENCES

1. Kwee TC, Kwee RM. Chest CT in COVID-19: what the radiologist needs to know. *Radiographics*. 2020;40:1848–1865.
2. Wang Y, Dong C, Hu Y, et al. Temporal changes of CT findings in 90 patients with COVID-19 pneumonia: a longitudinal study. *Radiology.* 2020; 296:E55–E64.
3. Charters PFP, Little D, Rodrigues JCL, et al. 18 FDG-PET/CT findings in COVID-19: a single centre retrospective radiological review. *BJR Case Rep*. 2020;6:20200091.
4. Pan F, Ye T, Sun P, et al. Time course of lung changes at chest CT during recovery from coronavirus disease 2019 (COVID-19). *Radiology.* 2020;295:715–721.
5. De Galiza Barbosa F, Queiroz MA, Nunes RF, et al. Nonprostatic diseases on PSMA PET imaging: a spectrum of benign and malignant findings. *Cancer Imaging*. 2020;20:23.
6. Ceci F, Oprea-Lager DE, Emmett L, et al. E-PSMA: the EANM standardized reporting guidelines v1.0 for PSMA-PET. *Eur J Nucl Med Mol Imaging*. 2021;48:1626–1638.
7. Habouzit V, Sanchez A, Dehbi S, et al. Incidental finding of COVID-19 lung infection in ^{18}F-FDG PET/CT. *Clin Nucl Med*. 2020;45:649–651.
8. Morón S, González E, Rojas J. ^{68}Ga-DOTANOC PET/CT with lung involvement in the era of COVID-19 pandemic. *Clin Nucl Med*. 2021;46:166–167.
9. García Vicente AM, Soriano Castrejón Á. Incidental COVID-19 pneumonia on ^{18}F-Fluorocholine PET/CT. *Clin Nucl Med*. 2020;45:e376–e377.
10. Morón S, González E, Rojas J. ^{68}Ga-PSMA PET/CT with incidental finding of COVID-19 in an asymptomatic patient. *Clin Nucl Med*. 2020;45:1032–1033.

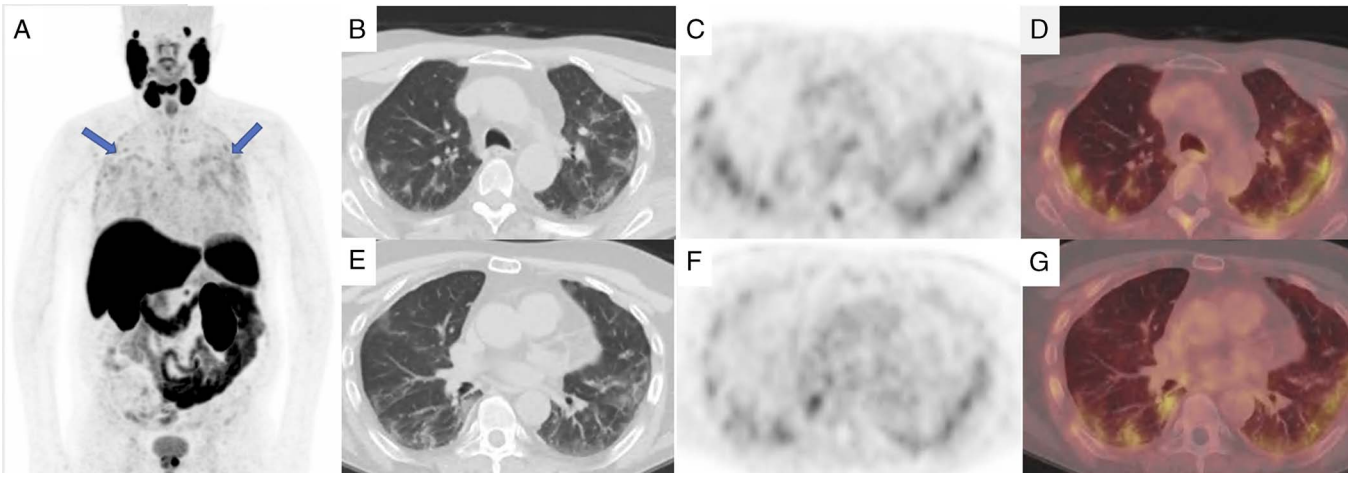

FIGURE 1. A 70-year-old man with prostate cancer. ^{18}F-PSMA-1007 PET/CT. **A**, MIP demonstrates intense focal uptake in the prostate consistent with the known malignancy. Moderate ill-defined uptake in the chest (arrows) was also seen. Axial CT, ^{18}F-PSMA-1007 PET, and fused PET/CT of the chest at 2 different levels (**B–D**) and (**E–G**) demonstrate uptake associated with patchy peripheral/ subpleural opacification. This is associated with moderate uptake on the PET component. The low-dose CT features were in keeping with COVID-19 infection, with a classic pattern of COVID-19 pneumonia bilateral, peripheral ground glass opacities.[1–3] The presence and pattern of lung parenchymal change depends on the time of imaging during the course of illness. Ground glass opacities commonly develop between days 0 and 4, peaking at days 6 to 13 and may persist beyond 24 days.[2,4] Sixty-one percent of persistent long-term changes beyond 24 days are ground glass opacities. Also, associated uptake depends on the grade of inflammation, which is associated with variable vascular permeability.[5] In keeping with this, the patient gave a history of a positive real time-polymerase chain reaction test result for COVID-19 4 weeks before the scan. Inflammatory and infectious lung processes have been documented to demonstrate ^{18}F-PSMA uptake.[5,6] Similar avid COVID-19–related findings on PET/CT were described but in asymptomatic patients with other tracers including ^{18}F-FDG, ^{68}Ga-DOTANOC, and ^{18}F-flourocholine.[7–9] This was also described with ^{68}Ga-PSMA, which has the same mechanism of uptake as all PSMA-based PET tracers, including ^{18}F-PSMA-1007.[10] PSMA stands for "prostate-specific membrane antigen," which could be argued as a misnomer because these are not exclusively expressed on prostate cells and can be found in other tissues and conditions, such as inflammation/infection. There are limited data available explaining the exact mechanism of uptake at sites of inflammation, but it is thought to possibly also be as a result of neovascularization and increased regional blood flow/vascular permeability, delivering more PSMA ligand to the site of inflammation/infection.[5] This example of nonmalignant PSMA lung uptake highlights a cause, which may be increasingly seen in the context of the current COVID-19 pandemic and may persist even after the initial illness.