

COVID-19 pneumonia incidentally discovered on [¹⁸F]F-PSMA-1007 PET/CT scan

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Abstract

A 75-year-old man underwent a positron emission tomography/computed tomography (PET/CT) scan with fluorine-18-prostate specific membrane antigen ([¹⁸F]F-PSMA-1007) for initial staging of prostate adenocarcinoma. The scan showed lung infiltrates predominantly in both lower lobes with moderate uptake, in addition to a bilateral pulmonary hilar lymph node uptake. CT images revealed ground-glass opacities and a reticular pattern, suggesting COVID-19 pneumonia, which was confirmed by reverse transcription polymerase chain reaction (RT-PCR). Similar incidental findings have been reported in patients undergoing PET/CT scans with other radiotracers. In this case, the probable lung angiogenesis linked to COVID-19 infection can be potentially demonstrated by [¹⁸F]F-PSMA-1007, which helps ensure timely diagnosis and appropriate care for cancer patients.

KEYwords: [¹⁸F]F-PSMA-1007; PET/CT; COVID-19

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A positron emission tomography/computed tomography (PET/CT) imaging with fluorine-18-prostate specific membrane antigen ([¹⁸F]F-PSMA-1007) was carried out in a 75 years old man for the initial staging of a prostate adenocarcinoma with a prostate-specific antigen (PSA) value of 22.5 ng/mL. Ninety minutes after the injection of the radiotracer, a whole-body scan was performed and images were acquired.

The scan (Fig. 1) revealed in addition to a prostate uptake (Fig. 1A–C), a bilateral peripheral lung infiltrate predominant in the lower lobes, with moderate and diffuse uptake of $SUV_{max} = 3.3$ on the left lung and 3.5 on the right lung (Fig. 1D–G), associated with a bilateral uptake in pulmonary hilar lymph nodes ($SUV_{max} = 3.4$ on the left and 2.0 on the right) (Fig. 1K, L). The CT images showed ground-glass opacities and a reticular pattern (Fig. 1H–J), suggesting a diagnosis of severe acute respiratory syndrome coronavirus 2 pneumonia (COVID-19), which was subsequently confirmed by real-time polymerase chain reaction (RT-PCR) on nasopharyngeal swab.

Several studies have reported COVID-19 compatible images with [¹⁸F]FDG and to a lesser degree, [¹⁸F]choline uptakes in asymptomatic patients undergoing the scan for oncological

indications [1–3]. These incidental findings are important because the cancer population is at risk of developing severe complications (such as intensive care unit [ICU] admission, need for intubation, and death). In this case, the patient had a fever and mild respiratory symptoms two days prior to the exam. The treating physician has been informed and treatment as well as isolation and prevention measures have been implemented.

Other few cases of gallium-68-labeled prostate-specific membrane antigen ([⁶⁸Ga]Ga-PSMA) PET/CT have been reported with a mild pulmonary uptake, in addition to mediastinal and hilar lymph node with increased metabolic activity [4]. It is theorized that the uptake is due to vascular angiogenesis, which is reported to be higher in COVID-19 compared to equally severe influenza virus infection [5]. PSMA is not only overexpressed in prostate cancer but also in several benign and malignant diseases, especially those with angiogenesis such as multiple myeloma, fibrous dysplasia, and sarcoidosis [6].

Understanding the imaging findings of COVID-19 and other pulmonary infections in nuclear medicine exams is crucial to ensure appropriate and timely diagnosis, thus reducing the risk of complications and ensuring the best care for cancer patients.

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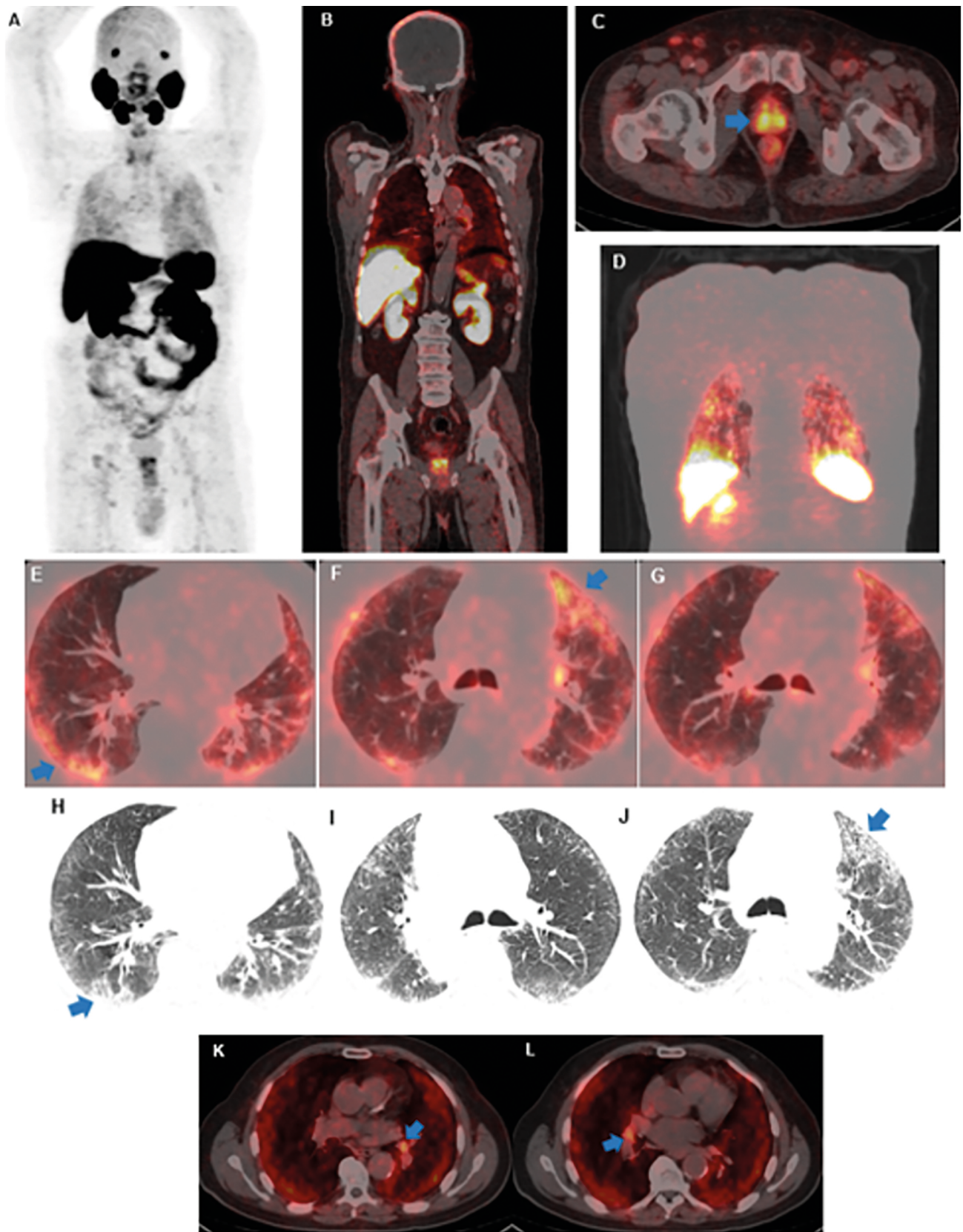


Figure 1. [¹⁸F]F-PSMA-1007 PET/CT whole body maximum intensity projection image (A) coronal fused image (B) fused axial image, primary prostate adenocarcinoma (arrow) (C). Fused [¹⁸F]F-PSMA-1007 PET/CT coronal image (D) and fused axial images (E–G) demonstrate bilateral lung [¹⁸F]F-PSMA-1007 uptake (arrow). Axial CT images show lung ground-glass opacities (arrows) (H–J). Fused axial [¹⁸F]F-PSMA-1007 PET/CT images show bilateral pulmonary hilar lymph node uptake (arrows) (K, L)

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Author contributions

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Conflicts of interest

All authors declare no conflict of interest.

Ethics statement

Informed consent has been obtained from the patient.

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Supplementary material

None.

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