

^{18}F -FDG PET/CT Metabolic Behavior of COVID-19 Pneumonia

A Series of 4 Patients With RT-PCR Confirmation

Domenico Albano, MD,† Luca Camoni, NMT, Msc,† Roberto Rinaldi, NMT,†
Francesco Bertagna, MD,*† and Raffaele Giubbini, MD*†*

Abstract: Between March 26 and April 6, among 80 patients who underwent ^{18}F -FDG PET/CT in our department (Brescia, Italy), 4 showed the presence of an interstitial pneumonia suspected for COVID-19 with reverse transcriptase polymerase chain reaction confirmation. All patients except one had bilateral ground-glass opacities and/or lung consolidations in at least 2 pulmonary lobes. Inferior lobes and basal segments were the most frequent site of disease. All lung lesions had an increased FDG uptake corresponding to the interstitial pneumonia, and in one case, mediastinal nodal involvement was registered.

Key Words: COVID-19, PET/CT, pneumonia, ^{18}F -FDG

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From the *Department of Nuclear Medicine, University of Brescia; and †Department of Nuclear Medicine, ASST Spedali Civili Brescia, Brescia, Italy.
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Correspondence to: Domenico Albano, MD, Nuclear Medicine, Spedali Civili di Brescia, P.le Spedali Civili, 1, 25123 Brescia, Italy. E-mail: doalba87@libero.it.
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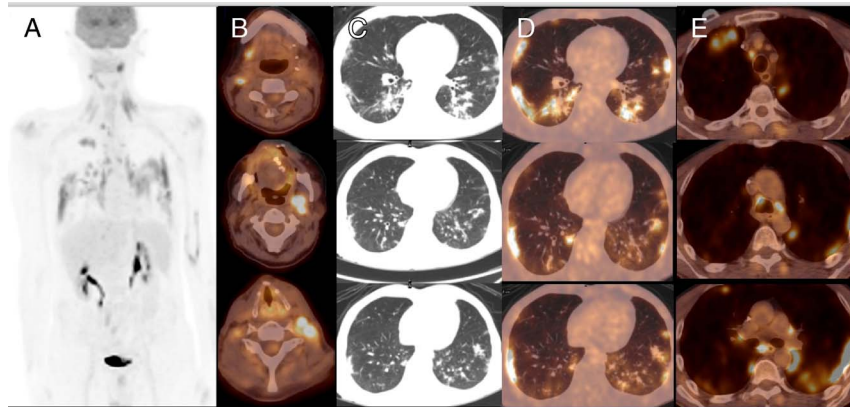


FIGURE 1. A 59-year-old man with a previous history of oral cavity cancer treated with surgery underwent an ^{18}F -FDG PET/CT for restaging purpose. PET/CT was positive, showing the presence of local relapse at the right side of the tongue and several laterocervical lymph nodes (A and B). Moreover, FDG-positive plural diffuse interstitial alterations with ground-glass opacities (GGOs) appearance were registered with SUV_{max} of 13.8 (C and D). Concomitant mediastinal nodes with increased FDG uptake were present (E). A subsequent chest radiographs confirmed a diffuse interstitial pneumonia; reverse transcriptase polymerase chain reaction (RT-PCR) was positive, and the patient was hospitalized for specific therapy.

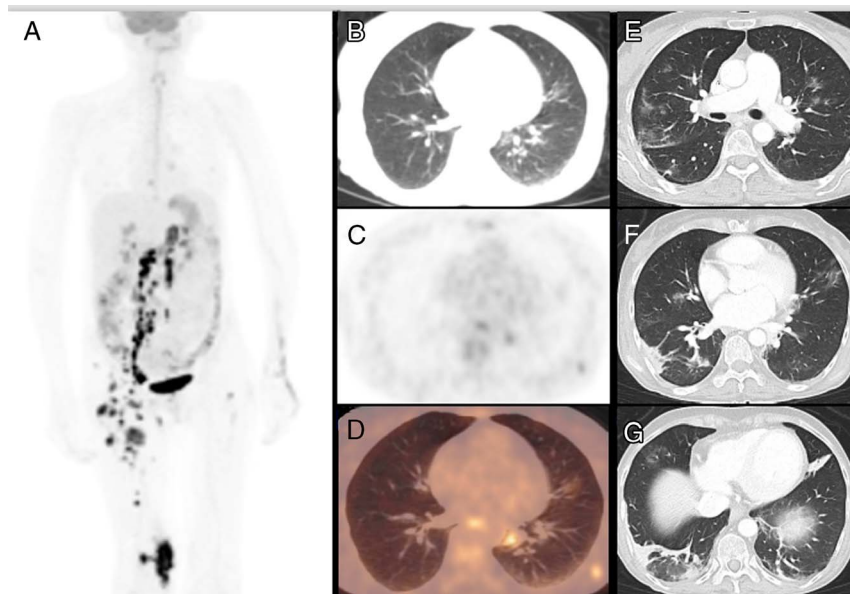


FIGURE 2. A 47-year-old woman affected by an advanced stage anaplastic large-cell lymphoma relapsed after 2 chemotherapy regimen lines and was hospitalized for starting new chemotherapy cycle. Before starting, she did a nasopharyngeal swap with RT-PCR positive for COVID-19. ^{18}F -FDG PET/CT confirmed the metabolic progression of disease with nodal, muscular, and skeletal hypermetabolic localizations (A). A moderate FDG uptake (SUV_{max} 5.6) was showed in small GGOs, especially in the left inferior lobe (B–D). A subsequent chest CT demonstrated a progression of interstitial pneumonia with massive lung involvement (E–G).

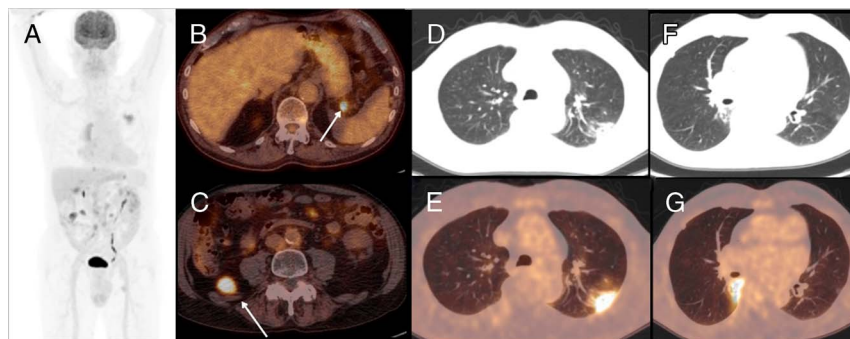


FIGURE 3. An asymptomatic 77-year-old man with non-Hodgkin lymphoma treated previously with one line of chemotherapy underwent an ¹⁸F-FDG PET/CT showing increased FDG uptake to several abdominal nodes consistent of relapse (A–C) and the presence of bilateral pleural thickening and FDG-avid GGOs with SUV_{max} of 10.2 (D–G). After the appearance of dyspnea and breathing difficulty, he went to the emergency unit and was hospitalized and started treatment with hydroxychloroquine.

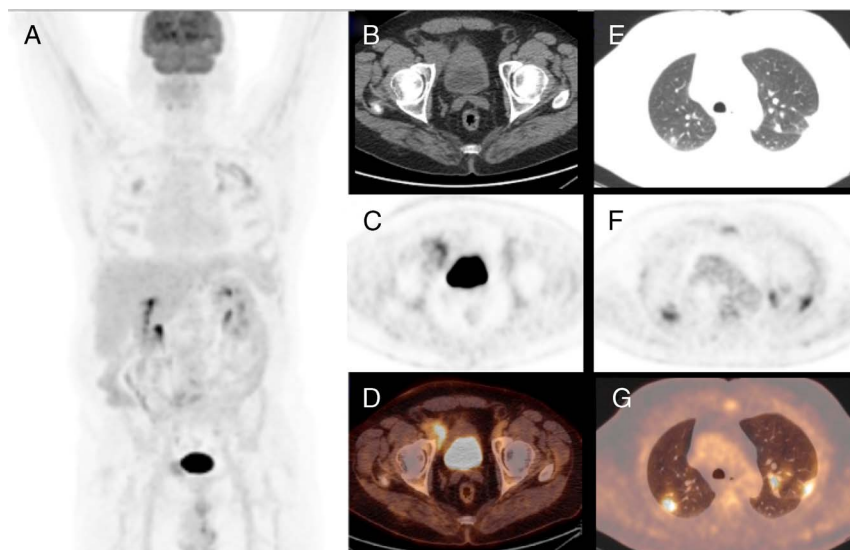


FIGURE 4. A 62-year-old man affected by follicular lymphoma underwent PET/CT scan for evaluating treatment response after 6 cycles of chemotherapy, and PET/CT showed a partial metabolic response with persistence of increased FDG uptake to an inguinal node (A–D) and the appearance of several bilateral lung consolidative and FDG-avid nodular areas, especially in the superior lobes with SUV_{max} of 9 (E–G). Being the pattern atypical for COVID-19, the patient started new chemotherapy regimen, but after the early onset of cough and dyspnea, RT-PCR test was done with positive finding for COVID-19. Chest radiographs and CT is the preferred examinations for screening, diagnosis, and monitoring of COVID-19 pneumonia.^{1–3} In this setting, the role of ¹⁸F-FDG PET/CT is still unclear with only few cases present.^{4–10} ¹⁸F-FDG PET/CT is a noninvasive tool with a significant role in evaluating several phlogistic and infectious pulmonary diseases, such as sarcoidosis and tuberculosis.¹¹ However, usually lesions presenting as GGOs are unlikely to have FDG uptake.¹² In agreement with previous articles,^{6–8} our patients were characterized by the presence of bilateral peripheral consolidative areas and/or GGOs. All had increased FDG uptake higher than blood pool activity. COVID-19 do not seem to be associated with lymph node involvement; however, Qin et al⁶ reported an increased nodal FDG uptake in 3 of 4 cases. Of course ¹⁸F-FDG PET/CT is not routinely recommended for pulmonary lung inflammatory diseases and not indicated in an emergency setting, but our findings underline that COVID-19 pneumonia are characterized by high ¹⁸F-FDG uptake in most cases despite GGOs appearance.