Incidental Discovery of a COVID-19 Infection on a Reevaluation FDG PET/CT in a Patient Treated for Hodgkin Lymphoma

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Abstract: We report the results of ^{18}F-FDG PET/CT in an asymptomatic case of COVID-19 infection. A 27-year-old woman underwent FDG PET/CT for revaluation of a stage IIIE B Hodgkin lymphoma after the fourth cycle of chemotherapy. It showed intense avid FDG subpleural mixed ground-glass and consolidative lesions, especially in the left lung. Because of this morpho-metabolic aspect and the epidemic context, a viral pneumopathy was suspected. The patient who was initially asymptomatic was admitted for fever 28 hours after the PET/CT. The nasopharyngeal swab was positive for COVID-19, and the outcome was favorable.

Key Words: COVID-19, coronavirus, FDG PET/CT, CT scan, Hodgkin lymphoma

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REFERENCES

1. Diehl V, Franklin J, Hasenclever D, et al. BEACOPP, a new dose-escalated and accelerated regimen, is at least as effective as COPP/ABVD in patients with advanced-stage Hodgkin's lymphoma: interim report from a trial of the German Hodgkin's lymphoma study group. *J Clin Oncol*. 1998;16:3810–3821.
2. Ai T, Yang Z, Hou H, et al. Correlation of chest CT and RT-PCR testing in coronavirus disease 2019 (COVID-19) in China: a report of 1014 cases. *Radiology*. 2020;200642.
3. Guan WJ, Ni ZY, Hu Y, et al. Clinical characteristics of coronavirus disease 2019 in China. *N Engl J Med*. 2020;382:1708–1720.
4. Ye Z, Zhang Y, Wang Y, et al. Chest CT manifestations of new coronavirus disease 2019 (COVID-19): a pictorial review. *Eur Radiol*. 2020. [Epub ahead of print].
5. Bernheim A, Mei X, Huang M, et al. Chest CT findings in coronavirus disease-19 (COVID-19): relationship to duration of infection. *Radiology*. 2020;200463.
6. Qin C, Liu F, Yen TC, et al. ^{18}F-FDG PET/CT findings of COVID-19: a series of four highly suspected cases. *Eur J Nucl Med Mol Imaging*. 2020;47:1281–1286.
7. Zou S, Zhu X. FDG PET/CT of COVID-19. *Radiology*. 2020;200770.
8. Deng Y, Lei L, Chen Y, et al. The potential added value of FDG PET/CT for COVID-19 pneumonia. *Eur J Nucl Med Mol Imaging*. 2020. [Epub ahead of print].

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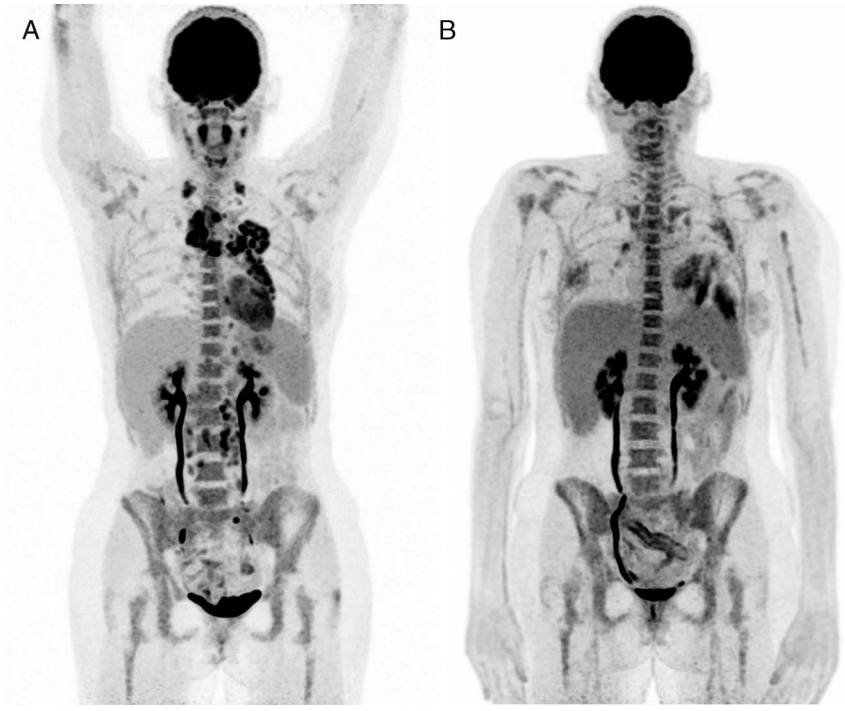

FIGURE 1. MIP 3D imaging, before chemotherapy (**A**) and after the fourth cycle (**B**). We have incidentally diagnosed a pulmonary infection in an asymptomatic 27-year-old woman on a reevaluation PET/CT after 4 cycles of chemotherapy. Stage IIIE B Hodgkin lymphoma was diagnosed in November 2019. Initially, the disease extended to pelvic, retroperitoneal, celiac, mediastinal, internal mammary, supraclavicular, and cervical lymph nodes, as well as to the spleen and local extension to the pericardium and left lung. Dose-escalated BEACOPP chemotherapy was initiated on December 5, 2019.[1] PET/CT showed a metabolic complete remission after 2 cycles. Cycle 4 was started on March 3, 2020, and ended on March 10, 2020. A reevaluation PET/CT was performed on March 18, 2020. CT scan showed bilateral pulmonary infiltrates and subpleural pseudonodular mixed ground-glass and consolidative lesions. The MIP image showed several areas of FDG avidity predominantly in the lower base of the left lung. Bone marrow avidity is related most likely to recovery from aplasia under filgrastim administration.

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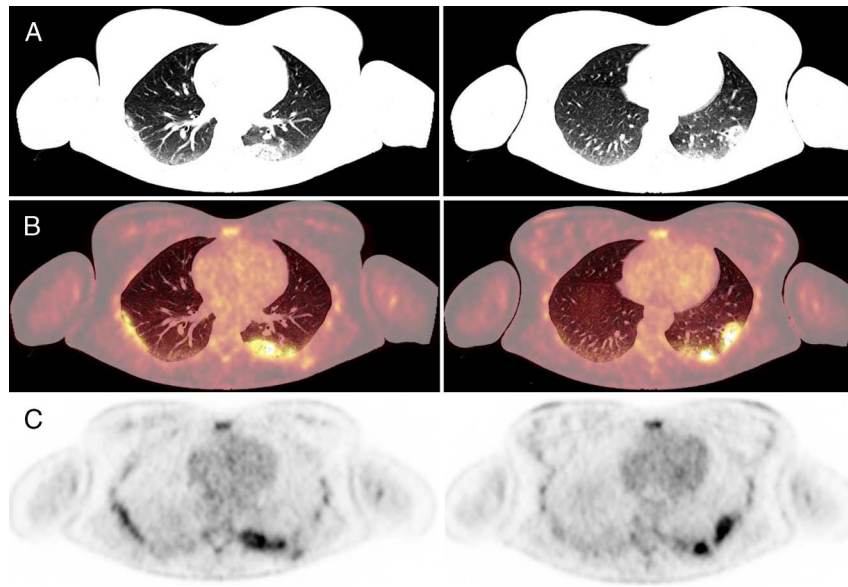

FIGURE 2. Axial CT (**A**), fused FDG PET/CT (**B**), and FDG PET (**C**) images. On axial PET/CT fusion images, the FDG avidity was highest in the solid part of the mixed ground-glass opacities and consolidation lesions. The SUV_{max} was measured at a maximum of 8.1 in the left lower lobe. A viral pneumopathy was suspected. Metabolic complete remission of the lymphoma was confirmed. The patient had no fever and no clinical symptoms suggestive of infection. She returned home with instructions to stay isolated and to call in case of fever or any other symptoms. Twenty-eight hours later, she had sudden high fever. She was admitted because of mild neutropenia (1.34 G/L) and severe lymphocytopenia (0.04 G/L). Nasopharyngeal swab was positive for COVID-19. She had no oxygen requirement. Fever resolved within 5 days. Chest CT scan manifestations of COVID-19 infections are well known with data on more than 2000 patients.[2–5] Most frequent patterns are ground-glass opacities, consolidation or combination of both. Interlobular septal thickening, reticular pattern, crazy paving, bronchial wall thickening, pleural thickening, pleural effusion, nodules, reversed halo sign, pericardial effusion, and lymphadenopathies are additional possible manifestations. PET/CT aspects are poorly known with only 5 cases reported in literature.[6–8] Qin et al[6] reported FDG PET/CT aspects of 4 patients with a COVID-19 infection. Ground-glass opacities were present in all patients; consolidation and interlobular septal thickening were present in one case each. Three patients also had FDG-positive lymph nodes localized in hilar, mediastinal, subclavicular, or supraclavicular regions. SUV_{max} of the lung lesions ranged from 4.6 to 12.2. Zou and Zhu[7] reported FDG PET/CT aspects in a febrile patient with suspicion of malignancy on a chest CT. SUV_{max} of the lung lesion was 4.9. Paratracheal and hilar lymph nodes were noted. Although there is no indication for PET/CT in COVID-19–infected patients, our case shows this infection can be discovered incidentally on surveillance PET/CT. In the context of the COVID epidemic, avid FDG ground-glass opacities, consolidation or combination of both patterns, require investigations to identify a potential COVID-19 infection.

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