

**Effect of COVID-19 on  $^{18}\text{F}$ -FDG PET/CT: Is there a need for considering COVID-19 status before planning  $^{18}\text{F}$ -FDG PET/CT for oncological evaluation?**

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## **ABSTRACT**

Incidental detection of coronavirus disease-2019 (COVID-19) related lung changes in  $^{18}\text{F}$ -FDG PET/CT of oncology patients have been increasingly reported. Most of the case reports/series stressed the retrospective diagnosis of COVID-19 with the help of  $^{18}\text{F}$ -FDG PET/CT lung findings. In this case report, we introduce a different aspect of COVID-19 related lung changes in  $^{18}\text{F}$ -FDG PET/CT, interfering with the evaluation of metastatic lung lesions in patients with renal cell carcinoma.

**KEYWORDS:** COVID-19,  $^{18}\text{F}$ -FDG PET/CT, Lung metastasis, Response Evaluation, Renal cell carcinoma

## **INTRODUCTION**

Various lung involvement patterns have been reported in  $^{18}\text{F}$ -FDG PET/CT of COVID-19 patients undergoing workup for various malignancies. The patterns range from  $^{18}\text{F}$ -FDG avid diffuse ground-glass opacities to  $^{18}\text{F}$ -FDG avid patchy consolidatory changes, with or without  $^{18}\text{F}$ -FDG avid mediastinal lymph nodes, depending on the imaging time from the onset of infection and other unknown factors [1-4]. COVID-19 infection was a retrospective diagnosis in most reported cases, after seeing the typical image findings in the  $^{18}\text{F}$ -FDG PET/CT [3-7]. Here, we present a different aspect of COVID-19 on  $^{18}\text{F}$ -FDG PET/CT causing interference with response assessment in a patient receiving chemotherapy for pulmonary metastasis from renal cell carcinoma.

## **CASE HISTORY**

A 45 year-old-man, a known case of metastatic renal cell carcinoma, underwent cytoreduction nephrectomy followed by first-line chemotherapy with pembrolizumab and axitinib because of multiple cannonball metastases in the lungs.  $^{18}\text{F}$ -FDG PET/CT scan, at the end of treatment, showed disease progression in the form of an increase in the number and size of the lung nodules. Then he was started on second-line chemotherapy with Lenvatinib (oral, 18 mg daily) and Everolimus (oral, 5 mg daily). His interim  $^{18}\text{F}$ -FDG PET/CT (Figure 1) showed a favorable response (> 30% reduction in size and  $^{18}\text{F}$ -FDG avidity compared to baseline PET/CT) to second-line therapy, and he was continued on the same treatment. He was diagnosed with COVID-19 in May 2020 on evaluation for malaise and chills. He was managed conservatively with antibiotics, antipyretics, and multivitamins in a local hospital. He had no symptoms/signs suggestive of pneumonia and never required oxygen support during the 11 days course in the hospital. He was discharged from the hospital following a negative nucleic acid test one week before he was

scheduled for an  $^{18}\text{F}$ -FDG PET/CT scan at six months of chemotherapy to look for the response. The  $^{18}\text{F}$ -FDG PET/CT (Figure 2) showed  $^{18}\text{F}$ -FDG avid diffuse GGOs/patchy consolidatory changes in bilateral lung fields from apex to base, obscuring the metastatic lesions. The COVID - 19 related lung changes obscured both anatomical and metabolic features of metastatic lesions, leading to difficulty in assessing response to treatment.

## **DISCUSSION**

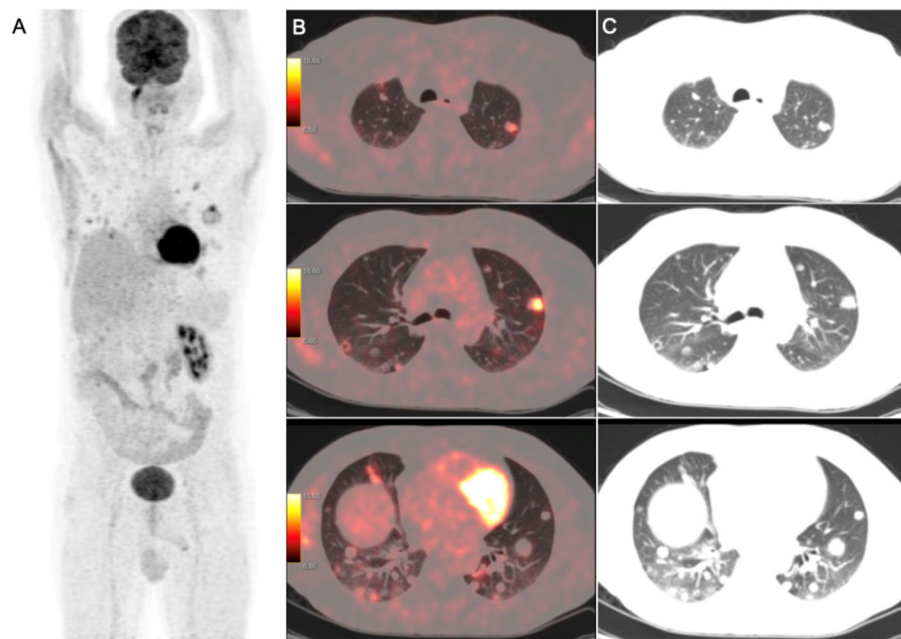
The  $^{18}\text{F}$ -FDG uptake in the GGOs in the background may add spill-in counts to the metastatic lesions causing a false high uptake in the metastatic lesions [8]. So, an accurate assessment of metabolic response was also not possible in this patient. The patient was advised to repeat the nucleic acid test because of  $^{18}\text{F}$ -FDG avidity in the GGOs/consolidatory changes and was found to be positive. The patient was advised to remain in home isolation again.

## **CONCLUSION**

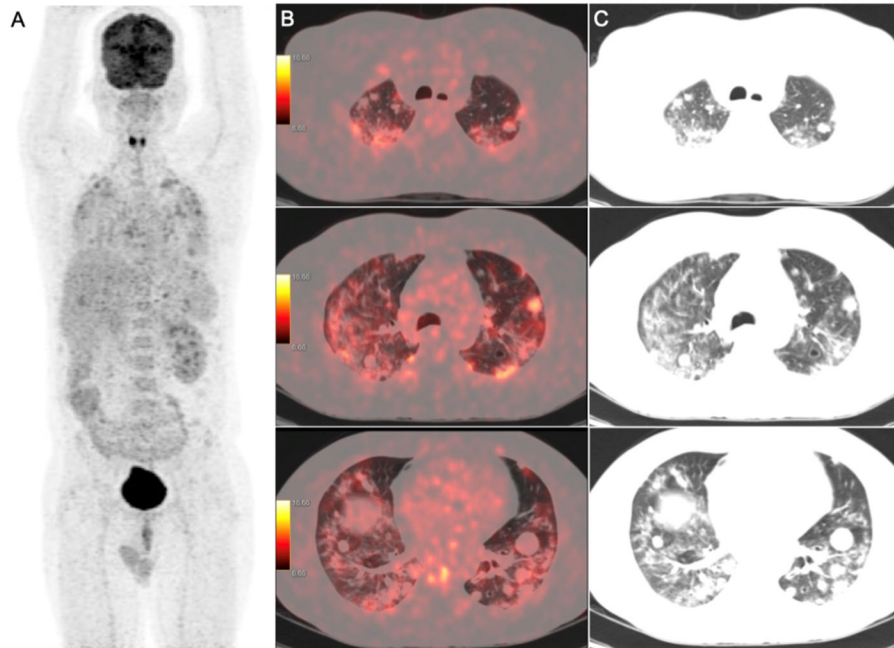
Thus, we have to consider this possible interference during this pandemic phase before scheduling patients for  $^{18}\text{F}$ -FDG PET/CT scan for various oncological purposes.

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**Figure 1:** (Column A)  $^{18}\text{F}$ -FDG PET/CT whole-body maximum-intensity projection image, (Column B) axial fused PET/CT images and (Column C) corresponding CT images showed variably  $^{18}\text{F}$ -FDG avid random nodules in both lung fields (SUVmax of hottest nodule 9.9).



**Figure 2:** (Column A)  $^{18}\text{F}$ -FDG PET/CT whole-body maximum-intensity projection image, (Column B) axial fused PET/CT images and (Column C) corresponding CT images showed  $^{18}\text{F}$ -FDG avid diffuse GGOs/patchy consolidatory changes in bilateral lung fields from apex to base obscuring the details of metastatic lesions (SUVmax of hottest nodule 7.8, SUV max of GGOs 7.3).