Resolution of Misleading COVID-19 Vaccination–Related Nodal and Splenic FDG Uptake in the Follow-up Study

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Abstract: Newly diagnosed low-grade bilateral breast lymphoma in 63-year-old woman demonstrated intense FDG uptake in the left axillary lymph nodes and the spleen, concerning for lymphomatous involvement. Subsequent ultrasound-guided biopsy did not demonstrate any pathologic left axillary lymph nodes. Further investigation revealed COVID-19 vaccination in the left arm, 5 days prior to the ^{18}F-FDG PET/CT study. Six-month follow-up ^{18}F-FDG PET/CT showed resolution of the intense FDG uptake in the left axillary lymph nodes and spleen without any treatment, suggesting a self-remitting acute local and systemic immune response to COVID-19 vaccination.

Key Words: COVID-19, FDG PET/CT, follow-up, immune response, lymph nodes, spleen, vaccination

(*Clin Nucl Med* 2022;47: e658–e659)

Received for publication February 4, 2022; revision accepted April 22, 2022.
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Author Contribution: S.B. was involved in the interpretation of the images, for drafting, reviewing, and submitting the manuscript, and for all correspondence. A.J. has been involved in interpreting the images and for conceptualizing, reviewing, and editing the manuscript.
Conflicts of interest and sources of funding: none declared.
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ISSN: 0363-9762/22/4710–e658
DOI: 10.1097/RLU.0000000000004289

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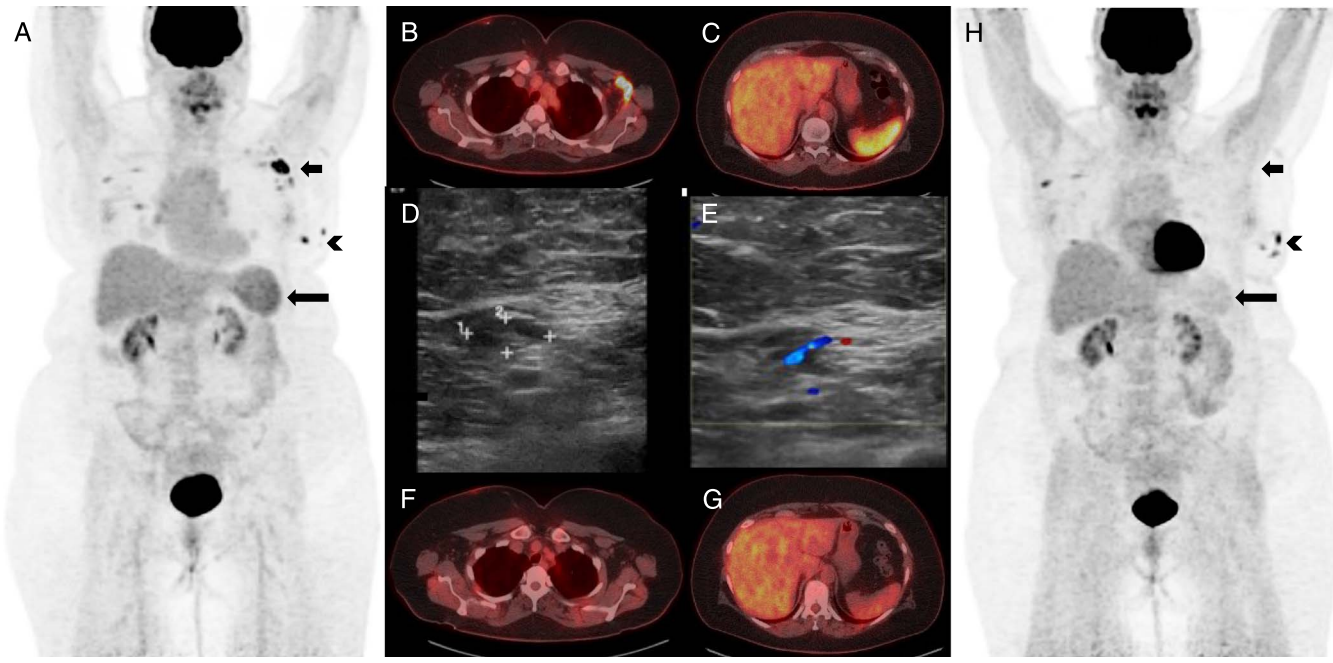

FIGURE 1. A–H, A 62-year-old woman with bilateral breast nodules underwent biopsy of the left breast lesion, which demonstrated a low-grade B-cell follicular lymphoma. ^{18}F-FDG PET/CT (**A**–**C**) was requested for initial staging, which demonstrated bilateral, mildly to moderately FDG-avid breast nodules (arrowhead in **A**), with the most avid nodule having an SUV_{max} of 7.9. In addition, there were markedly FDG-avid left axillary lymph nodes (short arrow in **A** and **B**) with an SUV_{max} of 14.4, which were concerning for lymph nodal lymphomatous involvement. Moreover, there was intense FDG uptake in the spleen (long arrow in **A** and **C**) with an SUV_{max} of 5.8, greater than that of the liver, also concerning for lymphomatous involvement. An ultrasound-guided left axillary lymph node biopsy was planned to obtain a definitive diagnosis for initial staging. On the day of the biopsy, approximately 28 days after the ^{18}F-FDG PET/CT; however, no pathologic left axillary lymph nodes were identified. Ultrasound demonstrated a normal-appearing lymph (**D**, **E**). The biopsy was hence deferred. Upon further investigation, the patient revealed that she had received COVID-19 vaccination in the left arm 5 days prior to the ^{18}F-FDG PET/CT study. Hence, it was presumed that the intense left axillary lymph nodal and splenic uptake likely represents postvaccination immune response. The follow-up ^{18}F-FDG PET/CT performed 6 months later demonstrated complete resolution of increased FDG uptake in the left axillary lymph nodes and spleen (short and long arrows in **H**, **F** and **G**). There was an overall stable disease in the bilateral breasts (arrowhead in image **H**). Resolution of abnormal FDG uptake in the left axillary lymph nodes and spleen in the absence of treatment proves causality and self-limiting nature of the immune response to the COVID-19 vaccination. COVID-19 vaccination has been reported to confound ^{18}F-FDG PET/CT interpretation in patients being evaluated for malignancies, particularly lymphoma.[1] Elevated uptake in the ipsilateral axillary lymph nodes after COVID-19 vaccination has also been reported in the literature.[1–3] Only 2 case reports had shown elevated splenic uptake secondary to COVID-19 vaccination.[4,5] Another case report had shown increased splenic uptake after influenza vaccination.[6] This case demonstrates the self-limiting nature of the immune response without any treatment. It also highlights the importance of specific history taking regarding recent vaccination at the time of imaging to safeguard against misinterpretation of such findings. Recently, a similar case was described in a patient with breast carcinoma causing a diagnostic dilemma.[7,8] With increasing number of people getting booster revaccination, we expect a continued increased prevalence of incidental findings related to COVID-19 vaccination on ^{18}F-FDG PET/CT. It is imperative that nuclear medicine physicians be cognizant of imaging features of immune responses secondary to COVID-19 vaccination during this pandemic to avoid misinterpretations.