

DOTATATE -Avid Bilateral Axilla and Subpectoral Lymphadenopathy Induced From COVID-19 mRNA Vaccination Visualized on PET/CT

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Abstract: A 64-year-old woman with malignant carcinoid tumor of the ileum received right ileocelectomy 9 years ago. Series follow-up imaging studies including most recent ^{68}Ga -DOTATATE PET/CT scan in June 2020 have been negative for disease. Current ^{68}Ga -DOTATATE PET/CT scan showed new cluster of bilateral axillary and subpectoral lymphadenopathy with normal CT morphology, but with avid DOTATATE uptake. There was no other abnormal DOTATATE-avid lesion or suspicious CT image findings. The medical history revealed that the patient received 2 doses of COVID-19 (coronavirus disease 2019) mRNA vaccine at bilateral upper arm deltoid muscles at 21 and 42 days prior to the PET/CT examination, respectively.

Key Words: ^{68}Ga -DOTATATE, COVID-19, immunization, mRNA vaccine, neuroendocrine tumor, PET/CT

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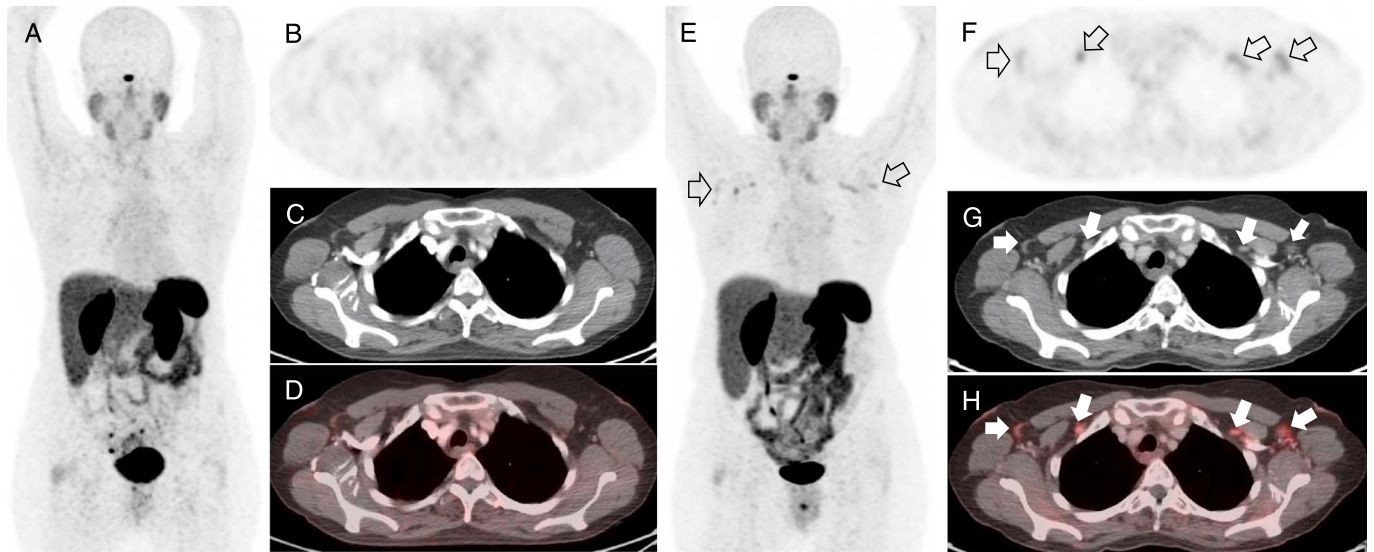


FIGURE 1. A 64-year-old woman with malignant carcinoid tumor of the ileum received right ileocelectomy 9 years ago. Her series posttherapy follow-up imaging studies have been negative for disease, including the most recent ^{68}Ga -DOTATATE PET/CT scan performed 8 months ago (A: MIP image; B: axial PET; C: axial CT; D: axial fused PET/CT images of the axillary). The current ^{68}Ga -DOTATATE PET/CT images (E: MIP image; F: axial PET; G: axial CT; H: axial fused PET/CT images of the axillary and subpectoral regions) revealed cluster of new DOTATATE-avid bilateral axillary and subpectoral nodes (arrows in E–H, with SUVmax 2.2–3.6). The fatty right axillary lymph node has been stable in size, but with new DOTATATE avidity (SUVmax 2.2). Other lymph nodes are new and subcentimeter in short axis, that is, normal CT morphology. The reference liver background SUVmean was 4.1. There was no other abnormal DOTATATE-avid lesion on PET/CT. Upon further investigation, as documented in the patient's medical records, she received 2 doses of intramuscular injection of Pfizer-BioNTech COVID-19 (coronavirus disease 2019) mRNA vaccine¹: the first dose in the right upper arm 42 days ago and the second dose in the left upper arm 21 days prior to the current PET/CT examination. Thus, the new DOTATATE-avid bilateral axillary nodes are reactive changes rather than metastatic small bowel neuroendocrine tumor. It has been recently reported that COVID-19 mRNA vaccine can induce ipsilateral FDG-avid axillary lymphadenopathy shortly after vaccination,² which shares similar FDG PET/CT findings as other vaccinations such as influenza.^{3–6} This case showed that COVID-19 mRNA vaccination could not only induce new DOTATATE avidity in preexisting axillary lymph node (the right axillary fatty lymph node), but also induce new DOTATATE-avid ipsilateral axillary and subpectoral lymph nodes. Such immune response–induced DOTATATE avidity can be detected up to 42 days after vaccination. This phenomenon suggests a systemic immune-mediated response to the COVID-19 mRNA vaccine, probably similar to that reported in other RNA cancer vaccination.⁷ As millions of people are receiving COVID-19 mRNA vaccination,⁸ it is important for physicians to understand that such vaccination can induce reactive lymph nodes with either FDG avidity or DOTATATE avidity and avoid false interpretation.