

# <sup>18</sup>F-Fluciclovine–Avid Reactive Axillary Lymph Nodes After COVID-19 Vaccination

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**Abstract:** A 74-year-old man presenting with biochemical recurrent prostate cancer 9 months after robotic-assisted radical prostatectomy and pelvic lymphadenectomy underwent <sup>18</sup>F-fluciclovine PET/CT for restaging to determine subsequent treatment strategy. Serum prostate-specific antigen was 0.7 ng/mL at the time of imaging. Images demonstrated foci of abnormal increased <sup>18</sup>F-fluciclovine uptake corresponding to prominent round lymph nodes in the left axilla, some of which with fatty hila. Due to recent mRNA COVID-19 vaccination in the ipsilateral arm and the low likelihood of nodal metastases to the axilla from prostate cancer in this patient, the lymph nodes were considered to be benign, reactive to the vaccine.

**Key Words:** SARS-CoV-2, COVID-19, lymphadenopathy, false-positive, <sup>18</sup>F-fluciclovine, PET/CT

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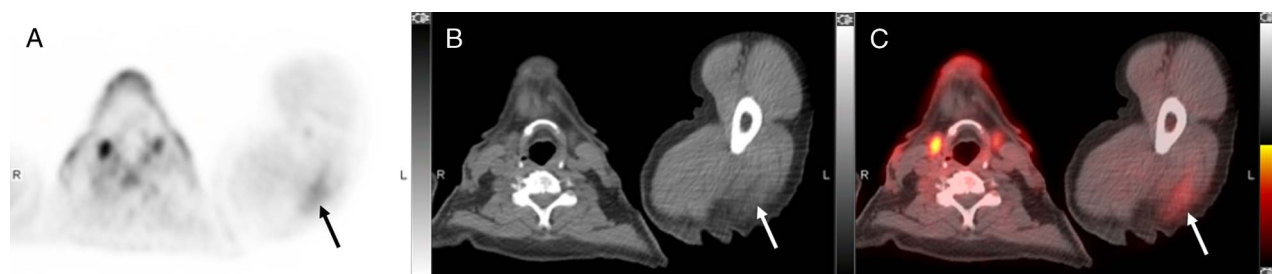
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**FIGURE 1.** A 74-year-old man with Gleason 7 (4 + 3) prostate cancer presenting with biochemical recurrence 9 months after robotic-assisted radical prostatectomy and pelvic lymphadenectomy. The patient's serum prostate-specific antigen levels increased from undetectable postsurgically to 0.7 ng/mL at the time of imaging.  $^{18}\text{F}$ -Fluciclovine PET/CT was performed from the proximal thighs to the vertex of the skull 3 to 5 minutes after the IV administration of 344.1 MBq (9.3 mCi). MIP image (A) demonstrates multiple foci of abnormal increased  $^{18}\text{F}$ -fluciclovine uptake corresponding to left axillary lymph nodes (ovoid shape). In addition, there is a focus of increased uptake in the right femoral neck, compatible with a bone metastasis (arrow). Increased activity in the right upper extremity and right axilla is related to radiotracer injection and is of no clinical significance (asterisk).  $^{18}\text{F}$ -Fluciclovine axial PET (B), axial CT (C), axial fused PET/CT (D), coronal PET (E), coronal CT (F), and coronal fused PET/CT (G) images demonstrate foci of increased radiotracer uptake localizing to prominent round lymph nodes in the left axilla, some of which with fatty hila (ovoid shape). The largest lymph node, measuring approximately  $1.1 \times 1.0$  cm, had a maximum SUV of 6.6. The patient had undergone mRNA COVID-19 vaccination (Moderna, Inc, Cambridge, MA) in the left arm 6 and 30 days prior to the PET/CT imaging acquisition.



**FIGURE 2.** Axial PET (A), axial CT (B), and axial fused PET/CT (C) demonstrates an area of increase  $^{18}\text{F}$ -fluciclovine activity in the left deltoid musculature and adjacent subcutaneous adipose tissues (SUV<sub>max</sub> 2.9), consistent with local inflammation secondary to recent mRNA COVID-19 vaccination.  $^{18}\text{F}$ -Fluciclovine is an amino acid–based radiotracer initially proposed for the evaluation of brain gliomas.<sup>1</sup>  $^{18}\text{F}$ -fluciclovine gained US Food and Drug Administration approval in May of 2016 as a PET tracer for patients with suspected recurrence of prostate cancer.<sup>2</sup> In addition to prostate cancer and brain gliomas, there are several reports of other tumors that demonstrate increased  $^{18}\text{F}$ -fluciclovine uptake including breast cancer, head and neck cancers, and malignant melanoma.<sup>3–5</sup> However, increased  $^{18}\text{F}$ -fluciclovine uptake is not a feature limited to just malignancies as inflammatory and infectious processes may also exhibit increased  $^{18}\text{F}$ -fluciclovine accumulation.<sup>6</sup> With the Worldwide deployment of COVID-19 vaccination, ipsilateral reactive axillary, subpectoral, and supraclavicular adenopathy has become a frequent finding during  $^{18}\text{F}$ -FDG and  $^{68}\text{Ga}$ -DOTATATE imaging.<sup>7–10</sup> Recent National Comprehensive Cancer Network guidelines recommend postponing PET/CT imaging by 4 to 6 weeks after the COVID-19 vaccine if patient care is not affected.<sup>11</sup> However, delaying PET/CT imaging may not be allowed by tight treatment schedules and the need for prompt decisions on therapy changes. Our center routinely documents information regarding COVID-19 vaccine status (with vaccination dates) in the electronic medical records. This case report highlights the importance of recognizing that reactive lymph nodes from COVID-19 vaccine can also be seen during  $^{18}\text{F}$ -fluciclovine imaging.