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Incidentally Detected Oropharyngeal Squamous Cell Carcinoma on ^{18}F-Fluciclovine PET/CT

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Abstract: We present a case of oropharyngeal squamous cell carcinoma (SCC) of the tongue base incidentally detected on ^{18}F-fluciclovine PET/CT. A 79-year-old man with history of locally advanced prostate cancer (Gleason score 4 + 5 = 9; cT2cN1M0) previously treated with androgen deprivation therapy (luprolide + bicalutamide) presented with a slowly rising serum prostate-specific antigen over 3 years, concerning for recurrent disease. ^{18}F-fluciclovine PET/CT, obtained to identify potential sites of recurrence, demonstrated prostate bed uptake with possible left seminal vesicle involvement. Additionally, an exophytic, tracer-avid right tongue base mass was incidentally noted and later confirmed to be p16+ SCC on biopsy.

Key Words: ^{18}F-fluciclovine, ^{18}F-FDG, head and neck squamous cell carcinoma, prostate cancer, PET

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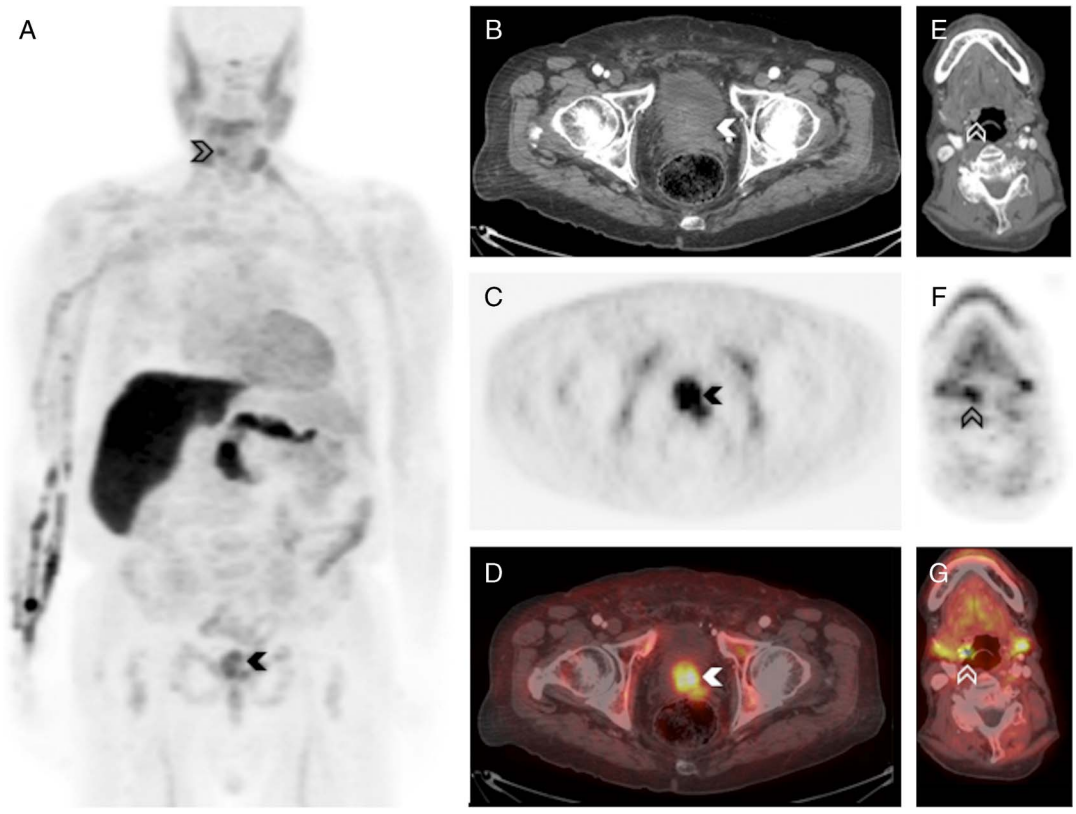

FIGURE 1. A 79-year-old man with history of locally advanced prostate carcinoma (Gleason score 4 + 5 = 9; cT2cN1M0) initially responsive to androgen deprivation therapy (luprolide + bicalutamide) presented with slowly rising serum prostate-specific antigen from 0.9 to 2.5 ng/mL over 3 years, concerning for recurrent disease. To identify potential sites of recurrence, an ^{18}F-fluciclovine PET/CT was performed with PET images acquired 4 minutes after injection of 10.7 mCi (395.9 MBq). MIP PET (**A**) images demonstrated focal radiotracer uptake in the prostate gland (solid arrowhead). CT (**B**), PET (**C**), and transaxial fused PET/CT (**D**) identified ill-defined, tracer-avid soft tissue in the left aspect of prostate gland with possible seminal vesicle involvement, compatible with prostate cancer without nodal or osseous radiotracer-avid metastases. However, a fluciclovine-avid lesion was noted in the right oropharynx (open arrowhead) on MIP PET (**A**), corresponding to an enhancing exophytic 1.1-cm right tongue base mass on CT (**E**), PET (**F**; SUVmax 5.6, uptake greater than bone marrow), and fused PET/CT (**G**). Because prostate cancer metastasis to the oropharyngeal mucosa *is rare,*[1] the possibility of a second primary malignancy was raised.

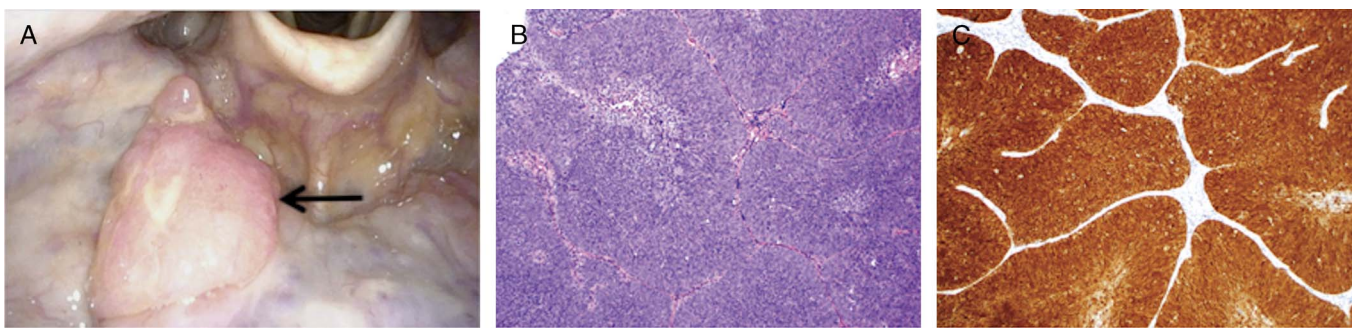

FIGURE 2. Endoscopy showed a 1.1-cm exophytic hypervascular right tongue base mass (**A**, straight arrow). Hematoxylin and eosin sections demonstrated spindle to ovoid, cohesive tumor cells in sheets and large nests with basaloid morphology (**B**), compatible with squamous cell carcinoma (SCC). Immunohistochemistry demonstrated diffuse positivity for p16 (**C**), which is strongly correlated with HPV infection and portends a better prognosis.[2]

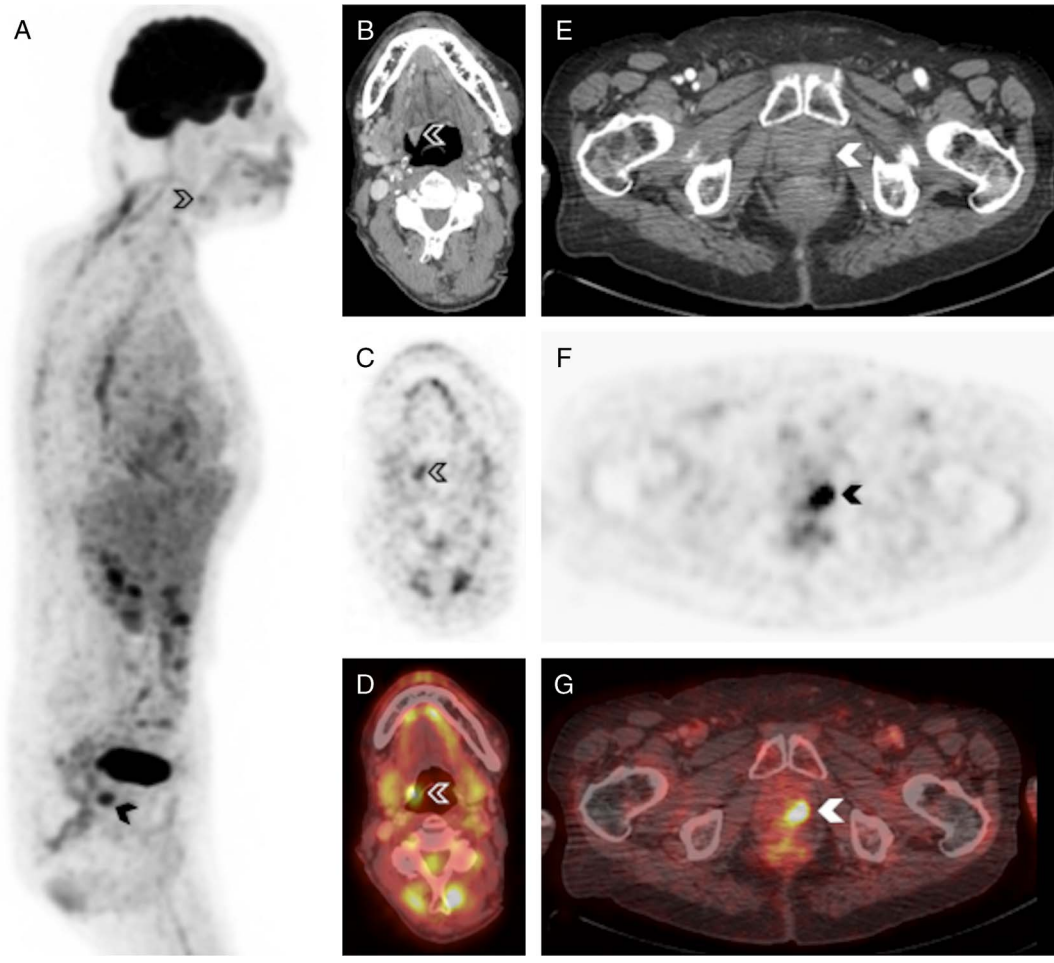

FIGURE 3. ^{18}F-FDG PET/CT was obtained for further SCC characterization and staging, with PET images acquired 81 minutes after injection of 8.6 mCi (318.2 MBq). Axial PET (**C**) images demonstrated focal right oropharyngeal hypermetabolism (open arrowhead; SUVmax 3.4), corresponding to known tongue base SCC visualized on sagittal MIP PET (**A**), CT (**B**), and fused PET/CT (**D**). Additionally, MIP PET (**A**), CT (**E**), PET (**F**), and fused PET/CT (**G**) showed prostate gland focal hypermetabolism (solid arrowhead), compatible with known prostate cancer. No definite additional FDG avid metastases were identified. Given the patient's cardiac comorbidities, targeted radiation therapy was favored over chemotherapy, and the patient is currently undergoing stereotactic body radiation therapy. While ^{18}F-fluciclovine is approved for PET/CT imaging of suspected recurrent prostate cancer,[3] it is also being evaluated for cerebral glioma[4,5] and has shown promise in breast cancer diagnosis and treatment response.[6–8] Tracer avidity has been described in several other malignancies including lung cancer,[9] papillary renal cell carcinoma,[10] colon cancer, rectal cancer, follicular lymphoma,[11,12] hepatocellular carcinoma,[13] and melanoma.[14] Finally, uptake is reported with benign entities including meningioma, osteoid osteoma, and pituitary adenoma.[12] Fluciclovine is a non-natural amino acid with cellular uptake driven by ASCT2 and LAT1, sodium-dependent amino acid transporters[3] that play an important role in pathogenesis of many malignancies. ASCT2 and LAT1 overexpression has been described in tongue and laryngeal SCC.[15,16] This case demonstrates that head and neck SCC can uptake ^{18}F-fluciclovine, and highlights the importance of investigating regions of unexpected radiopharmaceutical uptake. Moreover, it suggests a potential application of this radiopharmaceutical in detecting head and neck SCC.