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Case report

A Unique Case of Diffuse Metastatic Neuroendocrine Cancer with Subcutaneous Nodules on ^{18}F-Fluorodeoxyglucose Positron Emission Tomography/Computer Assisted Tomography

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Abstract

Neuroendocrine tumors (NETs) account for 8–10% of cases of carcinomas of unknown primary. Most of these cases are poorly differentiated with metastatic disease at the time of diagnosis. However, cutaneous metastatic presentation is rare. We present an interesting case of a 74-year-old woman presenting with cutaneous metastatic involvement from high grade poorly differentiated NET of unknown origin. She was referred to us with a diagnosis of lymphoma. ^{18}F-fluorodeoxyglucose positron emission tomography/computer assisted tomography imaging at our institution offered a differential diagnosis, including neuroendocrine cancer. Repeat skin lesion biopsy demonstrated "non-Merkel cell" carcinoma, favoring metastatic high-grade neuroendocrine carcinoma.

Keywords: ^{18}F-fluorodeoxyglucose positron emission tomography/computer-assisted tomography, neuroendocrine tumors, subcutaneous nodule

Introduction

Presented is a unique case of a 74-year-old white female, who was referred to our clinic for evaluation of multiple subcutaneous nodules. She was admitted with a diagnosis of subcutaneous lymphomatous nodules, based on an outside facility biopsy. Subsequent biopsy at our institution demonstrated metastatic high-grade neuroendocrine carcinoma (non-Merkel cell). Neuroendocrine tumors (NETs) have been shown to have cutaneous involvement.[1,2] ^{18}F-fluorodeoxyglucose (^{18}F-FDG) positron emission tomography/computer assisted tomography (PET/CT) proved useful in reassessment of the diagnosis. She was found to have a significant disease burden with multiple organ involvements in addition to the nodules.

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Whole body maximum intensity projection (MIP) [Figure 1] and select axial [Figures 2-4] ^{18}F-FDG PET/CT images of a 74-year-old white female who underwent initial staging ^{18}F-FDG PET/CT for presumed large B-cell lymphoma, based on an outside institution chest wall biopsy. At the time of injection, the patient was 5′ 0″, 100 lbs, and she had a blood sugar of 71 mg%. Radiotracer uptake time was 71 min.

Figure 1 is an MIP image demonstrating multiple areas of the abnormal focal hypermetabolism, which corresponded to numerous cutaneous nodules throughout the chest, abdomen and extremities, retroperitoneal lymph nodes, as well as multiple osseous lesions and involvement of both adrenal glands. Figures 2 and 3 are select fused PET/CT axial images. Figure 2 demonstrates a 38 mm × 30 mm left adrenal nodule as well as two markedly hypermetabolic

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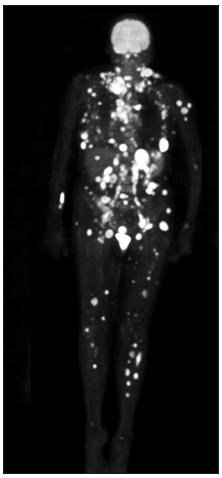

Figure 1: Whole body maximum intensity projection

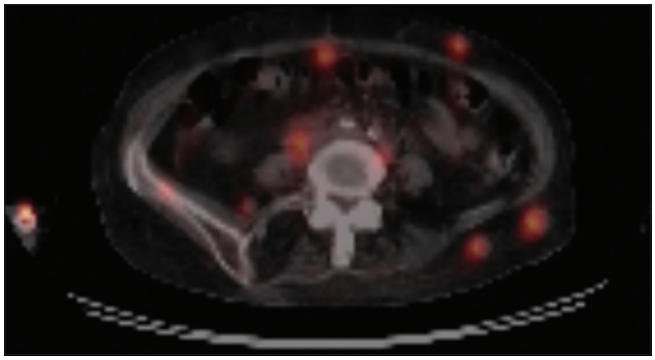

Figure 3: Select axial ^{18}F-fluorodeoxyglucose positron emission tomography/computer-assisted tomography, subcutaneous nodules

subcutaneous nodules in the posterior abdominal wall. Figure 3 demonstrates additional subcutaneous nodule as well as retroperitoneal lymph nodes. Figure 4 demonstrates a destructive hypermetabolic osseous focus in the right femur.

Discussion

The patient underwent a repeat biopsy of the lower abdominal wall lesion. Immunostaining included multiple markers of which only synaptophysin was positive. At that time, there was no support for a diagnosis of lymphoma. The lack of CK20 expression excluded the diagnosis of a primary NET (Merkel cell carcinoma).[3] A diagnosis of metastatic high-grade neuroendocrine carcinoma was thus favored.

The patient was started on tumor lysis protocol and chemotherapy (carboplatin/etoposide). She succumbed to her disease approximately 3 months later.

The carcinoid subset of NET has been imaged successfully with meta-iodobenzylguanidine, 6-[^{18}F] fluorodopamine and 11-C-5-Hydroxy-L-Tryptophan.[4,5] Scintigraphy with 111-In-diethylenetriaminepentaacetic acid octreotide is

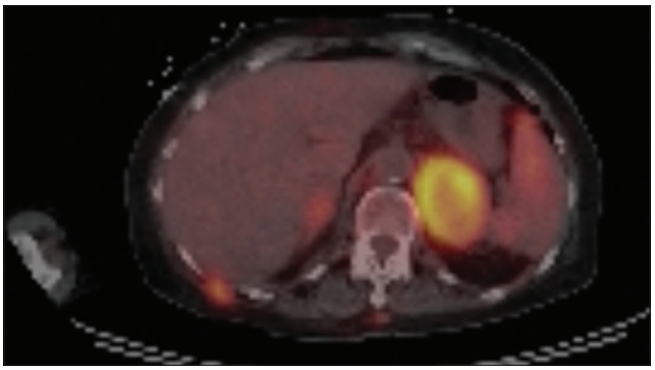

Figure 2: Select axial ^{18}F-fluorodeoxyglucose positron emission tomography/computer-assisted tomography, soft tissue mets

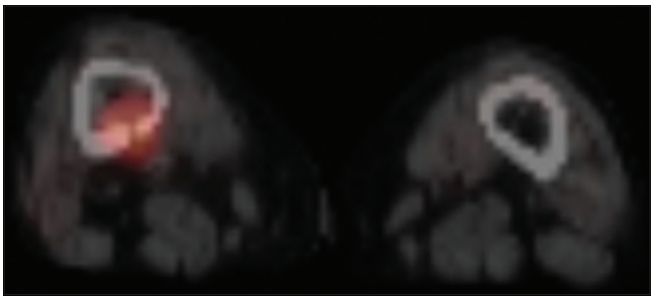

Figure 4: Select axial ^{18}F-fluorodeoxyglucose positron emission tomography/computer-assisted tomography, bony mets

the current gold standard for NETs expressing a high density of somatostatin receptors.[6] However, poorly differentiated tumors lose their somatostatin expression. There is a growing trend to use 68-Ga labeled PET radiopharmaceuticals. Where they are available, they may prove to be more useful.

For dedifferentiated tumors, coupled with a high proliferative index, somatostatin scintigraphy is a less sensitive imaging modality. ^{18}F-FDG PET/CT has a high sensitivity for this subgroup, which demonstrate increased glucose metabolism corresponding to the increased propensity for invasion and metastasis and an overall poorer prognosis.[7] Given the strong association of ^{18}F-FDG PET/CT with tumor aggressiveness, it could be valuable for selecting treatment, monitoring therapy, and determining prognosis.[8] In addition, the ability of ^{18}F-FDG PET/CT to assess carcinoma of unknown primary is well-established.[9]

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