Case of the Quarter—January 2012

\[ ^{18}\text{F-FDG PET/CT for Breast Cancer Staging and Restaging} \]

**Patient History**

The patient is a 64-year-old woman who presented in May 2011 with palpable left breast lump discovered upon self-examination. Mammogram and ultrasound were performed, finding a solid lesion measuring 2.8 cm as well as a small density with the characteristics of a lymph node measuring 5.5 mm x 3.3 mm x 2.9 mm in the left upper outer breast. An ultrasound-guided biopsy was performed, finding infiltrating ductal carcinoma in the larger solid lesion and metastatic ductal carcinoma in the lymph node in question. Breast MRI was performed that demonstrated an enhancing tumor corresponding to the palpable lump. An \[^{18}\text{F-FDG PET/CT} \] was ordered for initial staging and workup to evaluate metastatic spread of disease.

**^{18}\text{F-FDG PET/CT Findings}**

The \[^{18}\text{F-FDG PET/CT} \] demonstrated the following: intense FDG uptake within the left breast mass; abnormal lymph node uptake in the left upper outer breast/axilla and left internal mammary region; abnormal osseous uptake in the sternum, C5, T1, and L3 vertebral bodies. These findings were consistent with the patient’s known breast cancer with nodal and osseous metastatic disease.

The patient also had an FDG-avid left thyroid nodule that had been previously biopsied and found to be benign.

Subsequent MRI of the cervicothoracic spine confirmed osseous metastatic disease, with abnormal signal within the C5 and T1 vertebrae. There was no evidence of spinal cord compression due to metastatic disease.

Shortly after the \[^{18}\text{F-FDG PET/CT} \] and MRI studies, the patient was recommended for neoadjuvant chemotherapy and began four cycles of Adriamycin and Cytoxan.

Restaging \[^{18}\text{F-FDG PET/CT} \] was performed, which found that the area of intense uptake in the left breast had diminished in intensity since the baseline \[^{18}\text{F-FDG PET/CT} \], and also that the intense uptake in the sternum had nearly completely resolved. In addition, focal areas of uptake seen in lymph nodes and in the spine on the prior \[^{18}\text{F-FDG PET/CT} \] were not apparent on the restaging study. There were no new or enlarging foci of abnormal uptake to suggest progressive metastatic disease.

**How Did \[^{18}\text{F-FDG PET/CT} \] Help?**

The baseline \[^{18}\text{F-FDG PET/CT} \] played an important role in initial staging, not only in confirming carcinoma of the breast and metastatic left internal mammary and axillary lymphadenopathy, but also in identifying bony metastatic disease to the sternum and C5, T1, and L3 vertebral bodies. In addition, restaging \[^{18}\text{F-FDG PET/CT} \] demonstrated a high degree of response to therapy.

**Discussion**

Medicare has recognized the utility of \[^{18}\text{F-FDG PET/CT} \] in breast cancer for a number of clinical indications:

**Initial Staging**

PET is covered as an adjunct to other imaging modalities for staging patients with distant metastasis.

**Subsequent Treatment Strategy**

PET is covered for restaging patients with locoregional recurrence or distant metastasis, as well as for monitoring tumor response to treatment for women with locally advanced and metastatic breast cancer when a change in therapy is anticipated.

This case demonstrates the utility of \[^{18}\text{F-FDG PET/CT} \] in the initial staging of breast cancer to identify distant metastases, as well as for restaging and monitoring response to therapy.

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