Uncommon Reason for High Fluorodeoxyglucose Positron Emission Tomography Uptake

A 32-year-old woman presented with a local recurrence of breast cancer. She had first been diagnosed in 2006 with clinical stage II (T4.5 cm N0 M0), triple-negative breast cancer of the left breast; she received neo-adjuvant chemotherapy and breast-conserving surgery followed by adjuvant chemotherapy and breast irradiation. She remained disease-free until May 2009, when a 0.9-mm lump appeared in her left breast. A trucut biopsy showed infiltrating ductal carcinoma. A computed tomography/positron emission tomography (PET) scan showed diffuse high fluorodeoxyglucose (FDG) uptake in her right breast with no pathologic findings or uptake elsewhere (Fig 1).

The PET scan is one of the most useful tools for metastatic evaluation. In an extensive review of the FDG-PET literature, comprising 419 articles from 1993 to 2000, the overall sensitivity and specificity was estimated to be 84% and 86%, respectively, and results from a PET scan changed the management of one third of the patients in the literature.1 Tumor cells have higher metabolic rates than normal cells; therefore, they take up greater amounts of glucose and FDG than surrounding tissues do.1 However, it is not only tumor cells that may have an increased FDG uptake. Lesions with high concentrations of inflammatory cells may also show increased FDG uptake, which can be mistaken for malignancy in patients with proven or suspected cancer.2 Incidental increased FDG uptake in the thyroid can be seen in 2% of PET scans, including scans of Graves’ disease.3 Increased FDG uptake has also been reported in the normal uterus during menstruation;4,5 in healing bone, joints, and sites of infection;6 in granulomatous diseases like sarcoidosis;7–9 in chronic inflammatory diseases like tuberculosis;10 and in other infrequent conditions like Lhermitte-Duclos disease.11 Some other rare reasons for high FDG uptake include atherosclerotic plaque formation,12 adenomatous polyps of the colon,13 diffuse bone marrow uptake after erythropoietin or granulocyte colony-stimulating factor administration,14,15 and thalassemia.16 Finally, high FDG uptake has also been reported in breast-feeding women.17

In this patient, there was no FDG uptake in her left breast recurrence of a tumor the size of less than 1 cm under the scan resolution. Unexpectedly, there was an extensive high FDG uptake in her contralateral breast, which was otherwise clinically normal. The patient was breast-feeding her three-month-old newborn, which provides an uncommon reason for high FDG uptake that is not widely recognized as a cause for a false-positive PET scan in clinical practice. Radiation therapy may lead to a substantially reduced milk supply, even to the point of no milk at all.18,19 After having had her left breast irradiated three years before when the disease was first diagnosed, the patient’s milk production occurred in her contralateral breast only—the one showing high FDG uptake.

Delay of PET scanning until after completion of breast-feeding should be considered to avoid a work-up of a false-positive result. On the other hand, if PET scanning must be performed, then breast-feeding should be interrupted both before the exam and afterward until the radioactivity has left the breast.

Daniel Hendler and Salomon M. Stemmer
Institute of Oncology, Davidoff Center, Rabin Medical Center, Petach Tikva, Israel

REFERENCES


Fig 1.

DOI: 10.1200/JCO.2010.29.5543; published online ahead of print at www.jco.org on August 16, 2010