

Case of the Month—August 2005

## FDG-PET for Metastatic Breast Cancer

### History and Findings

A 50-year-old female presented with a history of breast cancer. Three years ago, a 2-cm nodule was detected in the lingual region of the lung. A PET scan was performed in November 2002 that showed multiple areas of increased FDG uptake in the left lung, left hilum, right chest wall, and liver (Figure 1).

The patient then received chemotherapy. A repeat PET study in August 2003 showed complete resolution of the abnormal uptake, indicating good response to the therapy (Figure 2).

The patient was in remission until one month ago when a lab test revealed elevated CA125, CEA, and CA15-3. A chest CT and bone scan were performed and failed to detect significant abnormality. PET was performed (Figure 3) and showed multiple foci of increased FDG uptake in the left humerus, right SI joint, and bilateral femora that is consistent with bone metastases. The PET also detected recurrent cancer in the liver.



Figure 1, PET study, November 2002



Figure 2, PET study, August 2003



Figure 3, PET study, August 2005

### How Did PET Help?

In this case, PET helped to detect initial metastatic breast cancer and recurrence after therapy. PET also helped to evaluate the chemotherapy response after the initial therapy.

### Discussion

18F-FDG PET has been found to be superior to bone scans in detecting bone metastasis in various malignant diseases, including breast cancer. FDG-PET often detects early marrow involvement before an identifiable bone reaction. Although 18F-FDG-PET has been reported as being appropriate for detecting all types of

bone metastasis including lytic, sclerotic, and mixed lesions, it is more sensitive in detecting lytic metastasis than sclerotic metastasis. Quantitative assessment of therapy-induced changes in tumor F-FDG uptake may allow the prediction of both tumor response and patient outcome very early in the course of therapy. Treatment may be adjusted according to the chemosensitivity and radiosensitivity of the tumor tissue in an individual patient. Thus, 18F-FDG-PET has an enormous potential to reduce the side effects and costs of ineffective therapy.

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