



Positron Emission Tomography

NORTH SHORE P.E.T. IMAGING CENTER

a service of North Shore Magnetic Imaging Center

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CASE FILES FROM NORTH SHORE P.E.T. IMAGING CENTER

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HISTORY

Two patients with newly diagnosed breast cancer were referred for staging PET/CT scans.

VALUE OF PET/CT FOR BREAST CANCER STAGING

PET/CT can contribute to patient diagnosis and management as preoperative studies in breast cancer in the following situations:

DETECTION OF PRIMARY BREAST CANCER

When evaluating suspicious breast abnormalities, FDG-PET has a sensitivity of 80–100% and specificity of 75–100%.

PROGNOSTIC VALUE OF FDG UPTAKE IN THE PRIMARY TUMOR

Most studies suggest that a higher FDG uptake is correlated with more clinically aggressive tumors.

AXILLARY NODE STAGING

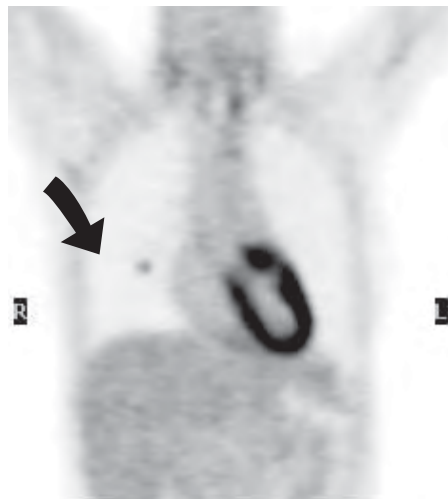
In this situation, FDG-PET has a sensitivity of 57–100% and specificity of 66–100%. Since FDG-PET underestimates the number of tumor-involved nodes compared with pathologic evaluation from conventional dissection, its role should be complementary to sentinel lymph node mapping and other standard axillary procedures.

PATIENT A

CT Scan



PET Scan



Fused PET/CT Image



There is a small focus of moderate FDG uptake corresponding to an unsuspected right lower lobe pulmonary nodule.

DETECTION OF LOCOREGIONAL AND DISTANT METASTASES

Functional imaging with FDG-PET is more accurate than CT for the detection of nodal involvement in the mediastinum. The sensitivity of FDG-PET was significantly higher (85%) than CT (50%), with nearly the same specificity (90% for FDG-PET versus 83% for CT). FDG-PET can accurately detect sites of distant disease with a sensitivity of 80–97% and specificity of 75–94%.

EVALUATION OF THERAPY RESPONSE

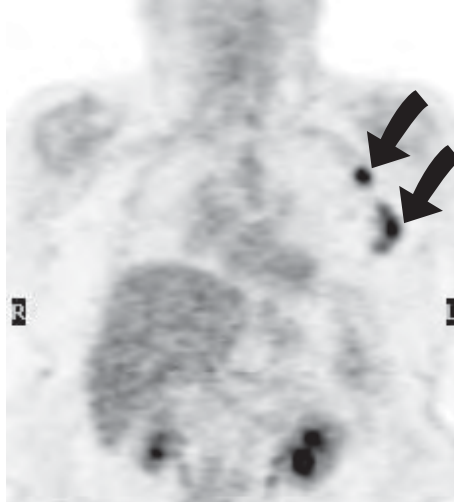
In locally advanced breast cancer (LABC), initial studies have shown the utility of FDG-PET in the evaluation of treatment response, specifically in its ability to discriminate responders from non-responders more accurately and earlier than conventional imaging methods.

PATIENT B - CORONAL CHEST

CT Scan



PET Scan



Fused PET/CT Image



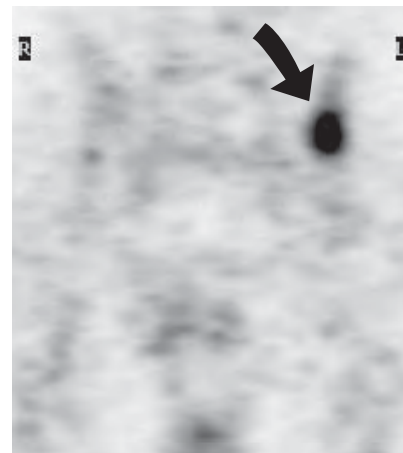
There is a small focus of marked FDG uptake corresponding to an unsuspected metastasis to the left iliac wing.

PATIENT B - CORONAL PELVIC

CT Scan



PET Scan



Fused PET/CT Image



Several foci of marked FDG corresponding to enlarged left axillary lymph nodes.

REFERENCES:

Eubank W, Mankoff D. Evolving role of positron emission tomography in breast cancer imaging. *Semin Nucl Med.* 2005 Apr;35(2):84-99.

Lind P, Igerc I, Beyer T, Reinprecht P, Hausegger K. Advantages and limitations of FDG PET in the follow-up of breast cancer. *Eur J Nucl Med Mol Imaging.* 2004 Jun;31 Suppl 1:S125-34.

RespoDose Schwarz J, Bader M, Jenicke L, Hemminger G, Janicke F, Avril N. Early prediction of response to chemotherapy in metastatic breast cancer using sequential ¹⁸F-FDG PET. *J Nucl Med* 2005; 46:1144–1150.