

Earlier identification of metastatic disease in breast cancer

According to the National Cancer Institute (NCI), one out of 8 women will be diagnosed with breast cancer at some time during her life.¹ PET/CT is useful in all aspects of breast cancer staging, treatment and follow-up.²

Precise knowledge of the extent of disease is essential for adequate management and prognostic stratification in newly diagnosed breast cancer.³

- PET/CT following conventional imaging serves an important role in the evaluation of local disease extent, regional spread and distant metastases. PET/CT is effective in early detection and characterization of metastases compared to conventional

imaging in patients with high suspicion of distant metastases.³

- Accurate staging is particularly important, as treatment options may include surgery, radiation, chemotherapy and hormonal therapy, depending on the distribution and burden of disease.⁴
- In patients with primary breast carcinoma, pre-operative PET/CT has substantial impact on staging and clinical management.⁵

PET/CT: High accuracy for detection of distant lesions and extra-axillary lymph nodes when compared with conventional procedures³

	Sensitivity	Specificity	NPV	PPV	Accuracy
Staging					
PET/CT	97.80% ⁶	93.50% ⁶	85% ⁶	99.10% ⁶	97.30% ⁶
CT	87.60% ⁶	42% ⁶	31.70% ⁶	91.60% ⁶	82.10% ⁶
Recurrence					
PET/CT	93% ⁷	100% ⁷			98% ⁷
CT	66% ⁷	92% ⁷			77% ⁷

PET/CT differentiates responders from non-responders earlier in the course of chemotherapy as compared to conventional imaging thereby making it possible to avoid ineffective treatment regimens.⁸

Medicare recognizes the utility of PET and PET/CT in breast cancer.⁹

Initial Treatment Strategy (formerly Diagnosis and Staging)

PET and PET/CT are covered for the initial staging of loco/regional metastases. PET and PET/CT are not covered for diagnosis of breast cancer and initial staging of axillary lymph nodes.

- If it could potentially replace one or more conventional imaging studies when it is expected that conventional study information is sufficient for the clinical management of the patient

Subsequent Treatment Strategy (Restaging)

PET and PET/CT are covered for restaging of breast cancer:

- After completion of treatment for the purpose of detecting residual disease
- For detecting suspected recurrence or metastasis
- To determine the extent of a known recurrence

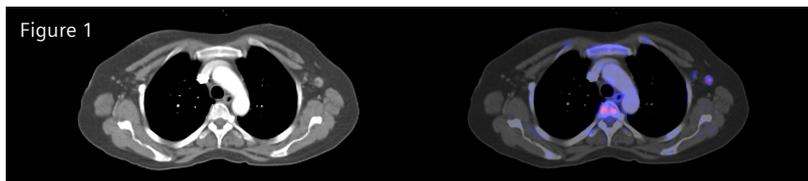
Restaging applies to testing after a course of treatment is completed and is covered subject to the conditions above.

Monitoring response to therapy

PET is covered for monitoring tumor response to treatment during the planned course of therapy (ie, when a change in therapy is being considered).

The ordering physician is responsible for documenting the medical necessity of the PET scan and that it meets these criteria.

PET/CT reveals extent of metastases in patients with breast cancer



Data courtesy of University of Tennessee Knoxville, Tennessee, USA.

History

A 51-year-old woman discovered a mass in her left breast during self examination. The tumor was estrogen and progesterone receptor positive, HER2neu status negative. A breast MRI confirmed a malignant breast lesion with associated skin thickening and tissue retraction and was highly suspicious for left axillary lymph-adenopathy and sternal metastases.

Imaging findings

The PET/CT showed multiple hyper-metabolic lytic lesions throughout axial skeleton (Figure 1). Increased tracer accumulation is visualized in splenic lesions that appear hypointense on contrast CT (Figure 2) as in hypermetabolic lymph-adenopathy in right pelvic wall (Figure 3). The PET/CT revealed a hypermetabolic left breast mass consistent with primary inflammatory breast cancer as well as 3 left axillary lymph nodes, in agreement with metastatic lymph node spread (Figure 4), all consistent with metastatic disease.

Treatment

Based on the PET/CT findings, the patient was diagnosed with Stage IV breast cancer. The suggested treatment was neoadjuvant chemotherapy, followed by a modified radical mastectomy.

Overall evaluation

Inflammatory breast cancer is associated with a high rate of distant metastases and PET/CT is useful for detecting occult metastases in these patients.¹⁰

¹ National Cancer Institute available at <http://www.cancer.gov/cancertopics/factsheet/detection/probability-breast-cancer>

² Bourgeois AC, et al. Role of positron emission tomography/computed tomography in breast cancer. *Radiol Clin N Am*. 2013; Sep; 51(5):781-98.

³ Cochet A, et al. 18F-FDG PET/CT provides powerful prognostic stratification in the primary staging of large breast cancer when compared with conventional explorations. *Eur J Nucl Med Mol Imaging*. 2014; Mar;41(3):428-37.

⁴ Rosen E, et al. FDG PET, PET/CT, and breast cancer imaging. *Radiographics*. 2007;27 Suppl 1:S215-29.

⁵ Bernsdorf M, et al. Preoperative PET/CT in early-stage breast cancer. *Ann Oncol*. 2012; Sep;23(9):2277-82.

⁶ Piperkova E, et al. Impact of PET/CT in comparison with same day contrast enhanced CT in breast cancer management. *Clinical Nuclear Medicine*. 2007; 32(6):429-434.

⁷ Dirisamer A, et al. Integrated contrast-enhanced diagnostic whole-body PET/CT as a first-line restaging modality in patients with suspected metastatic recurrence of breast cancer. *Eur J Radiol*. 2010; 73(2):294-9.

⁸ Andrade WP, et al. Can FDG-PET/CT predict early response to neoadjuvant chemotherapy in breast cancer? *Eur J Surg Oncol*. 2013; Dec;39(12):1358-63.

⁹ CMS Publication 100-03, Medicare National Coverage Determinations Manual, Chapter 1, Part 4, Section 220.6). Available at http://www.cms.hhs.gov/manuals/downloads/ncd103c1_part4.pdf

¹⁰ Groheux D, et al. Performance of FDG PET/CT in the clinical management of breast cancer. *Radiology*.2013; Feb; 266(2):388-405.

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