

## BREAST MRI MORE SENSITIVE THAN MAMMOGRAPHY

In a recent article in the New England Journal of Medicine (2004; 351:427-437), the authors concluded that “MRI appears to be more sensitive than mammography in detecting tumors in women with an inherited susceptibility to breast cancer.” Mammography was shown to be 33% sensitive, while MRI demonstrated 80% sensitivity.

The NEJM further validated the importance of breast MRI as a powerful tool in diagnosing breast cancer, especially in patients with high risk for breast cancer, or with indeterminate mammography or clinical exams.

In selecting a facility for breast MRI, many factors must be considered.

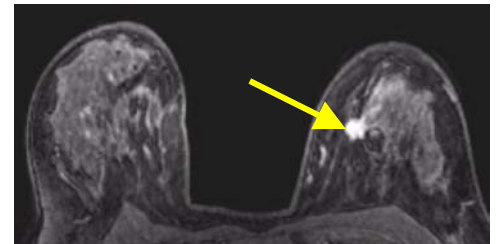
First, breast MRI must be performed on a high-field (1.5T) magnet. Open MRI units produce inferior quality exams.

Second, dedicated breast coils must be used, preferably coils that can scan both breasts simultaneously. In many facilities, patients must be scanned on two separate days for each breast.

Finally, the facility must have the ability to perform MRI-guided biopsy or needle localization, as lesions found on MRI are often not visible on any other imaging modality.

At Main Street Radiology, all Breast MRI's are performed on a high-field magnet with dedicated breast coils

which enable imaging of both breasts simultaneously. We have also successfully performed MRI-guided needle localization of breast lesions.



**Breast MRI (Cancer = arrow)**

Medicare and most insurance companies reimburse payment for Breast MRI examinations.

## MEDICARE APPROVES PET FOR ALZHEIMER DEMENTIA

In September 2004, Medicare coverage was approved for PET (Positron Emission Tomography) in the early diagnosis of Alzheimer's dementia [AD]. This is an important step in the management of AD patients, as new drugs work best in the early stages to slow the progression of this disease.

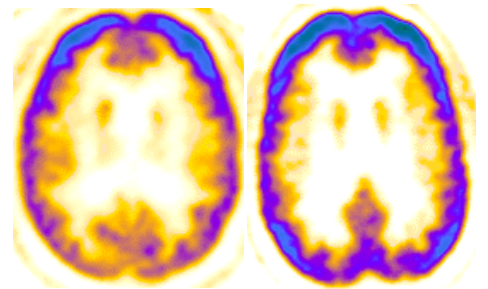
A UCLA study which included 138 patients with neuropathology proven AD [JAMA 2001; 286: 2120-7] showed the sensitivity/specificity of PET to be 94%/73%. This compares with reported average sensitivity/specificity of 81%/70% for expert clinical diagnosis of probable Alzheimer's disease without PET imaging [Neurology 2001;56:1143-53].

The approved coverage is for patients with at least 6 months of documented cognitive decline, in whom the

diagnosis is between fronto-temporal dementia and AD, despite a comprehensive clinical evaluation (which has included MRI or CT) by an experienced physician.

CT and MR are not sensitive nor specific for the diagnosis of AD. Role of CT and MR in the work-up of dementia is primarily to assess the degree of atrophy and to exclude other causes of dementia such as normal-pressure hydrocephalus, multi-infarct dementia, and intracranial mass.

Radiologists at Main Street Radiology have been interpreting PET scans at our facility since 2002, when we installed the 1<sup>st</sup> PET scanner in Queens. Our physicians are experienced in interpreting PET scans of the brain for diseases such as dementia and seizure disorders.



**Figure 1**

**Figure 2**

Axial PET image of the brain (figure 1) demonstrates normal activity in the frontal lobes (bright blue), with diminished activity in the parietal, temporal, and occipital lobes. This pattern is typical of Alzheimer disease. As a comparison, figure 2 is of a different patient with normal brain activity.

# CASE OF THE MONTH

## BREAST CANCER STAGING WITH PET/CT FUSION

**History:** A patient with carcinoma of the right breast was referred to Main Street Radiology for staging.

**Findings:** Chest CT was performed at MSR on a 16 detector spiral CT (Figure 1). A 3 cm right axillary lymph node was noted (thin arrow). A sub-centimeter right internal mammary lymph node was also seen (thick arrow).

A PET scan was performed (Figure 2) showing abnormal increased metabolic activity in the right axilla (thin arrow) and in the right internal mammary lymph node region (thick arrow).

Fusion of PET with CT (Figure 3) confirms that the small right internal mammary lymph node (thick arrow) as well as the larger axillary node (thin arrow) are hypermetabolic, consistent with metastatic disease.

**Discussion:** Traditional staging of breast cancer has often included CT of the Chest, Abdomen and Pelvis, bone scan, and sentinel node biopsy. CT and bone scans, however, do have limitations.

Lymph nodes are commonly seen on CT. Thus, the suspicion for tumor involvement is usually only raised on CT when these nodes are enlarged (typically at least 1 cm). Raising suspicion in smaller lymph nodes on CT, while increasing sensitivity, would lead to an unacceptable specificity for malignancy. With higher specificity, however, PET scanning can demonstrate malignancy in these smaller nodes [5-10 mm], as seen in this case in a right internal mammary lymph node.

Bone scans are, in actuality, 'calcium scans.' The radioactive tracer used in bone scans localizes to calcium, which is typically laid down in greater

abundance in the bone cortex adjacent to sites of metastatic disease in the bone marrow. However, bone scans have difficulty detecting sites of metastatic disease that are solely in the bone marrow and do not induce a significant reaction. PET scans have been shown to be more sensitive for these lesions. Several reports have noted that PET scans may be less sensitive for blastic lesions compared to bone scans, and thus these two studies are currently seen as complimentary.

Thus, PET scanning improves the diagnostic accuracy of the staging of breast cancer, mostly through its detection of distal disease. Sentinel node biopsy is still the best method to stage the axilla.

A survey of 50 referring physicians at UCLA revealed that PET imaging altered breast cancer patient management by changing the clinical stage in 36% of patients, usually by upstaging [J Nucl Med 2001 Sep;42:1334-7].

PET is approved by Medicare and most other insurance companies, for the staging of distal metastasis from breast cancer as well as the restaging of breast cancer with local/regional recurrence or metastatic disease. PET is also approved by Medicare for assessing the response of breast cancer with locally advanced or metastatic disease after the 1<sup>st</sup> cycle of chemotherapy.

Unlike many other facilities in which PET scans are interpreted by nuclear medicine physicians without general radiology training, the PET scans at MSR are interpreted by physicians boarded by both the American Board of Radiology as well as the American Board of Nuclear medicine. Our PET

center also has the distinction of having performed the first PET scan in Queens.



Figure 1

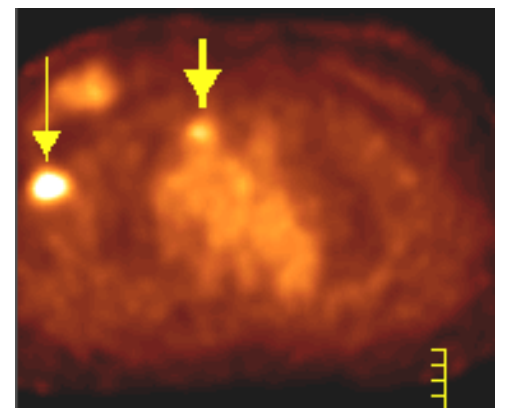


Figure 2

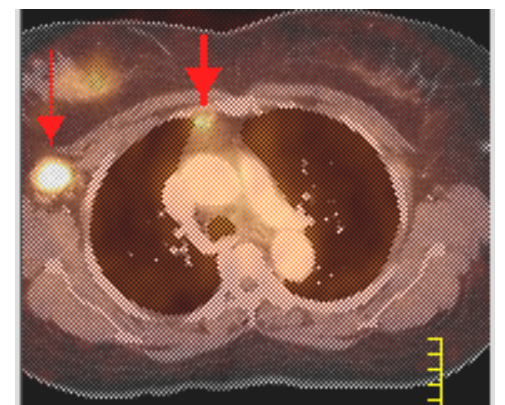


Figure 3

(Case prepared by Jac Scheiner, M.D.)