



High Resolution Positron Emission Mammography: Utility in Presurgical Planning for Breast Cancer Patients.

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INTRODUCTION: Positron emission mammography (PEM) is a high resolution functional imaging tool that has high accuracy in detecting breast cancer including non-invasive breast cancers. The purpose of the current study was to determine the performance characteristics of PEM and study the role of PEM in pre-surgical planning in women with breast cancer.

METHODS: A prospective IRB approved study was performed at our site with accruing women over 18 years of age with histologically proven breast cancer. Subjects were injected with 10-12mCi of FDG and imaged with gentle compression 60 minutes post injection. Bilateral views were acquired for 10 minutes per view. Standardized PEM Uptake Values (PUVs) were measured for lesions and background for all patients. To date, 73 patients have completed both PEM and MRI imaging studies and therapeutic surgery. The images were reviewed by the site radiologists with final surgical histopathology as the gold standard.

RESULTS: Of the total of 80 lesions were identified as invasive or in-situ breast cancers in 73 patients, PEM identified 71 as suspicious for malignancy. Out of the nine cases where PEM did not identify the cancer lesion, six were outside the field of view due to poor patient positioning. Of the 7 lesions that were pathology proven as benign, PEM correctly identified six as negative. PEM depicted all three cases of atypical ductal hyperplasia. In 21 out of 73 patients, the site radiologists felt that PEM changed surgical management. The mean tumor to background PUV ratio for invasive tumors were 6.1(range 2.1-16.8) while that of the DCIS was 4.4 (range 1.3-23.5).

CONCLUSION: PEM provides functional information which demonstrates high sensitivity and specificity with fewer additional preoperative biopsies. Lesion to background ratio provides quantitative information which gives the physician the ability to suspect severity of the identified pathology. Continued evaluation will be necessary to determine the ultimate role of PEM in breast cancer detection.