Comparison of $^{18}$FDG-PET with $^{99m}$Tc-HMDP scintigraphy for the detection of bone metastases in patients with breast cancer

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Objective: Bone is one of the most common sites of metastasis in breast cancer patients. Although bone scintigraphy is widely used to detect metastatic breast cancer, the usefulness of $^{18}$FDG-PET for detecting bone metastasis has not been clearly evaluated. The purpose of this study was to compare the diagnostic accuracy of $^{18}$FDG-PET with bone scintigraphy in detecting bone metastasis in breast cancer patients.

Methods: Forty-four women aged 35 to 81 years (mean, 56 years) with breast cancer were examined in this study. Both $^{18}$FDG-PET and bone scintigraphy were performed for each patient with 0–69 day intervals (mean, 11.5 days). The results of each image interpretation were compared retrospectively. Whole-body bones were classified into 9 anatomical regions. Metastases were confirmed at 45/187 regions in 14 patients by bone biopsy or clinical follow-up including other imaging techniques for a period of at least 6 months afterwards.

Results: On a region basis, the sensitivity, specificity, and accuracy of $^{18}$FDG-PET were 84%, 99% and 95%, respectively. Although these results were comparable to those of bone scintigraphy, the combination of $^{18}$FDG-PET and bone scintigraphy improved the sensitivity (98%) and accuracy (97%) of detection. False negative lesions of bone scintigraphy were mostly bone marrow metastases and those of $^{18}$FDG-PET were mostly osteoblastic metastases. $^{18}$FDG-PET was superior to bone scintigraphy in the detection of osteolytic lesions (92% vs. 73%), but inferior in the detection of osteoblastic lesions (74% vs. 95%).

Conclusions: This study shows that $^{18}$FDG-PET tends to be superior to bone scintigraphy in the detection of osteolytic lesions, but inferior in the detection of osteoblastic lesions. $^{18}$FDG-PET should play a complementary role in detecting bone metastasis with bone scintigraphy.

Key words: $^{18}$FDG-PET, bone scintigraphy, bone metastasis, breast cancer