

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

Koichiro ABE,* Masayuki SASAKI,** Yasuo KUWABARA,* Hirofumi KOGA,* Shingo BABA,*
Kazutaka HAYASHI,* Naoki TAKAHASHI* and Hiroshi HONDA*

*Department of Clinical Radiology, Graduate School of Medical Sciences and

**Department of Health Sciences, School of Medicine, Kyushu University

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}F FDG-PET for detecting bone metastasis has not been clearly evaluated. The purpose of this study was to compare the diagnostic accuracy of ^{18}F 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}F 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}F FDG-PET were 84%, 99% and 95%, respectively. Although these results were comparable to those of bone scintigraphy, the combination of ^{18}F 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}F FDG-PET were mostly osteoblastic metastases. ^{18}F 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}F FDG-PET tends to be superior to bone scintigraphy in the detection of osteolytic lesions, but inferior in the detection of osteoblastic lesions. ^{18}F FDG-PET should play a complementary role in detecting bone metastasis with bone scintigraphy.

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